ANVIL®
INTERNATIONAL
Building Connections That Last

October 2012

For the most current product/pricing information on Anvil products, please visit our website at www.anvilintl.com.

GRUVLOK®

Mechanical Piping Products

BUILDING CONNECTIONS THAT LAST

GRUVLOK · SPF/ANVIL · Catawissa · ANVIL EPS · JBS · CANVIL · MERIT · BECK · ANVIL-STRUT · SEMINOLE Tubular Products · North Alabama Pipe

BUILDING CONNECTIONS THAT LAST

For over 150 years, Anvil has worked diligently to build a strong, vibrant tradition of making connections — pipe to pipe and people to people.

We pride ourselves in providing the finest-quality pipe products and services with integrity and dedication to superior customer service at all levels.

We provide expertise and product solutions for a wide range of applications, from plumbing, mechanical, HVAC, industrial and fire protection to mining, oil and gas. Our comprehensive line of products includes: grooved pipe couplings, grooved and plain-end fittings, valves, cast and malleable iron fittings, forged steel fittings, steel pipe nipples and couplings, pipe hangers and supports, channel and strut fittings, mining and oil field fittings, along with much more.

As an additional benefit to our customers, Anvil offers a complete and comprehensive Design Services Analysis for mechanical equipment rooms, to help you determine the most effective and cost-efficient piping solutions.

At Anvil, we believe that responsive and accessible customer support is what makes the difference between simply delivering products — and delivering solutions.

GRUVLOK®

Mechanical Piping Products

Durable. Flexible. Safe. Easy to install. Easy to maintain. That's Anvil's Gruvlok® product line. Gruvlok gives your building the toughest, simplest, and most adaptable piping system possible.

Through a combination of roll-grooving and two-bolt coupling design, this innovative product line joins piping and other components into a single rugged yet flexible system. This makes Gruvlok products ideal for a variety of applications — particularly in tight spaces such as subfloors, UFAD systems, crawlspaces, trenches, and tunnels.

Gruvlok products eliminate the need for traditional expansion joints, allowing your system to expand and contract with your needs. With a Gruvlok union at every joint, you have the freedom to make on-site tweaks without altering the overall design of your system.

Maintenance is as simple and flexible as installation. Every component in a Gruvlok system is easily replaceable and easily accessed, so that you can make repairs without resorting to a total shut-down.

New 3-D CAD Library

Anvil's Gruvlok product line is now available in 3-D CAD Models, as well as the standard 2-D drawings, at www.anvilintl.com. Anvil also offers downloadable Master Format 3 Part Specifications.

Building Green with Anvil

Anvil manufactures an extensive line of products composed of 90% recycled materials, visit www.anvilintl.com for current certificates related to recycled material. Anvil is a member of the United States Green Building Council.

Products include:

- Gruvlok® Couplings, Fittings, and Flanges
- Anvil® Cast and Malleable Threaded Fittings
- Anvil Cast Iron Flanged Fittings
- Anvil Pipe Hangers and Supports
- Merit® Tee-Lets and Drop Nipples
- Beck Welded Pipe Nipples

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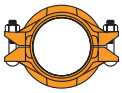
Rigidlok® Coupling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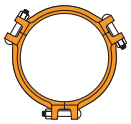
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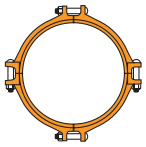
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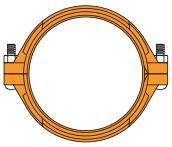

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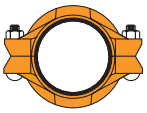

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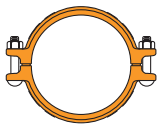

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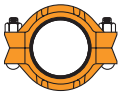
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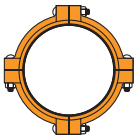
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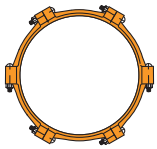
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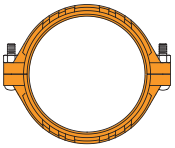

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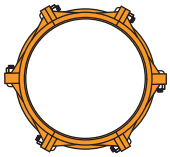

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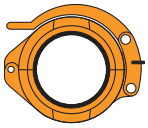

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Size Range: 2" x 1½" thru
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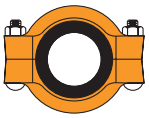

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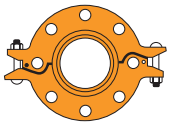
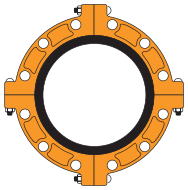

Size Range: 2" - 12"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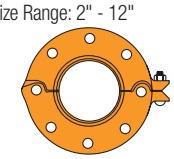

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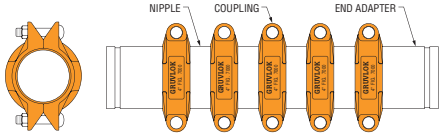

BRANCH OUTLETS

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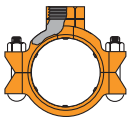
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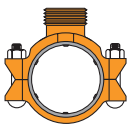
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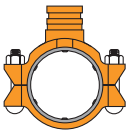
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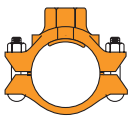
Clamp-T, FPT Branch
Size Range: 3" x 1¼" thru
8" x 4"


(U-Bolt)
Size Range: 2½" x ½" thru
4" x 1"

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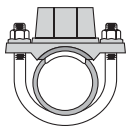
Branch Outlet
Size Range: 1¼" x ½" thru
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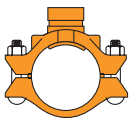
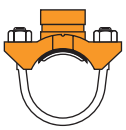

Clamp-T, Grooved Branch
Size Range: 3" x 1¼" thru
8" x 4"


(U-Bolt)
Size Range: 2½" x 1¼" thru
2½" x 1½"

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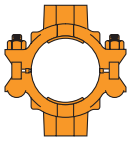
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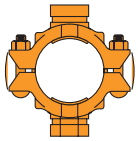
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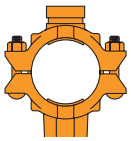
Fig. 7049
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GROOVED FITTINGS

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90˚ Elbow
Size Range: 1" - 24"

Fig. 7051 *Page 52*
45˚ Elbow
Size Range: 1" - 24"

Fig. 7052 *Page 52*
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Size Range: 1" - 24"

Fig. 7052i *Page 52*
22½˚ Elbow
Size Range: 1" - 12"

Fig. 7053 *Page 53*
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Size Range: 1" - 24"

Fig. 7050LR *Page 53*
90˚ Long Radius Elbow
Size Range: 1" - 24"

Fig. 7051LR *Page 53*
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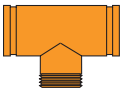

Fig. 7061 *Page 54*
Reducing Tee Standard
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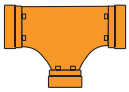

Fig. 7064 *Page 55*
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Fig. 7060 *Page 55*
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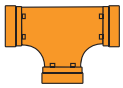
Size Range: 1" - 24"



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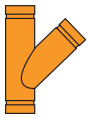

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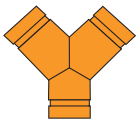

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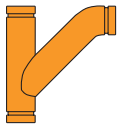

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Size Range: 1" - 6"

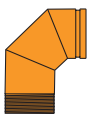

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Fig. 7084 *Page 62*
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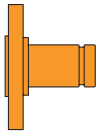

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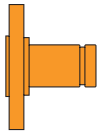
Size Range: 3" - 8"



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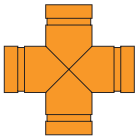
Size Range: 1" - 24"



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Bullhead Tee Specialty Tees (Gr x Gr x FPT)
Size Range: 5" x 5" x 8" thru 6" x 6" x 8"

Fig. 7050DR *Page 65*
90˚ Drain Elbow
Size Range: 1¼" - 12"

GROOVED FITTINGS

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Nipples
Size Range: 1" - 12"

Fig. 7080
Groove x Groove

Fig. 7081
Groove x MPT

Fig. 7082
Groove x Bevel

Fig. 7450 *Page 66*
90˚ Short Pattern Elbow
Size Range: 2" - 8"

Fig. 7460 *Page 66*
Short Pattern Tee
Size Range: 2" - 8"

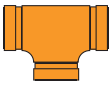


Fig. 7050-3D *Page 67*
Long Radius Elbows
Size Range: 2" - 24"

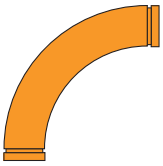


Fig. 7050-3D
90˚ Elbow

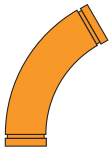


Fig. 7057-3D
60˚ Elbow

Fig. 7051-3D
45˚ Elbow

Fig. 7058-3D
30˚ Elbow

Fig. 7052-3D
22½˚ Elbow

Fig. 7053-3D
11¼˚ Elbow

Fig. 7050-5D *Page 68*
Long Radius Elbows
Size Range: 2" - 24"

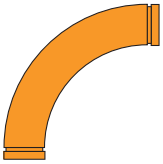


Fig. 7050-5D
90˚ Elbow

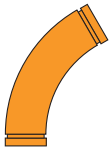


Fig. 7057-5D
60˚ Elbow

Fig. 7051-5D
45˚ Elbow

Fig. 7058-5D
30˚ Elbow

Fig. 7052-5D
22½˚ Elbow

Fig. 7053-5D
11¼˚ Elbow

Fig. 7050-6D *Page 69*
Long Radius Elbows
Size Range: 2" - 24"

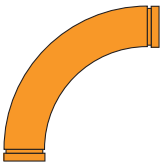


Fig. 7050-6D
90˚ Elbow

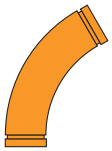


Fig. 7057-6D
60˚ Elbow

Fig. 7051-6D
45˚ Elbow

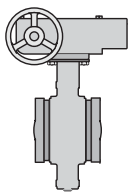
Fig. 7058-6D
30˚ Elbow

Fig. 7052-6D
22½˚ Elbow

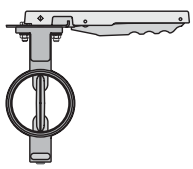
Fig. 7053-6D
11¼˚ Elbow

VALVES & ACCESSORIES

Series 7700 *Pages 70-74*
Butterfly Valve
Size Range: 2" - 12"

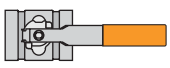


AN-7722-3
Series 7700
Butterfly Valve
with Gear Operator

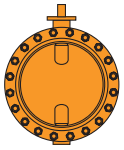


AN-7721-3
Series 7700
Butterfly Valve
with 10 Position Lever Lock

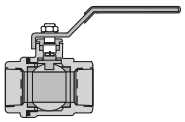
Series 7600 *Page 75*
Butterfly Valve
Size Range: 2" - 6"



Series 8000GR *Pages 76-78*
Butterfly Valve
Size Range: 14" - 24"



Series 171 & 1715 *Pages 79-80*
Brass Ball Valve
171N – Size Range: ¼" - 4"
1715 – Size Range: ½" - 4"



Series 7500 *Pages 81-82*
Ball Valve
Size Range: 2" - 6"

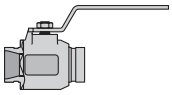
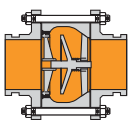
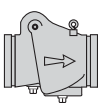


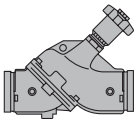
Fig. 400G *Page 83*
Grooved-End
Silent Check Valve
Size Range: 2" - 10"



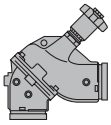
Series 7800 *Pages 84-86*
Check Valve
for use in Grooved-End
Piping Systems
Size Range: 2" - 12"



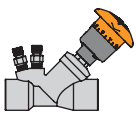
GBV-G *Page 87*
Balancing Valve
Ductile Iron, Grooved-End Straight
Size Range: 2½" - 12"



GBV-A *Page 88*
Balancing Valve
Ductile Iron, Grooved-End Angle
Size Range: 2½" - 12"

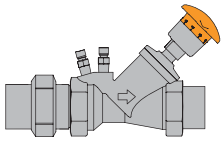


GBV-S & GBV-T *Page 89*
Globe Valves
Cast Bronze, Solder (GBV-S)
Cast Bronze, Threaded (GBV-T)
Size Range: ½" - 2"

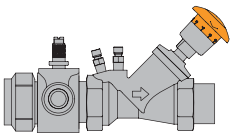


VALVES & ACCESSORIES

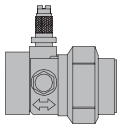
KNX Model CU *Pages 90-94*
CBV Union
Size Range: 1/2" - 2"



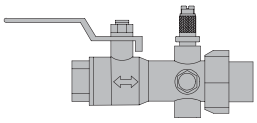
KNX Model CA *Pages 90-94*
CBV Accessory
Size Range: 1/2" - 2"



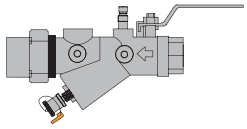
KNX Model AU *Pages 90-92, 95*
Accessory Union
Size Range: 1/2" - 2"



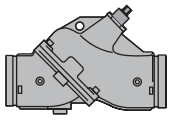
KNX Model UV *Pages 90-92, 96*
Integral Ball Valve Union
Size Range: 1/2" - 2"



KNX Model SV *Pages 90-92, 97*
Integral Ball Valve Strainer
Size Range: 1/2" - 2"



FTV-S *Pages 99-100*
Tri-Service Valve (Straight)
Size Range: 2 1/2" - 12"



FTV-A *Pages 99-100*
Tri-Service Valve
(Angle Body)
Size Range: 2 1/2" - 12"

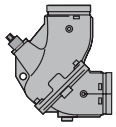
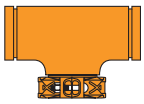
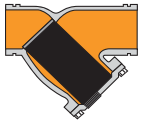


Fig. 7260 *Pages 101-102*
Gruvlok Tee Strainer
Size Range: 2" - 18"



Model 758G *Page 103*
Grooved-End
"Wye" Strainer
Size Range: 2" - 12"



Model 768G *Page 104*
Grooved-End
"Wye" Strainer
Size Range: 2" - 12"

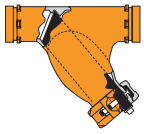
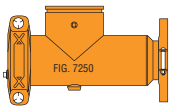
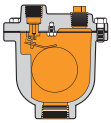


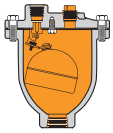
Fig. 7250 *Pages 105-106*
Suction Diffuser
Size Range: 2 1/2" x 2 1/2"
thru 16" x 14"



Model GAV-15
Page 107
Automatic Air Vent
for Ultimate Performance
Size Range: 1/2" - 1"



Model GAV-30
Page 108
Automatic Air Vent
for Ultimate Performance
Size Range: 1/2" - 3/4"



AnvilFlex™ AF21 Series *Pages 109-112*
Flex Connectors
Size Range: 2" - 12"

Fig. AF21-GG
Grooved Ends

Fig. AF21-GF
Grooved x Class
150 Flanged

Fig. AF21-FF
Class 150 Flanged x
Class 150 Flanged

Fig. AF21-RFF
Reducing Class 150
Flanged x
Class 150 Flanged

Fig. AF21-RGF
Reducing Grooved x
Class 150 Flanged

HIGH PRESSURE SYSTEMS

Fig. 7050 EG *Page 118*
High Pressure 90° LR Elbow
Size Range: 2" - 12"

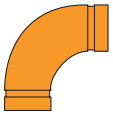


Fig. 7051 EG *Page 118*
High Pressure 45° LR Elbow
Size Range: 2" - 6"

Fig. 7662 EG *Page 119*
High Pressure Header Tee
Size: 2"

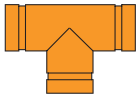


Fig. 7060 EG *Page 119*
High Pressure Tee
Size Range: 2" - 6"

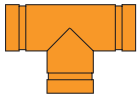


Fig. 7068 EG *Page 119*
High Pressure Cross
Size Range: 2" - 6"

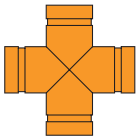


Fig. 7004
Pages 114-115
Coupling
Size Range: 2" - 12"

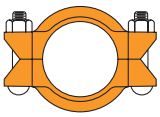
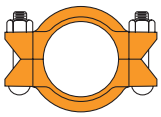


Fig. 7004 with EG® Gasket
Pages 116-117
Coupling with EG Gasket
Size Range: 2" - 12"



CTS COPPER SYSTEM

Fig. 6400 *Page 121*
Rigid Coupling
Size Range: 2" - 8"

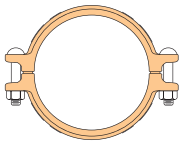


Fig. 6050 *Page 122*
90˚ Elbow
Size Range: 2" - 8"

Fig. 6051 *Page 122*
45˚ Elbow
Size Range: 2" - 8"

Fig. 6060 *Page 122*
Tee
Size Range: 2" - 8"

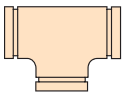


Fig. 6061 *Page 123*
Reducing Tee (Gr x Gr x Gr)
Size Range: 2½" x 2½" x 2" thru 6" x 6" x 5"

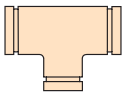


Fig. 6064 *Page 123*
Reducing Tee (Gr x Gr x Cup)
Size Range: 2" x 2" x ¾" thru 4" x 4" x 1½"

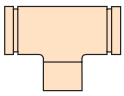


Fig. 6074 *Page 122*
End Cap
Size Range: 2" - 6"

Fig. 6072 *Page 124*
Concentric Reducer (Gr x Gr)
Size Range: 2½"x 2" thru 8" x 6"

Fig. 6075 *Page 124*
Reducing Adapter (Gr x Cup)
Size Range: 2" x 1" thru 4" x 2"

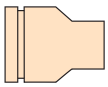
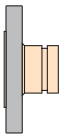
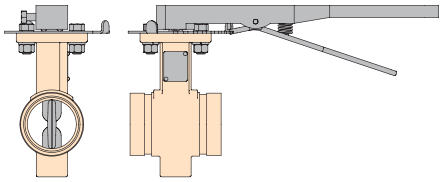


Fig. 6084 *Page 124*
Flange Adapter
Size Range: 2" - 6"



Series 6700 CTS Copper Butterfly Valve *Pages 125-126*
Size Range: 2½" - 6"



DI-LOK® NIPPLE

Fig. 7091 *Page 127*
Gruvlok DI-LOK® Nipple Di-Electric Pipe Connection
CTS Groove x IPS Groove
Size Range: ¾" - 6"

HDPE COUPLINGS

Fig. 7305 *Pages 133-134*
HDPE Coupling
Size Range: 2" - 12"

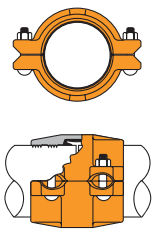


Fig. 7307 *Pages 135-136*
HDPE Transition Coupling
Size Range: 2" - 12"

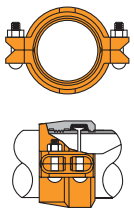
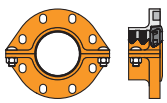


Fig. 7312 *Pages 137-138*
HDPE Flange Adapter
Size Range: 4" - 8"



PLAIN-END FITTINGS

Fig. 7005 *Page 128*
Roughneck® Coupling
Size Range: 2" - 16"

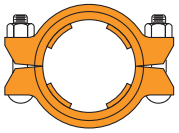


Fig. 7050P, Fig. 7051P & Fig. 7060P *Page 129*
Gruvlok Plain-End Fittings
Size Range: 2" - 8"


Fig. 7050P
90˚ Elbow


Fig. 7051P
45˚ Elbow

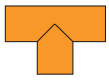


Fig. 7060P
Tee

Fig. 7061P *Page 130*
Reducing Tee
Size Range: 3" x 3" x 2" thru 12" x 12" x 10"

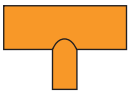


Fig. 7080P, Fig. 7081P & Fig. 7082P *Page 132*
Adapter Nipples
Size Range: 2" - 8"


Fig. 7080P
Plain x Groove


Fig. 7081P
Plain x Thread


Fig. 7082P
Plain x Bevel

Fig. 7050LRP *Page 130*
90˚ LR Elbow
Size Range: 2" - 8"

Fig. 7051LRP *Page 131*
45˚ LR Elbow
Size Range: 2" - 8"

Fig. 7071P *Page 130*
90˚ True Wye
Size Range: 2" - 8"

Fig. 7068P *Page 130*
Cross
Size Range: 2" - 8"

Fig. 7069P *Page 130*
45˚ Lateral
Size Range: 2" - 8"

Fig. 7077P *Page 132*
Swaged Nipple
Size Range: 2½" x 2" thru 8" x 6"

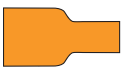
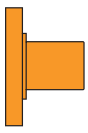


Fig. 7075P *Page 131*
Bull Plug
Size Range: 2" - 8"

Fig. 7084P & Fig. 7085P *Page 131*
Flange Nipples
Plain-End x Class 150
Size Range: 2" - 8"
Plain-End x Class 300
Size Range: 2" - 8"



SOCK-IT® METHOD

Fig. 7100 *Page 139*
90˚ Elbow
(Sock-It x Sock-It)
Size Range: 1" - 2"

Fig. 7101 *Page 140*
90˚ Reducing Elbow
(Sock-It x NPT)
Size Range: 1" x 1/2" thru 1 1/2" x 1"

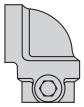


Fig. 7103 *Page 140*
Straight Tee
(Sock-It x Sock-It x Sock-It)
Size Range: 1" - 2"

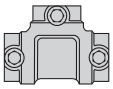


Fig. 7105 *Page 141*
Reducing Outlet Tee
(Sock-It x Sock-It x NPT)
Size Range: 1" x 1" x 1/2" thru 2 1/2 x 2 1/2 x 1"

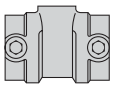


Fig. 7106 *Page 141*
Reducing Tee
(Sock-It x Sock-It x NPT)
Size Range: 1 1/4" x 1" x 1/2" thru 2 x 1 1/2 x 1"

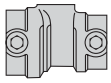
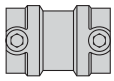


Fig. 7107 *Page 140*
Coupling
(Sock-It x Sock-It)
Size Range: 1" - 2"



STAINLESS STEEL METHOD

SS TYPE 304 FITTINGS

Fig. 7074-SS04 *Page 144*
Stainless Steel Cap
Size Range: 1 1/4" - 12"

Fig. 7050-SS04 *Page 144*
90˚ Stainless Steel Elbow
Size Range: 1 1/4" - 12"

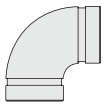


Fig. 7051-SS04 *Page 144*
45˚ Stainless Steel Elbow
Size Range: 1 1/4" - 12"

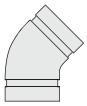


Fig. 7060-SS04 *Page 144*
Stainless Steel Tee
Size Range: 1 1/4" - 12"

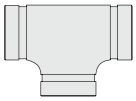


Fig. 7061-SS04 *Page 145*
Stainless Steel Reducing Tee
Size Range: 1 1/2" x 1 1/4" thru 12" x 10"

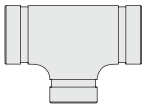


Fig. 7072-SS04 *Page 145*
Stainless Steel Concentric Reducer
Size Range: 1 1/2" x 1 1/4" thru 12" x 10"

SS TYPE 316 FITTINGS

Fig. 7074SS *Page 146*
Stainless Steel Cap
Size Range: 1 1/4" - 12"

Fig. 7050SS *Page 146*
90˚ Stainless Steel Elbow
Size Range: 1 1/4" - 12"

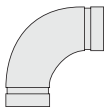


Fig. 7051SS *Page 146*
45˚ Stainless Steel Elbow
Size Range: 1 1/4" - 12"

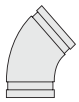


Fig. 7060SS *Page 146*
Stainless Steel Tee
Size Range: 1 1/4" - 12"

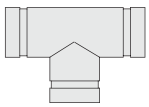


Fig. 7061SS *Page 147*
Stainless Steel Reducing Tee
Size Range: 1 1/2" x 1 1/2" x 3/4" thru 8" x 8" x 6"

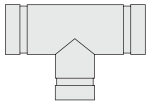


Fig. 7072SS *Page 147*
Stainless Steel Concentric Reducer
Size Range: 1 1/2" x 1" thru 8" x 6"

Fig. 7073SS *Page 147*
Stainless Steel Eccentric Reducer
Size Range: 1 1/2" x 1" thru 8" x 6"

Fig. 7084SS *Page 147*
Stainless Steel Flange Adapter
Size Range: 2" - 12"

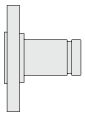
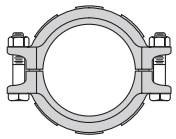


Fig. 7400SS *Page 142*
Rigidlite® Coupling
Size Range: 1 1/4" - 8"



ROLL GROOVERS

Gruvlok roll grooving technology is protected by
U.S. Patents 5450738, 5570603, 5778715 and others pending.

Model 1007 *Pages 148-149*

Roll Groover
Groover Capability: 2" - 16"

Model 3007 *Pages 148-149*

Roll Groover
Groover Capability: 2" - 16"

Model 3006 *Pages 150-151*

Roll Groover
Groover Capability: 2" - 12"

PRODUCTS FOR GROOVED PIPING SYSTEM

The Gruvlok® System has been manufactured since the late 1960's. The Gruvlok product line has grown from standard couplings and fittings to today's extensive range of grooved product, plain-end product, butterfly valves, check valves, pump protection components, pipe preparation tools and various accessories.

Gruvlok is part of our overall commitment to provide today's piping industry with tomorrow's products.

c UL us LISTED
FM APPROVED
LPCB
VdS
UPC FOUNDED 1926 IAPMO®
DNV
U.S. GREEN BUILDING COUNCIL MEMBER
Certified to ANSI/NSF 61

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

ISO 9001:2008

INDUSTRY & GOVERNMENT STANDARDS & APPROVALS

ANSI	American National Standards Institute
API	American Petroleum Institute: API Std. 5L, Sect. 7.5
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers: Power Piping, B 31.1; Chemical Plant and Petroleum Refinery Piping, B 31.3; Refrigeration Piping, B 31.5; Building Services Piping, B 31.9; Slurry Pipelines, B 31.11
ASTM	American Society of Testing and Materials: F 1476, F 1387
AWWA	American Water Works Association: C 606
BV	Bureau Veritas
CDF	California State Fire Marshal
COE	Corps of Engineers: CEGS 15000
CSA	Canadian Standards Association: B 242
DNV	Det Norske Veritas
	Hong Kong Fire Services Board
	New Zealand Insurance Council
	New Zealand Building Act. (1991)
FAA	Federal Aviation Administration: HVAC, Plumbing, Fire Protection
FHA	Federal Housing Administration
FM	Factory Mutual Engineering Corp.
GSA	General Services Administration: 15000 Series
IAPMO	International Association of Plumbing & Mechanical Officials
LPC	Loss Prevention Council
MEA	Materials & Equipment Acceptance
MIL	Military Specifications: MILP-10388 Fittings; MIL-C-10387 Couplings; MIL-P-11087A(CE) Steel Pipe, Grooved MIL-I-45208 Inspection Procedure
NASA	National Aeronautics and Space Administration: 15000 Series
NAVFAC	Naval Facilities Engineering Command: NFGS 15000 Series
NFPA	National Fire Protection Association
NIH	National Institute of Health (Dept. of Health): 15000 Series
NSF	NSF International
NY-BSA	New York Board of Standards and Appeals
NYC	New York City
TVA	Tennessee Valley Authority: Fire protection, storm drains
UL	Underwriter's Laboratories, Inc.
ULC	Underwriter's Laboratories of Canada
	Bureau of Marine Inspection: Salt and fresh water, oil transfer
	Bureau of Public Roads; Div. of Bridges: Drain lines and bridge crossings
	Canadian Coast Guard
	U.S. Coast Guard –Approves each vessel individually
USGBC	United States Green Building Council
VA	Veterans Affairs : 15000 Series
VdS	Verband der Sachversicherer e.V.

Note: Please refer to product specific pages for exact listings and approvals related to a specific size for a specific product.

GRUVLOK® – THE ENGINEERED COUPLING

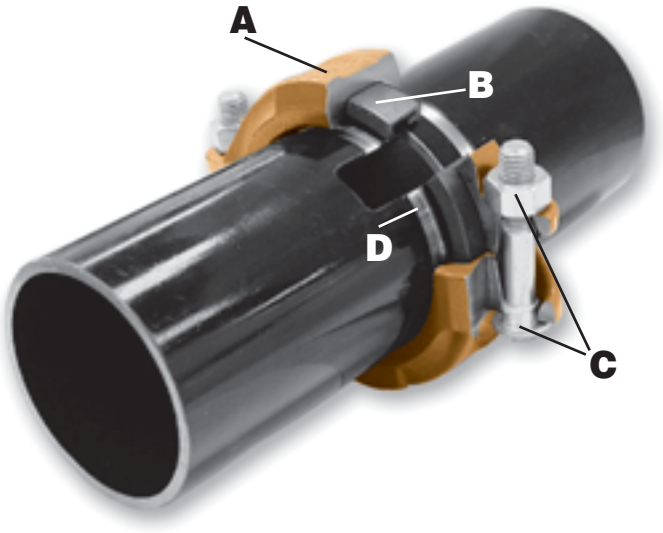
HOUSING (A) FLEXIBLE OR RIGID

The Gruvlok Coupling housing is designed to self-center around the pipe. The housing encircles and retains the gasket against the application of internal system pressure or vacuum.

The housing key sections fit into and engage the pipe-end grooves around the entire pipe circumference, thus restraining the pipe ends from separation due to the application of internal pressure.

Flexible Couplings provide designed-in clearances between the housing key sections and the pipe grooves to permit both angular and longitudinal movement of the pipe. Rigid couplings grip the pipe and lock the joint into position.

All housings are coated with paint for general service applications. The paint serves to provide protection against normal atmospheric corrosion. However, for couplings used in corrosive environments, hot-dip galvanizing, and stainless steel are available.

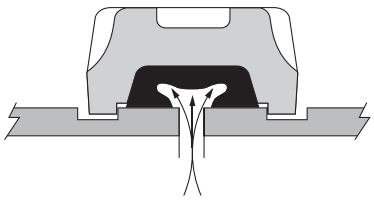


GASKET (B)

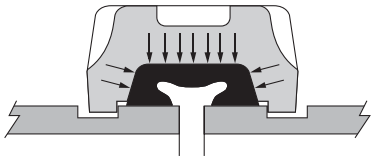
The unique single piece "C" style design of the gasket has been engineered to provide a pressure responsive, leak-tight seal in both pressure and vacuum applications without the aid of external forces. The "lips" of the gasket are molded so that upon installation onto the pipe ends they provide compression against the pipe surface to establish the leak-tight seal.

The gasket cavity functions as a "pressure reservoir". Pressure within the pipe system is applied to the internal surfaces of the gasket which increases the sealing force and enhances the leak-tight seal. In vacuum systems, non-pressure-responsive seals tend to "lift off" the pipe, producing leak paths. However, the Gruvlok gasket reacts to the negative pressure (higher outside atmospheric pressure) as to improve the sealing capability of the gasket.

Gasket Reaction to Pressure



Gasket Reaction to Vacuum



BOLTS AND NUTS (C)

Heat treated oval neck track head bolts serve to connect and secure the housing segments together. The oval neck design prevents turning of the bolt while tightening the hex nut with a single wrench. The bolt size and corresponding wrench (or socket) size for the hex nuts are shown in the chart below.

ANSI

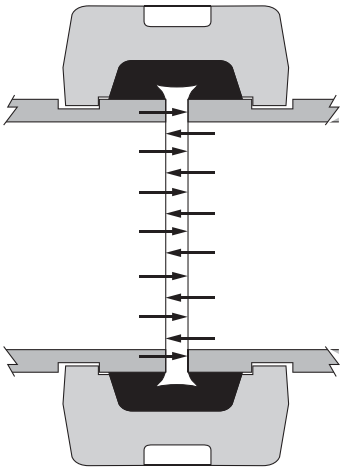
Bolt Size	3/8	1/2	5/8	3/4	7/8	1	1 1/4
Wrench Size	11/16	7/8	1 1/16	1 1/4	1 7/16	1 5/8	2

METRIC

Bolt Size	M10	M12	M16	M20	M22
Wrench Size	16	22	24	30	34

GROOVED PIPE ENDS (D)

The ends of the pipe must have a groove in them which may be either cut grooved or roll grooved. The grooved pipe ends engage the coupling keys, thus, providing a self-restraining, mechanical joint capable of resisting the separation of the pipe ends due to the application of system pressure. The groove diameters must be dimensionally accurate to obtain the maximum benefit of the Gruvlok Coupling.



THE GRUVLOK® PIPING METHOD

Gruvlok couplings and grooved-end fittings are widely used for joining pipe in a wide variety of piping systems. Gruvlok couplings for grooved-end pipe are designed to provide a self-centering joint which accommodates the application of pressure, vacuum and other external forces, while limiting the burdensome need for special supports, expansion joints, etc.

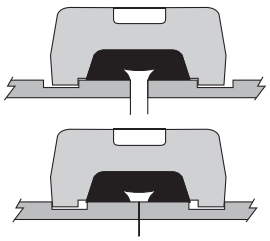
The Gruvlok piping method offers many mechanical design features which benefit the design engineer, the contractor, and the end user. Utilization of the functional characteristics of the Gruvlok coupling will aid in pipe system design and must be considered for proper installation, assembly and performance.

The design factors presented in the Gruvlok technical data section should always be referenced to when designing any grooved piping system to obtain the maximum benefit of the Gruvlok piping method.

GRUVLOK FEATURES

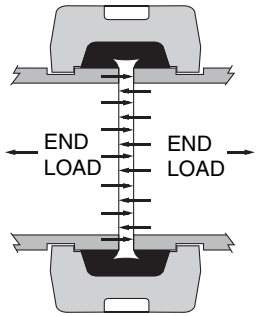
RIGIDITY OR FLEXIBILITY

Couplings are available where rigid connections are required. Couplings with flexible design allow for pipe expansion and contractions with temperature changes. The need for an expansion joint is minimized or eliminated.



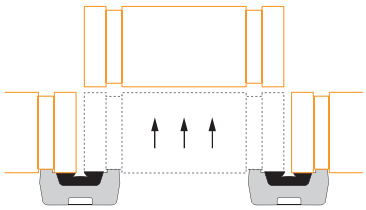
SELF RESTRAINED JOINT

The couplings engage the pipe around the entire circumference and restrain the pipe ends from separation due to pressure and other forces, up to the maximum coupling rated working pressure.



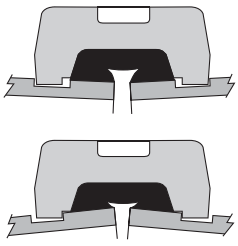
UNION AT EVERY JOINT

Gruvlok couplings can be disassembled easily permitting maintenance and servicing of the piping system. It will facilitate periodic rotation of pipe to distribute internal wear from slurries or other abrasive media.



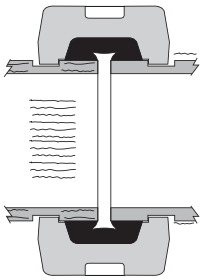
STRESS-FREE SYSTEM

Flexibility designed in the Gruvlok coupling absorbs and eliminates stress from settlement of buried pipe or those induced by seismic tremors.



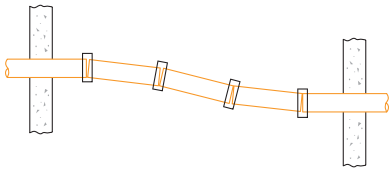
MINIMIZES NOISE & VIBRATION

The resilient elastomeric gasket and pre-designed gap of the Gruvlok coupling help isolate and absorb noise and vibration, this minimizes vibration transmission.



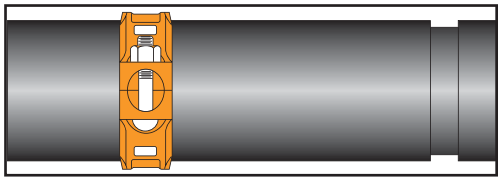
ACCOMMODATES MISALIGNMENT AND JOINT DEFLECTION

The flexibility designed into the Gruvlok coupling will accommodate misalignments caused by imprecise location of pipe opening through walls and floors, will provide pitch for drainage piping systems and facilitate laying pipe on uneven terrain, thus permitting deflection in any direction.



GRUVLOK® COUPLINGS FOR GROOVED-END PIPE

Gruvlok couplings for grooved-end pipe are available in nominal pipe sizes 1" thru 30" and metric sizes. The variety of coupling designs provide a universal means for the connection of pipe, fittings and pipe system components. The wide assortment of Gruvlok couplings and gaskets permit selection of the most suitable combination for a specific application, thus providing the most versatile and economical pipe system installation.



MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12 or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:
Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

GRADE "E" EPDM (Green color code) NSF-61 Certified
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

GRADE "EP" EPDM (Green/Red color code) NSF-61 Certified
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)
20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants

Grade "L" Silicone (Red color code)
-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services

GASKET TYPE:
Standard C Style
Flush Gap (1" - 24") (25mm - 600mm)

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

WORKING PRESSURE, END LOAD, PIPE END SEPARATION & DEFLECTION FROM CENTER LINE:
Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

COUPLING DATA CHART NOTES

COUPLING DATA CHART NOTES														
Nominal Size	O.D.	Max. Work. Pressure	Max. End Load	Range of Pipe End Separation	Deflection from ℄		Coupling Dimensions			Coupling Bolts		Specified Torque		Approx. Wt. Ea.
					Per Coupling	of Pipe	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*Degrees(°)-Minutes(')*	*In./ft-mm/m*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs/N-m*		*Lbs./kg*
1	2	3	4	5	6		7			8		9		10

1 Gruvlok Couplings are identified by either the nominal ANSI pipe size in inches or pipe O.D. in millimeters (see column 2).

2 Nominal Outside Diameter of Pipe.

3 Maximum line pressure, including surge, to which a joint can be subjected. Working pressure ratings are based on standard wall steel pipe with standard cut or roll grooves in accordance with Gruvlok specifications. For Performance Data on other than standard wall pipe, refer to Technical data section. **NOTE: For one time field test only the maximum joint working pressure may be increased to 1.5 times the figure shown.**

4 Maximum end load from all interior and/or exterior forces to which the joint can be subjected are based on standard wall steel pipe with standard cut or roll grooves in accordance with Gruvlok specifications.

5 Range of pipe end separation for roll grooved pipe, Double values shown when using cut groove pipe; see page 190 for details.

6 Maximum allowable angular deflection values from centerline when using standard roll grooved pipe; Double values shown when using cut groove pipe; see page 190 for details.

7 "X", "Y", and "Z" are external dimensions for reference purposes only.

8 The quantity of bolts per coupling.

9 Nuts must be tightened alternating and evenly to the specified bolt torque. See individual product installation instructions for additional important information.

10 Approximate weight for a fully assembled coupling with gasket, bolts, and nuts.

FIG. 7401

Rigidlok® Coupling

c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

The Fig. 7401 Rigidlok Coupling from Gruvlok provides a rigid pipe connection. Rigidity is attained simply; it is designed in.

The Fig. 7401 Rigidlok coupling utilizes a technologically advanced housing design that conforms to and grips the pipe. With the Fig. 7401 there emerges a new generation of rigid couplings.

Coupling installation is fast and easy, remove only one nut and swing the housing over the gasket and into the grooves. The exclusive Guidelok® feature automatically separates the grooved pipe ends and guides the coupling into position as the bolts are tightened. Precisely sized and oriented tines in the housing key section firmly grip the pipe. The combination of these designed in features produce a secure, rigid pipe joint connection.

This coupling is an ideal connector for service and applications that require a rigid connection.

The Fig. 7401 Rigidlok Coupling is designed for use with roll grooved or cut grooved standard weight and roll grooved lightweight pipe, as well as with grooved-end fittings and valves. The Rigidlok Coupling maintains a rigid connection with support and hanging in conformance with applicable ANSI B31.1 Power Piping Code, ANSI B31.9 Building Service Pipe Code as well as NFPA 13 sprinkler systems.

The Fig. 7401 Rigidlok Coupling allows for working pressure ratings to 750 psi (51.7 bar) when used on standard wall roll or cut grooved pipe.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)
20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

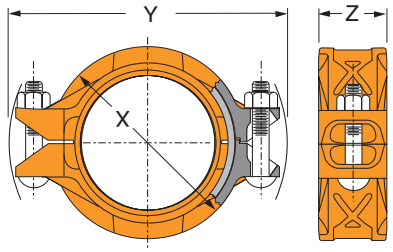
Grade "L" Silicone (Red color code)
-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services. Contact an Anvil Representative for availability.

GASKET TYPE:
C Style (Standard 1" - 12")
Flush Gap (Standard 14" - 24", Available 1" - 12")

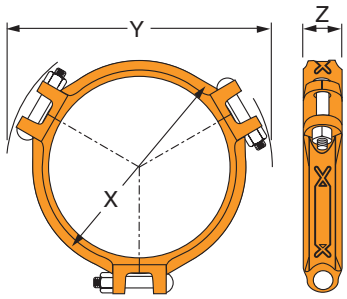
LUBRICATION:
Standard
Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7401

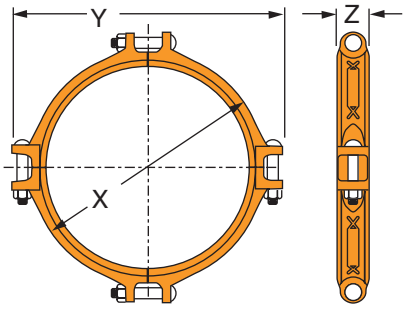
Rigidlok® Coupling



SIZES 1 1/2" - 14"



SIZE 16"



SIZES 18" - 24"

FIGURE 7401 RIGIDLOK COUPLING

Nominal Size	O.D.	Max. Working Pressure	Max. End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts*		Specified Torque §		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs/N-M*		*Lbs./kg*
1½	1.900	750	2,126	0-1/32	3	5⅛	1⅞	2	⅜ x 2¼	30	45	1.8
40	*48.3*	*51.7*	*9.46*	*0-0.79*	*76*	*130*	*48*		*M10 x 57*	*40*	*60*	*0.8*
2	2.375	750	3,323	0-1/32	3½	5⅝	1⅞	2	⅜ x 2½	30	45	2.4
50	*60.3*	*51.7*	*14.78*	*0-0.79*	*89*	*143*	*48*		*M10 x 63*	*40*	*60*	*1.1*
2½	2.875	750	4,869	0-1/32	4	6⅛	1⅞	2	⅜ x 2½	30	45	2.9
65	*73.0*	*51.7*	*21.66*	*0-0.79*	*102*	*156*	*48*		*M10 x 63*	*40*	*60*	*1.3*
3 O.D.	*2.996*	*750*	*5,207*	*0-1/32*	*4⅛*	*6⅛*	*1⅞*	*2*	*⅜ x 2½*	*80*	*100*	*3.4*
76.1	76.1	51.7	23.52	0-0.79	105	156	48		M10 x 63	110	150	1.5
3	3.500	750	7,216	0-1/32	4¾	7¼	1⅞	2	½ x 3	80	100	3.6
80	*88.9*	*51.7*	*32.10*	*0-0.79*	*121*	*184*	*48*		*M12 x 76*	*110*	*150*	*1.6*
4	4.500	750	11,928	0-3/32	5⅞	8⅜	2⅛	2	½ x 3	80	100	5.0
100	*114.3*	*51.7*	*53.06*	*0-2.38*	*149*	*213*	*54*		*M12 x 76*	*110*	*150*	*2.3*
5½ O.D.	*5.500*	*750*	*17,819*	0-3/32	*7*	*9¼*	*2⅛*	*2*	*⅝ x 3½*	*100*	*130*	*6.9*
139.7	139.7	51.7	79.26	*0-2.38*	178	248	54		M16 x 85	135	175	3.1
5	5.563	750	18,229	0-3/32	7	10	2⅛	2	⅝ x 3½	100	130	6.9
125	*141.3*	*51.7*	*81.09*	*0-2.38*	*178*	*254*	*54*		*M16 x 85*	*135*	*175*	*3.1*
6½ O.D.	*6.500*	*750*	*24,887*	*0-3/32*	*8*	*11*	*2⅛*	*2*	*⅝ x 3½*	*100*	*130*	*7.6*
165.1	165.1	51.7	110.70	0-2.38	203	279	54		M16 x 85	135	175	3.4
6	6.625	750	25,854	0-3/32	8⅛	11⅛	2⅛	2	⅝ x 3½	100	130	7.9
150	*168.3*	*51.7*	*115.00*	*0-2.38*	*206*	*283*	*54*		*M16 x 85*	*135*	*175*	*3.6*
8	8.625	600	35,056	0-3/32	10½	14⅛	2⅝	2	¾ x 4½	130	180	15.9
200	*219.1*	*41.4*	*155.94*	*0-2.38*	*267*	*359*	*67*		*M20 x 110*	*175*	*245*	*7.2*
10	10.750	500	45,381	0-3/32	12⅞	17½	2⅝	2	1 x 6	200	250	25.6
250	*273.1*	*34.5*	*201.87*	*0-2.38*	*327*	*445*	*67*		*M24 x 150*	*270*	*340*	*11.6*
12	12.750	400	51,070	0-3/32	15	19½	2⅝	2	⅞ x 6	180	220	30.5
300	*323.9*	*27.6*	*227.17*	*0-2.38*	*381*	*495*	*67*		*M22 x 150*	*245*	*300*	*13.8*
14	14.000	300	46,181	0-3/32	16¼	19¾	3	2	⅞ x 5½	180	220	36.1
350	*355.6*	*20.7*	*205.43*	*0-2.38*	*413*	*502*	*76*		*M22 x 140*	*245*	*300*	*16.4*
16	16.000	300	60,319	0-3/32	18⅛	22¼	3	3	⅞ x 5½	180	220	42.0
400	*406.4*	*20.7*	*268.31*	*0-2.38*	*460*	*565*	*76*		*M22 x 140*	*245*	*300*	*19.1*
18	18.000	300	76,341	0-3/32	20½	24⅜	3⅛	4	1 x 4	200	250	51.6
450	*457.2*	*20.7*	*339.58*	*0-2.38*	*521*	*619*	*79*		*M24 x 100*	*270*	*340*	*23.4*
20	20.000	300	94,248	0-3/32	23	26⅞	3⅛	4	1 x 4	200	250	68.3
500	*508.0*	*20.7*	*419.23*	*0-2.38*	*581*	*683*	*79*		*M24 x 100*	*270*	*340*	*31.0*
24	24.000	250	113,097	0-3/32	27⅛	30⅞	3⅛	4	1 x 4	200	250	89.3
600	*609.6*	*17.2*	*503.08*	*0-2.38*	*689*	*784*	*79*		*M24 x 100*	*270*	*340*	*40.5*

NOTE:
Range of Pipe End Seperation values are for roll grooved pipe and may be doubled for cut groove pipe.

For additional details see "Coupling Data Chart Notes" on page 17.
* Available in ANSI or metric bolt sizes only as indicated.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 153.
Not for use in copper systems.

FIG. 7401-2

Rigidlok® Coupling

Gruvlok® introduces new 2-piece large diameter standard groove couplings in both rigid and flexible styles

- Uses standard grooves (conforming to AWWA C-606)
- No special grooves or grooving tools needed
- Pressures to 350 P.S.I. on cut or roll grooved pipe with a wall thickness of 0.250" or greater
- No special fittings needed
- No special valves needed
- Up to 23% less weight than competitive models
- Sizes: 14" through 24" in Rigid: Figure 7401-2

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "EP" EPDM (Green and Red color code) Standard
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended.

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)
20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

GASKET TYPE:
Flush Gap (Standard)

LUBRICATION:
Standard
Gruvlok Xtreme™

WORKING PRESSURE, END LOAD & PIPE END SEPARATION:
Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

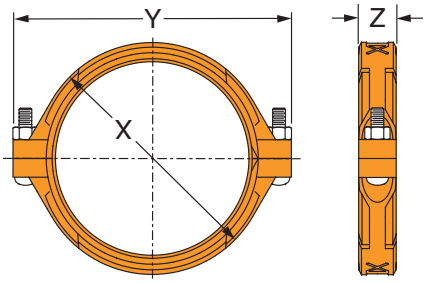


FIGURE 7401-2 RIGIDLOK COUPLING

Nominal Size	O.D.	Max. Working Pressure	Max. End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts*		Specified Torque §		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs/N-M*		*Lbs./kg*
14 *350*	14.000 *355.6*	350 *24.1*	53,878 *239.66*	0-3/32 *0-2.38*	16 1/4 *413*	19 3/4 *502*	3 *76*	2	7/8 x 5 1/2 –	180 *245*	220 *300*	36.5 *16.6*
16 *400*	16.000 *406.4*	350 *24.1*	70,372 *313.03*	0-3/32 *0-2.38*	18 5/16 *465*	22 *558*	3 *76*	2	1 x 5 1/2 –	250 *340*	300 *408*	46.0 *20.9*
18 *450*	18.000 *457.2*	350 *24.1*	89,064 *396.18*	0-3/32 *0-2.38*	20 3/4 *527*	24 1/4 *615*	3 1/8 *79*	2	1 x 5 1/2 –	250 *340*	300 *408*	62.5 *28.3*
20 *500*	20.000 *508.0*	350 *24.1*	109,956 *489.11*	0-3/32 *0-2.38*	23 *582*	27 1/8 *691*	3 1/8 *79*	2	1 1/8 x 5 1/2 –	375 *510*	425 *578*	73.5 *33.3*
24 *600*	24.000 *609.6*	350 *24.1*	158,336 *704.31*	0-3/32 *0-2.38*	27 1/4 *688*	31 1/8 *791*	3 3/16 *81*	2	1 1/8 x 5 1/2 –	375 *510*	425 *578*	90.5 *41.1*

Range of Pipe End Separation values are for roll grooved pipe and may be doubled for cut groove pipe.
See Installation & Assembly directions on page 155.

FIG. 7001
Standard Coupling

The Gruvlok® Fig. 7001 Standard Coupling forms a flexible grooved end pipe joint connection with the versatility for a wide range of applications. Services include mechanical and plumbing, process piping, mining and oil field piping, and many others. The coupling design supplies optimum strength for working pressures to 1000 PSI (69 bar) without excessive casting weight.

The flexible design eases pipe and equipment installation while providing the designed-in benefit of reducing pipeline noise and vibration transmission without the addition of special components. To ease coupling handling and assembly and to assure consistent quality, sizes 1" through 14" couplings have two 180° segment housings, 16" have three 120° segment housings, and 18" through 24" sizes have four 90° segment housings, while the 28" O.D. and 30" O.D. couplings have six 60° segment housings. The 28" O.D. and 30" O.D. are weld-ring couplings.

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For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12 or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)
20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)
-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services. Contact an Anvil Representative for availability.

GASKET TYPE:
C Style (Standard 1" - 12")
Flush Gap (Standard 14" - 24", Available 1" - 12")

LUBRICATION:
Standard
Gruvlok Xtreme™ (Do Not use with Grade "L")

WORKING PRESSURE, END LOAD, PIPE END SEPARATION & DEFLECTION FROM CENTER LINE:
Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

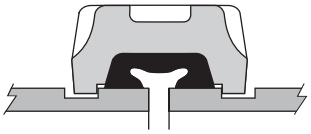


Fig. 7001 with Standard Gasket

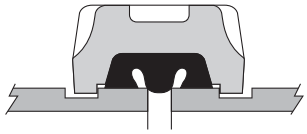
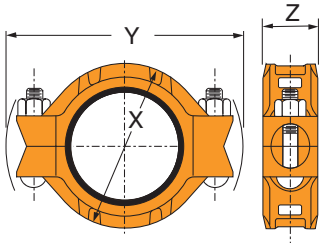


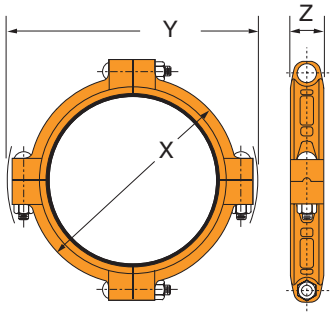
Fig. 7001 with Flush Gap Gasket

FIG. 7001

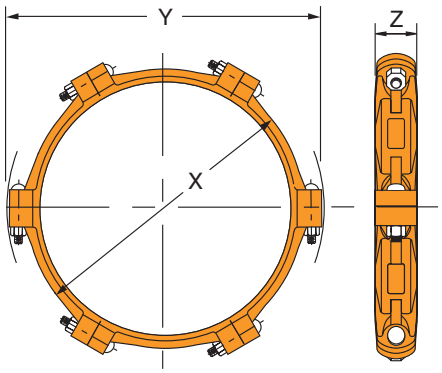
Standard Coupling



SIZES 1" - 14"



SIZES 16" - 24"



SIZES 28" - 30"

FIGURE 7001 STANDARD COUPLING

Nominal Size	O.D.	Max. Work. Pressure	Max. End Load	Range of Pipe End Separation	Deflection from ℄		Coupling Dimensions			Bolt Dimensions*		Specified Torque §		Approx. Wt. Ea.
					Per Coupling	of Pipe	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*Degrees(°)-Minutes(')*	*In./ft-mm/m*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs/N-m*		*Lbs./kg*
1 *25*	1.315 *33.4*	1000 *68.9*	1,358 *6.04*	0-1/32 *0-0.79*	1° 22'	0.29 *23.8*	2½ *64*	4½ *114*	1⅞ *48*	2	⅜ x 2¼ *M10 x 57*	30 *40*	45 *60*	1.3 *0.6*
1¼ *32*	1.660 *42.2*	1000 *68.9*	2,164 *9.63*	0-1/32 *0-0.79*	1° 5'	0.23 *18.8*	2¾ *70*	4½ *114*	1⅞ *48*	2	⅜ x 2¼ *M10 x 57*	30 *40*	45 *60*	1.4 *0.6*
1½ *40*	1.900 *48.3*	1000 *68.9*	2,835 *12.61*	0-1/32 *0-0.79*	0° 57'	0.20 *16.5*	3 *76*	4⅝ *117*	1⅞ *48*	2	⅜ x 2¼ *M10 x 57*	30 *40*	45 *60*	1.5 *0.7*
2 *50*	2.375 *60.3*	1000 *68.9*	4,430 *19.71*	0-1/32 *0-0.79*	0° 45'	0.16 *13.1*	3⅝ *92*	6⅛ *156*	1⅞ *48*	2	½ x 3 *M12 x 76*	80 *110*	100 *150*	3.1 *1.4*
2½ *65*	2.875 *73.0*	1000 *68.9*	6,492 *28.88*	0-1/32 *0-0.79*	0° 37'	0.13 *10.9*	4¼ *108*	6½ *165*	1⅞ *48*	2	½ x 3 *M12 x 76*	80 *110*	100 *150*	3.7 *1.7*
3 O.D. 76.1	*2.996* 76.1	*1000* 68.9	*7,050* 31.36	*0-1/32* *0-0.79*	*0° 36'*	*0.13* 10.4	*4¼* 108	*6¾* 171	*1⅞* 48	*2*	*½ x 3* M12 x 76	*80* 110	*100* 150	*4.3* 2.0
3 *80*	3.500 *88.9*	1000 *68.9*	9,621 *42.80*	0-1/32 *0-0.79*	0° 31'	0.11 *8.9*	4⅞ *124*	7⅛ *181*	1⅞ *48*	2	½ x 3 *M12 x 76*	80 *110*	100 *150*	4.3 *2.0*
3½ *90*	4.000 *101.6*	1000 *68.9*	12,566 *55.90*	0-1/32 *0-0.79*	0° 27'	0.09 *7.8*	5¼ *133*	8¼ *210*	1⅞ *48*	2	⅝ x 3½ *M16 x 89*	100 *135*	130 *175*	5.1 *2.3*
4 *100*	4.500 *114.3*	1000 *68.9*	15,904 *70.75*	0-3/32 *0-2.38*	1° 12'	0.25 *20.8*	6¼ *159*	8¾ *222*	2 *51*	2	⅝ x 3½ *M16 x 89*	100 *135*	130 *175*	6.8 *3.1*
5 *125*	5.563 *141.3*	1000 *68.9*	24,306 *108.12*	0-3/32 *0-2.38*	0° 58'	0.20 *16.8*	7¼ *184*	11¼ *286*	2 *51*	2	¾ x 4½ *M20 x 110*	130 *175*	180 *245*	9.6 *4.4*
6½ O.D. 165.1	*6.500* 165.1	*1000* 68.9	*33,183* 147.61	*0-3/32* *0-2.38*	*0° 50'*	*0.17* 14.4	*8¼* 210	*11¾* 298	*2* 51	*2*	*¾ x 4½* M20 x 110	*130* 175	*180* 245	*11.8* 5.4
6 *150*	6.625 *168.3*	1000 *68.9*	34,472 *153.34*	0-3/32 *0-2.38*	0° 49'	0.17 *14.1*	8⅝ *219*	11¾ *298*	2 *51*	2	¾ x 4½ *M20 x 110*	130 *175*	180 *245*	11.8 *5.4*
8 *200*	8.625 *219.1*	800 *55.2*	46,741 *207.91*	0-3/32 *0-2.38*	0° 37'	0.13 *10.9*	11 *279*	14⅜ *365*	2⅜ *60*	2	⅞ x 5½ *M22 x 140*	180 *245*	220 *300*	21.7 *9.8*
10 *250*	10.750 *273.0*	800 *55.2*	72,610 *322.99*	0-3/32 *0-2.38*	0° 30'	0.11 *8.7*	13⅛ *333*	16⅝ *422*	2⅝ *67*	2	⅞ x 5½ *M22 x 140*	180 *245*	220 *300*	27.0 *12.2*
12 *300*	12.750 *323.9*	800 *55.2*	102,141 *454.35*	0-3/32 *0-2.38*	0° 25'	0.09 *7.3*	15½ *394*	18⅝ *473*	2⅝ *67*	2	⅞ x 6 *M22 x 150*	180 *245*	220 *300*	35.0 *15.9*
14 *350*	14.000 *355.6*	300 *20.7*	46,181 *205.43*	0-3/32 *0-2.38*	0° 23'	0.08 *6.7*	16⅛ *410*	20½ *521*	3 *76*	2	⅞ x 5½ *M22 x 140*	180 *245*	220 *300*	37.0 *16.8*
16 *400*	16.000 *406.4*	300 *20.7*	60,319 *268.31*	0-3/32 *0-2.38*	0° 20'	0.07 *5.9*	18⅛ *460*	22⅞ *581*	3 *76*	4	1 x 4 *	200 -	250 -	50.0 *22.7*
18 *450*	18.000 *457.2*	300 *20.7*	76,341 *339.58*	0-3/32 *0-2.38*	0° 18'	0.06 *5.2*	21⅛ *537*	25⅜ *645*	3⅛ *79*	4	1 x 4 *	200 -	250 -	72.0 *32.7*
20 *500*	20.000 *508.0*	300 *20.7*	94,248 *419.23*	0-3/32 *0-2.38*	0° 16'	0.06 *4.7*	23 *584*	28¼ *718*	3⅛ *79*	4	1⅛ x 4½ *	225 -	275 -	82.0 *37.2*
24 *600*	24.000 *609.6*	300 *20.7*	135,717 *603.70*	0-3/32 *0-2.38*	0° 13'	0.05 *3.9*	27 *686*	32⅜ *822*	3⅛ *79*	4	1⅛ x 4½ *	225 -	275 -	90.0 *40.8*
28" O.D. *733.4*	28.875 *733.4*	150 *10.3*	98,226 *436.93*	0-3/32 *0-2.38*	0° 11'	0.04 *3.2*	33½ *851*	35½ *902*	3⅛ *79*	6	1 x 5½ *	200 -	250 -	105.0 *47.6*
30" I.D. *787.4*	31.00 *787.4*	150 *10.3*	113,215 *503.61*	0-3/32 *0-2.38*	0° 10'	0.04 *3.0*	33¾ *857*	38¼ *972*	3⅝ *92*	6	1 x 5½ *	200 -	250 -	137.0 *62.1*

NOTES:

Range of Pipe End Separation and Angular Deflection values are for roll grooved pipe and may be doubled for cut groove pipe. See page 190 for details.
Refer to page 196 for Misalignment & Deflection Calculations and page 197 for Curve Layout Calculations.

* Available in ANSI or metric bolt sizes only as indicated.
For additional details see "Coupling Data Chart Notes" on page 17.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 154.
Not for use in copper systems.

FIG. 7001-2
Standard Coupling

Gruvlok® introduces new 2-piece large diameter standard groove couplings in both rigid and flexible styles

- Uses standard grooves (conforming to AWWA C-606)
- No special grooves or grooving tools needed
- Pressures to 350 P.S.I. on cut or roll grooved pipe with a wall thickness of 0.250" or greater
- No special fittings needed
- No special valves needed
- Up to 23% less weight than competitive models
- Sizes: 14" through 24" in Flexible: Figure 7001-2

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "EP" EPDM (Green and Red color code) Standard
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended.

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)
20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

GASKET TYPE:
Flush Gap (Standard)

LUBRICATION:
Standard
Gruvlok Xtreme™

WORKING PRESSURE, END LOAD, PIPE END SEPARATION & DEFLECTION FROM CENTER LINE:
Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

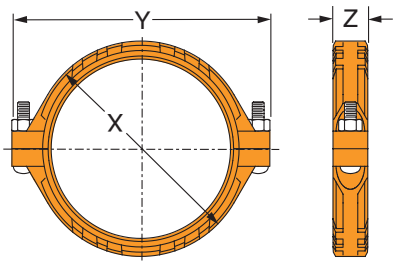
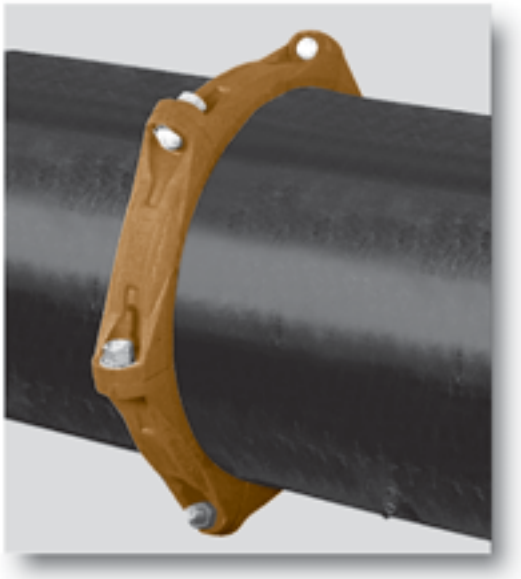


FIGURE 7001-2 STANDARD COUPLING

Nominal Size	O.D.	Max. Work. Pressure	Max. End Load	Range of Pipe End Separation	Deflection from ℄		Coupling Dimensions			Bolt Dimensions*		Specified Torque §		Approx. Wt. Ea.
					Per Coupling	of Pipe	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*Degrees(°)-Minutes(')*	*In./ft-mm/m*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs/N-m*		*Lbs./kg*
14 *350*	14.000 *355.6*	350 *24.1*	53,878 *239.66*	0-3/32 *0-2.38*	0° 23'	0.08 *6.7*	16¼ *413*	19¾ *502*	3 *76*	2	⅞ x 5½ –	180 *245*	220 *300*	36.0 *16.3*
16 *400*	16.000 *406.4*	350 *24.1*	70,372 *313.03*	0-3/32 *0-2.38*	0° 20'	0.07 *5.9*	18⅝ *465*	22 *558*	3 *76*	2	1 x 5½ –	250 *340*	300 *408*	45.0 *20.4*
18 *450*	18.000 *457.2*	350 *24.1*	89,064 *396.18*	0-3/32 *0-2.38*	0° 18'	0.06 *5.2*	20¾ *527*	24¼ *615*	3⅛ *79*	2	1 x 5½ –	250 *340*	300 *408*	60.0 *27.2*
20 *500*	20.000 *508.0*	350 *24.1*	109,956 *489.11*	0-3/32 *0-2.38*	0° 16'	0.06 *4.7*	23 *582*	27⅛ *691*	3⅛ *79*	2	1⅛ x 5½ –	375 *510*	425 *578*	72.5 *32.9*
24 *600*	24.000 *609.6*	350 *24.1*	158,336 *704.31*	0-3/32 *0-2.38*	0° 13'	0.05 *3.9*	27¼ *688*	31⅛ *791*	3³⁄₁₆ *81*	2	1⅛ x 5½ –	375 *510*	425 *578*	90.0 *40.8*

Range of Pipe End Separation and Angular Deflection values are for roll grooved pipe and may be doubled for cut groove pipe.
See Installation & Assembly directions on page 155.

FIG. 7011
Standard Coupling



The Gruvlok® Figure 7011 Standard Coupling is a flexible coupling designed to join roll grooved or cut grooved 30" O.D. pipe for a wide range of applications, including Commercial/Industrial Construction, Mining, Process Piping and many others. This coupling's operating temperature ranges from –40°F to 230°F (-40°C to 110°C) with the Grade E EPDM gasket and –20°F to 180°F (-29°C to 82°C) with the Grade T Nitrile gasket. The operating pressure ranges 15" of Hg. vacuum to 300 psig on standard wall steel pipe.

MATERIAL SPECIFICATIONS

HOUSING DESIGN:
This six-segment coupling housing is cast in ductile iron per ASTM A 536 Grade 65-45-12. Each housing segment is machined to assure a close dimensional fit with pipe ends that are prepared in accordance with Gruvlok "Large Diameter Roll and Cut Groove Specifications."

GASKET DESIGN:
The gasket design is a "C" Style cross section and features a larger cross section to provide optimal sealing throughout the range of pipe dimensional variations and operating conditions. The gasket is available in EPDM and Nitrile, to facilitate use in a wide range of applications. For Gruvlok gasket material recommendations see the Gruvlok catalog.

BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track bolts of carbon steel conforming to ASTM A 183 Grade 2, with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563. Bolts and nuts are zinc plated per ASTM B 633 as standard.

PIPE END PREPARATION:
Pipe grooving is simple, easy and quick. It is critical that the pipe ends be prepared in accordance with the Gruvlok "Large Diameter Roll and Cut Groove Specifications." **For roll grooved pipe, grinding the weld seam on the interior and exterior of the pipe may be required. Not performing this operation may result in improper assembly of the coupling, gasket leakage and damage to the roll grooving machine.**

FIG. 7011
Standard Coupling

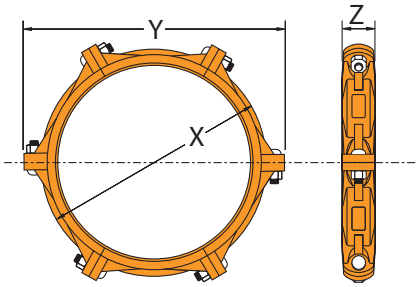
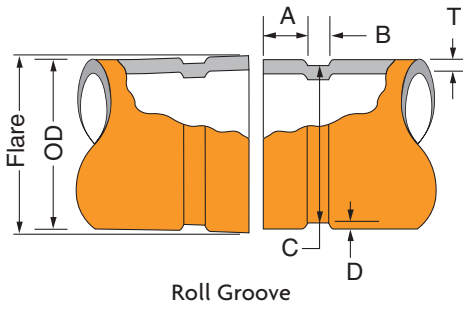


FIGURE 7011 STANDARD COUPLING

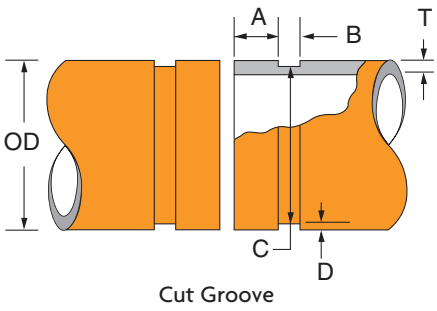
Nominal Size	O.D.	Max. Working Pressure	Max. End Load	Range of Pipe End Separation	Deflection from ℄		Coupling Dimensions			Coupling Bolts*		Specified Torque §		Approx. Wt. Ea.
					Per Coupling	of Pipe	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*Degrees(°)-Minutes(')*	*In./ft-mm/m*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs./N-m*		*Lbs./Kg*
30 O.D. *750*	30.000 *762.0*	300 *20.7*	212,058 *943.2*	0-9/64 *0-3.57*	0° 16'	0.06 *4.7*	34 *864*	39½ *1003*	5 *127*	6	1¼ x 4⅜ –	600 -	800 -	200 *90.9*

NOTE:
Working pressure and end load values are for standard wall pipe.
Range of pipe end separation values are for cut grooved pipe.
Roll and Cut Grooving Specifications can be found in the technical data section.

For additional details see "Coupling Data Chart Notes" on page 17.
* Available in ANSI or metric bolt sizes only as indicated.
§ – For additional Bolt Torque information,see page 190.
See Installation & Assembly directions on page 156.



Roll Groove



Cut Groove

LARGE DIAMETER PIPE ROLL & CUT GROOVE SPECIFICATIONS

Nominal IPS Pipe Size	O.D.			Gasket Seat "A" +.030/-.060 +.77/-1.54	Groove Width "B" ±.030 ±.77	Groove Diameter "C"		Groove Depth "D" (Ref. Only)	Min. Wall Thickness "T"		Max. Flare Dia.
	Actual	Tolerance				Actual	Tol +0.000		Roll Groove	Cut Groove	
In./DN(mm)	*In./mm*	*+In./mm*	*-In./mm*	*In./mm*	*In./mm*	*In./mm*	*-In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*
30 O.D.	30.000	0.093	0.031	1.750	0.625	29.500	0.063	0.250	0.250	0.625	30.200
750	*762.0*	*2.36*	*0.79*	*44.45*	*15.88*	*749.30*	*1.60*	*6.35*	*6.35*	*15.88*	*767.1*

- Pipe O.D. must be within specified dimensions.
- Gasket Seat must be free from scores, seams, chips, rust or other scale, which may interfere with proper sealing of the gasket. Gasket Seat width, dimension A, is to be measured from the pipe end to the vertical flank in the groove.
- Groove width, dimension B, is to be measured between the vertical flank of the groove side walls.
- Groove depth must be uniform depth around the entire pipe circumference. (Reference column 6.)
- Maximum Flare Diameter is to be measured at the most extreme pipe end.
- **Out of Roundness:** Difference between the maximum and minimum pipe O.D. measured at 90° must not exceed the total pipe O.D. tolerance listed (Reference column 2).
- The maximum allowable tolerance from square cut ends is .125" measured from a true square line.
- Beveled end pipe in conformance with ANSI B16.25 (37½°) is acceptable, however square cut is preferred.

SPECIAL ROLL GROOVING INSTRUCTION:
- Weld seams must be ground flush with the pipe O.D. and I.D. prior to roll grooving. Failure to do so may result in damage to the roll grooving machine and unacceptable roll grooves may be produced.

FIG. 7000

Lightweight Flexible Coupling

c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

The Fig. 7000 Lightweight Flexible Coupling is designed for applications where system flexibility is desired.

The Fig. 7000 Coupling is approximately 30% lighter in weight than the Fig. 7001 Coupling, and allows for working pressure ratings up to 600 psi (41.4 bar).

The Figure 7000 Lightweight Flexible Coupling is intended for use in several applications. See gasket Grade Index for gasket recommendations.

See technical data section for design factors.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)
-20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)
-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:
Standard C Style
Flush Gap (1" - 8")

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7000

Lightweight Flexible Coupling

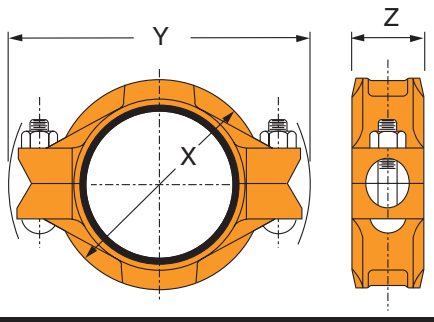


FIGURE 7000 COUPLING

Nominal Size	O.D.	Max. Working Pressure	Max. End Load	Range of Pipe End Separation	Deflection from ℄		Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
					Per Coupling	of Pipe	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*Degrees(°)-Minutes(')*	*In./ft-mm/m*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs./N-m*		*Lbs./Kg*
1 25	1.315 33.4	600 41.4	815 3.62	0-1/32 0-0.79	1° 22'	0.29 23.8	2 3/8 60	4 1/4 108	1 3/4 44	2	3/8 x 2 1/4 M10 x 57	30 40	45 60	1.3 0.6
1 1/4 32	1.660 42.2	600 41.4	1,299 5.78	0-1/32 0-0.79	1° 5'	0.23 18.8	2 3/4 70	4 3/8 111	1 3/4 44	2	3/8 x 2 1/4 M10 x 57	30 40	45 60	1.4 0.6
1 1/2 40	1.900 48.3	600 41.4	1,701 7.57	0-1/32 0-0.79	0° 57'	0.20 16.5	3 76	4 5/8 117	1 3/4 44	2	3/8 x 2 1/4 M10 x 57	30 40	45 60	1.5 0.7
2 50	2.375 60.3	600 41.4	2,658 11.82	0-1/32 0-0.79	0° 45'	0.16 13.1	3 1/2 89	5 1/2 140	1 3/4 44	2	3/8 x 2 1/4 M10 x 57	30 40	45 60	1.7 0.8
2 1/2 65	2.875 73.0	600 41.4	3,895 17.33	0-1/32 0-0.79	0° 37'	0.13 10.9	4 102	5 3/4 146	1 3/4 44	2	3/8 x 2 1/4 M10 x 57	30 40	45 60	1.9 0.9
3 O.D. 76.1	*2.996* 76.1	*600* 41.4	*4,230* 18.82	*0-1/32* *0-0.79*	*0° 36'*	*0.13* 10.4	*4* 102	*6 1/8* 156	*1 3/4* 44	*2*	*3/8 x 2 1/4* M10 x 57	*30* 40	*45* 60	*2.3* 1.0
3 80	3.500 88.9	600 41.4	5,773 25.68	0-1/32 0-0.79	0° 31'	0.11 8.9	4 5/8 117	6 3/4 171	1 3/4 44	2	1/2 x 2 3/4 M12 x 70	80 110	100 150	2.9 1.3
3 1/2 90	4.000 101.6	600 41.4	7,540 33.54	0-1/32 0-0.79	0° 27'	0.09 7.8	5 1/8 130	7 5/8 194	1 3/4 44	2	1/2 x 3 M12 x 76	80 110	100 150	3.1 1.4
4 1/4 O.D. 108.0	*4.250* 108.0	*600* 41.4	*8,512* 37.86	*0-3/32* 0-2.38	*1° 16'*	*0.26* 22.0	*5 1/2* 140	*7 3/4* 197	*2* 51	*2*	*1/2 x 3* M12 x 76	*80* 110	*100* 150	*4.0* 1.8
4 100	4.500 114.3	600 41.4	9,543 42.45	0-3/32 0-2.38	1° 12'	0.25 20.8	5 7/8 149	8 1/8 206	2 51	2	1/2 x 3 M12 x 76	80 110	100 150	4.6 2.1
5 1/4 O.D. 133.0	*5.236* 133.0	*500* 34.5	*10,766* 47.89	*0-3/32* 0-2.38	*1° 2'*	*0.21* 17.9	*6 1/2* 165	*9 1/8* 232	*2* 51	*2*	*5/8 x 3 1/2* M16 x 85	*100* 135	*130* 175	*5.7* 2.6
5 1/2 O.D. 139.7	*5.500* 139.7	*500* 34.5	*11,879* 52.84	*0-3/32* 0-2.38	*0° 59'*	*0.20* 17.0	*6 3/4* 171	*9 3/8* 238	*2* 51	*2*	*5/8 x 3 1/2* M16 x 85	*100* 135	*130* 175	*6* 2.7
5 125	5.563 141.3	500 34.5	12,153 54.06	0-3/32 0-2.38	0° 58'	0.20 16.8	7 178	9 5/8 244	2 51	2	5/8 x 3 1/2 M16 x 85	100 135	130 175	6.1 2.8
6 1/4 O.D. 159.0	*6.259* 159.0	*500* 34.5	*15,384* 68.43	*0-3/32* 0-2.38	*0° 51'*	*0.18* 14.9	*7 1/2* 191	*10 3/8* 264	*2* 51	*2*	*5/8 x 3 1/2* M16 x 85	*100* 135	*130* 175	*6.7* 3.0
6 1/2 O.D. 165.1	*6.500* 165.1	*500* 34.5	*16,592* 73.80	*0-3/32* 0-2.38	*0° 50'*	*0.17* 13.1	*7 3/4* 197	*10 3/4* 273	*2* 51	*2*	*5/8 x 3 1/2* M16 x 85	*100* 135	*130* 175	*7.0* 3.2
6 150	6.625 168.3	500 34.5	17,236 76.67	0-3/32 0-2.38	0° 49'	0.17 14.1	8 203	11 279	2 51	2	5/8 x 3 1/2 M16 x 85	100 135	130 175	8.1 3.7
8 200	8.625 219.1	500 34.5	29,213 129.95	0-3/32 0-2.38	0° 37'	0.13 10.9	10 1/2 264	12 13/16 337	2 1/2 60	2	3/4 x 4 1/2 M20 x 110	130 175	180 245	14.2 6.4

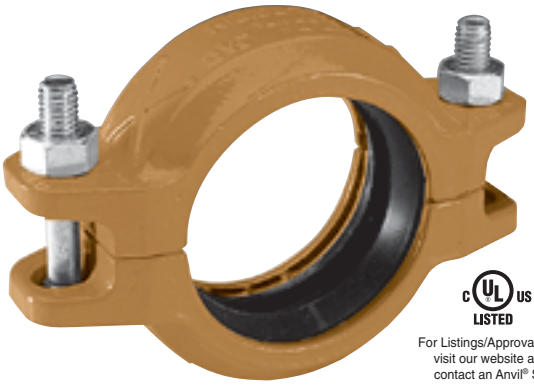
NOTES:

Range of Pipe End Separation and Angular Deflection values are for roll grooved pipe and may be doubled for cut groove pipe. See page 190 for details. Refer to page 196 for Misalignment & Deflection Calculations and page 197 for Curve Layout Calculations.

For additional details see "Coupling Data Chart Notes" on page 17.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 157.
Not for use in copper systems.

FIG. 7400

Rigidlite® Coupling



DN 50 and DN 200 sizes are VdS approved.

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The Fig. 7400 Rigidlite Coupling from Gruvlok is specially designed to provide a rigid, locked-in pipe connection to meet the specific demands of rigid design steel pipe systems. Fast and easy swing-over installation of the rugged lightweight housing produces a secure, rigid pipe joint.

The Fig. 7400 Rigidlite Coupling is UL/ULC Listed and FM Approved for 300 psi (20.7 bar) with roll grooved or cut grooved steel pipe prepared in accordance with Gruvlok grooving specifications.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR

Grade "O" Fluoro-Elastomer (Blue color code)
20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)
-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:
Standard C Style
Flush Gap (1" - 8")

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7400
Rigidlite® Coupling

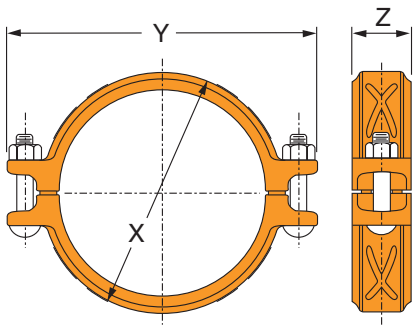


FIGURE 7400 RIGIDLITE COUPLING

Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs./N-m*		*Lbs./Kg*
1 *25*	1.315 *33.4*	300 *20.7*	407 *1.81*	0-1/32 *0-0.79*	2 1/4 *57*	4 1/2 *114*	1 3/4 *44*	2	3/8 x 2 1/4 *M10 x 57*	30 *40*	45 *60*	1.2 *0.5*
1 1/4 *32*	1.660 *42.2*	300 *20.7*	649 *2.89*	0-1/32 *0-0.79*	2 5/8 *67*	4 3/4 *121*	1 3/4 *44*	2	3/8 x 2 1/4 *M10 x 57*	30 *40*	45 *60*	1.3 *0.6*
1 1/2 *40*	1.900 *48.3*	300 *20.7*	851 *3.78*	0-1/32 *0-0.79*	2 7/8 *73*	4 7/8 *124*	1 3/4 *44*	2	3/8 x 2 1/4 *M10 x 57*	30 *40*	45 *60*	1.4 *0.6*
2 *50** *3 O.D.* 76.1	2.375 *60.3* *2.996* 76.1	300 *20.7* *300* 20.7	1,329 *5.91* *2,115* 9.41	0-1/32 *0-0.79* *0-1/32* 0-0.79	3 1/4 *83* *4* 102	5 1/2 *140* *5 7/8* 149	1 3/4 *44* *1 3/4* 44	2 *2* M10 x 57	3/8 x 2 1/4 *M10 x 57* *3/8 x 2 1/4* M10 x 57	30 *40* *30* 40	45 *60* *45* 60	1.6 *0.7* *1.9* 0.9
2 1/2 *65*	2.875 *73.0*	300 *20.7*	1,948 *8.66*	0-1/32 *0-0.79*	3 7/8 *98*	6 *152*	1 3/4 *44*	2	3/8 x 2 1/4 *M10 x 57*	30 *40*	45 *60*	1.9 *0.9*
3 *80*	3.500 *88.9*	300 *20.7*	2,886 *12.84*	0-1/32 *0-0.79*	4 1/2 *114*	6 3/4 *171*	1 3/4 *44*	2	3/8 x 2 3/4 *M10 x 70*	30 *40*	45 *60*	2.1 *1.0*
4 *100*	4.500 *114.3*	300 *20.7*	4,771 *21.22*	0-3/32 *0-2.38*	5 5/8 *143*	7 3/4 *197*	1 7/8 *48*	2	3/8 x 2 3/4 *M10 x 70*	30 *40*	45 *60*	3.1 *1.4*
5 1/2 O.D. 139.7	*5.500* 139.7	*300* 20.7	*7,127* 31.70	*0-3/32* 0-2.38	*6 3/4* 171	*9 1/4* 235	*2* 51	*2* M12 x 76	*1/2 x 3* M12 x 76	*80* 110	*100* 150	*4.5* 2.0
5 *125*	5.563 *141.3*	300 *20.7*	7,292 *32.44*	0-3/32 *0-2.38*	6 7/8 *175*	9 1/4 *235*	2 *51*	2	1/2 x 3 *M12 x 76*	80 *110*	100 *150*	4.6 *2.1*
6 1/2 O.D. 165.1	*6.500* 165.1	*300* 20.7	*9,955* 44.28	*0-3/32* 0-2.38	*7 3/4* 200	*10 3/8* 264	*2* 51	*2*	*1/2 x 3* M12 x 76	*80* 110	*100* 150	*5.5* 2.5
6 *150*	6.625 *168.3*	300 *20.7*	10,341 *46.00*	0-3/32 *0-2.38*	7 7/8 *200*	10 3/8 *264*	2 *51*	2	1/2 x 3 *M12 x 76*	80 *110*	100 *150*	5.5 *2.5*
8 *200**	8.625 *219.1*	300 *20.7*	17,528 *77.97*	0-3/32 *0-2.38*	10 1/4 *260*	12 3/4 *324*	2 3/8 *60*	2	1/2 x 3 *M12 x 76*	80 *110*	100 *150*	8.4 *3.8*

NOTE:
Range of Pipe End Seperation values are for roll grooved pipe and may be doubled for cut groove pipe.
Other sizes available, contact an Anvil Representative for more information.

For additional details see "Coupling Data Chart Notes" on page 17.
* DN 50 and DN 200 sizes are VdS approved.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 158.

FIG. 7003

Hingelok® Coupling

SIZES 1" - 4"

SIZES 5" - 8"

The Fig. 7003 Hingelok Coupling is specially designed for applications requiring a quick connection and/or disconnection of a pipe joint. The Fig. 7003 Hingelok Coupling is ideal for those applications where frequent pipe removal is required for maintenance or any other reason. Fig. 7003 Hingelok Coupling provides for system working pressure ratings up to 300 psi (20.7 bar).

The Fig. 7003 Hingelok Coupling halves are permanently hinged to provide an assembly that eases handling and installation. The two coupling halves are hinged for ease of handling and are secured by a cam-action handle. Sizes 1" to 4" use toggle link plates and sizes 5" to 8" use a toggle bolt to attach the cam-action handle to the housings. The cam-action locking handle permits rapid installation without the need for additional tools and maintains secure closure of the coupling into the pipe grooves. Final assembly of the locking pin to the Hingelok Coupling adds an extra measure of security required in critical pipe joint applications.

MATERIAL SPECIFICATIONS

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:
Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

HANDLE:
Sizes 1" - 4": Cold Rolled Carbon Steel Handles
Sizes 5" - 8": Cast Ductile Iron Handles

LINKS:
Sizes 1" - 4": Cold Rolled Carbon Steel Links
Sizes 5" - 8": Heat Treated Steel Links

LOCKING PIN:
Locking Pin: Spring Steel

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

Grade "O" Fluoro-Elastomer (Blue color code)
20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)
-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services.
DO NOT USE GRUVLOK XTREME LUBRICANT WITH GRADE "L" SILICONE GASKET.

GASKET TYPE:
Standard C Style
Flush Gap (1" - 8")

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7003

Hingelok® Coupling

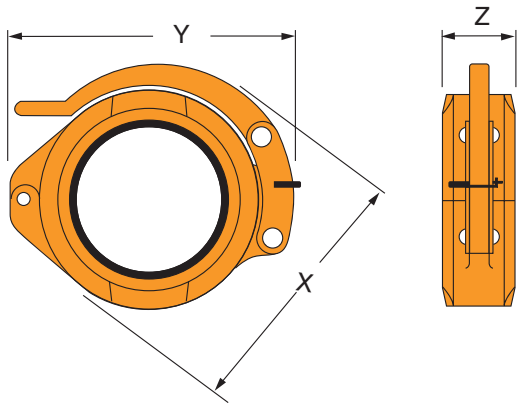


FIGURE 7003 HINGELOK COUPLING

Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	Range of Pipe End Separation	Deflection from ℄		Coupling Dimensions			Approx. Wt. Ea.
					Per Coupling	of Pipe	X	Y	Z	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*Degrees(°)-Minutes(')*	*In./ft-mm/m*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	300 *20.7*	407 *1.81*	0-1/32 *0-0.79*	1° 22'	0.29 *23.8*	3 *76*	4 *101*	1 3/4 *44*	1.4 *0.6*
1 1/4 *32*	1.660 *42.2*	300 *20.7*	649 *2.89*	0-1/32 *0-0.79*	1° 5'	0.23 *18.8*	3 7/16 *87*	4 7/16 *113*	1 7/8 *48*	1.5 *0.7*
1 1/2 *40*	1.900 *48.3*	300 *20.7*	851 *3.78*	0-1/32 *0-0.79*	0° 57'	0.20 *16.5*	3 5/8 *92*	4 1/4 *108*	1 7/8 *48*	1.7 *0.8*
2 *50*	2.375 *60.3*	300 *20.7*	1,329 *5.91*	0-1/32 *0-0.79*	0° 45'	0.16 *13.1*	4 1/4 *108*	4 7/8 *124*	1 7/8 *48*	2.2 *1.0*
2 1/2 *65*	2.875 *73.0*	300 *20.7*	1,948 *8.66*	0-1/32 *0-0.79*	0° 37'	0.13 *10.9*	5 1/4 *133*	5 7/8 *149*	1 7/8 *48*	3.2 *1.5*
3 *80*	3.500 *88.9*	300 *20.7*	2,886 *12.84*	0-1/32 *0-0.79*	0° 31'	0.11 *8.9*	5 5/8 *143*	6 1/2 *165*	1 7/8 *48*	3.6 *1.6*
4 *100*	4.500 *114.3*	300 *20.7*	4,771 *21.22*	0-3/32 *0-2.38*	1° 12'	0.25 *20.8*	7 *178*	7 3/4 *197*	2 *51*	5.1 *2.3*
5 *125*	5.563 *141.3*	300 *20.7*	7,292 *32.44*	0-3/32 *0-2.38*	0° 58'	0.20 *16.8*	8 5/8 *219*	9 1/2 *241*	2 1/8 *54*	9.5 *4.3*
6 *150*	6.625 *168.3*	300 *20.7*	10,341 *46.00*	0-3/32 *0-2.38*	0° 49'	0.17 *14.14*	9 7/8 *251*	10 7/8 *276*	2 1/8 *54*	11.2 *5.1*
8 *200*	8.625 *219.1*	300 *20.7*	17,528 *77.97*	0-3/32 *0-2.38*	0° 37'	0.13 *10.9*	12 *305*	13 1/8 *333*	2 1/2 *64*	18.1 *8.2*

NOTES:

Range of Pipe End Separation and Angular Deflection values are for roll grooved pipe and may be doubled for cut groove pipe. See page 190 for details. Refer to page 196 for Misalignment & Deflection Calculations and page 197 for Curve Layout Calculations.

For additional details see "Coupling Data Chart Notes" on page 17.
See Installation & Assembly directions on page 160.
Not for use in copper systems.

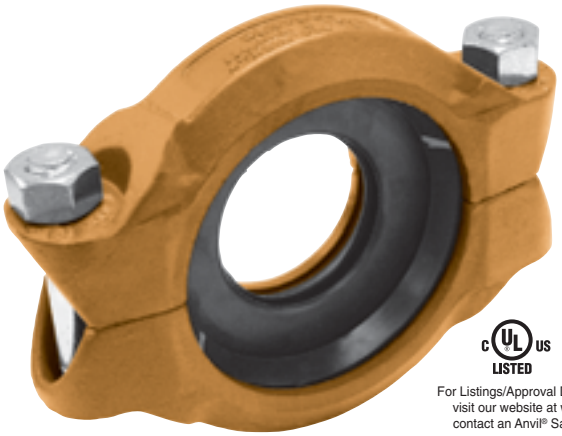
SPECIAL NOTE:

Fig. 7003 Hingelok Couplings are not designed for eccentric loading and therefore are not recommended for use at the end of concrete pumping booms or vertical risers above 30 feet (9.1 meters). Shockload must be considered and is to be included in the maximum working pressure listed above. Coupling keys, gasket cavity, and pipe grooves must be kept free of all foreign matter. Proper anchoring practice must always be exercised.

CAUTION:

Hammering or banging on the handle or coupling housing could cause serious damage to the locking device and coupling assembly. The result may be an unsuitable pipe joint and unusable coupling assembly.
When re-using, always check for gasket damage, housing hinge and handle for looseness, distortion, bending or any other damage.

FIG. 7010
Reducing Coupling



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The Fig. 7010 Reducing Coupling makes it possible to directly connect two different pipe sizes, eliminating the need for two couplings and a reducing fitting. The specially designed reducing coupling gasket with a center rib assures proper positioning of the gasket and prevents the smaller pipe from telescoping into the larger during assembly. Fig. 7010 Reducing Coupling allows for working pressure ratings up to 500 PSI (34.5 bar).

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12, or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7010
Reducing Coupling

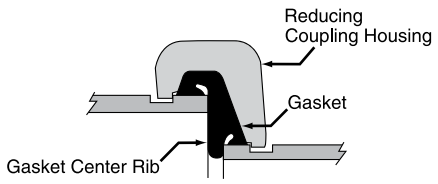


Fig. 7010
Coupling with Gasket

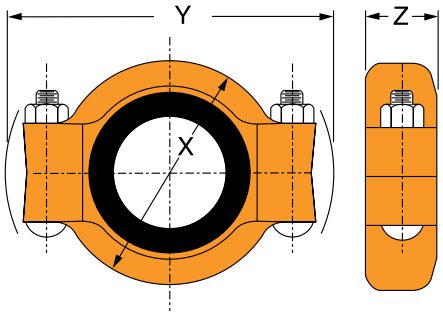


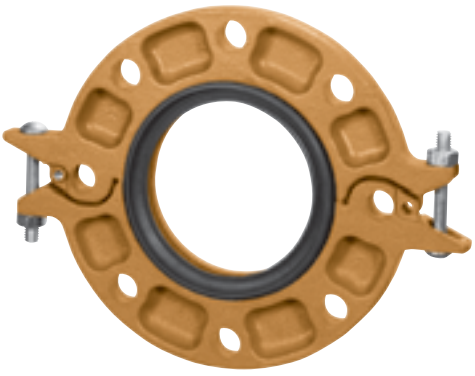
FIGURE 7010 REDUCING COUPLING

Nominal Size	Larger O.D.	Smaller O.D.	Max. Working Pressure	Max. End Load	Range of Pipe End Separation	Deflection from ℄		Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
						Per Coupling	of Pipe	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	*In./mm*	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*Degrees(°)-Minutes(')*	*In./ft-mm/m*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs./N-m*		*Lbs./Kg*
2 x 1½ *50 x 40*	2.375 *60.3*	1.900 *48.3*	500 *34.5*	2,215 *9.85*	0-1/32 *0-0.79*	0° 45'	0.16 *13.1*	3 5/8 *92*	5 7/8 *149*	1 7/8 *48*	2	½ x 2¾ *M12 x 76*	80 *110*	100 *150*	2.0 *0.9*
2½ x 2 *65 x 50*	2.875 *73.0*	2.375 *60.3*	500 *34.5*	3,246 *14.44*	0-1/32 *0-0.79*	0° 37'	0.13 *10.9*	4¼ *108*	6 3/8 *162*	1 7/8 *48*	2	½ x 2¾ *M12 x 76*	80 *110*	100 *150*	3.5 *1.6*
3 x 2 *80 x 50*	3.500 *88.9*	2.375 *60.3*	500 *34.5*	4,811 *21.40*	0-1/32 *0-0.79*	0° 31'	0.11 *8.9*	4 7/8 *124*	7 1/8 *181*	1 7/8 *48*	2	½ x 2¾ *M12 x 76*	80 *110*	100 *150*	4.4 *2.0*
3 x 2½ *80 x 65*	3.500 *88.9*	2.875 *73.0*	500 *34.5*	4,811 *21.40*	0-1/32 *0-0.79*	0° 31'	0.11 *8.9*	4 7/8 *124*	7 1/8 *181*	1 7/8 *48*	2	½ x 2¾ *M12 x 76*	80 *110*	100 *150*	4.1 *1.9*
4 x 2 *100 x 50*	4.500 *114.3*	2.375 *60.3*	500 *34.5*	7,952 *35.37*	0-3/32 *0-2.38*	1° 12'	0.25 *20.8*	6¼ *159*	8 7/8 *225*	2 *51*	2	⅝ x 3½ *M16 x 95*	100 *135*	130 *175*	8.9 *4.0*
4 x 2½ *100 x 65*	4.500 *114.3*	2.875 *73.0*	500 *34.5*	7,952 *35.37*	0-3/32 *0-2.38*	1° 12'	0.25 *20.8*	6¼ *159*	8 7/8 *225*	2 *51*	2	⅝ x 3½ *M16 x 95*	100 *135*	130 *175*	7.9 *3.6*
4 x 3 *100 x 80*	4.500 *114.3*	3.500 *88.9*	500 *34.5*	7,952 *35.37*	0-3/32 *0-2.38*	1° 12'	0.25 *20.8*	6¼ *159*	8 7/8 *225*	2 *51*	2	⅝ x 3½ *M16 x 95*	100 *135*	130 *175*	6.7 *3.0*
5 x 4 *125 x 100*	5.563 *141.3*	4.500 *114.3*	500 *34.5*	12,153 *54.06*	0-3/32 *0-2.38*	1° 58'	0.20 *16.8*	7¼ *184*	10 5/8 *270*	2 1/8 *54*	2	¾ x 4½ *M20 x 115*	130 *175*	180 *245*	11.4 *5.2*
6 x 4 *150 x 100*	6.625 *168.3*	4.500 *114.3*	500 *34.5*	17,236 *76.67*	0-3/32 *0-2.38*	0° 49'	0.17 *14.1*	8¼ *210*	11 5/8 *295*	2 1/8 *54*	2	¾ x 4½ *M20 x 115*	130 *175*	180 *245*	13.4 *6.1*
6 x 5 *150 x 125*	6.625 *168.3*	5.562 *141.3*	500 *34.5*	17,236 *76.67*	0-3/32 *0-2.38*	0° 49'	0.17 *14.1*	8½ *216*	11 5/8 *295*	2 1/8 *54*	2	¾ x 4½ *M20 x 115*	130 *175*	180 *245*	13.5 *6.1*
8 x 6 *200 x 150*	8.625 *219.1*	6.625 *168.3*	500 *34.5*	29,213 *129.95*	0-3/32 *0-2.38*	0° 37'	0.13 *10.9*	10½ *267*	14 *356*	2¼ *57*	2	¾ x 4½ *M20 x 115*	130 *175*	180 *245*	17.7 *8.0*

NOTES:
Fig. 7010 Reducing Coupling should not be used with end caps in systems where a vacuum may be developed. Contact your Anvil Representative for details.
Range of Pipe End Separation and Angular Deflection values are for roll grooved pipe and may be doubled for cut groove pipe. See page 190 for details.
Refer to page 196 for Misalignment & Deflection Calculations and page 197 for Curve Layout Calculations.

For additional details see "Coupling Data Chart Notes" on page 17.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 161.
Not for use in copper systems.

FIG. 7012
Gruvlok Flanges



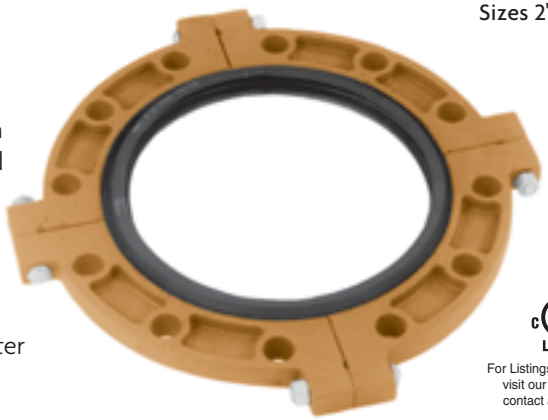
Sizes 2" - 12"

The Gruvlok® Fig. 7012 Flange allows direct connection of Class 125 or Class 150 flanged components to a grooved piping system. The two interlocking halves of the 2" thru 12" sizes of the Gruvlok Flange are hinged for ease of handling, and are drawn together by a latch bolt which eases assembly on the pipe. Precision machined bolt holes, key and mating surfaces assure concentricity and flatness to provide exact fit-up with flanged, lug, and wafer styles of pipe system equipment. A specially designed gasket provides a leak-tight seal on both the pipe and the mating flange face.

The 14" thru 24" sizes of the Gruvlok Fig. 7012 Flange are cast in four segments. A sleek profile gasket design allows quick and easy assembly of the Gruvlok Flange onto the pipe.

All Gruvlok Fig. 7012 Flanges have designed-in anti-rotation tines which bite into and grip the sides of the pipe grooves to provide a secure, rigid connection.

The Gruvlok Fig. 7012 Flange requires the use of a steel adapter insert when used against rubber faced surfaces, wafer/lug design valves and serrated or irregular sealing surfaces. In copper systems a phenolic adapter insert is required, in place of the steel adapter insert. (See Installation and Assembly Instructions Section or contact your Anvil Rep. for details.)



Sizes 14" - 24"

c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

MATERIAL SPECIFICATIONS

LATCH BOLT/NUT (2" - 12")
SEGMENT BOLT/NUT (14" - 24"):
Heat treated, zinc electroplated, carbon steel oval neck track bolts conforming to ASTM A 183 and zinc electroplated heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard), Red (optional)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

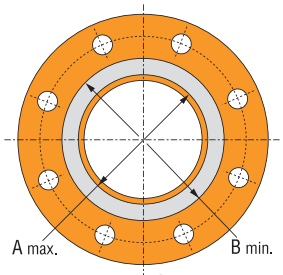
For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER.

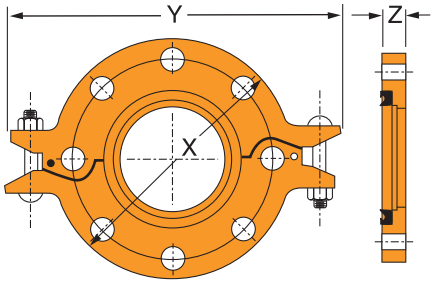
LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7012

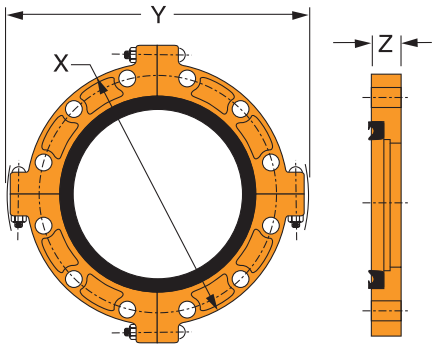
Gruvlok Flanges



Mating Flange



2"-12" sizes



14"-24" sizes

GRUVLOK FIGURE 7012 FLANGE: ANSI CLASS 150 OR ISO PN10 OR PN16 BOLT PATTERNS

Nominal Size	O.D.	Max. Working Pressure▼	Max. End Load▼	Latch Bolt			Dimensions			Sealing Surface		Mating Flange Bolts						Approx. Wt. Ea.
				Latch Bolt Size*	Specified Torque §		X	Y	Z	A Max.	B Min.	Mating Flange Bolts		Bolt Circle Diameter	Bolt Hole Diameter	Specified Torque §		
					Min.	Max.						Qty. ANSI	Size (ANSI)			Min.	Max.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*Ft.-Lbs/N-m*		*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*PN10 (16)*	*in. (ISO) mm*	*In./mm*	*In./mm*	*Ft.-Lbs/N-m*		*Lbs./Kg*
2	2.375	300	1,329	⅜ x 2¾	30	45	6¼	8⅜	¾	2⅜	3⁷⁄₁₆	4	⅝ x 2¾	4¾	¾	110	140	4.2
50	*60.3*	*20.7*	*5.91*	*M10 x 70*	*40*	*60*	*159*	*213*	*19*	*60*	*87*	*4*	*M16 x 70*	*120.7*	*19.1*	*149*	*190*	*1.9*
2½	2.875	300	1,948	⅜ x 2¾	30	45	7	9½	¾	2⅞	4	4	⅝ x 2¾	5½	¾	110	140	4.6
65	*73.0*	*20.7*	*8.66*	*M10 x 70*	*40*	*60*	*178*	*241*	*19*	*73*	*102*	*-*	*M16 x 70*	*139.7*	*19.1*	*149*	*190*	*2.1*
3 O.D.	*2.996*	*300*	*2,115*	-	*30*	*45*	*7¼*	*9¾*	*¾*	*3*	*4⅛*	-	-	-	-	*110*	*140*	*4.8*
76.1	76.1	20.7	9.41	M10 x 70	40	60	184	248	19	76	105	4	M16 x 70	-	-	149	190	2.2
3	3.500	300	2,886	⅜ x 2¾	30	45	7⅞	10½	¾	3½	4⁹⁄₁₆	4	⅝ x 2¾	6	¾	110	140	6.0
88.9	*88.9*	*20.7*	*12.84*	*M10 x 70*	*40*	*60*	*200*	*267*	*19*	*89*	*116*	*8*	*M16 x 70*	*152.4*	*19.1*	*149*	*190*	*2.7*
4	4.500	300	4,771	⅜ x 2¾	30	45	9	11½	¾	4½	5⁹⁄₁₆	8	⅝ x 2¾	7½	¾	110	140	6.3
100	*114.3*	*20.7*	*21.22*	*M10 x 70*	*40*	*60*	*229*	*292*	*19*	*114*	*141*	*8*	*M16 x 70*	*190.5*	*19.1*	*149*	*190*	*2.9*
5½ O.D.	*5.500*	*300*	*7,127*	-	*30*	*45*	*9⅞*	*12⅞*	*⅞*	*5⁹⁄₁₆*	*6¾*	-	-	-	-	*220*	*250*	*15.6*
139.7	139.7	20.7	31.70	M10 x 70	40	60	251	327	22	141	171	8	M16 x 75	-	-	298	339	7.1
5	5.563	300	7,292	⅜ x 2¾	30	45	10	12½	⅞	5⁹⁄₁₆	6¾	8	¾ x 2⅞	8½	⅞	220	250	8.8
125	*141.3*	*20.7*	*32.44*	*M10 x 70*	*40*	*60*	*254*	*318*	*22*	*141*	*171*	*-*	*-*	*215.9*	*22.2*	*298*	*339*	*4.0*
6½ O.D.	*6.500*	*300*	*9,955*	-	*30*	*45*	*11¼*	*14*	*⅞*	*6⅝*	*7¹³⁄₁₆*	-	-	-	-	*220*	*250*	*9.7*
165.1	165.1	20.7	44.28	M10 x 70	40	60	286	356	22	168	198	8	M20 x 80	-	-	298	339	4.4
6	6.625	300	10,341	⅜ x 2¾	30	45	11	14	⅞	6⅝	7¹³⁄₁₆	8	¾ x 3⅛	9½	⅞	220	250	9.6
150	*168.3*	*20.7*	*46.00*	*M10 x 70*	*40*	*60*	*279*	*356*	*22*	*168*	*198*	*8*	*M20 x 80*	*241.1*	*22.2*	*298*	*339*	*4.4*
8	8.625	300	17,528	⅜ x 2¾	30	45	13½	16½	1	8⅝	10	8	¾ x 3¼	11¾	⅞	220	250	15.6
200	*219.1*	*20.7*	*77.97*	*M10 x 70*	*40*	*60*	*343*	*419*	*25*	*219*	*254*	*8 (12)*	*M20 x 80*	*298.5*	*22.2*	*298*	*339*	*7.1*
10	10.750	300	27,229	⅜ x 2¾	30	45	16	19	1	10¾	12⅛	12	⅞ x 3½	14¼	1	320	400	18.2
250	*273.1*	*20.7*	*121.12*	*M10 x 70*	*40*	*60*	*406*	*483*	*25*	*273*	*308*	*12*	*M20 x 90*	*362.0*	*25.4*	*439*	*542*	*8.3*
12	12.750	300	38,303	⅜ x 2¾	30	45	19	21¾	1¼	12¾	14⅛	12	⅞ x 3¾	17	1	320	400	29.9
300	*323.9*	*20.7*	*170.38*	*M10 x 70*	*40*	*60*	*483*	*552*	*32*	*324*	*359*	*12*	-	*431.8*	*25.4*	*439*	*542*	*13.6*
12 (PN)	*12.750*	*300*	*38,303*	-	*30*	*45*	*18⅛*	*21¼*	*1*	*12¾*	*14⅛*	*12*	-	-	-	*320*	*400*	*20.9*
300	323.9	20.7	170.38	M10 x 70	40	60	460	540	25	324	359	12	M20 x 90 ✛	-	-	439	542	9.5
14	14.000	300	46,181	⅝ x 4¼	100	130	21	24	1½	14	16	12	1 x 4¼	18¾	1⅛	360	520	52.5
350	*355.6*	*20.7*	*205.43*	-	*136*	*176*	*533*	*610*	*38*	*356*	*406*	*-*	-	*476.3*	*28.6*	*488*	*705*	*23.8*
16	16.000	300	60,319	⅝ x 4¼	100	130	23½	26½	1½	16	18	16	1 x 4¼	21¼	1⅛	360	520	67.0
400	*406.4*	*20.7*	*268.31*	-	*136*	*176*	*597*	*673*	*38*	*406*	*457*	*-*	-	*539.8*	*28.6*	*488*	*705*	*30.4*
18	18.000	300	76,341	¾ x 5	130	180	25	29	1⅝	18	20	16	1⅛ x 4¾	22¾	1¼	450	725	82.5
450	*457.2*	*20.7*	*339.58*	-	*176*	*244*	*635*	*737*	*41*	*457*	*508*	*-*	–	*577.9*	*31.8*	*610*	*983*	*37.4*
20	20.000	300	94,248	¾ x 5	130	180	27½	31½	1¾	20	22	20	1⅛ x 4¾	25	1¼	450	725	106.5
500	*508.0*	*20.7*	*419.23*	-	*176*	*244*	*699*	*800*	*44*	*508*	*559*	*-*	–	*635.0*	*31.8*	*610*	*983*	*48.3*
24	24.000	250	113,097	⅞ x 5½	180	220	32	36½	1⅞	24	26	20	1¼ x 5½	29½	1⅜	620	1,000	138.5
600	*609.6*	*17.2*	*503.08*	-	*244*	*298*	*813*	*927*	*48*	*610*	*660*	*-*	-	*749.3*	*34.92*	*841*	*1,356*	*62.8*

NOTES:

The Gruvlok Flange bolt hole pattern conforms to ANSI Class 150 and Class 125 flanges.

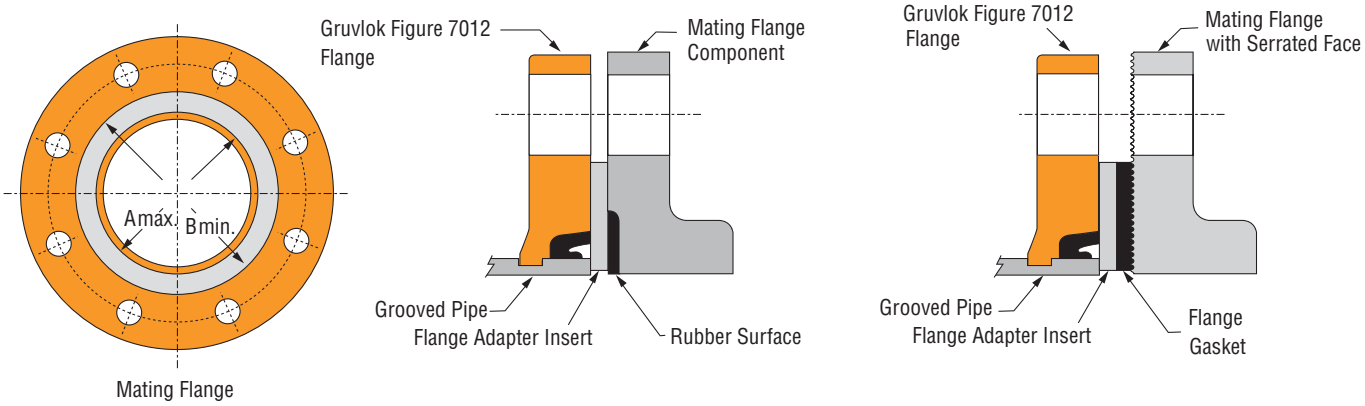
To avoid interference issues, flanges cannot be assembled directly to Series 7700 butterfly valve. Flange can be assembled to one side of series 7500 and 7600 valve only.

Mating flange bolts must be at least Intermediate Strength Bolting per ASME B16.5. Bolts with material properties equal or greater than SAE J429 Grade 5 are acceptable.

Refer to Gruvlok Products Catalog or Anvil's web site for more information on installing this flange.

For additional details see "Coupling Data Chart Notes" on page 17.
+ PN 16 uses M24 x 90 (PN) Dimensions for bolt circle PN 10 & 16 Flange.
* Available in ANSI or metric bolt sizes only as indicated.
▼ Based on use with standard wall pipe.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 162-163.

FIG. 7012
Gruvlok Flanges



A. The sealing surfaces A Max. to B Min. of the mating flange must be free from gouges, undulations and deformities of any type to ensure proper sealing of the gasket.

B. Gruvlok Flanges are to be assembled on butterfly valves so as not to interfere with actuator or handle operation.

C. Do not use Gruvlok Flanges within 90 degrees of one another on standard fittings because the outside dimensions may cause interference.

D. Gruvlok Flanges should not be used as anchor points for tierods across non-restrained joints.

E. Fig. 7012 Gruvlok Flange sealing gaskets require a hard flat surface for adequate sealing. The use of a Gruvlok Flange Adapter Insert is required for applications against rubber faced valves or other equipment. The Gruvlok Flange Adapter Insert is installed between the Gruvlok Flange sealing gasket and the mating flange or surface to provide a good sealing surface area.

F. Gruvlok Flanges are not recommended for use against formed rubber flanges.

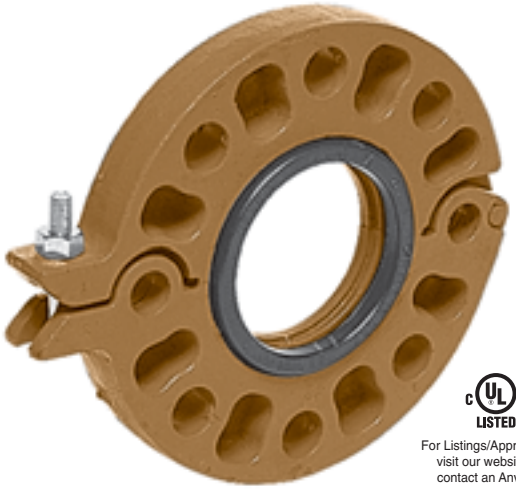
G. Contact an Anvil Representative for Di-Electric Flange connections.

Applications which require a Gruvlok Flange Adapter Insert:

1. When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok flange.
2. When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
3. When mating to a serrated flange surface, a standard full-faced flange gasket is installed against the serrated flange face and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard Flange gasket.
4. When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

FIG. 7013

Gruvlok Flanges (300# Flange)



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The Gruvlok Fig. 7013 300# Flange allows direct connection of Class 250 or Class 300 flanged components to a Gruvlok piping system. The two halves of the 2" thru 12" sizes of both Gruvlok Flanges are drawn together by a latch bolt which eases assembly on the pipe. A specially designed gasket provides a leak-tight seal on both the pipe and the mating flange face.

Gruvlok Flanges have designed-in anti-rotation tines which bite into and grip the side of the pipe groove to provide a secure, rigid connection.

Gruvlok flange adapter insert required when mating to rubber surfaces or serrated faced mating flanges.

*** The 7013 Gruvlok adapter flange should not be used with the 78FP or 7800 check valve.**

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

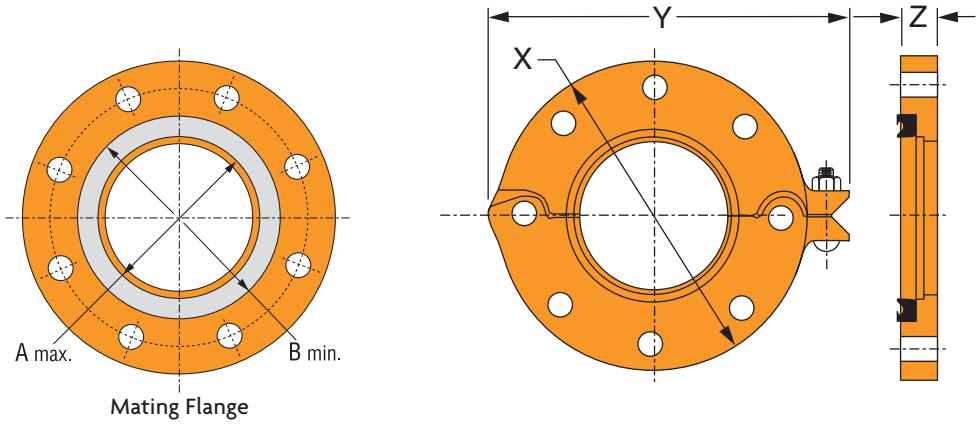
For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use for Grade "L")

FIG. 7013

Gruvlok Flanges (300# Flange)



GRUVLOK FIGURE 7013 FLANGE: ANSI CLASS 250 AND 300 BOLT PATTERN

Nominal Size	O.D.	Max. Wk. Pressure ▼	Max. End Load ▼	Latch* Bolt Size	Specified Torque §		Dimensions			Sealing Surface		Mating Flange Bolts				Approx. Wt. Ea.
					Min.	Max.	X	Y	Z	A Max.	B Min.	Qty. ANSI	Size (ANSI) in.	Bolt Circle Dia.	Bolt Hole Dia.	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In.*	*Ft.-Lbs/N-m*		*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*(ISO) mm*	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	750 *51.7*	3,323 *14.78*	⅜ x 2½ -	30 -	45 -	6½ *165*	8 *203*	1 *25*	2⅜ *60*	3 7/16 *87*	8 -	⅝ x 3 -	5 *127.0*	¾ *19.1*	5.0 *2.3*
2½ *65*	2.875 *73.0*	750 *51.7*	4,869 *21.66*	⅜ x 2½ -	30 -	45 -	7½ *191*	9⅛ *232*	1 *25*	2⅞ *73*	4 *102*	8 -	¾ x 3¼ -	5⅞ *149.2*	⅞ *22.2*	6.9 *3.1*
3 *80*	3.500 *88.9*	750 *51.7*	7,216 *32.10*	⅜ x 2½ -	30 -	45 -	8¼ *210*	9⅞ *251*	1⅛ *29*	3½ *89*	4 9/16 *116*	8 -	¾ x 3½ -	6⅝ *168.3*	⅞ *22.2*	9.4 *4.3*
4 *100*	4.500 *114.3*	750 *51.7*	11,928 *53.06*	⅜ x 2½ -	30 -	45 -	10 *254*	11⅜ *289*	1¼ *32*	4½ *114*	5⅝ *143*	8 -	¾ x 3¾ -	7⅞ *200.0*	⅞ *22.2*	14.4 *6.5*
5 *125*	5.563 *141.3*	750 *51.7*	18,229 *81.09*	⅜ x 2½ -	30 -	45 -	11 *279*	12⅝ *321*	1⅜ *35*	5 9/16 *141*	6¾ *171*	8 -	¾ x 4½ -	9¼ *235.0*	⅞ *22.2*	18.3 *8.3*
6 *150*	6.625 *168.3*	750 *51.7*	25,854 *115.00*	⅜ x 2½ -	30 -	45 -	12½ *318*	14⅛ *359*	1½ *38*	6⅝ *168*	7 13/16 *198*	12 -	¾ x 4½ -	10⅝ *269.9*	⅞ *22.2*	24.9 *11.3*
8 *200*	8.625 *219.1*	750 *51.7*	43,820 *194.92*	½ x 3½ -	80 -	100 -	15 *381*	16⅞ *429*	1⅝ *41*	8⅝ *219*	10 *254*	12 -	⅞ x 4¾ -	13 *330.2*	1 *25.4*	35.4 *16.1*
10 *250*	10.750 *273.1*	750 *51.7*	68,072 *302.80*	½ x 3½ -	80 -	100 -	17½ *445*	19⅜ *492*	1⅞ *48*	10¾ *273*	12⅛ *308*	16 -	1 x 5 -	15¼ *387.4*	1⅛ *28.6*	54.0 *24.5*
12 *300*	12.750 *323.9*	750 *51.7*	95,757 *425.95*	½ x 3½ -	80 -	100 -	20½ *521*	22½ *572*	2 *51*	12¾ *324*	14 3/16 *360*	16 -	1⅛ x 5¾ -	17¾ *450.9*	1¼ *31.8*	74.8 *33.9*

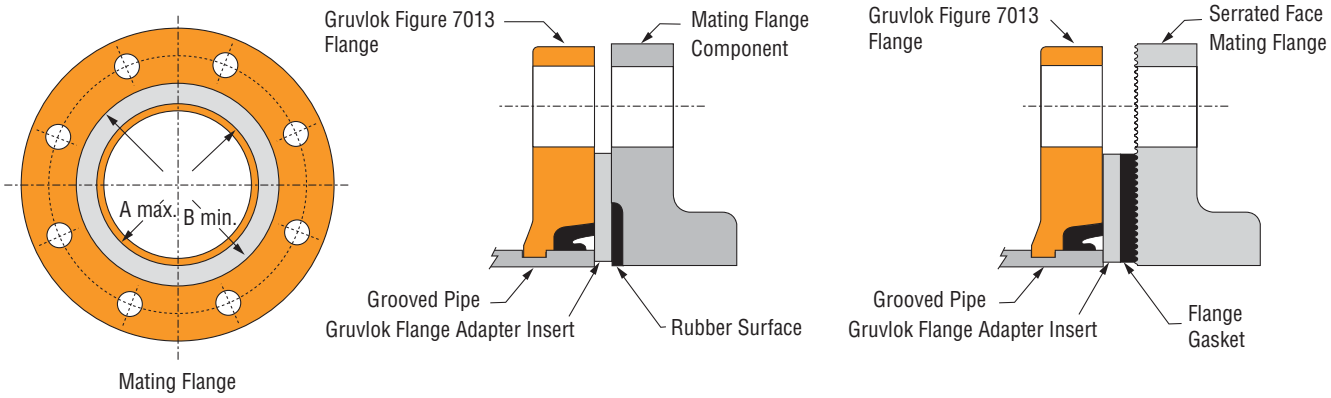
NOTES:

Effective sealing area of mating flange must be free from gouges, undulations or deformities of any type to ensure proper sealing of the gasket. Flange cannot be assembled directly to Series 7700 butterfly valve. Flange can be assembled to one side of series 7500 and 7600 valve.

For additional details see "Coupling Data Chart Notes" on page 17.
* Available in ANSI or metric bolt sizes only as indicated.
▼ Based on use with standard wall pipe.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions or contact your Anvil Representative
Not for use with copper systems.

FIG. 7013

Gruvlok Flanges (300# Flange)



A. The sealing surfaces A Max. to B Min. of the mating flange must be free from gouges, undulations and deformities of any type to ensure proper sealing of the gasket.

B. Gruvlok Flanges are to be assembled on butterfly valves so as not to interfere with actuator or handle operation.

C. Do not use Gruvlok Flanges within 90 degrees of one another on standard fittings because the outside dimensions may cause interference.

D. Gruvlok Flanges should not be used as anchor points for tierods across non-restrained joints.

E. Fig. 7013 Gruvlok Flange sealing gaskets require a hard flat surface for adequate sealing. The use of a Gruvlok Flange Adapter Insert is required for applications against rubber faced valves or other equipment. The Gruvlok Flange Adapter Insert is installed between the Gruvlok Flange sealing gasket and the mating flange or surface to provide a good sealing surface area.

F. Gruvlok Flanges are not recommended for use against formed rubber flanges.

G. Contact an Anvil Representative for Di-Electric Flange connections.

Applications which require a Gruvlok Flange Adapter Insert:

1. When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok flange.
2. When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
3. When mating to a serrated flange surface, a standard fullfaced flange gasket is installed against the serrated flange face and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard Flange gasket.
4. When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

FIG. 7240

Expansion Joints

NOTE: Expansion joint shown with shipping support. Contact an Anvil representative for proper installation support requirements.

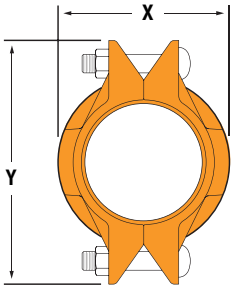
The Gruvlok® Figure 7240 Expansion Joints take advantage of the axial expansion capabilities of the Gruvlok flexible couplings to produce a reliable grooved end expansion joint. The expansion joints are comprised of the Gruvlok Figure 7000 or 7001 flexible couplings and precision machined grooved end pipe nipples. Ties are used to custom preset the expansion joints in the expanded, compressed or intermediate position to provide for the desired expansion and/or contraction compensation.

Installation is easy, simply follow the Gruvlok coupling installation and assembly instructions to install the expansion joint in the system and after installation is complete, remove the ties.

The expansion joints can be used as flexible connectors, however, they will not simultaneously provide for full axial expansion and angular deflection. Expansion joints require pipe anchoring capable of restraining the maximum system pressure end load.

The service conditions are the same as the service conditions for coupling and gasket used in the expansions joint. Unless otherwise requested, this product will contain a silicone based lubricant. Refer to the Gruvlok catalog for coupling performance capabilities and material specifications. To order please provide the order form on the page 213.

NOTE: The Gruvlok Figure 7240 Expansion Joint is also available in stainless steel for use in grooved copper systems.



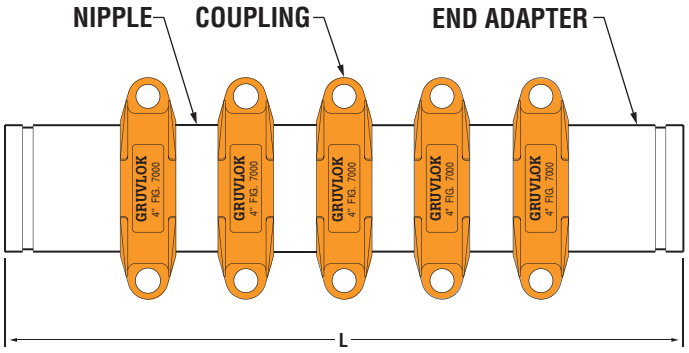
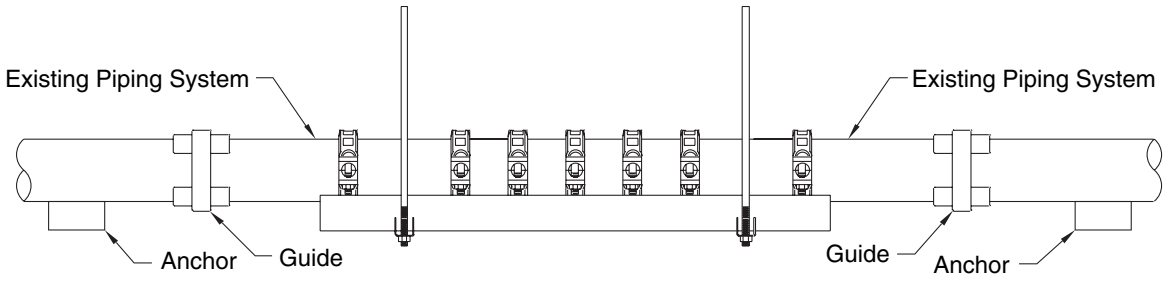


FIGURE 7240 PERFORMANCE DATA (INCHES)

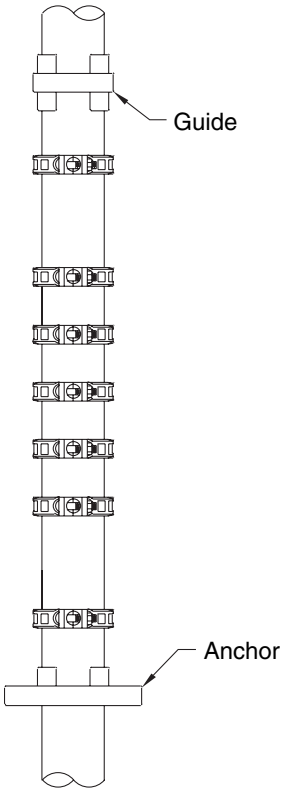
Nominal Size	O.D.	Coupling Figure	X	Y	Compressed Length L	Expanded Length L	Coupling Movement Capability	Number of Couplings	Total Movement Capability
In./DN(mm)	*In./mm*		*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*
2 *50*	2.375 *60.3*	7000	3½ *89*	5½ *125*	30 *762*	31¼ *794*	⅛ *3.2*	10	1¼ *31.8*
2½ *65*	2.875 *73.0*	7000	4 *100*	5¾ *146*	30 *762*	31¼ *794*	⅛ *3.2*	10	1¼ *31.8*
3 *80*	3.500 *88.9*	7000	4⅝ *117*	6¾ *171*	30 *762*	31¼ *794*	⅛ *3.2*	10	1¼ *31.8*
4 *100*	4.500 *114.3*	7000	5⅞ *149*	8⅛ *206*	17½ *445*	18¾ *476*	¼ *6.4*	5	1¼ *31.8*
5 *125*	5.562 *141.3*	7000	7 *178*	9⅝ *244*	19 *483*	20¼ *514*	¼ *6.4*	5	1¼ *31.8*
6 *150*	6.625 *168.3*	7000	8 *200*	11 *279*	19 *483*	20¼ *514*	¼ *6.4*	5	1¼ *31.8*
8 *200*	8.625 *219.0*	7000	10⅜ *264*	13¼ *337*	22½ *572*	23¾ *603*	¼ *6.4*	5	1¼ *31.8*
10 *250*	10.750 *273.1*	7001	12⅞ *327*	17½ *445*	23½ *597*	24¾ *629*	¼ *6.4*	5	1¼ *31.8*
12 *300*	12.750 *323.9*	7001	15 *381*	19½ *495*	23½ *597*	24¾ *629*	¼ *6.4*	5	1¼ *31.8*

FIG. 7240
Expansion Joints

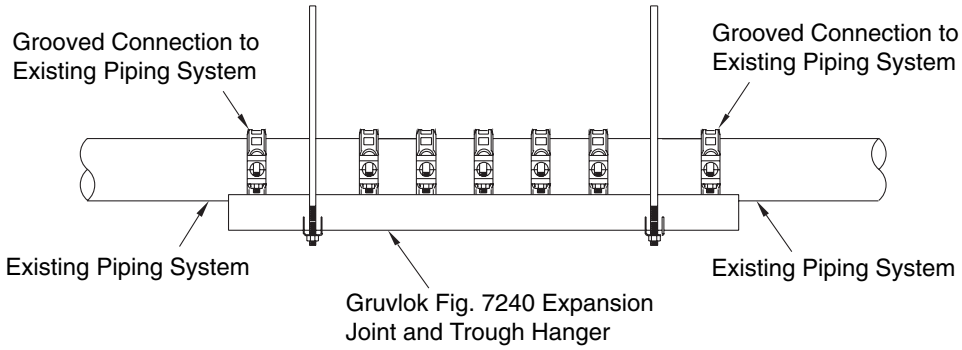
HANGER DETAILS



Vertical Support



Horizontal Support



Gruvlok Fig. 7240 Expansion Joint and Trough Hanger

Trough and Hanger

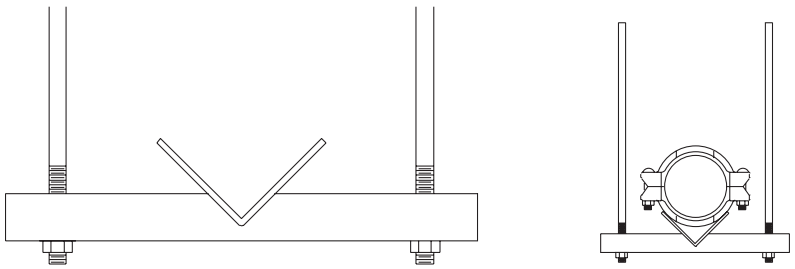


FIG. 7042
Outlet Coupling

The Gruvlok Fig. 7042 Outlet Coupling is designed to join two sections of grooved end pipe and form a reducing outlet connection. The outlet couplings are available for the 1 1/2" through 6" IPS or ISO run pipe sizes with the outlet pipe sizes ranging from 1/2" through 2".

Assembly of the coupling will create a gap between the pipe ends allowing the space required for the introduction of an outlet connection. The outlet connections are available grooved (Fig. 7042G), FPT (Fig. 7042F) and MPT (Fig. 7042M).

The gaskets are available in EPDM and Nitrile to suit a wide range of applications. The gasket design is a unique pressure responsive design that provides a higher sealing force as pressure is increased. The outlet gasket seal is reinforced by a steel ring and is mated to a machined housing surface to assure a leak-tight outlet seal. Center ribs inside the gasket ease positioning of the pipe during installation and provide additional support to the gasket. The outlet couplings are NOT recommended for vacuum applications.

The Figure 7074 Cast Caps are **NOT** recommended for use on run connections. Figure 7075 Bull Plugs must be used on end of line run connections. Figure 7074 Cast Caps may be used on Figure 7042G outlet connections. Flow into the outlet connection of the Figure 7042 Outlet Couplings must not exceed 7 ft./sec.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

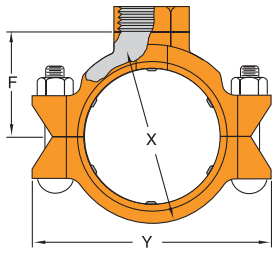
Grade "E" EPDM (Green color code)
-40°F to 150°F (Service Temperature Range)(-40°C to 66°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)
-20°F to 150°F (Service Temperature Range)(-29°C to 66°C)
Recommended for petroleum applications. air with oil vapor and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

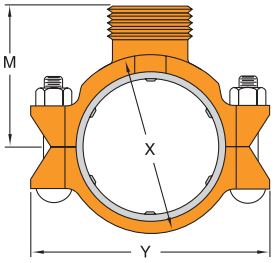
LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™(Do Not use with Grade "L")

FIG. 7042

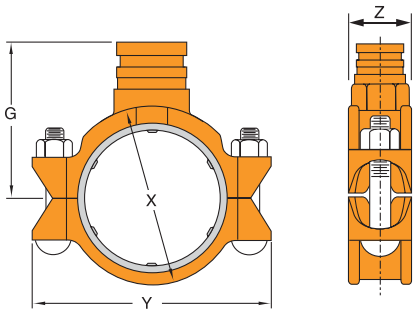
Outlet Coupling



Female IPS Outlet- 7042F



Male IPS Outlet - 7042M



Grooved Outlet - 7042G

FIGURE 7042 - OUTLET COUPLING

Nominal Pipe Size			Working Pressure	Max. Run End Load	Range of Pipe End Separation	Coupling Dimensions						Bolt Size	Approx. Wt. Each
Run	Outlet					X	Y	Z	FPT F	MPT M	Grv. G		
	FPT F	MPT/Grv. M/G											
In./DN(mm)	*In./mm*	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
	½	—	500	1418	¾-1 1/16	2 15/16	4¾	2¾	2 1/16	—	—	⅜ x 2⅛	2.6
	15	—	*34.5*	*6.31*	*19-27*	*75*	*121*	*70*	*52*	—	—	-	*1.2*
1½	¾	—	500	1418	¾-1 1/16	2 15/16	4¾	2¾	2 1/16	—	—	⅜ x 2⅛	2.6
40	*20*	—	*34.5*	*6.31*	*19-27*	*75*	*121*	*70*	*52*	—	—	-	*1.2*
	1	—	500	1418	¾-1 1/16	2 15/16	4¾	2¾	1 15/16	—	—	⅜ x 2⅛	2.9
	25	—	*34.5*	*6.31*	*19-27*	*75*	*121*	*70*	*49*	—	—	-	*1.3*
	½	—	500	2215	1 1/16-1	3 7/16	5¼	2¾	2 5/16	—	—	⅜ x 2⅛	3.1
	15	—	*34.5*	*9.85*	*17-25*	*87*	*133*	*70*	*59*	—	—	-	*1.4*
2	¾	—	500	2215	1 1/16-1	3 7/16	5¼	2¾	2 5/16	—	—	⅜ x 2⅛	3.1
50	*20*	—	*34.5*	*9.85*	*17-25*	*87*	*133*	*70*	*59*	—	—	-	*1.4*
	1	1	500	2215	1 1/16-1	3 7/16	5¼	2¾	2 3/16	2⅞	3½	⅜ x 2⅛	3.3
	25	*25*	*34.5*	*9.85*	*17-25*	*87*	*133*	*70*	*56*	*73*	*89*	-	*1.5*
	½	—	500	3246	1 3/16-1½	4 3/16	6½	3¼	2 9/16	—	—	½ x 2⅜	4.8
	15	—	*34.5*	*14.44*	*30-38*	*106*	*165*	*83*	*65*	—	—	-	*2.2*
	¾	—	500	3246	1 3/16-1½	4 3/16	6½	3¼	2 9/16	—	—	½ x 2⅜	4.6
2½	*20*	—	*34.5*	*14.44*	*30-38*	*106*	*165*	*83*	*65*	—	—	-	*2.1*
65	1	—	500	3246	1 3/16-1½	4 3/16	6½	3¼	2 7/16	—	—	½ x 2⅜	4.4
	25	—	*34.5*	*14.44*	*30-38*	*106*	*165*	*83*	*62*	—	—	-	*2.2*
	—	1¼	500	3246	1 3/16-1½	4 3/16	6½	3¼	—	3⅝	3⅝	½ x 2⅜	5.1
	—	*32*	*34.5*	*14.44*	*30-38*	*106*	*165*	*83*	—	*92*	*92*	-	*2.3*
	—	1½	500	3246	1 3/16-1½	4 3/16	6½	3¼	—	3⅝	3⅝	½ x 2⅜	5.9
	—	*40*	*34.5*	*14.44*	*30-38*	*106*	*165*	*83*	—	*92*	*92*	-	*2.4*
	¾	—	500	4811	1 3/16-1½	4¾	7¼	3¼	2 13/16	—	—	½ x 3	5.9
	20	—	*34.5*	*21.40*	*30-38*	*121*	*184*	*83*	*72*	—	—	-	*2.7*
3	1	1	500	4811	1 3/16-1½	4¾	7¼	3¼	2¾	3⅜	4	½ x 3	6.2
80	*25*	*25*	*34.5*	*21.40*	*30-38*	*121*	*184*	*83*	*70*	*86*	*102*	-	*2.8*
	—	1½	500	4811	1 3/16-1½	4¾	7¼	3¼	—	4	4	½ x 3	6.4
	—	*40*	*34.5*	*21.40*	*30-38*	*121*	*184*	*83*	—	*102*	*102*	-	*2.9*
	¾	—	500	7952	1 9/16-1⅞	6 3/16	8⅞	3⅝	3 11/16	—	—	⅝ x 3½	9.2
	20	—	*34.5*	*35.37*	*40-48*	*157*	*225*	*92*	*94*	—	—	-	*4.2*
	1	—	500	7952	1 9/16-1⅞	6 3/16	8⅞	3⅝	3 9/16	—	—	⅝ x 3½	9.5
4	*25*	—	*34.5*	*35.37*	*40-48*	*157*	*225*	*92*	*91*	—	—	-	*4.3*
100	—	1½	500	7952	1 9/16-1⅞	6 3/16	8⅞	3⅝	—	4⅞	4⅞	⅝ x 3½	9.5
	—	*40*	*34.5*	*35.37*	*40-48*	*157*	*225*	*92*	—	*124*	*124*	-	*4.3*
	—	2	500	7952	1 9/16-1⅞	6 3/16	8⅞	3⅝	—	4⅞	4⅞	⅝ x 3½	9.9
	—	*50*	*34.5*	*35.37*	*40-48*	*157*	*225*	*92*	—	*124*	*124*	-	*4.5*
	1	—	500	17236	1⅝-1 15/16	8⅛	11¼	3 11/16	4¾	—	—	⅝ x 3½	13.2
	25	—	*34.5*	*76.66*	*41-51*	*206*	*286*	*94*	*121*	—	—	-	*6.0*
6	1½	1½	500	17236	1⅝-1 15/16	8⅛	11¼	3 11/16	4¾	6	6	⅝ x 3½	13.6
150	*40*	*40*	*34.5*	*76.66*	*41-51*	*206*	*286*	*94*	*121*	*154*	*152*	-	*6.2*
	—	2	500	17236	1⅝-1 15/16	8⅛	11¼	3 11/16	—	6	6	⅝ x 3½	14.3
	—	*50*	*34.5*	*76.66*	*41-51*	*206*	*286*	*94*	—	*154*	*152*	-	*6.5*

NOTES:

Pipe ends must be prepared in accordance with Gruvlok "Roll or Cut Groove Specifications for Steel and Other IPS or ISO size Pipe".
Pressure and end load ratings are for use with standard wall steel pipe.
For a one-time field test only, the maximum working pressure may be increased 1½ times the figure shown.

For additional details see "Coupling Data Chart Notes" on page 17.
See Installation & Assembly directions on page 165.
Not for use in copper systems.

FIG. 7045

Clamp-T, FPT Branch

c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

The Gruvlok Clamp-T provides a quick and easy outlet at any location along the pipe. A hole drilled or cut in the pipe to receive the locating collar of the Clamp-T is all that is required. The full, smooth outlet area provides for optimum flow characteristics.

The Clamp-T housing is specially engineered to conform to the pipe O.D. and the Clamp-T gasket providing a leak tight reliable seal in both positive pressure and vacuum conditions. The maximum working pressure for all sizes is 500 PSI (34.5 bar) when assembled on standard wall steel pipe.

The Gruvlok Clamp-T provides for a branch or cross connection in light wall or standard wall steel pipe.

The Fig. 7045 Clamp-T female pipe thread branch is available with NPT or ISO 7/1 connection and the Fig. 7046 Clamp-T has grooved-end branch connection.

Clamp-T cross connections are available in various sizes allowing greater versatility in piping design.

NOTE: Variable End Configurations are Possible — Thd x Thd and Gr. x Thd.
Sizes — 2" x 1/2" through 8" x 4"

CLAMP-T FLOW DATA (FRICTIONAL RESISTANCE)

Branch Size Inches	Fig. 7045 Threaded Branch	
	C.V. Value	Equiv. Pipe Length Feet
DN/mm		*Meters*
1/2	22	1.0
15	-	*0.3*
3/4	25	2.0
20	-	*0.6*
1	44	2.0
25	-	*0.6*
1 1/4	76	2.5
32	-	*0.8*
1 1/2	89	4.0
40	-	*1.2*
2	164	3.5
50	-	*1.1*
2 1/2	152	12.5
65	-	*3.8*
3	318	8.5
80	-	*2.6*
4	536	8.0
100	-	*2.4*

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

U-BOLT:
Cold drawn steel and zinc plated.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements Contact an Anvil Representative for more information.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7045

Clamp-T, FPT Branch

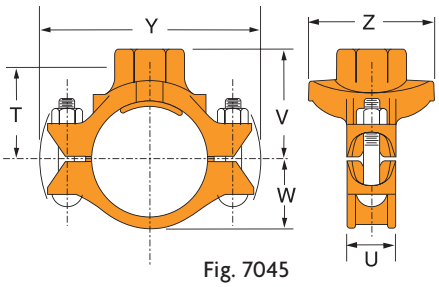


Fig. 7045

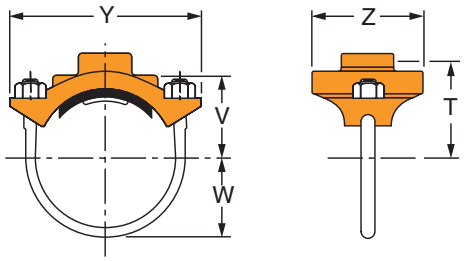


Fig. 7045 (U-Bolt)

FIGURE 7045-FPT BRANCH (TABLE CONTINUES TO NEXT PAGE)

Nominal Size	O.D.	Hole Dimensions		▼ Max. Working Pressure	Clamp-T Dimensions						Bolt Size	Specified Torque §		Approx. Wt. Each
		Min. Diameter	Max. Diameter		T	U	V Threaded	W	Y	Z		Min.	Max.	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Ft.-Lbs/N-m*		*Lbs./Kg*
2 x ½ *50 x 15*	2.375 x 0.840 *60.3 x 21.3*	1½ *38*	1⅝ *41*	500 *34.5*	2 3/16 *56*	9/16 *14*	2⅝ *67*	½ *12*	5½ *140*	3 *76*	½ U-Bolt -	30	40	2.3 *1.0*
2 x ¾ *50 x 20*	2.375 x 1.050 *60.3 x 26.7*	1½ *38*	1⅝ *41*	500 *34.5*	2 1/16 *52*	9/16 *14*	2⅝ *67*	1½ *38*	5½ *140*	3 *76*	½ U-Bolt -	30	40	2.3 *1.0*
2 x 1 *50 x 25*	2.375 x 1.315 *60.3 x 33.7*	1½ *38*	1⅝ *41*	500 *34.5*	1 15/16 *51*	9/16 *14*	2⅝ *67*	1½ *38*	5½ *140*	3 *76*	½ U-Bolt -	30	40	2.6 *1.2*
2 x 1¼ *50 x 32*	2.375 x 1.660 *60.3 x 42.4*	2 *51*	2⅛ *54*	500 *34.5*	2 3/16 *55*	9/16 *14*	2⅞ *73*	1½ *38*	5½ *140*	3½ *89*	½ U-Bolt -	30	40	2.7 *1.2*
2 x 1½ *50 x 40*	2.375 x 1.900 *60.3 x 48.3*	2 *51*	2⅛ *54*	500 *34.5*	2 3/16 *55*	9/16 *14*	2⅞ *73*	1½ *38*	7 *178*	3½ *89*	½ U-Bolt -	30	40	2.5 *1.1*
2½ x ½ *65 x 15*	2.875 x 0.840 *73.0 x 21.3*	1½ *38*	1⅝ *41*	500 *34.5*	2 7/16 *62*	9/16 *14*	2⅞ *73*	1¾ *44*	5½ *140*	3 *76*	½ U-Bolt -	30	40	3.0 *1.4*
2½ x ¾ *65 x 20*	2.875 x 1.050 *73.0 x 26.7*	1½ *38*	1⅝ *41*	500 *34.5*	2 5/16 *59*	9/16 *14*	2⅞ *73*	1¾ *44*	5½ *140*	3 *76*	½ U-Bolt -	30	40	2.9 *1.3*
2½ x 1 *65 x 25*	2.875 x 1.315 *73.0 x 33.7*	1½ *38*	1⅝ *41*	500 *34.5*	2 3/16 *55*	9/16 *14*	2⅞ *73*	1¾ *44*	6⅛ *156*	3 *76*	½ U-Bolt -	30	40	2.9 *1.3*
2½ x 1¼ *65 x 32*	2.875 x 1.660 *73.0 x 42.4*	2 *51*	2⅛ *54*	500 *34.5*	2 7/16 *62*	9/16 *14*	3⅛ *79*	1¾ *44*	6⅛ *156*	3⅜ *86*	½ U-Bolt -	30	40	3.4 *1.5*
2½ x 1½ *65 x 40*	2.875 x 1.900 *73.0 x 48.3*	2 *51*	2⅛ *54*	500 *34.5*	2 7/16 *62*	9/16 *14*	3⅛ *79*	1¾ *44*	6⅛ *156*	3⅜ *86*	½ U-Bolt -	30	40	3.4 *1.5*
3 x ½ *80 x 15*	3.500 x 0.840 *88.9 x 21.3*	1½ *38*	1⅝ *41*	500 *34.5*	2 9/16 *65*	9/16 *14*	3 *76*	2⅛ *54*	7 *178*	3¾ *95*	½ U-Bolt -	30	40	2.8 *1.2*
3 x ¾ *80 x 20*	3.500 x 1.050 *88.9 x 26.7*	1½ *38*	1⅝ *41*	500 *34.5*	2 7/16 *62*	9/16 *14*	3 *76*	2⅛ *54*	7 *178*	3¾ *95*	½ U-Bolt -	30	40	2.7 *1.2*
3 x 1 *80 x 25*	3.500 x 1.315 *88.9 x 33.7*	1½ *38*	1⅝ *41*	500 *34.5*	2 5/16 *59*	9/16 *14*	3 *76*	2⅛ *54*	7 *178*	3¾ *95*	½ U-Bolt -	30	40	2.7 *1.2*
3 x 1¼ *80 x 32*	3.500 x 1.660 *88.9 x 42.4*	2 *51*	2⅛ *54*	500 *34.5*	2 11/16 *68*	1½ *38*	3⅜ *86*	2⅛ *54*	6⅞ *175*	3¾ *95*	½x 2¾ -	80	100	3.4 *1.5*
3 x 1½ *80 x 40*	3.500 x 1.900 *88.9 x 48.3*	2 *51*	2⅛ *54*	500 *34.5*	2 11/16 *68*	1½ *38*	3⅜ *86*	2⅛ *54*	6⅞ *175*	3¾ *95*	½ x 2¾ -	80	100	4.4 *2.0*
3 x 2 *80 x 50*	3.500 x 2.375 *88.9 x 60.3*	2½ *64*	2⅝ *67*	500 *34.5*	2 11/16 *68*	1½ *38*	3⅜ *86*	2⅛ *54*	6⅞ *175*	4⅛ *105*	½ x 2¾ -	80	100	4.6 *2.1*
4 x ½ *100 x 15*	4.500 x 0.840 *114.3 x 21.3*	1½ *38*	1⅝ *41*	500 *34.5*	3 1/16 *76*	9/16 *14*	3½ *89*	2⅝ *67*	7¾ *197*	3¾ *95*	½ U-Bolt -	30	40	2.9 *1.3*
4 x ¾ *100 x 20*	4.500 x 1.050 *114.3 x 26.7*	1½ *38*	1⅝ *41*	500 *34.5*	3 1/16 *78*	9/16 *14*	3½ *89*	2⅝ *67*	7¾ *197*	3¾ *95*	½ U-Bolt -	30	40	2.8 *1.3*
4 x 1 *100 x 25*	4.500 x 1.315 *114.3 x 33.7*	1½ *38*	1⅝ *41*	500 *34.5*	2 13/16 *73*	9/16 *14*	3½ *89*	2⅝ *67*	7¾ *197*	3¾ *95*	½ U-Bolt -	30	40	2.7 *1.2*
4 x 1¼ *100 x 32*	4.500 x 1.660 *114.3 x 42.4*	2 *51*	2⅛ *54*	500 *34.5*	3 3/16 *81*	1⅞ *48*	3⅞ *98*	2⅝ *67*	7½ *191*	3¾ *95*	½ x 2¾ -	80	100	4.5 *2.0*
4 x 1½ *100 x 40*	4.500 x 1.900 *114.3 x 48.3*	2 *51*	2⅛ *54*	500 *34.5*	3 3/16 *81*	1⅞ *48*	3⅞ *98*	2⅝ *67*	7½ *191*	3¾ *95*	½ x 2¾ -	80	100	4.6 *2.1*
4 x 2 *100 x 50*	4.500 x 2.375 *114.3 x 60.3*	2½ *64*	2⅝ *67*	500 *34.5*	3 5/16 *84*	1⅞ *48*	4 *102*	2⅝ *67*	7½ *191*	4⅛ *105*	½ x 2¾ -	80	100	7.7 *3.5*
4 x 2½ *100 x 65*	4.500 x 2.875 *114.3 x 73.0*	2¾ *70*	2⅞ *73*	500 *34.5*	3 11/16 *78*	1⅞ *48*	4 *102*	2⅝ *67*	7½ *191*	4⅜ *111*	½ x 2¾ -	80	100	5.2 *2.4*
4 x 3 O.D. 100 x 80	*4.500 x 2.996* 114.3 x 76.1	*2¾* 70	*2⅞* 73	*500* 34.5	*3* 76	*1⅛* 48	*4* 102	*2⅝* 67	*7½* 191	*4⅜* 111	*½ x 2¾* -	*80*	*100*	*5.2* 2.4
4 x 3 *100 x 80*	4.500 x 3.500 *114.3 x 88.9*	3½ *89*	3⅝ *92*	500 *34.5*	3¼ *83*	1⅞ *48*	4¼ *108*	2⅝ *67*	7½ *191*	5¼ *133*	½ x 3½ -	80	100	6.5 *2.9*

NOTE:
2½", 5" and 6" Nom. Run pipe size Clamp-T may be used on 3" O.D., 5½" O.D. and 6½" O.D. pipe.

(Additional larger sizes on next page.)

▼ Based on use with standard wall pipe.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 166.
Not for use with copper systems.

FIG. 7045

Clamp-T, FPT Branch

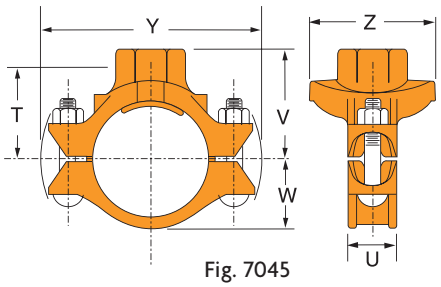


Fig. 7045

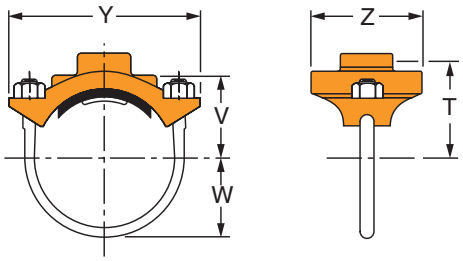


Fig. 7045 (U-Bolt)

FIGURE 7045-FPT BRANCH (CONTINUED FROM PREVIOUS PAGE)

Nominal Size	O.D.	Hole Dimensions		▼ Max. Working Pressure	Clamp-T Dimensions						Bolt Size	Specified Torque §		Approx. Wt. Each
		Min. Diameter	Max. Diameter		T	U	V Threaded	W	Y	Z		Min.	Max.	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Ft.-Lbs/N-m*		*Lbs./Kg*
5 x 1¼	5.563 x 1.660	2	2⅛	500	3 1/16	1⅞	4⅜	3¼	9⅛	3¾	⅝ x 3¼	100	130	5.4
125 x 32	*141.3 x 42.4*	*51*	*54*	*34.5*	*94*	*48*	*111*	*83*	*232*	*95*	-			*2.4*
5 x 1½	5.563 x 1.900	2	2⅛	500	3 1/16	1⅞	4⅜	3¼	9⅛	3¾	⅝ x 3¼	100	130	5.5
125 x 40	*141.3 x 48.3*	*51*	*54*	*34.5*	*94*	*48*	*111*	*83*	*232*	*95*	-			*2.5*
5 x 2	5.563 x 2.375	2½	2⅝	500	3 3/16	1⅞	4½	3¼	9⅛	4⅛	⅝ x 3¼	100	130	5.7
125 x 50	*141.3 x 60.3*	*64*	*67*	*34.5*	*97*	*48*	*114*	*83*	*232*	*105*	-			*2.6*
5 x 2½	5.563 x 2.875	2¾	2⅞	500	3 3/16	1⅞	4¾	3¼	9⅛	4⅜	⅝ x 3¼	100	130	7.0
125 x 65	*141.3 x 73.0*	*70*	*73*	*34.5*	*97*	*48*	*121*	*83*	*232*	*111*	-			*3.2*
5 x 3 O.D.	*5.563 x 2.996*	*2¾*	*2⅞*	*500*	*3¾*	*1⅞*	*4¾*	*3¼*	*9⅛*	*4⅜*	*⅝ x 3¼*	*130*	*180*	*7.0*
125 x 80	141.3 x 76.1	70	73	34.5	95	48	121	83	232	111	-			3.2
5 x 3	5.563 x 3.500	3½	3⅝	500	4	1⅞	5	3¼	9⅛	5¼	⅝ x 3¼	100	130	8.7
125 x 80	*141.3 x 88.9*	*89*	*92*	*34.5*	*102*	*48*	*127*	*83*	*232*	*133*	-			*3.9*
6 x 1¼	6.625 x 1.660	2	2⅛	500	4 3/16	2	4⅞	3⅞	10⅛	3¾	⅝ x 4¼	100	130	7.8
150 x 32	*168.3 x 42.4*	*51*	*54*	*34.5*	*106*	*51*	*124*	*98*	*257*	*95*	-			*3.5*
6 x 1½	6.625 x 1.900	2	2⅛	500	4 3/16	2	4⅞	3⅞	10⅛	3¾	⅝ x 4¼	100	130	7.8
150 x 40	*168.3 x 48.3*	*51*	*54*	*34.5*	*106*	*51*	*124*	*98*	*257*	*95*	-			*3.5*
6 x 2	6.625 x 2.375	2½	2⅝	500	4 3/16	2	4⅞	3⅞	10⅛	4⅛	⅝ x 4¼	100	130	7.8
150 x 50	*168.3 x 60.3*	*64*	*67*	*34.5*	*106*	*51*	*124*	*98*	*257*	*105*	-			*3.5*
6 x 2½	6.625 x 2.875	2¾	2⅞	500	4 3/16	2	5⅛	3⅞	10⅛	4⅜	⅝ x 4¼	100	130	8.4
150 x 65	*168.3 x 73.0*	*70*	*73*	*34.5*	*106*	*51*	*130*	*98*	*257*	*111*	-			*3.8*
6 x 3 O.D.	*6.625 x 2.996*	*2¾*	*2⅞*	*500*	*4⅛*	*2*	*5⅛*	*3⅞*	*10⅛*	*4⅜*	*⅝ x 4¼*	*100*	*130*	*8.4*
150 x 80	168.3 x 76.1	70	73	34.5	105	51	130	98	257	111	-			3.8
6 x 3	6.625 x 3.500	3½	3⅝	500	4⅜	2	5⅜	3⅞	10⅛	5¼	⅝ x 4¼	100	130	9.6
150 x 80	*168.3 x 88.9*	*89*	*92*	*34.5*	*111*	*51*	*137*	*98*	*257*	*133*	-			*4.4*
6 x 4	6.625 x 4.500	4½	4⅝	500	4⅜	2	5½	3⅞	10⅛	6½	⅝ x 4¼	100	130	10.5
150 x 100	*168.3 x 114.3*	*114*	*117*	*34.5*	*111*	*51*	*140*	*98*	*257*	*165*	-			*4.8*
8 x 2	8.625 x 2.750	2½	2⅝	500	5 3/16	2¼	5⅞	5	12¾	4⅛	¾ x 4¼	130	180	11.3
200 x 50	*219.1 x 70.0*	*64*	*67*	*34.5*	*132*	*57*	*149*	*127*	*324*	*105*	-			*5.1*
8 x 2½	8.625 x 2.875	2¾	2⅞	500	5 5/16	2¼	6¼	5	12¾	4⅜	¾ x 4½	130	180	11.1
200 x 65	*219.1 x 73.0*	*70*	*73*	*34.5*	*134*	*57*	*159*	*127*	*324*	*111*	-			*5.0*
8 x 3 O.D.	*8.625 x 2.996*	*2¾*	*2⅞*	*500*	*5¼*	*2¼*	*6¼*	*5*	*12¾*	*4⅜*	*¾ x 4½*	*130*	*180*	*11.1*
200 x 80	219.1 x 76.1	70	73	34.5	133	57	159	127	324	111	-			5.0
8 x 3	8.625 x 3.500	3½	3⅝	500	5⅜	2¼	6⅜	5	12¾	5¼	¾ x 4½	130	180	13.0
200 x 80	*219.1 x 88.9*	*89*	*92*	*34.5*	*137*	*57*	*162*	*127*	*324*	*133*	-			*5.9*
8 x 4	8.625 x 4.500	4½	4⅝	500	5⅜	2¼	6½	5	12¾	6½	¾ x 4½	130	180	16.2
200 x 100	*219.1 x 114.3*	*114*	*117*	*34.5*	*137*	*57*	*165*	*127*	*324*	*165*	-			*7.3*

NOTE:
2½", 5" and 6" Nom. Run pipe size Clamp-T may be used on 3" O.D., 5½" O.D. and 6½" O.D. pipe.

(Additional smaller sizes on previous page.)

▼ Based on use with standard wall pipe.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 166.
Not for use with copper systems.

FIG. 7046

Clamp-T, Grooved Branch

c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

The Gruvlok Clamp-T provides a quick and easy outlet at any location along the pipe. A hole drilled or cut in the pipe to receive the locating collar of the Clamp-T is all that is required. The full, smooth outlet area provides for optimum flow characteristics.

The Clamp-T housing is specially engineered to conform to the pipe O.D. and the Clamp-T gasket providing a leak-tight reliable seal in both positive pressure and vacuum conditions. The maximum working pressure for all sizes is 500 PSI (34.5 bar) when assembled on standard wall steel pipe.

The Gruvlok Clamp-T provides for a branch or cross connection in light wall or standard wall steel pipe.

Clamp-T cross connections are available in most sizes allowing greater versatility in piping design.

CLAMP-T FLOW DATA (FRICTIONAL RESISTANCE)

Branch Size	Fig. 7046 Grooved Branch	
	C.V. Value	Equiv. Pipe Length
In./DN/mm		*Ft./Meters*
1¼ *32*	5.4	5.0 *1.5*
1½ *40*	95	3.5 *1.1*
2 *50*	148	4.5 *1.4*
2½ *65*	205	7.0 *2.1*
3 *80*	294	9.5 *2.9*
4 *100*	571	7.0 *2.1*

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

U-BOLT:
Cold drawn steel and zinc plated.

STAINLESS STEEL BOLTS & NUTS:
Stainless Steel Bolts and Nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative for more information.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

FIG. 7046

Clamp-T, Grooved Branch

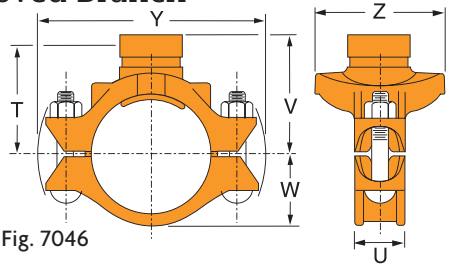


Fig. 7046

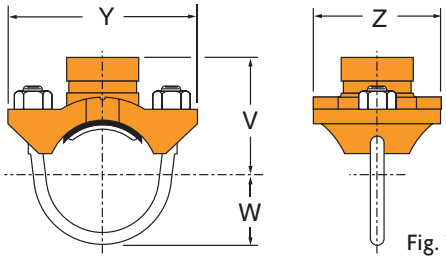


Fig. 7046 (U-Bolt)

FIGURE 7046-GR BRANCH

Nominal Size	O.D.	Hole Dimensions		▼ Max. Working Pressure	Clamp-T Dimensions					Bolt Size	Specified Torque §		Approx. Wt. Each
		Min. Diameter	Max. Diameter		U	V Grooved	W	Y	Z		Min.	Max.	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Ft.-Lbs/N-m*		*Lbs./Kg*
2½ x 1¼•	2.875 x 1.660	2	2⅛	500	9⁄16	3⅛	1¾	6⅛	3½	½ U-Bolt	30	40	3.4
65 x 32	*73.0 x 42.4*	*51*	*54*	*34.5*	*14*	*79*	*44*	*156*	*89*	-			*1.5*
2½ x 1½	2.875 x 1.900	2	2⅛	500	9⁄16	3⅛	1¾	6⅛	3½	½ U-Bolt	30	40	3.4
65 x 40	*73.0 x 48.3*	*51*	*54*	*34.5*	*14*	*79*	*44*	*156*	*89*	-			*1.5*
3 x 1¼	3.500 x 1.660	2	2⅛	500	1½	3½	2⅛	6⅞	3¾	½ x 2¾	80	100	3.4
80 x 32	*88.9 x 42.4*	*51*	*54*	*34.5*	*38*	*89*	*54*	*175*	*95*	-			*1.5*
3 x 1½	3.500 x 1.900	2	2⅛	500	1½	3½	2⅛	6⅞	3¾	½ x 2¾	80	100	4.4
80 x 40	*88.9 x 48.3*	*51*	*54*	*34.5*	*38*	*89*	*54*	*175*	*95*	-			*2.0*
3 x 2	3.500 x 2.375	2½	2⅝	500	1½	3½	2⅛	6⅞	4⅛	½ x 2¾	80	100	4.6
80 x 50	*88.9 x 60.3*	*64*	*67*	*34.5*	*38*	*89*	*54*	*175*	*105*	-			*2.1*
4 x 1¼	4.500 x 1.660	2	2⅛	500	1⅞	4	2⅝	7½	3¾	½ x 2¾	80	100	4.2
100 x 32	*114.3 x 42.4*	*51*	*54*	*34.5*	*48*	*102*	*67*	*191*	*95*	-			*1.9*
4 x 1½	4.500 x 1.900	2	2⅛	500	1⅞	4	2⅝	7½	3¾	½ x 2¾	80	100	4.3
100 x 40	*114.3 x 48.3*	*51*	*54*	*34.5*	*48*	*102*	*67*	*191*	*95*	-			*2.0*
4 x 2	4.500 x 2.375	2½	2⅝	500	1⅞	4	2⅝	7½	4⅛	½ x 2¾	80	100	4.6
100 x 50	*114.3 x 60.3*	*64*	*67*	*34.5*	*48*	*102*	*67*	*191*	*105*	-			*2.1*
4 x 2½	4.500 x 2.875	2¾	2⅞	500	1⅞	4	2⅝	7½	4⅜	½ x 2¾	80	100	5.0
100 x 65	*114.3 x 73.0*	*70*	*73*	*34.5*	*48*	*102*	*67*	*191*	*111*	-			*2.3*
4 x 3 O.D.	*4.500 x 2.996*	*2¾*	*2⅞*	*500*	*1⅞*	*4*	*2⅝*	*7½*	*4⅜*	*½ x 2¾*	*80*	*100*	*5.0*
100 x 80	114.3 x 76.1	70	73	34.5	48	102	67	191	111	-			2.3
4 x 3	4.500 x 3.500	3½	3⅝	500	1⅞	4	2⅝	7½	5¼	½ x 3½	80	100	5.6
100 x 80	*114.3 x 88.9*	*89*	*92*	*34.5*	*48*	*102*	*67*	*191*	*133*	-			*2.5*
5 x 1¼	5.563 x 1.660	2	2⅛	500	1⅞	4¼	3¼	9⅛	3¾	½ x 2¾	80	100	5.6
125 x 32	*141.3 x 42.4*	*51*	*54*	*34.5*	*48*	*108*	*83*	*232*	*95*	-			*2.5*
5 x 1½	5.563 x 1.900	2	2⅛	500	1⅞	4¼	3¼	9⅛	3¾	⅝ x 3¼	100	130	5.6
125 x 40	*141.3 x 48.3*	*51*	*54*	*34.5*	*48*	*108*	*83*	*232*	*95*	-			*2.5*
5 x 2	5.563 x 2.375	2½	2⅝	500	1⅞	4¼	3¼	9⅛	4⅛	⅝ x 3¼	100	130	5.5
125 x 50	*141.3 x 60.3*	*64*	*67*	*34.5*	*48*	*108*	*83*	*232*	*105*	-			*2.5*
5 x 2½	5.563 x 2.875	2¾	2⅞	500	1⅞	4¼	3¼	9⅛	4⅜	⅝ x 3¼	100	130	5.8
125 x 65	*141.3 x 73.0*	*70*	*73*	*34.5*	*48*	*108*	*83*	*232*	*111*	-			*2.6*
5 x 3	5.563 x 3.500	3½	3⅝	500	1⅞	4⅝	3¼	9⅛	5¼	⅝ x 3¼	100	130	7.1
125 x 80	*141.3 x 88.9*	*89*	*92*	*34.5*	*48*	*117*	*83*	*232*	*133*	-			*3.2*
6 x 1½	6.625 x 1.900	2	2⅛	500	2	5	3⅞	10⅛	3¾	⅝ x 4¼	100	130	7.2
150 x 40	*168.3 x 48.3*	*51*	*54*	*34.5*	*51*	*127*	*98*	*257*	*95*	*			*3.3*
6 x 2	6.625 x 2.375	2½	2⅝	500	2	5	3⅞	10⅛	4⅛	⅝ x 4¼	100	130	7.8
150 x 50	*168.3 x 60.3*	*64*	*67*	*34.5*	*51*	*127*	*98*	*257*	*105*	*			*3.5*
6 x 2½	6.625 x 2.875	2¾	2⅞	500	2	5⅛	3⅞	10⅛	4⅜	⅝ x 4¼	100	130	7.6
150 x 65	*168.3 x 73.0*	*70*	*73*	*34.5*	*51*	*130*	*98*	*257*	*111*	*			*3.4*
6 x 3 O.D.	*6.625 x 2.996*	*2¾*	*2⅞*	*500*	*2*	*5⅛*	*3⅞*	*10⅛*	*4⅜*	*⅝ x 4¼*	*100*	*130*	*7.6*
150 x 80	168.3 x 76.1	70	73	34.5	51	130	98	257	111	*			3.4
6 x 3	6.625 x 3.500	3½	3⅝	500	2	5⅛	3⅞	10⅛	5¼	⅝ x 4¼	100	130	8.0
150 x 80	*168.3 x 88.9*	*89*	*92*	*34.5*	*51*	*130*	*98*	*257*	*133*	*			*3.6*
6 x 4	6.625 x 4.500	4½	4⅝	500	2	5¼	3⅞	10⅛	6½	⅝ x 4¼	100	130	10.4
150 x 100	*168.3 x 114.3*	*114*	*117*	*34.5*	*51*	*133*	*98*	*257*	*165*	*			*4.7*
8 x 2	8.625 x 2.375	2½	2⅝	500	2¼	6⅛	5	12¾	4¼	¾ x 4½	130	180	10.4
200 x 50	*219.1 x 60.3*	*64*	*67*	*34.5*	*57*	*156*	*127*	*324*	*108*	-			*4.7*
8 x 2½	8.625 x 2.875	2¾	2⅞	500	2¼	6⅛	5	12¾	4⅜	¾ x 4½	130	180	10.6
200 x 65	*219.1 x 73.0*	*70*	*73*	*34.5*	*57*	*156*	*127*	*324*	*111*	*M20 x 110*	*175*	*245*	*4.8*
8 x 3	8.625 x 3.500	3½	3⅝	500	2¼	6⅛	5	12¾	5¼	¾ x 4½	130	180	11.5
200 x 80	*219.1 x 88.9*	*89*	*92*	*34.5*	*57*	*156*	*127*	*324*	*133*	*M20 x 110*	*175*	*245*	*5.2*
8 x 4	8.625 x 4.500	4½	4⅝	500	2¼	6¼	5	12¾	6½	¾ x 4½	130	180	16.2
200 x 100	*219.1 x 114.3*	*114*	*117*	*34.5*	*57*	*159*	*127*	*324*	*165*	*M20 x 110*	*175*	*245*	*7.3*

NOTES:
2½", 5" and 6" Nom. Run pipe size Clamp-T may be used on 3" O.D., 5½" O.D. and 6½" O.D. pipe.
• Cannot be used in cross configuration.

▼ Based on use with standard wall pipe.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 166.
Not for use with copper systems.

FIG. 7047, FIG. 7048 & FIG. 7049

Clamp-T, Cross

Fig. 7047

Fig. 7048

Fig. 7049

The Gruvlok Clamp-T provides a branch or cross connection in light wall or standard wall steel pipe.

The Fig. 7045 Clamp-T female pipe thread branch is available with NPT or ISO 7/1 connection and the Fig. 7046 Clamp-T has grooved-end branch connection.

Clamp-T cross connections are available allowing greater versatility in piping design.

NOTE: 2 1/2" x 1 1/4" Figure 7046 cannot be used in cross configuration.

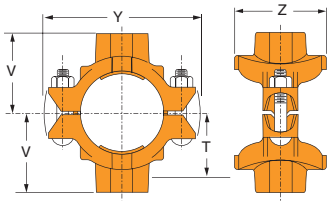


Fig. 7047 - Thread x Thread

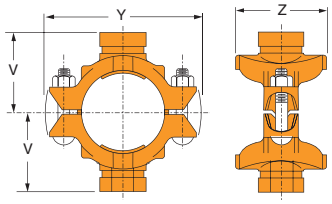


Fig. 7048 - Groove x Groove

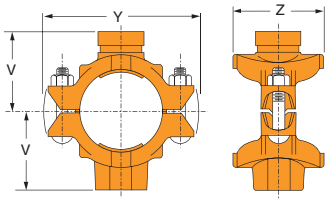


Fig. 7049 - Groove x Thread

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MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12 or Malleable Iron conforming to ASTM A 47, Grade 32510.

COATINGS:
Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative for more information.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")

Not for use in copper systems.

FIG. 7044

Branch Outlet

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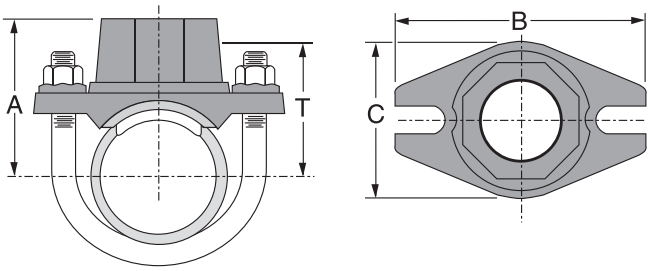
The Gruvlok Fig. 7044 Branch Outlet is for direct connection of sprinkler heads and drop nipples. Just cut a hole, saddle up and fasten it with the U-bolt. The branch outlet provides an economical, quick, and easy outlet at any location along a pipe. Specially engineered to conform to the pipe O.D., the Fig. 7044 provides a leak tight reliable seal in both positive pressure and vacuum conditions. Ductile iron housings with Grade E gasket and carbon steel U-bolt (3/8" dia.) with flanged nuts. Ductile iron housings is available black.

The maximum working pressure for all sizes is 175 PSI (12.1 bar).



MATERIAL SPECIFICATIONS

GASKETS: Materials

Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code)
-40°F to 150°F (Service Temperature Range)
(-40°C to 66°C) Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

HOUSING:

Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

U-BOLT:

Plated U-bolt conforming to ASTM A 307 with plated hex nuts conforming to ASTM A 563.

LUBRICATION:

Standard Gruvlok
Gruvlok Xtreme™

FIGURE 7044 BRANCH OUTLET

Nominal Size	O.D.	Hole Diameter		Dimensions				Specified Torque §		Approx. Wt. Each
		Min. Dia.	Max. Dia.	A	B	C	Take-out T	Min.	Max.	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Ft.-Lbs./N-m*		*Lbs./Kg*
1¼ x ½	1.660 x 0.840	1 3/16	1¼	2 1/16	3½	2 7/32	1 3/8	27	33	0.8
32 x 15	*42.4 x 21.3*	*30*	*32*	*53*	*89*	*56*	*35*	-	-	*0.4*
1¼ x ¾	1.660 x 1.050	1 3/16	1¼	2 1/16	3½	2 7/32	1 3/8	27	33	0.8
32 x 20	*42.4 x 26.7*	*30*	*32*	*53*	*89*	*56*	*35*	-	-	*0.4*
1¼ x 1	1.660 x 1.315	1 3/16	1¼	2 3/16	3½	2 7/32	1½	27	33	0.9
32 x 25	*42.4 x 33.7*	*30*	*32*	*56*	*89*	*56*	*38*	-	-	*0.4*
1½ x ½	1.900 x 0.840	1 3/16	1¼	2 5/32	3½	2 7/32	1 3/8	27	33	0.8
40 x 15	*48.3 x 21.3*	*30*	*32*	*55*	*89*	*56*	*35*	-	-	*0.4*
1½ x ¾	1.900 x 1.050	1 3/16	1¼	2 5/32	3½	2 7/32	1 3/8	27	33	0.8
40 x 20	*48.3 x 26.7*	*30*	*32*	*55*	*89*	*56*	*35*	-	-	*0.4*
1½ x 1	1.900 x 1.315	1 3/16	1¼	2 3/32	3½	2 7/32	1½	27	33	0.9
40 x 25	*48.3 x 33.7*	*30*	*32*	*58*	*89*	*56*	*38*	-	-	*0.4*
2 x ½	2.375 x 0.840	1 3/16	1¼	2½	3 7/8	2 7/32	1 5/8	27	33	0.8
50 x 15	*60.3 x 21.3*	*30*	*32*	*64*	*98*	*56*	*42*	-	-	*0.4*
2 x ¾	2.375 x 1.050	1 3/16	1¼	2½	3 7/8	2 7/32	1 5/8	27	33	0.8
50 x 20	*60.3 x 26.7*	*30*	*32*	*64*	*98*	*56*	*42*	-	-	*0.4*
2 x 1	2.375 x 1.315	1 3/16	1¼	2 5/8	3 7/8	2 7/32	1¾	27	33	0.9
50 x 25	*60.3 x 33.7*	*30*	*32*	*67*	*98*	*56*	*45*	-	-	*0.4*
2½ x ½	2.875 x 0.840	1 3/16	1¼	2 11/16	4 3/8	2 7/32	2	27	33	0.8
65 x 15	*73.0 x 21.3*	*30*	*32*	*69*	*111*	*56*	*51*	-	-	*0.4*
2½ x ¾	2.875 x 1.050	1 3/16	1¼	2 11/16	4 3/8	2 7/32	2	27	33	0.9
65 x 20	*73.0 x 26.7*	*30*	*32*	*69*	*111*	*56*	*51*	-	-	*0.4*
2½ x 1	2.875 x 1.315	1 3/16	1¼	2 13/16	4 3/8	2 7/32	2 1/8	27	33	1.0
65 x 25	*73.0 x 33.7*	*30*	*32*	*72*	*111*	*56*	*54*	-	-	*0.5*

Not for use in copper systems.
§ – For additional Bolt Torque information, see page 190.
See Installation & Assembly directions on page 167.

GRUVLOK FITTINGS FOR GROOVED-END PIPE

Gruvlok fittings are available through 24" nominal pipe size in a variety of styles. Use the Fitting Size Table to convert nominal pipe size to corresponding pipe O.D.

These fittings are designed to provide minimum pressure drop and uniform strength.

Depending on styles and size, Gruvlok fittings are provided in various materials including malleable iron, ductile iron, forged steel or fabricated steel.

Pressure ratings of Gruvlok standard fittings conform to those of Fig. 7001 Gruvlok coupling.

Not for use in copper systems.

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FLOW DATA – FRICTIONAL RESISTANCE (EXPRESSED AS EQUIVALENT STRAIGHT PIPE)

Nom. Size	O.D.	Pipe Wall Thickness	Elbow		Tee	
			90°	45°	Branch	Run
In./DN(mm)	In./mm	In./mm	Ft./m	Ft./m	Ft./m	Ft./m
1 25	1.315 33.4	0.133 3.4	1.7 0.5	0.9 0.3	4.4 1.3	1.7 0.5
1¼ 32	1.660 42.2	0.140 3.6	2.3 0.7	1.2 0.4	5.8 1.8	2.3 0.7
1½ 40	1.900 48.3	0.145 3.7	2.7 0.8	1.3 0.4	6.7 2.0	2.7 0.8
2 50	2.375 60.3	0.154 3.9	3.4 1.0	1.7 0.5	8.6 2.6	3.4 1.0
2½ 65	2.875 73.0	0.203 5.2	4.1 1.2	2.1 0.6	10.3 3.1	4.1 1.2
3 O.D. 76.1	2.996 76.1	0.197 5.0	4.3 1.3	2.2 0.7	10.8 3.3	4.3 1.3
3 80	3.500 88.9	0.216 5.5	5.1 1.6	2.6 0.8	12.8 3.9	5.1 1.6
4¼ O.D. 108.0	4.250 108.0	0.220 5.6	6.4 2.0	3.2 1.0	16.1 4.9	6.4 2.0
4 100	4.500 114.3	0.237 6.0	6.7 2.0	3.4 1.0	16.8 5.1	6.7 2.0
5¼ O.D. 133.0	5.236 133.0	0.248 6.3	8.0 2.4	4.0 1.2	20.1 6.1	8.0 2.4
5½ O.D. 139.7	5.500 139.7	0.248 6.3	8.3 2.5	4.2 1.3	20.9 6.4	8.3 2.5
5 125	5.563 141.3	0.258 6.6	8.4 2.6	4.2 1.3	21.0 6.4	8.4 2.6
6¼ O.D. 159.0	6.259 159.0	0.280 7.1	9.7 3.0	4.9 1.5	24.3 7.4	9.7 3.0
6½ O.D. 165.1	6.500 165.1	0.280 7.1	10.0 3.0	5.0 1.5	24.9 7.6	10.0 3.0
6 150	6.625 168.3	0.280 7.1	10.1 3.1	5.1 1.6	25.3 7.7	10.1 3.1
8 200	8.625 219.1	0.322 8.2	13.3 4.1	6.7 2.0	33.3 10.1	13.3 4.1
10 250	10.750 273.1	0.365 9.3	16.7 5.1	8.4 2.6	41.8 12.7	16.7 5.1
12 300	12.750 323.9	0.375 9.5	20.0 6.1	10.0 3.0	50.0 15.2	20.0 6.1
14 350	14.000 355.6	0.375 9.5	22.2 6.8	17.7 5.4	64.2 19.6	22.9 7.0
16 400	16.000 406.4	0.375 9.5	25.5 7.8	20.4 6.2	73.9 22.5	26.4 8.0
18 450	18.000 457.2	0.375 9.5	28.9 8.8	23.1 7.0	87.2 26.6	31.1 9.5
20 500	20.000 508.0	0.375 9.5	32.2 9.8	25.7 7.8	97.3 29.7	34.8 10.6
24 600	24.000 609.6	0.375 9.5	38.9 11.9	31.1 9.5	113.0 34.4	40.4 12.3

For the reducing tee and branches, use the value that is corresponding to the branch size. For example: for 6" x 6" x 3" tee, the branch value of 3" is 12.8 ft (3.9).

MATERIAL SPECIFICATIONS

CAST FITTINGS:

Ductile iron conforming to ASTM A 536, Grade 65-45-12
Malleable iron conforming to ASTM A 47

FABRICATED FITTINGS:

1-6" Carbon steel, Schedule 40, conforming to ASTM A 53, Grade B
8-12" Carbon steel, Schedule 30, conforming to ASTM A 53, Grade B
14-24" Carbon steel, 0.375 wall, conforming to ASTM A 53, Grade B

COATINGS:

Rust inhibiting paint – Color: ORANGE (standard)
Hot Dipped Zinc Galvanized conforming to ASTM A 153 (optional)
Other Colors Available (IE: RAL3000 and RAL9000)

FITTING SIZE

Nominal Size	O.D.	Nominal Size	O.D.
In./DN(mm)	In./mm	In./DN(mm)	In./mm
1 25	1.315 33.4	5 140	5.563 141.3
1¼ 32	1.660 42.4	6¼ O.D. 159.0	6.259 159.0
1½ 40	1.900 48.3	6½ O.D. 165.1	6.500 165.1
2 50	2.375 60.3	6 150	6.625 168.3
2½ 65	2.875 73.0	8 200	8.625 219.1
3 O.D. 76.1	2.996 76.1	10 250	10.750 273.0
3 80	3.500 88.9	12 300	12.750 323.9
3½ 65	4.000 101.6	14 350	14.000 355.6
4¼ O.D. 108.0	4.250 108.0	16 400	16.000 406.4
4 100	4.500 114.3	18 450	18.000 457.2
5¼ O.D. 133.0	5.236 133.0	20 500	20.000 508.0
5½ O.D. 139.7	5.500 139.7	24 600	24.000 609.6

The Fitting Size Chart is used to determine the O.D. of the pipe that the fittings is to be used with. Gruvlok Fittings are identified by either the Nominal size in inches or the Pipe O.D. in/mm.

FIG. 7050

90° Elbow*

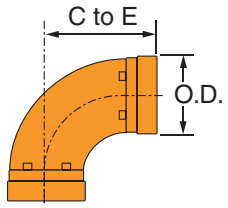

FIGURE 7050
90° ELBOW*

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	2¼ C *57*	0.6 *0.3*
1¼ *32*	1.660 *42.2*	2¾ C *70*	1.0 *0.5*
1½ *40*	1.900 *48.3*	2¾ C *70*	1.2 *0.5*
2 *50*	2.375 *60.3*	3¼ C *83*	1.7 *0.8*
2½ *65*	2.875 *73.0*	3¾ C *95*	2.6 *1.2*
3 O.D. 76.1	*2.996* 76.1	*4 C* 102	*3.6* 1.6
3 *80*	3.500 *88.9*	4¼ C *108*	4.0 *1.8*
3½ *90*	4.000 *101.6*	4½ C *114*	5.5 *2.5*
4¼ O.D. 108.0	*4.250* 108.0	*4¾ C* 121	*7.7* 3.5
4 *100*	4.500 *114.3*	5 C *127*	7.7 *3.5*
5¼ O.D. 133.0	*5.236* 133.0	*5¼ C* 133	*10.4* 4.7
5½ O.D. 139.7	*5.500* 139.7	*5¼ C* 133	*10.9* 4.9
5 *125*	5.563 *141.3*	5½ C *140*	11.1 *5.0*
6¼ O.D. 159.0	*6.259* 159.0	*6 C* 152	*15.2* 6.9
6½ O.D. 165.1	*6.500* 165.1	*6½ C* 165	*17.4* 7.9
6 *150*	6.625 *168.3*	6½ C *165*	16.5 *7.5*
8 *200*	8.625 *219.1*	7¾ C *197*	30.6 *13.9*
10 *250*	10.750 *273.1*	9 C *229*	53.5 *24.3*
12 *300*	12.750 *323.9*	10 C *254*	82 *37.2*
14 *350*	14.000 *355.6*	21 *533*	169.0 *76.7*
16 *400*	16.000 *406.4*	24 *610*	222.0 *100.7*
18 *450*	18.000 *457.2*	27 *686*	280.0 *127.0*
20 *500*	20.000 *508.0*	30 *762*	344.0 *156.0*
24 *600*	24.000 *609.6*	36 *914*	490.0 *222.3*

FIG. 7051

45° Elbow*

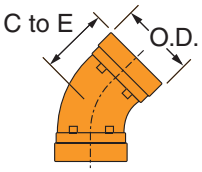

FIGURE 7051
45° ELBOW*

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	1¾ C *44*	0.5 *0.2*
1¼ *32*	1.660 *42.2*	1¾ C *44*	0.7 *0.3*
1½ *40*	1.900 *48.3*	1¾ C *44*	0.9 *0.4*
2 *50*	2.375 *60.3*	2 C *51*	1.5 *0.7*
2½ *65*	2.875 *73.0*	2¼ C *57*	1.9 *0.9*
3 O.D. 76.1	*2.996* 76.1	*2½ C* 64	*2.2* 1.0
3 *80*	3.500 *88.9*	2½ C *64*	3.3 *1.5*
3½ *90*	4.000 *101.6*	2¾ C *70*	4.3 *2.0*
4¼ O.D. 108.0	*4.250* 108.0	*2⅞ C* 83	*4.4* 2.0
4 *100*	4.500 *114.3*	3 C *76*	5.4 *2.4*
5¼ O.D. 133.0	*5.236* 133.0	*3¼ C* 83	*7.3* 3.3
5½ O.D. 139.7	*5.500* 139.7	*3¼ C* 83	*7.8* 3.5
5 *125*	5.563 *141.3*	3¼ C *83*	9.0 *4.1*
6¼ O.D. 159.0	*6.259* 159.0	*3½ C* 89	*10.1* 4.6
6½ O.D. 165.1	*6.500* 165.1	*3½ C* 89	*11.1* 5.0
6 *150*	6.625 *168.3*	3½ C *89*	11.2 *5.1*
8 *200*	8.625 *219.1*	4¼ C *108*	19.8 *9.0*
10 *250*	10.750 *273.1*	4¾ C *121*	34.3 *15.6*
12 *300*	12.750 *323.9*	5¼ C *133*	50.0 *22.7*
14 *350*	14.000 *355.6*	8¾ *222*	92.0 *41.7*
16 *400*	16.000 *406.4*	10 *254*	117.0 *53.1*
18 *450*	18.000 *457.2*	11¼ *286*	146.0 *66.2*
20 *500*	20.000 *508.0*	12½ *317*	179.0 *81.2*
24 *600*	24.000 *609.6*	15 *381*	255.0 *115.7*

FIG. 7052

22 ½° Elbow

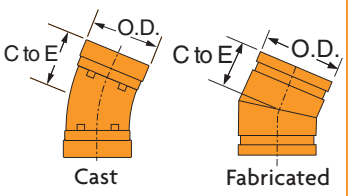

FIGURE 7052
22½° ELBOW*

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	3¼ *83*	0.5 *0.2*
1¼ *32*	1.660 *42.2*	1¾ *44*	0.7 *0.3*
1½ *40*	1.900 *48.3*	1¾ *44*	0.8 *0.4*
2 *50*	2.375 *60.3*	1⅞ C *48*	1.5 *0.7*
2½ *65*	2.875 *73.0*	2 *51*	1.9 *0.9*
3 *80*	3.500 *88.9*	2¼ C *57*	3.2 *1.5*
3½ *90*	4.000 *101.6*	2½ *64*	4.0 *1.8*
4 *100*	4.500 *114.3*	2⅝ C *67*	5.3 *2.4*
5 *125*	5.563 *141.3*	2⅞ *73*	7.2 *3.3*
6 *150*	6.625 *168.3*	3⅛ C *79*	8.2 *3.7*
8 *200*	8.625 *219.1*	3⅞ C *98*	17.8 *8.1*
10 *250*	10.750 *273.1*	4⅜ *111*	30.0 *13.6*
12 *300*	12.750 *323.9*	4⅞ *124*	40.4 *18.3*
14 *350*	14.000 *355.6*	5 *127*	46.0 *20.9*
16 *400*	16.000 *406.4*	5 *127*	52.2 *23.7*
18 *450*	18.000 *457.2*	5½ *140*	65.0 *29.5*
20 *500*	20.000 *508.0*	6 *152*	80.0 *36.3*
24 *600*	24.000 *609.6*	7 *178*	112.0 *50.8*

FIG. 7052i

22 ½° Elbow

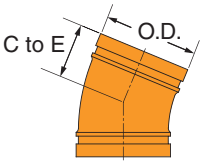

FIGURE 7052i
22½° ELBOW*

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	1⅝ *41.28*	0.5 *0.227*
1¼ *32*	1.675 *42.2*	1¾ *44.45*	1.0 *0.454*
1½ *40*	1.900 *48.3*	1¾ *44.45*	1.0 *0.454*
2 *50*	2.375 *60.3*	1⅞ *47.63*	1.5 *0.680*
2½ *65*	2.875 *73.0*	2 *50.8*	2.0 *0.907*
3 O.D. 76.1	*2.996* 76.1	*2* 50.8	*2.0* 0.907
3 *80*	3.500 *88.9*	2¼ *57.15*	2.5 *1.134*
4 *100*	4.5 *114.3*	2⅝ *66.68*	5.0 *2.268*
5½ O.D. 139.7	*5.500* 139.7	*2⅞* 73.03	*7.0* 3.175
5 *125*	5.563 *141.3*	2⅞ *73.03*	7.5 *3.402*
6½ O.D. 165.1	*6.500* 165.1	*3⅛* 79.38	*10.0* 4.536
6 *150*	6.625 *168.3*	3⅛ *79.38*	10.0 *4.536*
8 *200*	8.625 *219.1*	3⅞ *98.43*	18.5 *8.391*
10 *250*	10.75 *237.1*	4⅜ *111.13*	32.5 *14.741*
12 *300*	12.75 *323.9*	4⅞ *123.83*	48.0 *21.772*

All 7052i fittings are cast ductile iron.

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C - Cast malleable or ductile iron, all others are fabricated steel.

* 14"-24" Standard Radius 90° & 45° Elbows are 1 ½.

Center to end dimensions and weights may differ from those shown in chart, contact an Anvil Representative for more information.

FIG. 7053

11 ¼° Elbow

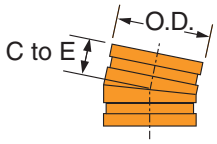

FIGURE 7053
11¼° ELBOW*

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	1⅜ 35	0.3 0.1
1¼ 32	1.660 42.2	1⅜ 35	0.5 0.2
1½ 40	1.900 48.3	1⅜ 35	0.7 0.3
2 50	2.375 60.3	1⅜ 35	0.9 0.4
2½ 65	2.875 73.0	1½ 38	1.5 0.7
3 80	3.500 88.9	1½ 38	2.0 0.9
3½ 90	4.000 101.6	1¾ 44	2.8 1.3
4 100	4.500 114.3	1¾ 44	3.3 1.5
5 125	5.563 141.3	2 51	5.0 2.3
6 150	6.625 168.3	2 51	6.5 2.9
8 200	8.625 219.1	2 51	10.0 4.5
10 250	10.750 273.1	2⅛ 54	14.5 6.6
12 300	12.750 323.9	2¼ 57	18.7 8.5
14 350	14.000 355.6	3½ 89	32.1 14.6
16 400	16.000 406.4	4 102	42.0 19.1
18 450	18.000 457.2	4½ 114	53.2 24.1
20 500	20.000 508.0	5 127	65.7 29.8
24 600	24.000 609.6	6 152	96.0 43.5

FIG. 7050LR

90° Long Radius Elbow*

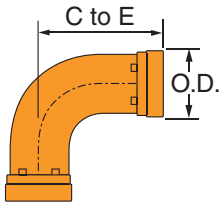

FIGURE 7050 LR
LONG RADIUS 90° ELBOW*

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	3½ 89	0.9 0.4
1¼ 32	1.660 42.2	3⅞ 98	1.3 0.6
1½ 40	1.900 48.3	4¼ 108	1.7 0.8
2 50	2.375 60.3	4⅜ 136	2.5 1.1
2½ 65	2.875 73.0	5¾ 146	4.9 2.2
3 80	3.500 88.9	5⅞ 181	6.5 2.9
3½ 90	4.000 101.6	7¼ 184	9.7 4.4
4 100	4.500 114.3	7½ 191	11.5 5.2
5 125	5.563 141.3	9½ 241	20.9 9.5
6 150	6.625 168.3	10¾ 273	29.1 13.2
8 200	8.625 219.1	15 381	59.2 26.9
10 250	10.750 273.1	18 457	104.0 47.2
12 300	12.750 323.9	21 533	147.0 66.7
14 350	14.000 355.6	21 533	169.0 76.7
16 400	16.000 406.4	24 610	222.0 100.7
18 450	18.000 457.2	27 686	280.0 127.0
20 500	20.000 508.0	30 762	344.0 156.0
24 600	24.000 609.6	36 914	490.0 222.3

FIG. 7051LR

45° Long Radius Elbow*

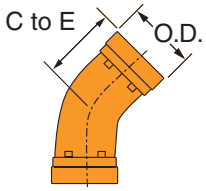

FIGURE 7051 LR
LONG RADIUS 45° ELBOW*

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	2½ 64	0.7 0.3
1¼ 32	1.660 42.2	2½ 64	1.0 0.5
1½ 40	1.900 48.3	2½ 64	1.2 0.5
2 50	2.375 60.3	2¾ 70	1.7 0.8
2½ 65	2.875 73.0	3 76	2.9 1.3
3 80	3.500 88.9	3⅜ 86	4.3 2.0
3½ 90	4.000 101.6	3½ 89	5.3 2.4
4 100	4.500 114.3	4 102	7.2 3.3
5 125	5.563 141.3	5 127	12.2 5.5
6 150	6.625 168.3	5½ 140	17.4 7.9
8 200	8.625 219.1	7¼ 184	34.0 15.4
10 250	10.750 273.1	8½ 216	57.4 26.0
12 300	12.750 323.9	10 254	82.6 37.5
14 350	14.000 355.6	8¾ 222	92.0 41.7
16 400	16.000 406.4	10 254	117.0 53.1
18 450	18.000 457.2	11¼ 286	146.0 66.2
20 500	20.000 508.0	12½ 317	179.0 81.2
24 600	24.000 609.6	15 381	255.0 115.7

C - Cast malleable or ductile iron, all others are fabricated steel.
* 14"-24" Standard Radius 90° & 45° Elbows are 1 ½.
Center to end dimensions and weights may differ from those shown in chart, Contact an Anvil Representative for more information.

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FIG. 7063

Tee w/ Threaded Branch

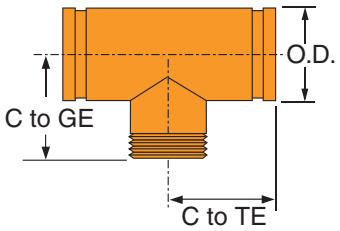

FIGURE 7063
TEE WITH THREADED BRANCH

Nominal Size	O.D.	C to GE	C to TE	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	2¼ *57*	2¼ *57*	0.9 *0.4*
1¼ *32*	1.660 *42.2*	2¾ *70*	2¾ *70*	1.4 *0.6*
1½ *40*	1.900 *48.3*	2¾ *70*	2¾ *70*	1.7 *0.8*
2 *50*	2.375 *60.3*	3¼ *83*	4¼ *108*	2.9 *1.3*
2½ *65*	2.875 *73.0*	3¾ *95*	3¾ *95*	4.7 *2.1*
3 *80*	3.500 *88.9*	4¼ *108*	6 *152*	8.1 *3.7*
3½ *90*	4.000 *101.6*	4½ *114*	4½ *114*	8.8 *4.0*
4 *100*	4.500 *114.3*	5 *127*	7¼ *184*	13.5 *6.1*
5 *125*	5.563 *140*	5½ *140*	5½ *140*	16.7 *7.6*
6 *150*	6.625 *168.3*	6½ *165*	6½ *165*	25.6 *11.6*
8 *200*	8.625 *219.1*	7¾ *197*	7¾ *197*	45.0 *20.4*
10 *250*	10.750 *273.1*	9 *229*	9 *229*	73.0 *33.1*
12 *300*	12.750 *323.9*	10 *254*	10 *254*	98.0 *44.5*

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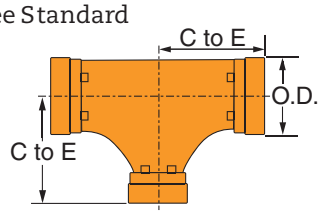
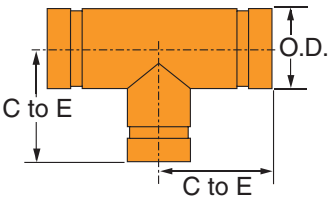
FIG. 7061

Reducing Tee Standard



Cast



Fabricated

FIGURE 7061 STANDARD REDUCING TEE

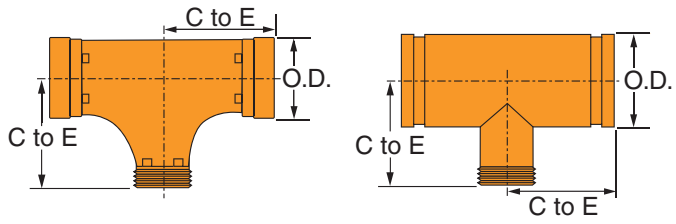
Nominal Size	Center to End	Approx. Wt. Ea.	Nominal Size	Center to End	Approx. Wt. Ea.	Nominal Size	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*	*In./DN(mm)*	*In./mm*	*Lbs./Kg*	*In./DN(mm)*	*In./mm*	*Lbs./Kg*
1¼ x 1¼ x 1 *32 x 32 x 25*	2¾ *70*	1.5 *0.7*	6 x 6 x 2½ *150 x 150 x 65*	6½ C *165*	26.5 *12.0*	14 x 14 x 8 *350 x 350 x 200*	11 *279*	103 *46.7*
1½ x 1½ x 1 *40 x 40 x 25*	2¾ *70*	1.8 *0.8*	6 x 6 x 3 *150 x 150 x 80*	6½ C *165*	26.5 *12.0*	14 x 14 x 10 *350 x 350 x 250*	11 *279*	104 *47.2*
1½ x 1½ x 1¼ *40 x 40 x 32*	2¾ *70*	1.8 *0.8*	6 x 6 x 4 *150 x 150 x 100*	6½ C *165*	26.5 *12.0*	14 x 14 x 12 *350 x 350 x 300*	11 *279*	105 *47.6*
2 x 2 x 1 *50 x 50 x 25*	3¼ C *83*	2.6 *1.2*	6 x 6 x 5 *150 x 150 x 125*	6½ C *165*	28.0 *12.7*	16 x 16 x 4 *400 x 400 x 100*	12 *305*	126 *57.2*
2 x 2 x 1¼ *50 x 50 x 32*	3¼ *83*	1.7 *0.8*	8 x 8 x 1½ *200 x 200 x 40*	7¾ *197*	33.0 *15.0*	16 x 16 x 6 *400 x 400 x 150*	12 *305*	127 *57.6*
2 x 2 x 1½ *50 x 50 x 40*	3¼ C *83*	2.7 *1.2*	8 x 8 x 2 *200 x 200 x 50*	7¾ *197*	32.7 *14.8*	16 x 16 x 8 *400 x 400 x 200*	12 *305*	128 *58.1*
2½ x 2½ x 1 *65 x 65 x 25*	3¾ *95*	4.1 *1.9*	8 x 8 x 2½ *200 x 200 x 65*	7¾ *197*	33.0 *15.0*	16 x 16 x 10 *400 x 400 x 250*	12 *305*	129 *58.5*
2½ x 2½ x 1¼ *65 x 65 x 32*	3¾ *95*	4.2 *1.9*	8 x 8 x 3 *200 x 200 x 80*	7¾ *197*	33.5 *15.2*	16 x 16 x 12 *400 x 400 x 300*	12 *305*	130 *59.0*
2½ x 2½ x 1½ *65 x 65 x 40*	3¾ *95*	4.3 *2.0*	8 x 8 x 4 *200 x 200 x 100*	7¾ C *197*	50.0 *22.7*	16 x 16 x 14 *400 x 400 x 350*	12 *305*	132 *59.9*
2½ x 2½ x 2 *65 x 65 x 50*	3¾ *95*	4.4 *2.0*	8 x 8 x 5 *200 x 200 x 125*	7¾ *197*	34.7 *15.7*	18 x 18 x 4 *450 x 450 x 100*	15½ *394*	188 *85.3*
3 x 3 x 1 *80 x 80 x 25*	4¼ C *108*	7.0 *3.2*	8 x 8 x 6 *200 x 200 x 150*	7¾C *197*	54.0 *24.5*	18 x 18 x 6 *450 x 450 x 150*	15½ *394*	190 *86.2*
3 x 3 x 1¼ *80 x 80 x 32*	4¼ *108*	5.8 *2.6*	10 x 10 x 1½ *250 x 250 x 40*	9 *229*	52.0 *23.6*	18 x 18 x 8 *450 x 450 x 200*	15½ *394*	192 *87.1*
3 x 3 x 1½ *80 x 80 x 40*	4¼ *108*	5.9 *2.7*	10 x 10 x 2 *250 x 250 x 50*	9 *229*	52.2 *23.7*	18 x 18 x 10 *450 x 450 x 250*	15½ *394*	194 *88.0*
3 x 3 x 2 *80 x 80 x 50*	4¼ C *108*	5.5 *2.5*	10 x 10 x 2½ *250 x 250 x 65*	9 *229*	52.6 *23.9*	18 x 18 x 12 *450 x 450 x 300*	15½ *394*	196 *88.9*
3 x 3 x 2½ *80 x 80 x 65*	4¼ *108*	6.3 *2.9*	10 x 10 x 3 *250 x 250 x 80*	9 *229*	53.0 *24.0*	18 x 18 x 14 *450 x 450 x 350*	15½ *394*	201 *91.2*
4 x 4 x 1 *100 x 100 x 25*	3¾ *95*	7.0 *3.2*	10 x 10 x 4 *250 x 250 x 100*	9 *229*	53.6 *24.3*	18 x 18 x 16 *450 x 450 x 400*	15½ *394*	203 *92.1*
4 x 4 x 1¼ *100 x 100 x 32*	5 *127*	9.6 *4.4*	10 x 10 x 5 *250 x 250 x 125*	9 *229*	54.2 *24.6*	20 x 20 x 6 *500 x 500 x 150*	17¼ *438*	240 *108.9*
4 x 4 x 1½ *100 x 100 x 40*	5 *127*	10.2 *4.6*	10 x 10 x 6 *250 x 250 x 150*	9 *229*	55.0 *24.9*	20 x 20 x 8 *500 x 500 x 200*	17¼ *438*	242 *109.8*
4 x 4 x 2 *100 x 100 x 50*	5 C *127*	10.2 *4.6*	10 x 10 x 8 *250 x 250 x 200*	9 *229*	64.7 *29.3*	20 x 20 x 10 *500 x 500 x 250*	17¼ *438*	244 *110.7*
4 x 4 x 2½ *100 x 100 x 65*	5 C *127*	11.2 *5.1*	12 x 12 x 1 *300 x 300 x 25*	10 *254*	77.0 *34.9*	20 x 20 x 12 *500 x 500 x 300*	17¼ *438*	246 *111.6*
4 x 4 x 3 *100 x 100 x 80*	5 C *127*	11.4 *5.2*	12 x 12 x 2 *300 x 300 x 50*	10 *254*	80.0 *36.3*	20 x 20 x 14 *500 x 500 x 350*	17¼ *438*	248 *112.5*
5 x 5 x 1 *125 x 125 x 25*	5½ *140*	13.6 *6.2*	12 x 12 x 2½ *300 x 300 x 65*	10 *254*	78.0 *35.4*	20 x 20 x 16 *500 x 500 x 400*	17¼ *438*	250 *113.4*
5 x 5 x 1½ *125 x 125 x 40*	5½ *140*	13.8 *6.3*	12 x 12 x 3 *300 x 300 x 80*	10 *254*	74.6 *33.8*	20 x 20 x 18 *500 x 500 x 450*	17¼ *438*	252 *114.3*
5 x 5 x 2 *125 x 125 x 50*	5½ *140*	14 *6.4*	12 x 12 x 4 *300 x 300 x 100*	10 *254*	75.1 *34.1*	24 x 24 x 8 *600 x 600 x 200*	20 *508*	327 *148.3*
5 x 5 x 2½ *125 x 125 x 65*	5½ *140*	14.3 *6.5*	12 x 12 x 5 *300 x 300 x 125*	10 *254*	75.6 *34.3*	24 x 24 x 10 *600 x 600 x 250*	20 *508*	330 *149.7*
5 x 5 x 3 *125 x 125 x 80*	5½ *140*	14.6 *6.6*	12 x 12 x 6 *300 x 300 x 150*	10 *254*	76.2 *34.6*	24 x 24 x 12 *600 x 600 x 300*	20 *508*	334 *151.5*
5 x 5 x 4 *125 x 125 x 100*	5½ C *140*	17.9 *8.1*	12 x 12 x 8 *300 x 300 x 200*	10 *254*	76.3 *34.6*	24 x 24 x 14 *600 x 600 x 350*	20 *508*	340 *154.2*
6 x 6 x 1 *150 x 150 x 25*	6½ *165*	20.5 *9.3*	12 x 12 x 10 *300 x 300 x 250*	10 *254*	77.6 *35.2*	24 x 24 x 16 *600 x 600 x 400*	20 *508*	342 *155.1*
6 x 6 x 1½ *150 x 150 x 40*	6½ *165*	21.0 *9.5*	14 x 14 x 4 *350 x 350 x 100*	11 *279*	100.0 *45.4*	24 x 24 x 18 *600 x 600 x 450*	20 *508*	345 *156.5*
6 x 6 x 2 *150 x 150 x 50*	6½ C *165*	26.4 *12.0*	14 x 14 x 6 *350 x 350 x 150*	11 *279*	101 *45.8*	24 x 24 x 20 *600 x 600 x 500*	20 *508*	347 *157.4*

Center to end dimensions and weights may differ from those shown in chart, contact an Anvil Representative for more information.

See Fitting Size chart on page 51 for O.D.

FIG. 7064

Reducing Tee w/ Threaded Branch



Cast Fabricated

FIGURE 7064 REDUCING TEE WITH THREADED BRANCH

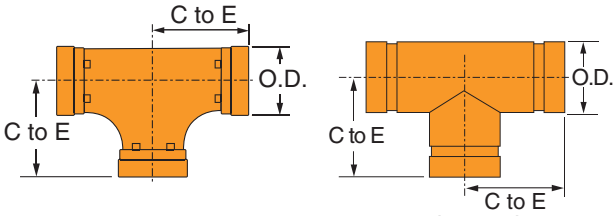
Nominal Size	Center to End	Approx. Wt. Ea.	Nominal Size	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs/Kg*	*In./DN(mm)*	*In./mm*	*Lbs/Kg*
2 x 2 x ¾ *50 x 50 x 20*	3¼ *83*	1.6 *0.7*	8 x 8 x 4 *200 x 200 x 100*	7¾ *197*	50.0 *22.7*
2 x 2 x 1 *50 x 50 x 25*	3¼ C *83*	2.6 *1.2*	8 x 8 x 5 *200 x 200 x 125*	7¾ *197*	41.0 *18.6*
2 x 2 x 1¼ *50 x 50 x 32*	3¼ *83*	1.7 *0.8*	8 x 8 x 6 *200 x 200 x 150*	7¾ *197*	54.0 *24.5*
2 x 2 x 1½ *50 x 50 x 40*	3¼ C *83*	2.7 *1.2*	10 x 10 x 2 *250 x 250 x 50*	9 *229*	61.8 *28.0*
2½ x 2½ x 1 *65 x 65 x 25*	3¾ *95*	4.1 *1.9*	10 x 10 x 3 *250 x 250 x 80*	9 *229*	63.0 *28.6*
2½ x 2½ x 1½ *65 x 65 x 40*	3¾ *95*	4.3 *2*	10 x 10 x 4 *250 x 250 x 100*	9 *229*	64.0 *29.0*
2½ x 2½ x 2 *65 x 65 x 50*	3¾ *95*	4.4 *2*	10 x 10 x 5 *250 x 250 x 125*	9 *229*	65.1 *29.5*
3 x 3 x ¾ *80 x 80 x 20*	4¼ *108*	5.7 *2.6*	10 x 10 x 6 *250 x 250 x 150*	9 *229*	55.0 *24.9*
3 x 3 x 1 *80 x 80 x 25*	4¼ C *108*	7.0 *3.2*	10 x 10 x 8 *250 x 250 x 200*	9 *229*	64.7 *29.3*
3 x 3 x 1½ *80 x 80 x 40*	4¼ *108*	5.3 *2.4*	12 x 12 x 3 *300 x 300 x 80*	10 *254*	84.9 *38.5*
3 x 3 x 2 *80 x 80 x 50*	4¼ *108*	5.5 *2.5*	12 x 12 x 4 *300 x 300 x 100*	10 *254*	85.8 *38.9*
3 x 3 x 2½ *80 x 80 x 65*	4¼ *108*	5.8 *2.6*	12 x 12 x 5 *300 x 300 x 125*	10 *254*	87.0 *39.5*
4 x 4 x ¾ *100 x 100 x 20*	3¾ *95*	7.2 *3.3*	12 x 12 x 6 *300 x 300 x 150*	10 *254*	88.3 *40.1*
4 x 4 x 1 *100 x 100 x 25*	3¾ *95*	7.0 *3.2*	12 x 12 x 8 *300 x 300 x 200*	10 *254*	91.2 *41.4*
4 x 4 x 1½ *100 x 100 x 40*	5 *127*	9.2 *4.2*	12 x 12 x 10 *300 x 300 x 250*	10 *254*	94.8 *43.0*
4 x 4 x 2 *100 x 100 x 50*	5 *127*	10.2 *4.6*	14 x 14 x 8 *350 x 350 x 200*	11 *279*	110.0 *49.7*
4 x 4 x 2½ *100 x 100 x 65*	5 *127*	11.2 *5.1*	14 x 14 x 10 *350 x 350 x 250*	11 *279*	114.0 *51.5*
4 x 4 x 3 *100 x 100 x 80*	5 *127*	11.4 *5.2*	14 x 14 x 12 *350 x 350 x 300*	11 *279*	117.0 *52.8*
5 x 5 x 2 *125 x 125 x 50*	5½ *140*	14.5 *6.6*	16 x 16 x 8 *400 x 400 x 200*	12 *305*	135.0 *61.2*
5 x 5 x 3 *125 x 125 x 80*	5½ *140*	16.1 *7.3*	16 x 16 x 10 *400 x 400 x 250*	12 *305*	139.0 *63.0*
5 x 5 x 4 *125 x 125 x 100*	5½ *140*	17.9 *8.1*	16 x 16 x 12 *400 x 400 x 300*	12 *305*	142.0 *64.4*
6 x 6 x 2 *150 x 150 x 50*	6½ *165*	26.4 *12*	18 x 18 x 10 *450 x 450 x 250*	15½ *394*	204.0 *92.5*
6 x 6 x 2½ *150 x 150 x 65*	6½ *165*	26.5 *12*	18 x 18 x 12 *450 x 450 x 300*	15½ *394*	209.0 *94.8*
6 x 6 x 3 *150 x 150 x 80*	6½ *165*	26.5 *12*	18 x 18 x 14 *450 x 450 x 350*	15½ *0*	211.0 *95.7*
6 x 6 x 4 *150 x 150 x 100*	6½ *165*	26.5 *12*	18 x 18 x 16 *450 x 450 x 400*	15½ *0*	216.0 *98.0*
6 x 6 x 5 *150 x 150 x 125*	6½ *165*	28.0 *12.7*	24 x 24 x 8 *600 x 600 x 200*	20 *508*	334.0 *152*
8 x 8 x 2 *200 x 200 x 50*	7¾ *197*	37.5 *17*	24 x 24 x 10 *600 x 600 x 250*	20 *508*	342.0 *155*
8 x 8 x 3 *200 x 200 x 80*	7¾ *197*	38.7 *17.6*	24 x 24 x 12 *600 x 600 x 300*	20 *508*	349.0 *158*

C - Cast malleable or ductile iron, all others are fabricated steel.

See Fitting Size chart on page 51 for O.D.

FIG. 7060

Tee



Cast Fabricated

FIGURE 7060 – TEE

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	2¼ C *57*	0.9 *0.4*
1¼ *32*	1.660 *42.2*	2¾ C *70*	1.5 *0.7*
1½ *40*	1.900 *48.3*	2¾ C *70*	1.8 *0.8*
2 *50*	2.375 *60.3*	3¼ C *83*	2.4 *1.1*
2½ *65*	2.875 *73.0*	3¾ C *95*	4.0 *1.8*
3 O.D. 76.1	*2.996* 76.1	*4 C* 101	*4.6* 2.1
3 *80*	3.500 *88.9*	4¼ C *108*	5.8 *2.6*
3½ *90*	4.000 *101.6*	4½ C *114*	9.8 *4.4*
4¼ O.D. 108.0	*4.250* 108.0	*4¾ C* 121	*9.3* 4.2
4 *100*	4.500 *114.3*	5 C *127*	10.3 *4.7*
5¼ O.D. 133.0	*5.236* 133.0	*5¼ C* 133	*14.1* 6.4
5½ O.D. 139.7	*5.500* 139.7	*5½ C* 140	*16.1* 7.3
5 *125*	5.563 *141.3*	5½ C *140*	16.2 *7.3*
6¼ O.D. 159.0	*6.259* 159.0	*6 C* 152	*20.8* 9.4
6½ O.D. 165.1	*6.500* 165.1	*6½ C* 165	*24.4* 11.1
6 *150*	6.625 *168.3*	6½ C *165*	25.7 *11.7*
8 *200*	8.625 *219.1*	7¾ C *197*	41.1 *18.6*
10 *250*	10.750 *273.1*	9 C *229*	74.5 *33.8*
12 *300*	12.750 *323.9*	10 C *254*	94.7 *43.0*
14 *350*	14.000 *355.6*	11 *279*	118.0 *53.5*
16 *400*	16.000 *406.4*	12 *305*	146.0 *66.2*
18 *450*	18.000 *457.2*	15½ *394*	218.0 *98.9*
20 *500*	20.000 *508.0*	17¼ *438*	275.0 *125*
24 *600*	24.000 *609.6*	20 *508*	379.0 *172*

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FIG. 7076

Gr x Thd

Concentric Reducers

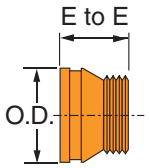

FIGURE 7076 – CONCENTRIC REDUCER GROOVE BY THREAD

Nominal Size	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1½ x 1 *40 x 25*	2½ *6 4*	0.6 *0.3*
2 x ¾ *50 x 80*	2½ *64*	1.0 *0.5*
2 x 1 *50 x 25*	2½ *64*	0.8 *0.4*
2 x 1¼ *50 x 32*	2½ *64*	1.3 *0.6*
2 x 1½ *50 x 40*	2½ *64*	1.3 *0.6*
2½ x 1 *65 x 25*	2½ *64*	1.0 *0.5*
2½ x 1¼ *65 x 32*	2½ *64*	1.0 *0.5*
2½ x 1½ *65 x 40*	2½ *64*	1.3 *0.6*
2½ x 2 *65 x 50*	2½ *64*	1.2 *0.5*
3 x ¾ *80 x 80*	2½ *64*	1.2 *0.5*
3 x 1 *80 x 25*	2½ *64*	1.2 *0.5*
3 x 1½ *80 x 40*	2½ *64*	1.3 *0.6*
3 x 2 *80 x 50*	2½ *64*	1.3 *0.6*
3 x 2½ *80 x 65*	2½ *64*	1.5 *0.7*
3½ x 3 *90 x 80*	3 *76*	1.8 *0.8*
4 x 1 *100 x 25*	3 *76*	2.2 *1.0*
4 x 1½ *100 x 40*	3 *76*	2.3 *1.0*
4 x 2 *100 x 50*	3 *76*	2.3 *1.0*
4 x 2½ *100 x 65*	3 *76*	2.3 *1.0*
4 x 3 *100 x 80*	3 *76*	2.6 *1.2*
4 x 3½ *100 x 90*	3 *76*	2.5 *1.1*
5 x 4 *125 x 100*	3½ *89*	4.5 *2.0*
6 x 1 *150 x 25*	4 *102*	6.0 *2.7*
6 x 2 *150 x 50*	4 *102*	6.0 *2.7*
6 x 3 *150 x 80*	4 *102*	6.0 *2.7*
6 x 4 *150 x 100*	4 *102*	5.9 *2.7*
6 x 5 *150 x 125*	4 *102*	5.8 *2.6*

All are Fabricated Steel.

See Fitting Size chart on page 51 for O.D.

FIG. 7073 & FIG. 7097

Eccentric Reducers

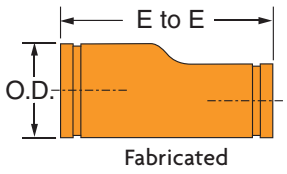

Fig. 7073– Gr. x Gr.

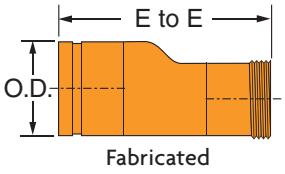

Fig. 7097 – Gr. x Thd.

FIGURE 7073 & 7097 ECCENTRIC REDUCER

Nominal Size	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1¼ x 1 *32 x 25*	8½ *216*	1.5 *0.7*
1½ x ¾ *40 x 20*	8½ *216*	1.6 *0.7*
1½ x 1 *40 x 25*	8½ *216*	1.7 *0.8*
1½ x 1¼ *40 x 32*	8½ *216*	4.5 *2.0*
2 x ¾ *50 x 80*	9 *229*	2.1 *1.0*
2 x 1 *50 x 25*	9 *229*	2.2 *1.0*
2 x 1¼ *50 x 32*	9 *229*	2.4 *1.1*
2 x 1½ *50 x 40*	9 *229*	2.5 *1.1*
2½ x 1 *65 x 25*	9½ *241*	3.2 *1.5*
2½ x 1¼ *65 x 32*	9½ *241*	3.4 *1.5*
2½ x 1½ *65 x 40*	9½ *241*	3.6 *1.6*
2½ x 2 *65 x 50*	9½ *241*	4.0 *1.8*
3 x 1 *80 x 25*	9½ *241*	4.0 *1.8*
3 x 1¼ *80 x 32*	9½ *241*	4.3 *2.0*
3 x 1½ *80 x 40*	9½ *241*	4.5 *2.0*
3 x 2 *80 x 50*	9½ *241*	4.8 *2.2*
3 x 2½ *80 x 65*	9½ *241*	5.6 *2.5*
3½ x 3 *90 x 80*	9½ *241*	6.6 *3.0*
4 x 1 *100 x 25*	10 *254*	5.9 *2.7*
4 x 1¼ *100 x 32*	10 *254*	6.3 *2.9*
4 x 1½ *100 x 40*	10 *254*	6.4 *2.9*
4 x 2 *100 x 50*	10 *254*	6.7 *3.0*
4 x 2½ *100 x 65*	10 *254*	7.3 *3.3*
4 x 3 *100 x 80*	10 *254*	7.9 *3.6*
4 x 3½ *100 x 90*	10 *254*	8.5 *3.9*
5 x 2 *125 x 50*	11 *279*	9.3 *4.2*
5 x 2½ *125 x 65*	11 *279*	9.9 *4.5*
5 x 3 *125 x 80*	11 *279*	10.7 *4.9*
5 x 4 *125 x 100*	11 *279*	11.9 *5.4*
6 x 1 *150 x 25*	11½ *292*	12.0 *5.4*
6 x 1½ *150 x 40*	11½ *292*	12.1 *5.5*
6 x 2 *150 x 50*	11½ *292*	12.2 *5.5*
6 x 2½ *150 x 65*	11½ *292*	12.8 *5.8*
6 x 3 *150 x 80*	11½ *292*	13.6 *6.2*
6 x 4 *150 x 100*	11½ *292*	14.9 *6.8*
6 x 5 *150 x 125*	11½ *292*	16.2 *7.3*
8 x 3 *200 x 80*	12 *305*	17.9 *8.1*
8 x 4 *200 x 100*	12 *305*	19.7 *8.9*
8 x 5 *200 x 125*	12 *305*	21.4 *9.7*
8 x 6 *200 x 150*	12 *305*	23.2 *10.5*
10 x 4 *250 x 100*	13 *330*	29.7 *13.5*
10 x 5 *250 x 125*	13 *330*	31.7 *14.4*
10 x 6 *250 x 150*	13 *330*	34.0 *15.4*
10 x 8 *250 x 200*	13 *330*	34.4 *15.6*
12 x 4 *300 x 100*	14 *356*	44.8 *20.3*
12 x 6 *300 x 150*	14 *356*	45.2 *20.5*
12 x 8 *300 x 200*	14 *356*	47.7 *21.6*
12 x 10 *300 x 250*	14 *356*	52.0 *23.6*
14 x 6 *350 x 150*	13 *330*	78 *35.4*
14 x 8 *350 x 200*	13 *330*	80 *36.3*
14 x 10 *350 x 250*	13 *330*	84 *38.1*
14 x 12 *350 x 300*	13 *330*	88 *39.9*
16 x 8 *400 x 200*	14 *356*	91 *41.3*
16 x 10 *400 x 250*	14 *356*	96 *43.5*
16 x 12 *400 x 300*	14 *356*	99 *44.9*
16 x 14 *400 x 350*	14 *356*	104 *47.2*
18 x 10 *450 x 250*	15 *381*	110 *49.9*
18 x 12 *450 x 300*	15 *381*	113 *51.3*
18 x 14 *450 x 350*	15 *381*	117 *53.1*
18 x 16 *450 x 400*	15 *381*	121 *54.9*
20 x 10 *500 x 250*	20 *508*	145 *65.8*
20 x 12 *500 x 300*	20 *508*	149 *67.6*
20 x 14 *500 x 350*	20 *508*	152 *68.9*
20 x 16 *500 x 400*	20 *508*	156 *70.8*
20 x 18 *500 x 450*	20 *508*	160 *72.6*
24 x 10 *600 x 250*	20 *508*	174 *78.9*
24 x 12 *600 x 300*	20 *508*	179 *81.2*
24 x 14 *600 x 350*	20 *508*	184 *83.5*
24 x 16 *600 x 400*	20 *508*	189 *85.7*
24 x 18 *600 x 450*	20 *508*	194 *88*
24 x 20 *600 x 500*	20 *508*	199 *90.3*

Fabricated Steel *Figure 7097 is available in sizes 1¼ x 1 through 12 x 10.

Center to end dimensions may differ from those shown above. Contact an Anvil Representative for more information.

See Fitting Size chart on page 51 for O.D.

See Fitting Size chart on page 51 for O.D.

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FIG. 7077, FIG. 7078 & FIG. 7079

Swaged Nipples

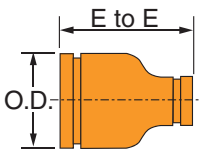

Fig. 7077
Gr x Gr

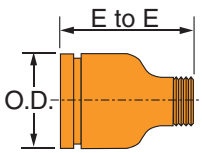

Fig. 7078
Gr x Thd

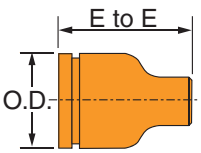

Fig. 7079
Gr x Bev

FIGURE 7077, 7078 & 7079 SWAGED NIPPLES

Nominal Size	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
2 x 1 *50 x 25*	6½ C *165*	2.0 *0.9*
2 x 1¼ *50 x 32*	6½ *165*	2.0 *0.9*
2 x 1½ *50 x 40*	6½ *165*	2.0 *0.9*
2½ x 1 *65 x 25*	7 *178*	3.5 *1.6*
2½ x 1¼ *65 x 32*	7 *178*	3.5 *1.6*
2½ x 1½ *65 x 40*	7 *178*	3.5 *1.6*
2½ x 2 *65 x 50*	7 *178*	3.5 *1.6*
3 x 1 *80 x 25*	8 *203*	5.0 *2.3*
3 x 1¼ *80 x 32*	8 *203*	5.0 *2.3*
3 x 1½ *80 x 40*	8 *203*	5.0 *2.3*
3 x 2 *80 x 50*	8 *203*	5.0 *2.3*
3 x 2½ *80 x 65*	8 *203*	5.0 *2.3*
3½ x 3 *90 x 80*	8 *203*	7.0 *3.2*
4 x 1 *100 x 25*	9 *229*	8.0 *3.6*
4 x 1¼ *100 x 32*	9 *229*	8.0 *3.6*
4 x 1½ *100 x 40*	9 *229*	8.0 *3.6*
4 x 2 *100 x 50*	9 *229*	8.0 *3.6*

Nominal Size	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
4 x 2½ *100 x 65*	9 *229*	8.0 *3.6*
4 x 3 *100 x 80*	9 *229*	8.0 *3.6*
4 x 3½ *100 x 90*	9 *229*	8.0 *3.6*
5 x 2 *125 x 50*	11 *279*	12.0 *5.4*
5 x 2½ *125 x 65*	11 *279*	12.0 *5.4*
5 x 3 *125 x 80*	11 *279*	12.0 *5.4*
5 x 4 *125 x 100*	11 *279*	12.0 *5.4*
6 x 1 *150 x 25*	12 *305*	19.0 *8.6*
6 x 1¼ *150 x 32*	12 *305*	19.0 *8.6*
6 x 1½ *150 x 40*	12 *305*	19.0 *8.6*
6 x 2 *150 x 50*	12 *305*	19.0 *8.6*
6 x 2½ *150 x 65*	12 *305*	19.0 *8.6*
6 x 3 *150 x 80*	12 *305*	19.0 *8.6*
6 x 3½ *150 x 90*	12 *305*	17.0 *7.7*
6 x 4 *150 x 100*	12 *305*	19.0 *8.6*
6 x 5 *150 x 125*	12 *305*	19.0 *8.6*

This product is not ULC Listed.
See Fitting Size chart on page 51 for O.D.

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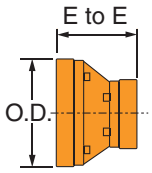
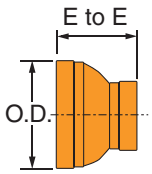
FIG. 7072 – Gr x Gr Concentric Reducer



Cast



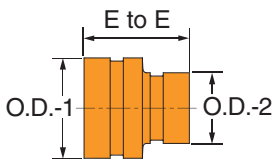
Fabricated

FIGURE 7072 CONCENTRIC REDUCER

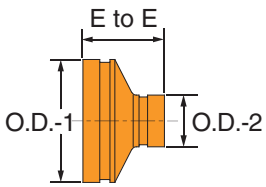
Nominal Size	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs/Kg
1¼ x 1 32 x 25	2½ 64	0.6 0.3
1½ x 1 40 x 25	2½ 64	0.6 0.3
1½ x 1¼ 40 x 32	2½ 64	0.6 0.3
2 x 1 50 x 25	2½ 64	0.8 0.4
2 x 1¼ 50 x 32	2½ C 64	1.3 0.6
2 x 1½ 50 x 40	2½ C 64	1.3 0.6
2½ x 1 65 x 25	2½ 64	1.0 0.5
2½ x 1¼ 65 x 32	2½ 64	1.0 0.5
2½ x 1½ 65 x 40	2½ 64	1.3 0.6
2½ x 2 65 x 50	2½ C 64	1.6 0.7
3 x 1 80 x 25	2½ 64	1.2 0.5
3 x 1¼ 80 x 32	2½ 64	1.3 0.6
3 x 1½ 80 x 40	2½ 64	1.3 0.6
3 x 2 80 x 50	2½ C 64	1.4 0.6
3 x 2½ 80 x 65	2½ C 64	1.5 0.7
3½ x 3 90 x 80	3 76	1.8 0.8
4 x 1 100 x 25	3 76	2.2 1.0
4 x 1¼ 100 x 32	3 76	2.2 1.0
4 x 1½ 100 x 40	3 76	2.3 1.0
4 x 2 100 x 50	3 C 76	2.4 1.1
4 x 2½ 100 x 65	3 C 76	2.6 1.2
4 x 3 100 x 80	3 C 76	3.2 1.5
4 x 3½ 100 x 90	3 76	3.6 1.6
5 x 2 125 x 50	3½ 89	4.6 2.1
5 x 2½ 125 x 65	3½ 89	4.5 2.0
5 x 3 125 x 80	3½ 89	4.4 2.0
5 x 4 125 x 100	3½ C 89	4.5 2.0
6 x 1 150 x 25	4 102	6.8 3.1
6 x 1½ 150 x 40	4 102	6.9 3.1
6 x 2 150 x 50	4 C 102	6.0 2.7
6 x 2½ 150 x 65	4 102	6.0 2.7
6 x 3 150 x 80	4 C 102	5.4 2.4
6 x 4 150 x 100	4 C 102	5.6 2.5
6 x 5 150 x 125	4 C 102	6.0 2.7
8 x 3 200 x 80	5 127	12.0 5.5
8 x 4 200 x 100	5 C 127	9.0 4.1
8 x 5 200 x 125	5 127	11.5 5.2
8 x 6 200 x 150	5 C 127	10.6 4.8
10 x 4 250 x 100	6 152	20 9.1
10 x 5 250 x 125	6 152	20 9.1
10 x 6 250 x 150	6 C 152	20 9.1
10 x 8 250 x 200	6 152	23.9 10.8
12 x 4 300 x 100	7 178	25 11.3
12 x 6 300 x 150	7 178	29 13.2
12 x 8 300 x 200	7 178	29 13.2
12 x 10 300 x 250	7 178	32.4 14.7
14 x 6 350 x 150	13 330	54.3 24.6
14 x 8 350 x 200	13 330	54.5 24.7
14 x 10 350 x 250	13 330	55.7 25.3
14 x 12 350 x 300	13 330	57.3 26.0
16 x 8 400 x 200	14 356	65.4 29.7
16 x 10 400 x 250	14 356	66.7 30.3
16 x 12 400 x 300	14 356	68.1 30.9
16 x 14 400 x 350	14 356	71.0 32.2
18 x 10 450 x 250	15 381	82.3 37.3
18 x 12 450 x 300	15 381	83.6 37.9
18 x 14 450 x 350	15 381	86.2 39.1
18 x 16 450 x 400	15 381	87.2 39.6
20 x 10 500 x 250	20 508	123.0 55.8
20 x 12 500 x 300	20 508	125.0 56.7
20 x 14 500 x 350	20 508	129.0 58.5
20 x 16 500 x 400	20 508	131.0 59.4
20 x 18 500 x 450	20 508	133.0 60.3
24 x 10 600 x 250	20 508	147.0 66.7
24 x 12 600 x 300	20 508	149.0 67.6
24 x 14 600 x 350	20 508	152.0 68.9
24 x 16 600 x 400	20 508	153.0 69.4
24 x 18 600 x 450	20 508	154.0 69.9
24 x 20 600 x 500	20 508	155.0 70.3

C - Cast malleable or ductile iron, all others are fabricated steel.

FIG. 7072i – Gr x Gr Concentric Reducer



Sizes 1¼" x 1" to 80mm x 76.1mm



Sizes 4" x 1" and larger

FIGURE 7072i CONCENTRIC REDUCER

Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs/Kg
1¼ x 1 32 x 25	1.660 x 1.315 42.2 x 33.4	2½ 63.5	0.5 0.227
1½ x 1 40 x 25	1.900 x 1.315 48.3 x 33.4	2½ 63.5	0.5 0.227
1½ x 1¼ 40 x 32	1.900 x 1.660 48.3 x 42.2	2½ 63.5	1.0 .454
2 x 1 50 x 25	2.375 x 1.315 60.3 x 33.4	2½ 63.5	1.0 .454
2 x 1¼ 50 x 32	2.375 x 1.660 60.3 x 42.2	2½ 63.5	1.0 .454
2 x 1½ 50 x 40	2.375 x 1.900 60.3 x 48.3	2½ 63.5	1.0 .454
2½ x 1 65 x 25	2.875 x 1.315 73.0 x 33.4	2½ 63.5	1.5 0.680
2½ x 1¼ 65 x 32	2.875 x 1.660 73.0 x 42.2	2½ 63.5	1.5 0.680
2½ x 1½ 65 x 40	2.875 x 1.900 73.0 x 48.3	2½ 63.5	1.5 0.680
2½ x 2 65 x 50	2.875 x 2.375 73.0 x 60.3	2½ 63.5	1.5 0.680
3 O.D. x 1 76.1 x 25	2.996 x 1.315 76.1 x 33.4	2½ 63.5	1.5 0.680
3 O.D. x 1¼ 76.1 x 32	2.996 x 1.660 76.1 x 42.2	2½ 63.5	1.5 0.680
3 O.D. x 1½ 76.1 x 40	2.996 x 1.900 76.1 x 48.3	2½ 63.5	1.5 0.680
3 O.D. x 2 76.1 x 50	2.996 x 2.375 76.1 x 60.3	2½ 63.5	1.5 0.680
3 x 1½ 80 x 40	3.500 x 1.900 88.9 x 48.3	2½ 63.5	1.5 0.680
3 x 2 80 x 50	3.500 x 2.375 88.9 x 60.3	2½ 63.5	2.0 0.907
3 x 2½ 80 x 65	3.500 x 2.875 88.9 x 73.0	2½ 63.5	2.0 0.907
3 x 3 O.D. 80 x 76.1	3.500 x 2.996 88.9 x 76.1	2½ 63.5	2.0 0.907
4 x 1 100 x 25	4.500 x 1.315 114.3 x 33.4	3 76.2	2.5 1.134
4 x 1½ 100 x 40	4.500 x 1.900 114.3 x 48.3	3 76.2	2.5 1.134
4 x 2 100 x 50	4.500 x 2.375 114.3 x 60.3	3 76.2	2.5 1.134
4 x 2½ 100 x 65	4.500 x 2.875 114.3 x 73.0	3 76.2	2.5 1.134
4 x 3 O.D. 100 x 76.1	4.500 x 2.996 114.3 x 76.1	3 76.2	2.5 1.134
4 x 3 100 x 80	4.500 x 3.500 114.3 x 88.9	3 76.2	2.5 1.134
5½ O.D. x 3 O.D. 139.7 x 76.1	5.500 x 2.996 139.7 x 76.1	3½ 88.9	4.0 1.814
5½ O.D. x 3 139.7 x 80	5.500 x 3.500 139.7 x 88.9	3½ 88.9	4.0 1.814
5½ O.D. x 4 139.7 x 100	5.500 x 4.500 139.7 x 114.3	3½ 88.9	4.0 1.814
5 x 2 125 x 50	5.563 x 2.375 141.3 x 60.3	3½ 88.9	4.0 1.814
5 x 2½ 125 x 65	5.563 x 2.875 141.3 x 73.0	3½ 88.9	4.0 1.814
5 x 3 125 x 80	5.563 x 3.500 141.3 x 88.9	3½ 88.9	4.0 1.814
5 x 4 125 x 100	5.563 x 4.5 141.3 x 114.3	3½ 88.9	5.0 2.041
6½ O.D. x 3 O.D. 165.1 x 76.1	6.500 x 2.996 165.1 x 76.1	4 101.6	5.0 2.268
6½ O.D. x 3 165.1 x 80	6.500 x 3.500 165.1 x 88.9	4 101.6	5.5 2.495
6½ O.D. x 4 165.1 x 100	6.500 x 4.500 165.1 x 114.3	4 101.6	6.0 2.720
6½ O.D. x 5½ O.D. 165.1 x 139.7	6.500 x 5.500 165.1 x 139.7	4 101.6	6.5 2.948
6 x 2 150 x 50	6.625 x 2.375 168.3 x 60.3	4 101.6	5.0 2.268
6 x 2½ 150 x 65	6.625 x 2.875 168.3 x 73.0	4 101.6	5.5 2.495
6 x 3 O.D. 150 x 76.1	6.625 x 2.996 168.3 x 76.1	4 101.6	5.5 2.495
6 x 3 150 x 80	6.625 x 3.500 168.3 x 88.9	4 101.6	5.5 2.495
6 x 4 150 x 100	6.625 x 4.500 168.3 x 114.3	4 101.6	6.5 2.948
6 x 5½ O.D. 150 x 139.7	6.625 x 5.500 168.3 x 139.7	4 101.6	6.5 2.948
6 x 5 150 x 125	6.625 x 5.563 168.3 x 141.3	4 101.6	6.0 2.720
6 x 6½ O.D. 150 x 165.1	6.625 x 6.500 168.3 x 165.1	4 101.6	7.5 3.402
8 x 4 200 x 100	8.625 x 4.500 219.1 x 114.3	5 127.0	10.0 4.536
8 x 6½ O.D. 200 x 165.1	8.625 x 6.500 219.1 x 165.1	5 127.0	11.0 4.990
8 x 6 200 x 150	8.625 x 6.625 219.1 x 168.3	5 127.0	11.0 4.990
10 x 8 250 x 200	10.750 x 8.675 273.1 x 219.1	6 152.4	19.5 8.845

All 7072i fittings are cast ductile iron.

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FIG. 7069

45° Lateral

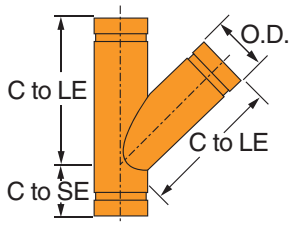

FIGURE 7069 LATERAL

Nominal Size	O.D.	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	5 *127*	2¼ *57*	1.5 *0.7*
1¼ *32*	1.660 *42.2*	5¾ *146*	2½ *64*	2.5 *1.1*
1½ *40*	1.900 *48.3*	6¼ *159*	2¾ *70*	3.5 *1.6*
2 *50*	2.375 *60.3*	7 *178*	2¾ *70*	4.5 *2.0*
2½ *65*	2.875 *73.0*	7¾ *197*	3 *76*	10.0 *4.5*
3 *80*	3.500 *88.9*	8½ *216*	3¼ *83*	11.0 *5.0*
3½ *90*	4.000 *101.6*	10 *254*	3½ *89*	14.0 *6.4*
4 *100*	4.500 *114.3*	10½ *267*	3¾ *95*	18.3 *8.3*
5 *125*	5.563 *141.3*	12½ *318*	4 *102*	30.0 *13.6*
6 *150*	6.625 *168.3*	14 *356*	4½ *114*	46.6 *21.1*
8 *200*	8.625 *219.1*	18 *457*	6 *152*	82.8 *37.6*
10 *250*	10.750 *273.1*	20½ *521*	6½ *165*	127 *57.4*
12 *300*	12.750 *323.9*	23 *584*	7 *178*	165 *74.8*
14 *350*	14.000 *355.6*	26½ *673*	7½ *191*	215 *97.5*
16 *400*	16.000 *406.4*	29 *737*	8 *203*	345 *157*
18 *450*	18.000 *457.2*	32 *813*	8½ *216*	425 *193*
20 *500*	20.000 *508.0*	35 *889*	9 *229*	517 *235*
24 *600*	24.000 *609.6*	40 *1016*	10 *254*	940 *426*

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FIG. 7070

45° Reducing Lateral

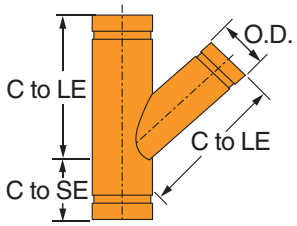

FIGURE 7070 REDUCING LATERAL

Nominal Size	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
3 x 3 x 2 *80 x 80 x 50*	8½ *216*	3¼ *83*	9.8 *4.4*
3 x 3 x 2½ *80 x 80 x 65*	8½ *216*	3¼ *83*	11.5 *5.2*
4 x 4 x 2 *100 x 100 x 50*	10½ *267*	3¾ *95*	15.5 *7.0*
4 x 4 x 2½ *100 x 100 x 65*	10½ *267*	3¾ *95*	17.0 *7.7*
4 x 4 x 3 *100 x 100 x 80*	10½ *267*	3¾ *95*	18.5 *8.4*
5 x 5 x 2 *125 x 125 x 50*	12½ *318*	4 *102*	22.5 *10.2*
5 x 5 x 3 *125 x 125 x 80*	12½ *318*	4 *102*	26.5 *12.0*
5 x 5 x 4 *125 x 125 x 100*	12½ *318*	4 *102*	30.5 *13.8*
6 x 6 x 2 *150 x 150 x 50*	14 *356*	4½ *114*	33.0 *15.0*
6 x 6 x 3 *150 x 150 x 80*	14 *356*	4½ *114*	37.0 *16.8*
6 x 6 x 4 *150 x 150 x 100*	14 *356*	4½ *114*	40.0 *18.1*
6 x 6 x 5 *150 x 150 x 125*	14 *356*	4½ *114*	45.0 *20.4*
8 x 8 x 4 *200 x 200 x 100*	18 *457*	6 *152*	59.6 *27.0*
8 x 8 x 5 *200 x 200 x 125*	18 *457*	6 *152*	68.0 *30.8*
8 x 8 x 6 *200 x 200 x 150*	18 *457*	6 *152*	75.0 *34.0*
10 x 10 x 4 *250 x 250 x 100*	20½ *521*	6½ *165*	83.0 *37.6*
10 x 10 x 5 *250 x 250 x 125*	20½ *521*	6½ *165*	100.0 *45.4*
10 x 10 x 6 *250 x 250 x 150*	20½ *521*	6½ *165*	105.0 *47.6*
10 x 10 x 8 *250 x 250 x 200*	20½ *521*	6½ *165*	116.0 *52.6*
12 x 12 x 4 *300 x 300 x 100*	23 *584*	7 *178*	137.0 *62.1*
12 x 12 x 6 *300 x 300 x 150*	23 *584*	7 *178*	140.0 *63.5*
12 x 12 x 8 *300 x 300 x 200*	23 *584*	7 *178*	147.0 *66.7*

Nominal Size	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
12 x 12 x 10 *300 x 300 x 250*	23 *584*	7 *178*	168 *76.2*
14 x 14 x 4 *350 x 350 x 100*	26½ *673*	7½ *191*	173 *78.5*
14 x 14 x 6 *350 x 350 x 150*	26½ *673*	7½ *191*	185 *83.9*
14 x 14 x 8 *350 x 350 x 200*	26½ *673*	7½ *191*	195 *88.5*
14 x 14 x 10 *350 x 350 x 250*	26½ *673*	7½ *191*	223 *101*
14 x 14 x 12 *350 x 350 x 300*	26½ *673*	7½ *191*	240 *109*
16 x 16 x 6 *400 x 400 x 150*	29 *737*	8 *203*	235 *107*
16 x 16 x 8 *400 x 400 x 200*	29 *737*	8 *203*	250 *113*
16 x 16 x 10 *400 x 400 x 250*	29 *737*	8 *203*	263 *119*
16 x 16 x 12 *400 x 400 x 300*	29 *737*	8 *203*	283 *128*
16 x 16 x 14 *400 x 400 x 350*	29 *737*	8 *203*	307 *139*
18 x 18 x 6 *450 x 450 x 150*	32 *813*	8½ *216*	275 *125*
18 x 18 x 8 *450 x 450 x 200*	32 *813*	8½ *216*	306 *139*
18 x 18 x 10 *450 x 450 x 250*	32 *813*	8½ *216*	321 *146*
18 x 18 x 12 *450 x 450 x 300*	32 *4813*	8½ *216*	333 *151*
18 x 18 x 14 *450 x 450 x 350*	32 *813*	8½ *216*	358 *162*
18 x 18 x 16 *450 x 450 x 400*	32 *813*	8½ *216*	382 *173*
20 x 20 x 12 *500 x 500 x 300*	35 *889*	9 *229*	390 *177*
20 x 20 x 14 *500 x 500 x 350*	35 *889*	9 *229*	410 *186*
20 x 20 x 16 *500 x 500 x 400*	35 *889*	9 *229*	440 *200*
24 x 24 x 16 *600 x 600 x 400*	40 *1016*	10 *254*	725 *329*
24 x 24 x 20 *600 x 600 x 500*	40 *1016*	10 *254*	785 *356*

See Fitting Size chart on page 51 for O.D.

FIG. 7066 – Tee Wye

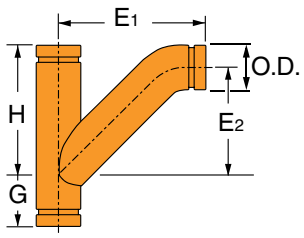

FIGURE 7066 TEE WYE

Nominal Size	G	H	E1	E2	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
2 x 2 x 2 *50 x 50 x 50*	2¾ *70*	7 *178*	9 *229*	4⅝ *117*	6.4 *2.9*
2½ x 2½ x 2½ *65 x 65 x 65*	3 *76*	7¾ *197*	10½ *267*	5¾ *146*	11.5 *5.2*
3 x 3 x 3 *80 x 80 x 80*	3¼ *83*	8½ *216*	11½ *292*	6½ *165*	16.5 *7.5*
3½ x 3½ x 3½ *90 x 90 x 90*	3½ *89*	10 *254*	13 *330*	7¾ *197*	22 *10.0*
4 x 4 x 3 *100 x 100 x 80*	3¾ *95*	10½ *267*	12⅞ *327*	7⅞ *200*	23 *10.4*
4 x 4 x 4 *100 x 100 x 100*	3¾ *95*	10½ *267*	13⅝ *346*	8⅛ *206*	26 *11.8*
5 x 5 x 3 *125 x 125 x 80*	4 *102*	12½ *318*	14¼ *362*	9¼ *235*	32 *14.5*
5 x 5 x 4 *125 x 125 x 100*	4 *102*	12½ *318*	15⅛ *384*	9⅝ *244*	35 *15.9*
5 x 5 x 5 *125 x 125 x 125*	4 *102*	12½ *318*	16⅛ *410*	10 *254*	40 *18.1*
6 x 6 x 3 *150 x 150 x 80*	4½ *114*	14 *356*	15⁵⁄₁₆ *389*	10⁵⁄₁₆ *262*	50 *22.7*
6 x 6 x 4 *150 x 150 x 100*	4½ *114*	14 *356*	16¼ *413*	10¾ *273*	55 *24.9*
6 x 6 x 5 *150 x 150 x 125*	4½ *114*	14 *356*	17¼ *438*	11⅛ *283*	58 *26.3*
6 x 6 x 6 *150 x 150 x 150*	4½ *114*	14 *356*	18¼ *464*	11½ *292*	60.5 *27.4*
8 x 8 x 3 *200 x 200 x 80*	6 *152*	18 *457*	18³⁄₁₆ *462*	13³⁄₁₆ *335*	100 *45.4*
8 x 8 x 4 *200 x 200 x 100*	6 *152*	18 *457*	19 *483*	13½ *343*	110 *49.9*
8 x 8 x 5 *200 x 200 x 125*	6 *152*	18 *457*	20 *508*	13⅞ *352*	111 *50.3*
8 x 8 x 6 *200 x 200 x 150*	6 *152*	18 *457*	21⅛ *537*	14⅜ *365*	112 *50.8*
8 x 8 x 8 *200 x 200 x 200*	6 *152*	18 *457*	23¼ *591*	15¼ *387*	120 *54.4*
10 x 10 x 3 *250 x 250 x 80*	6½ *165*	20½ *521*	19⅞ *505*	14⅞ *378*	130 *59.0*
10 x 10 x 4 *250 x 250 x 100*	6½ *165*	20½ *521*	20¾ *527*	15¼ *387*	135 *61.2*
10 x 10 x 5 *250 x 250 x 125*	6½ *165*	20½ *521*	21⅞ *556*	15¾ *400*	140 *63.5*
10 x 10 x 6 *250 x 250 x 150*	6½ *165*	20½ *521*	22⅞ *581*	16⅛ *410*	145 *65.8*
10 x 10 x 8 *250 x 250 x 200*	6½ *165*	20½ *521*	27¼ *692*	19¼ *489*	150 *68.0*
10 x 10 x 10 *250 x 250 x 250*	6½ *165*	20½ *521*	27¼ *692*	18 *457*	190 *86.2*
12 x 12 x 3 *300 x 300 x 80*	7 *178*	23 *584*	20¾ *527*	15¾ *400*	140 *63.5*
12 x 12 x 4 *300 x 300 x 100*	7 *178*	23 *584*	21½ *546*	16 *406*	145 *65.8*
12 x 12 x 6 *300 x 300 x 150*	7 *178*	23 *584*	23¾ *603*	17 *432*	165 *74.8*
12 x 12 x 8 *300 x 300 x 200*	7 *178*	23 *584*	26 *660*	18 *457*	175 *79.4*
12 x 12 x 10 *300 x 300 x 250*	7 *178*	23 *584*	28 *711*	18¾ *476*	200 *90.7*
12 x 12 x 12 *300 x 300 x 300*	7 *178*	23 *584*	31 *787*	20½ *521*	240 *109*

FIG. 7067 – Reducing Tee Wye

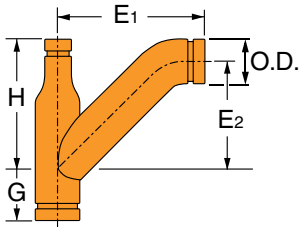

FIGURE 7067 REDUCING TEE WYE

Nominal Size	G	H	E1	E2	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
4 x 3 x 3 *100 x 80 x 80*	1⅝ *41*	7⅜ *187*	10¾ *273*	5⅝ *143*	16.0 *7.3*
4 x 3 x 4 *100 x 80 x 100*	3¾ *95*	10½ *267*	13⅝ *346*	8⅛ *206*	27.0 *12.2*
5 x 3 x 3 *125 x 80 x 80*	1¼ *32*	9¾ *248*	11½ *292*	6½ *165*	25.0 *11.3*
5 x 3 x 5 *125 x 80 x 125*	4 *102*	12½ *318*	16⅛ *410*	10 *254*	44.0 *20.0*
5 x 4 x 3 *125 x 100 x 80*	1⅞ *48*	9⅛ *232*	11⅞ *302*	6⅞ *175*	21.0 *9.5*
5 x 4 x 4 *125 x 100 x 100*	1⅞ *48*	9⅛ *232*	12¾ *324*	7¼ *184*	25.0 *11.3*
6 x 4 x 6 *150 x 100 x 150*	4½ *114*	14 *356*	18¼ *464*	11½ *292*	61.0 *27.7*
6 x 5 x 3 *150 x 125 x 80*	1¼ *32*	10¾ *273*	13 *330*	8 *203*	27.0 *12.2*
6 x 5 x 4 *150 x 125 x 100*	1¼ *32*	10¾ *273*	13⅞ *352*	8⅜ *213*	31.0 *14.1*
8 x 6 x 4 *200 x 150 x 100*	1 *25*	12 *305*	14¾ *375*	9¼ *235*	45.0 *20.4*
8 x 6 x 8 *200 x 150 x 200*	6 *152*	18 *457*	23¼ *591*	15¼ *387*	95.0 *43.1*

See Fitting Size chart on page 51 for O.D.

FIG. 7071 – True Wye

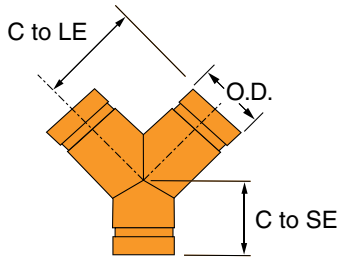

FIGURE 7071 TRUE WYE

Nominal Size	O.D.	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	2¼ *57*	2¼ *57*	1.1 *0.5*
1¼ *32*	1.660 *42.2*	2¾ *70*	2½ *64*	1.5 *0.7*
1½ *40*	1.900 *48.3*	2¾ *70*	2¾ *70*	1.8 *0.8*
2 *50*	2.375 *60.3*	3¼ *83*	2¾ *70*	2.3 *1.0*
2½ *65*	2.875 *73.0*	3¾ *95*	3 *76*	5.0 *2.3*
3 *80*	3.500 *88.9*	4¼ *108*	3¼ *83*	6.1 *2.8*
3½ *90*	4.000 *101.6*	4½ *114*	3½ *89*	8.3 *3.8*
4 *100*	4.500 *114.3*	5 *127*	3¾ *95*	10.5 *4.8*
5 *125*	5.563 *141.3*	5½ *140*	4 *102*	15 *6.8*
6 *150*	6.625 *168.3*	6½ *165*	4½ *114*	21.6 *9.8*
8 *200*	8.625 *219.1*	7¾ *197*	6 *152*	36.0 *16.3*
10 *250*	10.750 *273.1*	9 *229*	6½ *165*	51.0 *23.1*
12 *300*	12.750 *323.9*	10 *254*	7 *178*	160.0 *72.6*
14 *350*	14.000 *355.6*	11 *279*	7½ *191*	136.0 *61.7*
16 *400*	16.000 *406.4*	12 *305*	8 *203*	166.0 *75.3*
18 *450*	18.000 *457.2*	15½ *394*	8½ *216*	234 *106*
20 *500*	20.000 *508.0*	17¼ *438*	9 *229*	281 *128*
24 *600*	24.000 *609.6*	20 *508*	10 *254*	523 *237*

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FIG. 7087 GR X FPT

Female Thread Adapter

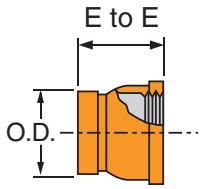

FIGURE 7087 FEMALE THREAD ADAPTER

Nominal Size	Grooved End O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	2 1/16 *52*	0.7 *0.3*
1 1/4 *32*	1.660 *42.2*	2 5/16 *59*	1.4 *0.6*
1 1/2 *40*	1.900 *48.3*	2 5/16 *59*	1.5 *0.7*
2 *50*	2.375 *60.3*	2 1/2 *64*	1.6 *0.7*
2 1/2 *65*	2.875 *73.0*	– –	1.6 *0.7*
3 *80*	3.500 *88.9*	2 3/4 *70*	2.5 *1.1*
4 *100*	4.500 *114.3*	3 1/4 *83*	4.5 *2.0*

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FIG. 7055 GR X MPT

90° Adapter Elbow

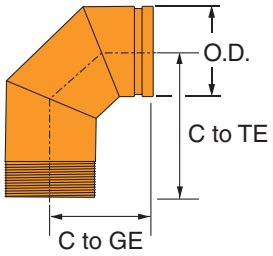

FIGURE 7055 90° ADAPTER ELBOW

Nominal Size	Fitting O.D.	Center to Grooved End	Center to Threaded End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	2 1/4 *57*	2 1/4 *57*	0.6 *0.3*
1 1/4 *32*	1.660 *42.2*	2 3/4 *70*	2 3/4 *70*	1.0 *0.5*
1 1/2 *40*	1.900 *48.3*	2 3/4 *70*	2 3/4 *70*	1.2 *0.5*
2 *50*	2.375 *60.3*	3 1/4 *83*	4 1/4 *108*	2.3 *1.0*
2 1/2 *65*	2.875 *73.0*	3 3/4 *95*	3 3/4 *95*	3.7 *1.7*
3 *80*	3.500 *88.9*	4 1/4 *108*	6 *152*	6.5 *2.9*
3 1/2 *90*	4.000 *101.6*	4 1/2 *114*	6 1/4 *159*	8.2 *3.7*
4 *100*	4.500 *114.3*	5 *127*	7 1/4 *184*	11 *5.0*
6 *150*	6.625 *168.3*	6 1/2 *165*	6 1/2 *165*	19.8 *9.0*

FIG. 7056 GR X MPT

45° Adapter Elbow

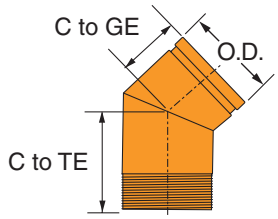

FIGURE 7056 45° ADAPTER ELBOW

Nominal Size	Fitting O.D.	Center to Grooved End	Center to Threaded End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	1 3/4 *44*	1 3/4 *44*	0.6 *0.3*
1 1/4 *32*	1.660 *42.2*	1 3/4 *44*	1 3/4 *44*	0.7 *0.3*
1 1/2 *40*	1.900 *48.3*	1 3/4 *44*	1 3/4 *44*	0.8 *0.4*
2 *50*	2.375 *60.3*	2 *51*	3 *76*	1.6 *0.7*
2 1/2 *65*	2.875 *73.0*	2 1/4 *57*	2 1/4 *57*	2.2 *1.0*
3 *80*	3.500 *88.9*	2 1/2 *64*	4 1/4 *108*	4.3 *2.0*
3 1/2 *90*	4.000 *101.6*	2 3/4 *70*	2 3/4 *70*	4.2 *1.9*
4 *100*	4.500 *114.3*	3 *76*	5 1/4 *133*	7.5 *3.4*
6 *150*	6.625 *168.3*	3 1/2 *89*	3 1/2 *89*	11.1 *5.0*

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REDUCING BASE SUPPORT ELBOW

FIG. 7050RF – Grooved x 150# Flanged (GxF)

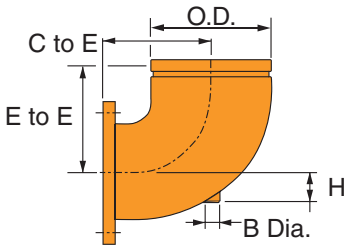

FIGURE 7050 RF REDUCING BASE SUPPORT ELBOW

Nominal Size	Grooved End O.D.	Center to End	H	B Dia. Threaded	Approx. Wt. Ea. GxF
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*NPSC*	*Lbs./Kg*
6 x 4 *150 x 100*	6.625 *168.3*	12 *305*	2½ *64*	1½ *38*	38.5 *17.5*
6 x 5 *150 x 125*	6.625 *168.3*	12½ *318*	2½ *64*	1½ *38*	45.4 *20.6*
8 x 5 *200 x 125*	8.625 *219.1*	16 *406*	3 *76*	1½ *38*	65.5 *29.7*
8 x 6 *200 x 150*	8.625 *219.1*	16 *406*	3 *76*	1½ *38*	73 *33.1*
10 x 6 *250 x 150*	10.750 *273.1*	19 *483*	3½ *89*	1½ *38*	100 *45.4*
10 x 8 *250 x 200*	10.750 *273.1*	19 *483*	3½ *89*	1½ *38*	127 *57.6*
12 x 8 *300 x 200*	12.750 *323.9*	22 *559*	4 *102*	1½ *38*	155 *70.3*
12 x 10 *300 x 250*	12.750 *323.9*	22 *559*	4 *102*	1½ *38*	186 *84.4*

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GROOVED FLANGE NIPPLES

FIG. 7084 – Groove x Class 150 Flange Nipple

FIG. 7085 – Groove x Class 300 Flange Nipple

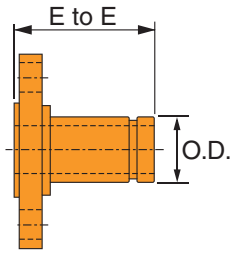

FIGURE 7084 GROOVE X CLASS 150 FLANGE NIPPLE

Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	3 *76*	2.5 *1.1*
1¼ *32*	1.660 *42.2*	4 *102*	3.8 *1.7*
1½ *40*	1.900 *48.3*	4 *102*	4.1 *1.9*
2 *50*	2.375 *60.3*	4 *102*	6.0 *2.7*
2½ *65*	2.875 *73.0*	4 *102*	9.2 *4.2*
3 *80*	3.500 *88.9*	4 *102*	10.4 *4.7*
3½ *90*	4.000 *101.6*	4 *102*	14.0 *6.4*
4 *100*	4.500 *114.3*	6 *152*	19.1 *8.7*
5 *125*	5.563 *141.3*	6 *152*	23.0 *10.4*
6 *150*	6.625 *168.3*	6 *152*	29.5 *13.4*
8 *200*	8.625 *219.1*	6 *152*	43.5 *19.7*
10 *250*	10.750 *273.1*	8 *203*	68.2 *30.9*
12 *300*	12.750 *323.9*	8 *203*	96.1 *43.6*
14 *350*	14.000 *355.6*	* *	* *
16 *400*	16.000 *406.4*	* *	* *
18 *450*	18.000 *457.2*	* *	* *
20 *500*	20.000 *508.0*	* *	* *
24 *600*	24.000 *609.6*	* *	* *

FIGURE 7085 GROOVE X CLASS 300 FLANGE NIPPLE

End to End	Approx. Wt. Ea.
In./mm	*Lbs./Kg*
3 *76*	3.6 *1.6*
4 *102*	4.6 *2.1*
4 *102*	7.1 *3.2*
4 *102*	8.2 *3.7*
4 *102*	11.9 *5.4*
4 *102*	15.5 *7.0*
4 *102*	21.0 *9.5*
6 *152*	28.0 *12.7*
6 *152*	35.0 *15.9*
6 *152*	50.0 *22.7*
6 *152*	72.0 *32.7*
8 *203*	* *
8 *203*	* *
* *	* *
* *	* *
* *	* *
* *	* *
* *	* *

* Contact an Anvil Representative for dimensions & weights.

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FIG. 7074

Cap

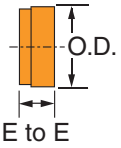

FIGURE 7074 CAP			
Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1C *25*	1.315 *33.4*	1¼ *32*	0.3 *0.1*
1¼ C *32*	1.660 *42.2*	1¼ *32*	0.4 *0.2*
1½ C *40*	1.900 *48.3*	1¼ *32*	0.5 *0.2*
2 C *50*	2.375 *60.3*	1 *25*	0.5 *0.2*
2½ C *65*	2.875 *73.0*	1 *25*	0.7 *0.3*
3 O.D. C 76.1	*2.996* 76.1	*1* 25	*0.8* 0.4
3 C *80*	3.500 *88.9*	1 *25*	1.1 *0.5*
3½ C *90*	4.000 *101.6*	1 *25*	1.4 *0.6*
4¼ O.D. C 108.0	*4.250* 108.0	*1⅛* 29	*2.0* 0.9
4 C *100*	4.500 *114.3*	1⅛ *29*	2.8 *1.3*
5¼ O.D. C 133.0	*5.236* 133.0	*1⅛* 29	*3.2* 1.5
5½ O.D. C 139.7	*5.500* 139.7	*1⅛* 29	*4.0* 1.8
5 C *125*	5.563 *141.3*	1⅛ *29*	4.0 *1.8*
6¼ O.D. C 159.0	*6.259* 159.0	*1⅛* 29	*5.1* 2.3
6½ O.D. C 165.1	*6.500* 165.1	*1⅛* 29	*6.0* 2.7
6 C *150*	6.625 *168.3*	1 5⁄16 *33*	6.0 *2.7*
8 C *200*	8.625 *219.1*	1½ *38*	12.5 *5.7*
10 C *250*	10.750 *273.1*	1½ *38*	21.9 *9.9*
12 C *300*	12.750 *323.9*	1½ *38*	33.8 *15.3*
14* *350*	14.000 *355.6*	8½ *216*	40 *18.1*
16* *400*	16.000 *406.4*	9 *229*	45 *20.4*
18* *450*	18.000 *457.2*	10 *254*	58 *26.3*
20* *500*	20.000 *508.0*	11 *279*	79 *35.8*
24* *600*	24.000 *609.6*	12½ *318*	100 *45.4*

* Machined Cap
C - Cast Malleable or Ductile Iron

FIG. 7075

Bull Plug

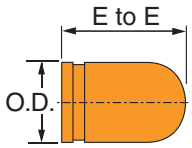

FIGURE 7075 BULL PLUG			
Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	4 *102*	2.5 *1.1*
2½ *65*	2.875 *73.0*	5 *127*	3.1 *1.4*
3 *80*	3.500 *88.9*	6 *152*	4.4 *2.0*
4 *100*	4.500 *114.3*	7 *178*	7.4 *3.4*
5 *125*	5.563 *141.3*	* *	* *
6 *150*	6.625 *168.3*	10 *254*	18.5 *8.4*

* Contact an Anvil Representative for dimensions & weights.
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FIG. 7068

Cross

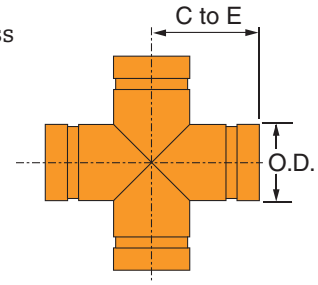

FIGURE 7068 CROSS			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	2¼ *57*	1.3 *0.6*
1¼ *32*	1.660 *42.2*	2¾ *70*	2.1 *1.0*
1½ *40*	1.900 *48.3*	2¾ *70*	2.5 *1.1*
2 *50*	2.375 *60.3*	3¼ *83*	2.9 *1.3*
2½ *65*	2.875 *73.0*	3¾ *95*	5.2 *2.4*
3 *80*	3.500 *88.9*	4¼ *108*	7.5 *3.4*
3½ *90*	4.000 *101.6*	4½ *114*	9.8 *4.4*
4 *100*	4.500 *114.3*	5 *127*	12.2 *5.5*
5 *125*	5.563 *141.3*	5½ *140*	17.6 *8.0*
6 *150*	6.625 *168.3*	6½ *165*	28.3 *12.8*
8 *200*	8.625 *219.1*	7¾ *197*	48.0 *21.8*
10 *250*	10.750 *273.1*	9 *229*	70.0 *31.8*
12 *300*	12.750 *323.9*	10 *254*	110 *49.9*
14 *350*	14.000 *355.6*	11 *279*	140 *63.5*
16 *400*	16.000 *406.4*	12 *305*	170 *77.1*
18 *450*	18.000 *457.2*	15½ *394*	260 *118*
20 *500*	20.000 *508.0*	17¼ *438*	320 *145*
24 *600*	24.000 *609.6*	20 *508*	585 *265*

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NIPPLES

FIG. 7086

GR x HOSE Nipple

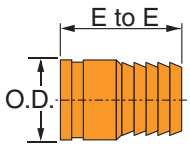


FIGURE 7086 HOSE NIPPLE			
Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	3¼ *83*	0.4 *0.2*
1¼ *32*	1.660 *42.2*	3⅝ *92*	0.7 *0.3*
1½ *40*	1.900 *48.3*	4 *102*	0.8 *0.4*
2 *50*	2.375 *60.3*	4⅝ *117*	1.3 *0.6*
2½ *65*	2.875 *73.0*	5½ *140*	2.1 *1.0*
3 *80*	3.500 *88.9*	6 *152*	3.3 *1.5*
4 *100*	4.500 *114.3*	7¼ *184*	5.5 *2.5*
5 *125*	5.563 *141.3*	9¾ *248*	8.1 *3.7*
6 *150*	6.625 *168.3*	11 *279*	13.2 *6.0*
8 *200*	8.625 *219.1*	12½ *318*	24.0 *10.9*
10 *250*	10.750 *273.1*	14 *356*	29.0 *13.2*
12 *300*	12.750 *323.9*	16 *406*	46.0 *20.9*

This product is not UL/ULC Listed or FM Approved.

FIG. 7080

GR x GR

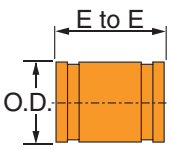


FIG. 7081

GR x MPT

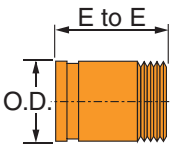
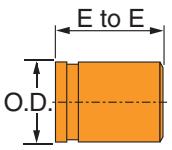


FIG. 7082

GR x BEV



FIGURES 7080, 7081 & 7082 ADAPTER NIPPLE			
Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.4*	3 *76*	0.4 *0.2*
1¼ *32*	1.660 *42.2*	4 *102*	0.8 *0.4*
1½ *40*	1.900 *48.3*	4 *102*	0.9 *0.4*
2 *50*	2.375 *60.3*	4 *102*	1.2 *0.5*
2½ *65*	2.875 *73.0*	4 *102*	1.9 *0.9*
3 *80*	3.500 *88.9*	4 *102*	2.5 *1.1*
3½ *90*	4.000 *101.6*	4 *102*	3.1 *1.4*
4 *100*	4.500 *114.3*	6 *152*	5.5 *2.5*
5 *125*	5.563 *141.3*	6 *152*	7.4 *3.4*
6 *150*	6.625 *168.3*	6 *152*	9.5 *4.3*
8 *200*	8.625 *219.1*	6 *152*	14.2 *6.4*
10 *250*	10.750 *273.1*	8 *203*	27.0 *12.2*
12 *300*	12.750 *323.9*	8 *203*	33.0 *15.0*

This product is not ULC Listed.

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FIG. 7062

Bullhead Tee (GR x GR x FPT)

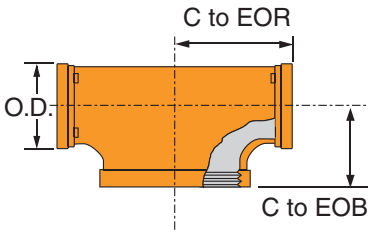

FIGURE 7062 BULLHEAD TEE (GR x GR x FPT)

Nominal Size	Center to End of Run	Center to End of Branch	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
5 x 5 x 8 *125 x 125 x 200*	7¾ *197*	5½ *140*	31.0 *14.1*
6 x 6 x 8 *150 x 150 x 200*	7¾ *197*	6½ *165*	37.6 *17.1*

See Fitting Size chart on page 51 for O.D.

These fittings are designed to provide minimal pressure drop and uniform strength. Pressure ratings of Gruvlok Fittings conforms to those of Fig. 7001 Gruvlok Standard Coupling.

FIG. 7065

Standpipe Tee (GR x GR x FPT)

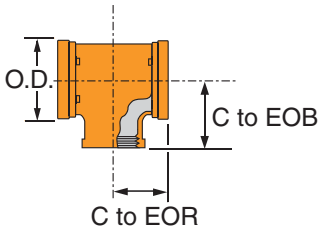

FIGURE 7065 STANDPIPE TEE (GR x GR x FPT)

Nominal Size	O.D.	Center to End of Run	Center to End of Branch	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
4 x 4 x 2½ *100 x 100 x 65*	4.500 *114.3*	3¼ *83*	4 *102*	7.6 *3.4*
6 x 6 x 2½ *150 x 150 x 65*	6.625 *168.3*	3¼ *83*	5⅛ *130*	11.2 *5.1*

See Fitting Size chart on page 51 for O.D.

These fittings are designed to provide minimal pressure drop and uniform strength. Pressure ratings of Gruvlok Fittings conforms to those of Fig. 7001 Gruvlok Standard Coupling.

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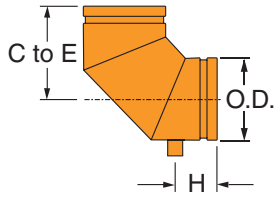
FIG. 7050DR

90° Drain elbow



Available fabricated Schedule 10 only.
Drain elbow has a standard 1" female NPT outlet.

FIGURE 7050DR 90° DRAIN ELBOW

Nominal Size	O.D.	Max Working Pressure	Dimensions		Approx. Wt. Ea.
			C to E	H	
In./DN(mm)	*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*Lbs./Kg*
1¼ *32*	1.660 *42.2*	300 *20.7*	2¾ *69*	1¾ *44*	0.7 *0.3*
1½ *40*	1.900 *48.3*	300 *20.7*	2¾ *69*	1¾ *44*	1.7 *0.8*
2 *50*	2.375 *60.3*	300 *20.7*	3¼ *83*	1¾ *44*	2.0 *0.9*
2½ *65*	2.875 *73.0*	300 *20.7*	3¾ *95*	1⅞ *48*	2.5 *1.1*
3 *80*	3.500 *88.9*	300 *20.7*	4¼ *108*	2 *51*	3.2 *1.5*
4 *100*	4.500 *114.3*	300 *20.7*	5 *127*	2¼ *57*	4.6 *2.1*
5 *125*	5.583 *141.3*	300 *20.7*	5½ *140*	2⅜ *60*	11.5 *5.2*
6 *150*	6.625 *168.3*	300 *20.7*	6½ *165*	2⅜ *60*	9.6 *4.4*
8 *200*	8.625 *219.1*	300 *20.7*	7¾ *197*	2½ *64*	15.8 *7.2*
10 *250*	10.750 *273.1*	300 *20.7*	9 *229*	2¾ *69*	48.5 *22.0*
12 *300*	12.750 *323.9*	300 *20.7*	10 *254*	2¾ *69*	66.0 *29.0*

GRUVLOK® FIRE-RITE™ SHORT PATTERN FITTINGS

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FIG. 7450

90° Short Pattern Elbow

The Gruvlok® Fire-Rite™ short pattern 90° elbows has a 2" to 8" size range and a 300 psi pressure rating.

Fire-Rite™ fittings are painted to industry specification and are available galvanized for more corrosive environments.

CAD design increases internal diameters and provides superior flow capability.

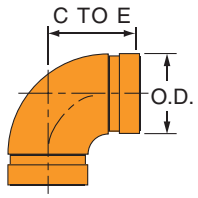
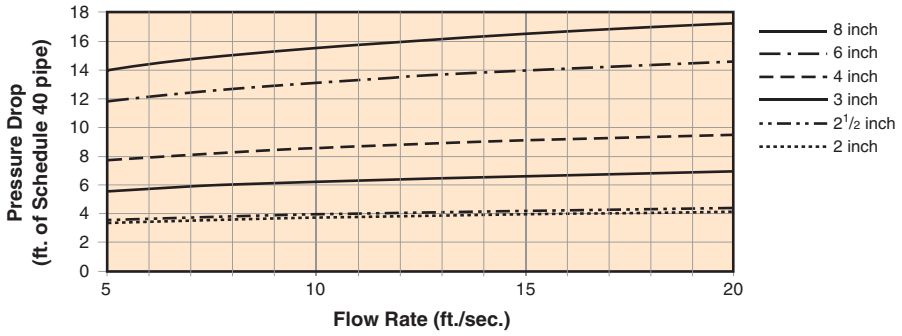


FIGURE 7450 90° ELBOW SHORT PATTERN FITTING – PRESSURE DROP



Gruvlok short pattern fittings exceed the headloss requirements of NFPA 13.

For Fig. 7450 90° grooved end elbows use the value shown.

Note: Above values are shown for Schedule 40 pipe to be consistent with industry practices.

FIGURE 7450 90° ELBOW

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	2¾ *70*	1.7 *0.8*
2½ *65*	2.875 *73.0*	3 *76*	2.6 *1.2*
3 *80*	3.500 *88.9*	3⅜ *86*	3.5 *1.6*
4 *100*	4.500 *114.3*	4 *102*	6.5 *3.0*
6 *150*	6.625 *168.3*	5½ *140*	14.8 *6.7*
8 *200*	8.625 *219.1*	6⅞ *175*	25.6 *11.6*

All are Ductile Iron.

FIG. 7460

Short Pattern Tee

The Gruvlok® Fire-Rite™ short pattern tee has a 2" to 8" size range and a 300 psi pressure rating.

Fire-Rite™ fittings are painted to industry specification and are available galvanized for more corrosive environments.

CAD design increases internal diameters and provides superior flow capability.

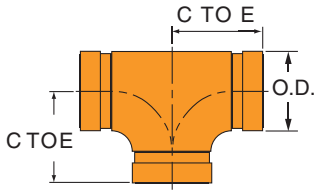
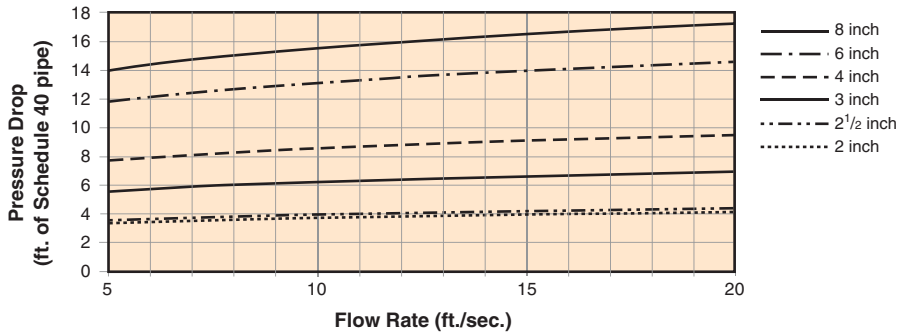


FIGURE 7460 TEE SHORT PATTERN FITTING – PRESSURE DROP



Gruvlok short pattern fittings exceed the headloss requirements of NFPA 13.

For Fig. 7460 Tee branch use 2½ times the value shown.

For Fig. 7460 Tee run use the value shown.

Note: Above values are shown for Schedule 40 pipe to be consistent with industry practices.

FIGURE 7460 TEE

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	2¾ *70*	2.5 *1.1*
2½ *65*	2.875 *73.0*	3 *76*	3.5 *1.6*
3 *80*	3.500 *88.9*	3⅜ *86*	4.8 *2.2*
4 *100*	4.500 *114.3*	4 *102*	8.1 *3.7*
6 *150*	6.625 *168.3*	5½ *140*	19.1 *8.7*
8 *200*	8.625 *219.1*	6⅞ *175*	35.2 *16.0*

All are Ductile Iron.

FIG. 7050 3D

Long Radius Elbows

1. 3D long radius elbows are available in sizes up to 24". Sizes 4" and below are provided with a 4" (101.6 mm) long integral tangent. Remaining sizes are provided with integral tangents with lengths equal to the nominal pipe size.
2. Grooved or plain-end available - specify choice on order.
3. Material: standard wall steel pipe to ASTM A 53, Grade B. (Other materials available on request).
4. Bends to conform to above radii.
5. C to E tolerances: 2" through 6" ± 1/8" (3.2 mm); 8" through 16" ± 1/4" (6.4 mm); 18" through 24" + 3/8" (9.5 mm).
6. All weights are approximate, based on calculated weight of pipe.

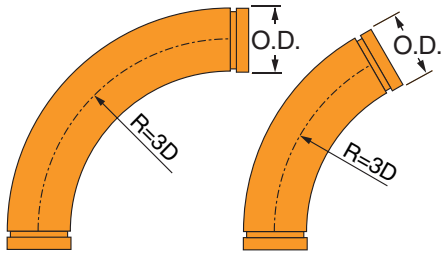


Fig. 7050-3D, 90° Elbow

Fig. 7057-3D, 60° Elbow

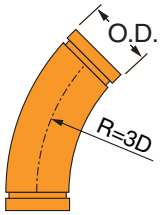


Fig. 7051-3D, 45° Elbow

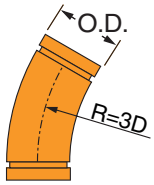


Fig. 7058-3D, 30° Elbow

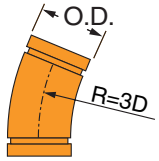


Fig. 7052-3D, 22½° Elbow

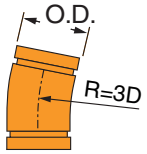


Fig. 7053-3D, 11¼° Elbow

FIGURE 7050-3D 90° ELBOW				FIG. 7057-3D 60° ELBOW		FIG. 7051-3D 45° ELBOW		FIG. 7058-3D 30° ELBOW		FIG. 7052-3D 22½° ELBOW		FIG. 7053-3D 11¼° ELBOW	
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.	Center to End	Approx. Wt. Ea.	Center to End	Approx. Wt. Ea.	Center to End	Approx. Wt. Ea.	Center to End	Approx. Wt. Ea.	Center to End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*	*In./mm*	*Lbs./Kg*	*In./mm*	*Lbs./Kg*	*In./mm*	*Lbs./Kg*	*In./mm*	*Lbs./Kg*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	10 *254*	5.3 *2.4*	7½ *191*	4.3 *2.0*	6½ *165*	3.9 *1.8*	5¾ *146*	3.4 *1.5*	5¼ *133*	3.2 *1.5*	4½ *114*	2.8 *1.3*
2½ *65*	2.875 *73*	11½ *292*	9.5 *4.3*	8¼ *210*	7.7 *3.5*	7¼ *184*	6.7 *3.0*	6 *152*	5.8 *2.6*	5½ *140*	5.3 *2.4*	4¾ *121*	4.6 *2.1*
3 *80*	3.500 *88.9*	13 *330*	14.0 *6.4*	9¼ *235*	11.0 *5.0*	7¾ *197*	9.5 *4.3*	6½ *165*	8.0 *3.6*	5¾ *146*	7.3 *3.3*	5 *127*	6.2 *2.8*
3½ *90*	4.000 *101.6*	14½ *368*	18.6 *8.4*	10 *254*	14.4 *6.5*	8½ *216*	12.3 *5.6*	6¾ *171*	10.2 *4.6*	6 *152*	9.2 *4.2*	5 *127*	7.6 *3.4*
4 *100*	4.500 *114.3*	16 *406*	24.1 *10.9*	11 *279*	18.5 *8.4*	9 *229*	15.7 *7.1*	7¼ *184*	12.8 *5.8*	6½ *165*	11.4 *5.2*	5¼ *133*	9.3 *4.2*
5 *125*	5.563 *141.3*	20 *508*	40.9 *18.6*	13¾ *349*	31.3 *14.2*	11¼ *286*	26.5 *12.0*	9 *229*	21.8 *9.9*	8 *203*	19.4 *8.8*	6½ *165*	15.8 *7.2*
6 *150*	6.625 *168.3*	24 *610*	63.7 *28.9*	16½ *419*	48.8 *22.1*	13½ *343*	41.3 *18.7*	10¾ *273*	33.9 *15.4*	9½ *241*	30.1 *13.7*	7¾ *197*	24.6 *11.2*
8 *200*	8.625 *219.1*	32 *813*	127.8 *58.0*	22 *559*	97.9 *44.4*	18 *457*	82.9 *37.6*	14½ *368*	68.0 *30.8*	12¾ *324*	60.5 *27.4*	10½ *267*	49.3 *22.4*
10 *250*	10.750 *273.1*	40 *1016*	226.4 *102.7*	27¼ *692*	173.4 *78.7*	22½ *572*	146.9 *66.6*	18 *457*	120.5 *54.7*	16 *406*	107.2 *48.6*	13 *330*	87.3 *39.6*
12 *300*	12.750 *323.9*	48 *1219*	332.7 *150.9*	32¾ *832*	254.8 *115.6*	27 *686*	215.9 *97.9*	21¾ *552*	177.0 *80.3*	19¼ *489*	157.5 *71.4*	15½ *394*	128.3 *58.2*
14 *350*	14.000 *355.6*	56 *1422*	427.3 *193.8*	38¼ *972*	327.3 *148.5*	31½ *800*	227.3 *103.1*	25¼ *641*	227.3 *103.1*	22½ *572*	202.3 *91.8*	18¼ *464*	164.8 *74.8*
16 *400*	16.000 *406.4*	64 *1626*	560.1 *254.1*	43¾ *1111*	429.0 *194.6*	36 *914*	363.5 *164.9*	29 *737*	297.9 *135.1*	25½ *648*	265.2 *120.3*	20¾ *527*	216.0 *98.0*
18 *450*	18.000 *457.2*	72 *1829*	710.7 *322.4*	49¼ *1251*	544.4 *246.9*	40½ *1029*	461.3 *209.2*	32½ *826*	378.1 *171.5*	28¾ *730*	336.5 *152.6*	23.35 *593*	274.1 *124.3*
20 *500*	20.000 *508*	80 *2032*	879.3 *398.8*	54¾ *1391*	673.5 *305.5*	45 *1143*	540.7 *245.3*	36 *914*	467.8 *212.2*	32 *813*	416.3 *188.8*	26 *660*	339.2 *153.9*
24 *600*	24.000 *609.6*	96 *2438*	1270.3 *576.2*	65½ *1664*	973.0 *441.3*	53¾ *1365*	824.4 *373.9*	43¼ *1099*	675.7 *304.1*	38¼ *972*	601.4 *272.8*	31 *787*	490.0 *222.3*

FIG. 7050 5D

Long Radius Elbows

1. 5D long radius elbows are available in sizes up to 24". Sizes 4" and below are provided with a 4" (101.6 mm) long integral tangent. Remaining sizes are provided with integral tangents with lengths equal to the nominal pipe size.
2. Grooved or plain-end available.
3. Material: standard wall steel pipe to ASTM A 53, Grade B. (Other materials available on request).
4. Bends to conform to above radii.
5. C to E tolerances: 2" through 6" ± ⅛" (3.2 mm); 8" through 16" ± ¼" (6.4 mm); 18" through 24" + ⅜" (9.5 mm).
6. All weights are approximate, based on calculated weight of pipe.

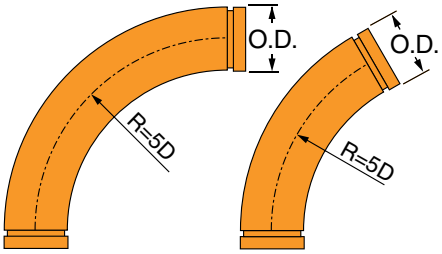


Fig. 7050-5D, 90° Elbow

Fig. 7057-5D, 60° Elbow

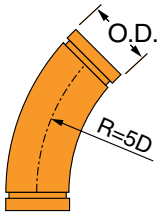


Fig. 7051-5D, 45° Elbow

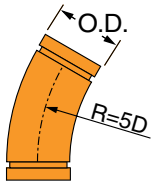


Fig. 7058-5D, 30° Elbow

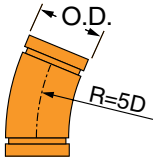


Fig. 7052-5D, 22½° Elbow

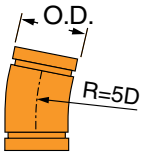


Fig. 7053-5D, 11¼° Elbow

FIGURE 7050-5D — 90° ELBOW

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	14 356	7.2 3.3
2½ 65	2.875 73	16½ 419	13.3 6.0
3 80	3.500 88.9	19 483	19.9 9.0
3½ 90	4.000 101.6	21½ 546	26.9 12.2
4 100	4.500 114.3	24 610	35.4 16.1
5 125	5.563 141.3	30 762	60.0 27.2
6 150	6.625 168.3	36 914	93.5 42.4
8 200	8.625 219.1	48 1219	187.6 85.1
10 250	10.750 273.1	60 1524	332.4 150.8
12 300	12.750 323.9	72 1829	488.4 221.5
14 350	14.000 355.6	84 2134	627.4 284.6
16 400	16.000 406.4	96 2438	822.2 372.9
18 450	18.000 457.2	108 2743	1,043.4 473.3
20 500	20.000 508	120 3048	1,290.9 585.5
24 600	24.000 609.6	144 3658	1,864.8 845.9

FIG. 7057-5D — 60° ELBOW

Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
9¾ 248	5.6 2.5
11¼ 286	10.2 4.6
12¾ 324	15.0 6.8
12¼ 311	20.0 9.1
15½ 394	26.0 11.8
19½ 495	44.1 20.0
23¼ 591	68.6 31.1
31 787	137.7 62.5
39 991	244.1 110.7
46¾ 1187	358.6 162.7
54½ 1384	460.7 209.0
62¼ 1581	603.8 273.9
70 1778	766.2 347.5
77¾ 1975	947.9 430.0
93¼ 2369	1,369.3 621.1

FIG. 7051-5D — 45° ELBOW

Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
8¼ 210	4.8 2.2
9¼ 235	8.6 3.9
10¼ 260	12.5 5.7
11¼ 286	16.5 7.5
12½ 318	21.3 9.7
15½ 394	36.1 16.4
18½ 470	56.2 25.5
24½ 622	112.8 51.2
30¾ 781	199.9 90.7
37 940	293.7 133.2
43 1092	377.3 171.1
49¼ 1251	494.5 224.3
55¼ 1403	627.6 284.7
61½ 1562	776.4 352.2
73¾ 1873	1,121.6 508.7

FIG. 7058-5D — 30° ELBOW

Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
6¾ 171	4.0 1.8
7½ 191	7.0 3.2
8 203	10.0 4.5
8¾ 222	13.0 5.9
9½ 241	16.6 7.5
11¾ 298	28.1 12.7
14 356	43.8 19.9
18¾ 476	87.9 39.9
23½ 597	155.8 70.7
28 711	228.9 103.8
32¾ 832	294.0 133.4
37½ 953	385.3 174.8
42¼ 1073	489.0 221.8
46¾ 1187	605.0 274.4
56¼ 1429	873.9 396.4

FIG. 7052-5D — 22½° ELBOW

Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
6 152	3.6 1.6
6½ 165	6.2 2.8
7 178	8.8 4.0
7½ 191	11.3 5.1
8 203	14.3 6.5
10 254	24.1 10.9
12 305	37.6 17.1
16 406	75.4 34.2
20 508	133.7 60.6
24 610	196.4 89.1
28 711	252.3 114.4
32 813	330.7 150.0
36 914	419.7 190.4
40 1016	519.2 235.5
48 1219	750.1 340.2

FIG. 7053-5D — 11¼° ELBOW

Center to End	Approx. Wt. Ea.
In./mm	Lbs./Kg
5 127	3.0 1.4
5¼ 133	5.0 2.3
5½ 140	6.9 3.1
5¾ 146	8.7 3.9
6 152	10.7 4.9
7½ 191	18.2 8.3
9 229	28.3 12.8
12 305	56.8 25.8
15 381	100.6 45.6
18 457	147.8 67.0
21 533	189.8 86.1
24 610	248.8 112.9
27 686	315.7 143.2
30 762	390.6 177.2
35¾ 908	564.3 256.0

FIG. 7050 6D

Long Radius Elbows

1. 6D long radius elbows are available in sizes up to 24". Sizes 4" and below are provided with a 4" (101.6 mm) long integral tangent. Remaining sizes are provided with integral tangents with lengths equal to the nominal pipe size.
2. Grooved or plain-end available.
3. Material: standard wall steel pipe to ASTM A 53, Grade B. (Other materials available on request).
4. Bends to conform to above radii.
5. C to E tolerances: 2" through 6" ± 1/8" (3.2 mm); 8" through 16" ± 1/4" (6.4 mm); 18" through 24" + 3/8" (9.5 mm).
6. All weights are approximate, based on calculated weight of pipe.

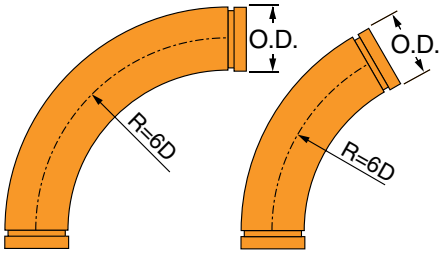


Fig. 7050-6D, 90° Elbow

Fig. 7057-6D, 60° Elbow

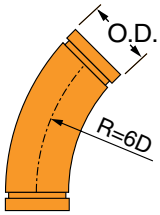


Fig. 7051-6D, 45° Elbow

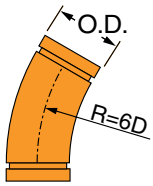


Fig. 7058-6D, 30° Elbow

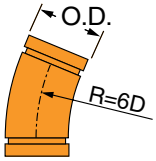


Fig. 7052-6D, 22½° Elbow

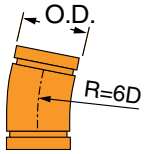


Fig. 7053-6D, 11¼° Elbow

FIGURE 7050-6D 90° ELBOW			
Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	16 406	8.2 3.7
2½ 65	2.875 73	19 483	15.2 6.9
3 80	3.500 88.9	22 559	22.9 10.4
3½ 90	4.000 101.6	25 635	31.1 14.1
4 100	4.500 114.3	28 711	41.1 18.6
5 125	5.563 141.3	35 889	69.6 31.6
6 150	6.625 168.3	42 1067	108.4 49.2
8 200	8.625 219.1	56 1422	217.5 98.7
10 250	10.750 273.1	70 1778	385.4 174.8
12 300	12.750 323.9	84 2134	566.2 256.8
14 350	14.000 355.6	98 2489	727.4 329.9
16 400	16.000 406.4	112 2845	953.3 432.4
18 450	18.000 457.2	126 3200	1,209.7 548.7
20 500	20 508	140 3556	1,496.6 678.8
24 600	24 609.6	168 4267	2,162.0 980.7

FIG. 7057-6D 60° ELBOW		
Center to End	Approx. Wt. Ea.	
In./mm	Lbs./Kg	
11 279	6.3 2.9	
12¾ 324	11.4 5.2	
14½ 368	17.0 7.7	
16¼ 413	22.8 10.3	
18 457	29.8 13.5	
22¼ 565	50.5 22.9	
26¾ 679	78.6 35.7	
35¾ 908	157.7 71.5	
44¾ 1137	279.4 126.7	
53½ 1359	410.5 186.2	
62½ 1588	527.3 239.2	
71½ 1816	691.1 313.5	
80½ 2045	877.1 397.8	
89¼ 2267	1,085.1 492.2	
107¼ 2724	1,567.5 711.0	

FIG. 7051-6D 45° ELBOW		
Center to End	Approx. Wt. Ea.	
In./mm	Lbs./Kg	
9 229	5.3 2.4	
10¼ 260	9.5 4.3	
11½ 292	14.0 6.4	
12¾ 324	18.6 8.4	
14 356	24.1 10.9	
17½ 445	40.9 18.6	
21 533	63.7 28.9	
28 711	127.8 58.0	
35 889	226.4 102.7	
41¾ 1060	332.7 150.9	
48¾ 1238	427.3 193.8	
55¾ 1416	560.1 254.1	
62¾ 1594	710.7 322.4	
69¾ 1772	879.3 398.8	
83¾ 2127	1,270.3 576.2	

FIG. 7058-6D 30° ELBOW		
Center to End	Approx. Wt. Ea.	
In./mm	Lbs./Kg	
7¼ 184	4.3 2.0	
8 203	7.7 3.5	
8¾ 222	11.0 5.0	
9¾ 248	14.4 6.5	
10½ 267	18.5 8.4	
13 330	31.3 14.2	
15¾ 400	48.8 22.1	
21 533	97.9 44.4	
26 660	173.4 78.7	
31¼ 794	254.8 115.6	
36½ 927	327.3 148.5	
41¾ 1060	429.0 194.6	
47 1194	544.4 246.9	
52¼ 1327	673.5 305.5	
62½ 1588	973.0 441.3	

FIG. 7052-6D 22½° ELBOW		
Center to End	Approx. Wt. Ea.	
In./mm	Lbs./Kg	
6½ 165	3.9 1.8	
7 178	6.7 3.0	
7½ 191	9.5 4.3	
8¼ 210	12.3 5.6	
8¾ 222	15.7 7.1	
11 279	26.5 12.0	
13¼ 337	41.3 18.7	
17½ 445	82.9 37.6	
22 559	146.9 66.6	
26¼ 667	215.9 97.9	
30¾ 781	277.3 125.8	
35¼ 895	363.5 164.9	
39½ 1003	461.3 209.2	
44 1118	570.7 258.9	
52.34 1329	824.4 373.9	

FIG. 7053-6D 11¼° ELBOW		
Center to End	Approx. Wt. Ea.	
In./mm	Lbs./Kg	
5¼ 133	3.2 1.5	
5½ 140	5.3 2.4	
5¾ 146	7.3 3.3	
6 152	9.2 4.2	
6½ 165	11.4 5.2	
8 203	19.4 8.8	
9½ 241	30.1 13.7	
12¾ 324	60.5 27.4	
16 406	107.2 48.6	
19 483	157.5 71.4	
22¼ 565	202.3 91.8	
25½ 648	265.2 120.3	
28¾ 730	336.5 152.6	
31¾ 806	416.3 188.8	
38¼ 972	601.4 272.8	

SERIES 7700

Butterfly Valve

AN-7721-3

Series 7700 butterfly valve
with 10 position lever lock

AN-7722-3

Series 7700 butterfly valve
with gear operator

Used in commercial grooved-end piping systems 2" through 12".

The uniqueness of the Series 7700 Gruvlok Butterfly Valve begins with the spherical bore of the disc seat area. This facilitates a constant DISC-TO-SEAT loading that maintains a leak tight stem seal regardless of disc position. The stem sealing force is constant through the full disc cycle and operating torques are kept low which increases valve life. The design provides a bubble tight seal from full vacuum to 300 psi when the valve is closed. The valve is rated for dead-end service to a full pressure rating of 300 psi.

NSF/ANSI 61

2" - 10" Series 7700
Certified to NSF/ANSI 61
(cold water) and Annex G

The stem-to-disc connection provides zero backlash. The high strength, corrosion resistant, stainless steel stems are blow-out proof. Each stem is fitted with a secondary seal that also provides a lifetime lubrication chamber.

The Series 7700 valve is designed with the contractor in mind. The valve body is a rugged one-piece casting with an integral mounting base for gear operator or handle actuation, while providing room for a minimum of 2" of pipe insulation. The valve is designed and manufactured to meet or exceed the requirements of MSS SP-67.

For data on fire protection listings/approvals, contact your Anvil representative.

SERIES 7700

Butterfly Valve

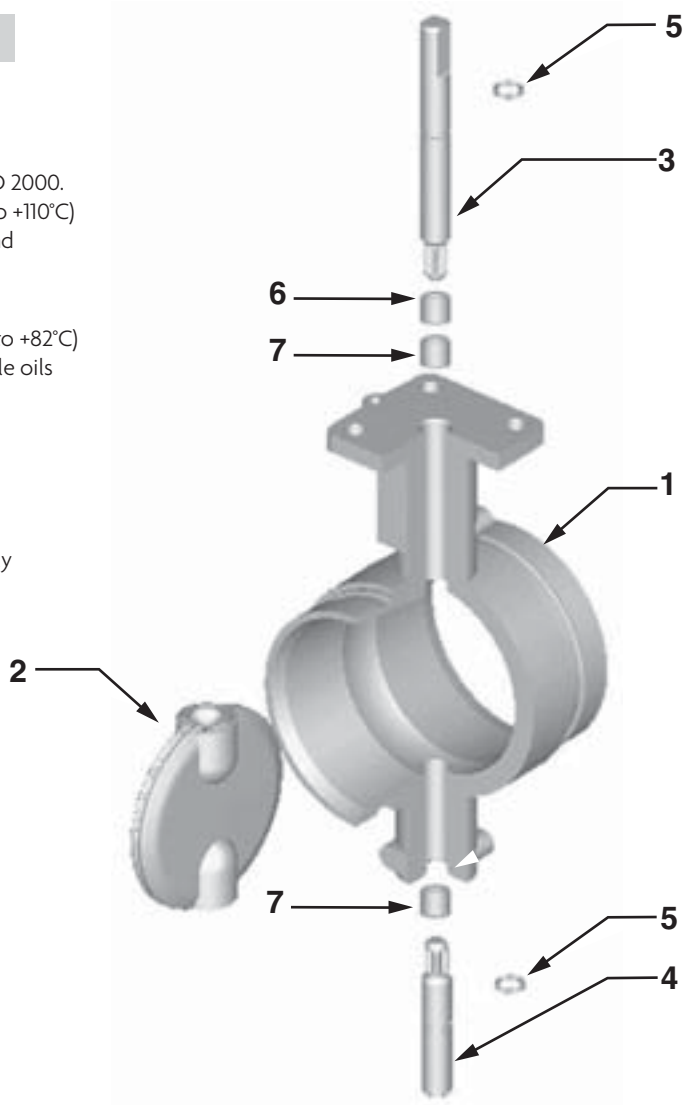
MATERIAL SPECIFICATIONS

1. **BODY:** Ductile Iron conforming to ASTM A 536, Grade 65-45-12
   Body Coating: Nylon: +230°F (+110°C) maximum service temperature
2. **DISC:** Ductile Iron conforming to ASTM A 536 Grades 65-45-12
   Disc Encapsulation: Properties as specified in accordance with ASTM D 2000.
   - ❑ **Grade E** (EPDM): Service Temperature Range -40°F to +230°F (-40°C to +110°C) Recommended for water service, dilute acids, alkalies, oil-free air and many chemical services. NOT FOR USE IN PETROLEUM SERVICES.
   - ❑ **Grade T** (Nitrile): Service Temperature Range -20°F to +180°F (-29°C to +82°C) Recommended for petroleum products, air with oil vapors, vegetable oils and mineral oils. NOT FOR USE IN HOT WATER SERVICES.

3, 4. **UPPER AND LOWER SHAFT:** Type 416 Stainless Steel

5. **O-RINGS:** Compatible with disc coating

6, 7. **TOP AND BOTTOM BRONZE SLEEVE BUSHINGS:** 8", 10", & 12" Valve only



*** Special Options -**
Call an Anvil Representative for pricing and availability.
E- Silicone Free

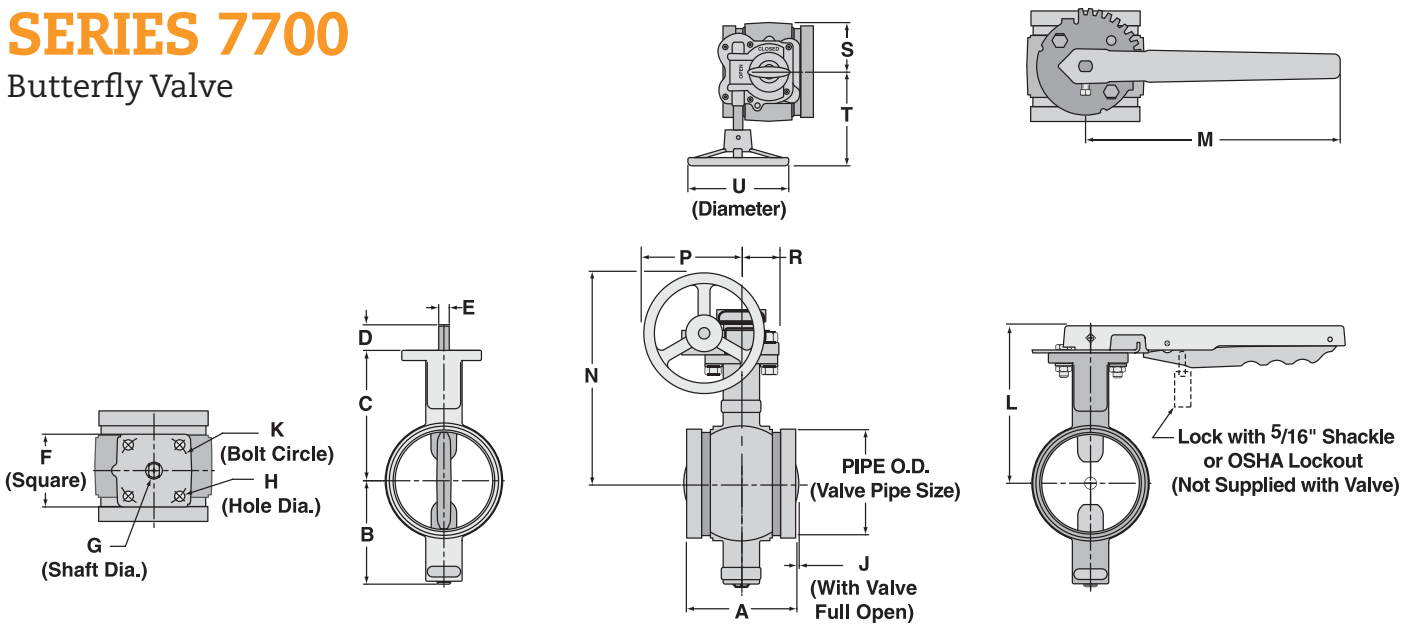
GRUVLOK BUTTERFLY VALVE SERIES 7700 (ORDERING INFORMATION)

Sample Part Number 8" AN7721-3* —>	8"	A	N	77	2	1 -	3*
	Size	Body Style	Body Coating	Series	Disc Coating	Operator	Stem
	2" - 12"	A	**N** - Nylon	77-77XX	**1** - Nitrile (Grade T) **2** - EPDM (Grade E)	**0** - None **1** - 10 Pos. L/Lock **2** - Gear Operator **D** - Infinite Pos. w/Memory Stop **4** - Short 10 Pos. L/lock Operator	**3** - 416 S.S.

NOTE: For operator safety, hand levers on 8" valves are limited to applications with a 25 PSI (1.7 bar) maximum pressure.
For operator safety, hand levers on 10" and 12" valves are not available.

SERIES 7700

Butterfly Valve



SERIES 7700 BUTTERFLY VALVE DIMENSIONS

Dimensions	Valve Size (ANSI/DN)								
	2	2½	3	4	5	6	8	10	12
In./mm	*50*	*65*	*80*	*100*	*125*	*150*	*200*	*250*	*300*
O.D. *In./mm*	2⅜ *60.3*	2⅞ *73.0*	3½ *88.9*	4½ *114.3*	5 9/16 *141.3*	6⅝ *168.3*	8⅝ *219.1*	10¾ *273.1*	12¾ *323.9*
A	3 3/16 *81.0*	3 13/16 *96.8*	3 13/16 *96.8*	4⅝ *117.3*	5 13/16 *147.6*	5 13/16 *147.6*	5¼ *133.4*	6¼ *158.8*	6½ *165.1*
B	3 *75.4*	3 3/16 *80.8*	3 13/16 *96.5*	4¼ *108.5*	5 *126.5*	5½ *138.9*	6 15/16 *175.8*	8 *202.9*	9 *229.4*
C	4 3/16 *105.9*	4⅜ *111.3*	5 1/16 *129.0*	5⅜ *136.7*	5⅞ *149.4*	6⅜ *161.8*	7¾ *196.9*	9½ *240.3*	10½ *266.7*
D	1 1/16 *26.9*	1 1/16 *26.9*	1 1/16 *26.9*	1 1/16 *26.9*	1 1/16 *26.9*	1 1/16 *26.9*	1⅝ *41.1*	1⅝ *41.1*	1⅝ *41.1*
E	7/16 *11.1*	7/16 *11.1*	7/16 *11.1*	7/16 *11.1*	7/16 *11.1*	7/16 *11.1*	¾ *19.1*	¾ *19.1*	¾ *19.1*
F	3 *76.2*	3 *76.2*	3 *76.2*	3 *76.2*	3 *76.2*	3 *76.2*	5 *127.0*	5 *127.0*	5 *127.0*
G	9/16 *14.3*	9/16 *14.3*	9/16 *14.3*	9/16 *14.3*	⅞ *22.2*	⅞ *22.2*	1 *25.4*	1¼ *31.8*	1¼ *31.8*
H	7/16 *11.1*	7/16 *11.1*	7/16 *11.1*	7/16 *11.1*	7/16 *11.1*	7/16 *11.1*	½ *13.5*	½ *13.5*	½ *13.5*
J	- -	- -	- -	- -	- -	⅛ *3.3*	1⅜ *34.8*	1⅞ *47.0*	2¾ *70.1*
K	3 *76.2*	3 *76.2*	3 *76.2*	3 *76.2*	3 *76.2*	3 *76.2*	5 *127.0*	5 *127.0*	5 *127.0*
L	5 5/16 *135.1*	5½ *140.5*	6¼ *158.2*	6½ *165.9*	7 *178.6*	7½ *191.0*	9 7/16 *240.3*	- -	- -
M	10½ *266.7*	10½ *266.7*	10½ *266.7*	10½ *266.7*	10½ *266.7*	10½ *266.7*	15 *381.0*	- -	- -
N	7 13/16 *198.0*	8 *203.3*	8 11/16 *221.1*	9 *228.7*	9½ *241.4*	10 *253.9*	14 15/16 *379.2*	16⅝ *422.7*	20 1/16 *525.3*
P	4 *102.1*	4 *102.1*	4 *102.1*	4 *102.1*	4 *102.1*	4 *102.1*	8 1/16 *204.5*	8 1/16 *204.5*	11⅝ *295.4*
R	1½ *38.2*	1½ *38.2*	1½ *38.2*	1½ *38.2*	1½ *38.2*	1½ *38.2*	2 5/16 *58.5*	2 5/16 *58.5*	2 9/16 *65.5*
S	2 *51.0*	2 *51.0*	2 *51.0*	2 *51.0*	2 *51.0*	2 *51.0*	2⅝ *66.0*	2⅝ *66.0*	3¼ *83.0*
T	6 5/16 *160.3*	6 5/16 *160.3*	6 5/16 *160.3*	6 5/16 *160.3*	6 5/16 *160.3*	6 5/16 *160.3*	10 13/16 *275.3*	10 13/16 *275.3*	13 13/16 *350.3*
U	5 *127.0*	5 *127.0*	5 *127.0*	5 *127.0*	5 *127.0*	5 *127.0*	12 *304.8*	12 *304.8*	18 *457.2*

Note: 3" or 5" handwheels may be included on valves sizes 2" - 4". Contact your Anvil Rep. for additional information.

SERIES 7700

Butterfly Valve Performance Data

Maximum Working Pressure Rating: 300 PSI

(Commercial Applications - Sizes 2" thru 12")

CV VALUES

Valve Size	O.D.	Disc Position (degrees open)							
		25°	30°	40°	50°	60°	70°	80°	90°
In./mm	*In./mm*								
2 *50*	2.375 *60.3*	4 *0.3*	7 *0.5*	19 *1.3*	44 *3.0*	48 *3.3*	80 *5.5*	111 *7.7*	158 *10.9*
2½ *65*	2.875 *73.0*	9 *0.6*	14 *1.0*	34 *2.3*	78 *5.4*	84 *5.8*	142 *9.8*	196 *13.5*	280 *19.3*
3 *80*	3.500 *88.9*	14 *1.0*	20 *1.4*	50 *3.4*	112 *7.7*	128 *8.8*	215 *14.8*	285 *19.7*	400 *27.6*
4 *100*	4.500 *114.3*	29 *2.0*	41 *2.8*	100 *6.9*	239 *16.5*	250 *17.2*	420 *29.0*	582 *40.1*	826 *57.0*
5 *125*	5.563 *141.3*	62 *4.3*	76 *5.2*	182 *12.5*	415 *28.6*	445 *30.7*	780 *53.8*	1,100 *75.8*	1,480 *102.0*
6 *150*	6.625 *168.3*	96 *6.6*	141 *9.7*	325 *22.4*	755 *52.1*	809 *55.8*	1,370 *94.5*	1,920 *132.4*	2,678 *184.6*
8 *200*	8.625 *219.1*	172 *11.9*	252 *17.4*	592 *40.8*	1,365 *94.1*	1,460 *100.7*	2,430 *167.5*	3,410 *235.1*	4,819 *332.3*
10 *250*	10.750 *273.1*	230 *15.9*	328 *22.6*	792 *54.6*	1,825 *125.8*	1,962 *135.3*	3,260 *224.8*	4,590 *316.5*	6,431 *443.4*
12 *300*	12.750 *323.9*	418 *28.8*	604 *41.6*	1,440 *99.3*	3,350 *231.0*	3,590 *247.5*	5,980 *412.3*	8,750 *603.3*	11,947 *823.7*

HEADLOSS EQUIVALENT LENGTH OF PIPE

Valve Size	O.D.	Equivalent Feet of Pipe* C=120			Max. Insulating Thickness
		Sch. 10	Sch. 30	Sch. 40	
In./mm	*In./mm*	*Ft./m*			*In./mm*
2 *50*	2.375 *60.3*	5.8 *1.8*	- -	4.7 *1.4*	2 *50*
2½ *65*	2.875 *73.0*	5.1 *1.6*	- -	3.7 *1.1*	2½ *65*
3 *80*	3.500 *88.9*	9.6 *2.9*	- -	7.2 *2.2*	2 *50*
4 *100*	4.500 *114.3*	7.5 *2.3*	- -	5.7 *1.7*	2½ *65*
5 *125*	5.563 *141.3*	7.0 *2.1*	- -	5.6 *1.7*	2½ *65*
6 *150*	6.625 *168.3*	6.1 *1.9*	- -	4.8 *1.5*	2½ *65*
8 *200*	8.625 *219.1*	6.3 *1.9*	5.7 *1.7*	- -	2½ *65*
10 *250*	10.750 *273.1*	11.3 *3.4*	10.2 *3.1*	- -	3 *80*
12 *300*	12.750 *323.9*	8.4 *2.6*	7.4 *2.3*	- -	3½ *90*

* The equivalent feet of pipe is based on the Hazen and Williams formula and the flow rates typically used with each size valve.

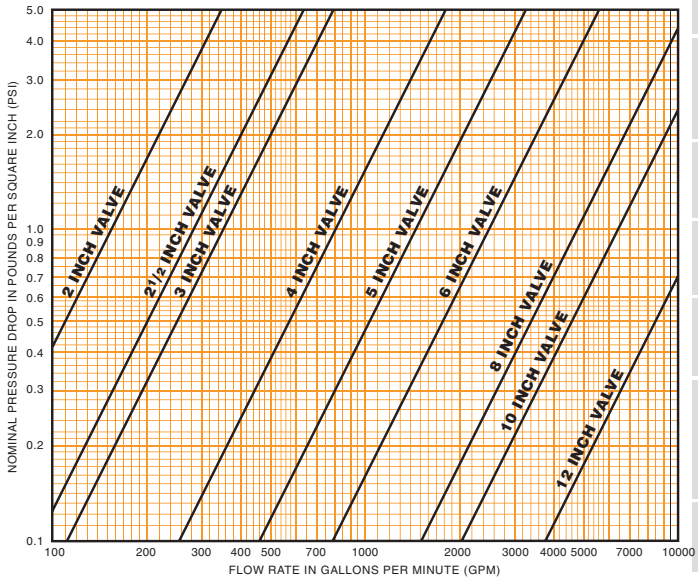
VALVE WEIGHT AND TORQUE VALUES

Valve Size	O.D.	* Approx. Wt. Ea.	Operating Pressure				
			50 PSIG	100 PSIG	150 PSIG	200 PSIG	300 PSIG
In./mm	*In./mm*	*Lbs./Kg*	*†Breakaway Torque (In. - Lbs) / N-m*				
2 *50*	2.375 *60.3*	5 *2.3*	65 *7.3*	72 *8.1*	75 *8.5*	80 *9.0*	85 *9.6*
2½ *65*	2.875 *73.0*	10 *4.5*	75 *8.5*	82 *9.3*	82 *9.3*	90 *10.2*	94 *10.6*
3 *80*	3.500 *88.9*	11 *5.0*	75 *8.5*	85 *9.6*	95 *10.7*	115 *13.0*	120 *13.6*
4 *100*	4.500 *114.3*	15 *6.8*	180 *20.3*	195 *22.0*	200 *22.6*	205 *23.2*	220 *24.9*
5 *125*	5.563 *141.3*	20 *9.0*	224 *25.3*	307 *34.7*	320 *36.2*	347 *39.2*	452 *51.1*
6 *150*	6.625 *168.3*	46 *20.9*	276 *31.2*	376 *42.5*	404 *45.6*	428 *48.4*	599 *67.7*
8 *200*	8.625 *219.1*	68 *30.8*	613 *69.3*	694 *78.4*	794 *89.7*	880 *99.4*	1,067 *120.6*
10 *250*	10.750 *273.1*	78 *35.4*	742 *83.8*	864 *97.6*	1,160 *131.1*	1,452 *164.1*	1,680 *189.8*
12 *300*	12.750 *323.9*	91 *41.3*	2,220 *250.8*	2,633 *297.5*	2,917 *329.6*	3,210 *362.7*	4,200 *474.5*

† These values are valid for water and lubricating fluid service only.
Contact Anvil for information on torques for dry and non-lubricating fluid service.

* Weights may vary based on valve options selected.

PRESSURE DROP (PSI) VS. (GPM)



SERIES 7700

Butterfly Valve

Resistance to various chemicals, as a function of temperature °F (Fahrenheit)

NYLON COATING

Coating Condition after 18 months immersion

RESISTANCE	68°F	104°F	140°F	176°F
Alcohols				
benzyl alcohol	L	P	P	P
butanol	G***	L	P	
ethanol (pure)	G***	G	L	
glycerine (pure)	G	G	L	P
glycol	G	G	G	P
methanol (pure)	G***	L	P	
Chlorinated solvents				
carbon tetrachloride	P			
methyl bromide	G	P		
methyl chloride	G	P		
perchloroethylene	G	G	L	
trichloroethane	L	P		
trichloreothylene	G	L		
Phenols				
	P	P	P	P
Various Organic Compounds				
anethole	G			
carbon disulphide	G***	L**	P	
diacetone alcohol	G	G***	L	P
dimethyl formamide	G	G	L	
ethylene chlorhydrin	P	P		
ethylene oxide	G	G	L	P
furfurol	G	G***	L	P
glucose	G	G	G	G
tetraethyl lead	G			
tetrahydrofurare	G	G	L	
Salts, esters, ethers				
amyl acetate	G	G	G	L
butyl acetate	G	G	G	L
diethyl ether		G		
dioctylphosphate	G	G	G	L
dioctylphthalate	G	G	G	L
ethyl acetate	G	G	G	
fatty acid esters	G	G	G	G
methyl acetate	G	G	G	
methyl sulfate	G	L		
tributylphosphaate	G	G	G	L
tricresylphosphate	GG	G	G	L
Various Products				
beer	G			
cider	G			
crude petroleum	G	G	G***	
diesel fuel	G	G	G***	
fruit juices	G	G		
fuel-oil	G	G	G	
greases	G	G	G	G
ground nut oil	G	G		
high octane gasoline	G	G	G***	
kerosene (paraffin)	G	G	G***	
linseed cake	G	G	G	G
milk	G	G	G	G
mustard	G			
normal gasoline	G	G	G***	
oils	G	G	G	G

RESISTANCE	68°F	104°F	140°F	176°F
Various Products (cont'd.)				
solutions or emulsions of D.D.T. or lindane hudroxy-quinoline (agricultural sprays)	G			
soap solution	G			
stearin	G	G	G	
solvent naptha	G	G	G***	
natural gas	G	G		
turpentine	G	G	G***	
vinegar	G			
wine	G			
Inorganic Acids				
chromic acid (10%)	P	P	P	P
hydrochlorhic acid (1%)	G	L	P	P
hydrochlorhic acid (10%)	G	L	P	P
nitric acid (all concentrations)	P	P	P	P
phosphoric acid (50%)	G	L	P	P
sulphuric acid (1%)	G	L	L	P
sulphuric acid (10%)	G	L	P	P
sulphur trioxide	L	P	P	P
Other Inorganic products				
agriculture sprays	G	G		
bleach solutions	L	P	P	P
bromine	P	P		
chlorine	P	P	P	P
fluorine	P	P	P	P
hydrogen	G	G	G	G
hydrogen peroxide (20 volumes)	G	L		
mercury	G	G	G	G
oxygen	G	G	L	P
ozone	L	P	P	P
potassium permanganate (5%)	P	P		
sea water	G	G	G	
soda water	G	G	G	G
sulphur	G	G		
water	G	G	G	G
Aldehydes & Ketones				
acetaldehyde	G	L	P	
acetone	G	G***	L	P
benzaldehyde	G	L	P	
cyclohexanone	G	L	P	
formaldehyde (technical grade)	G	L	P	
methylethylketone (MEK)	G	G	L	P
methylethylketone (MIBK)	G	G	L	P
Hydrocarbons				
acetylene	G	G	G	G
benzene	G	G***	L	
butane	G	G	G	
cyclohexane	G	G	G	L
decaline	G	G	G	L
HFA (Forane®)	G			
hexane	G	G	G	
methane	G	G	G	
naphthalene	G	G	G	L
propane	G	G	G	
styrene	G	G***		

RESISTANCE	68°F	104°F	140°F	176°F
Hydrocarbons (cont'd.)				
tulene	G	G***	L	L
xylene	G	G***	L	L
Inorganic Bases				
ammonium hydroxide (concentrated)	G	G	G	G
ammonia (liquid or gas)	G	G		
lime-wash	G	G	G	
potassium hydroxide (50%)	G	L	P	P
sodium hydroxide (5%)	G	G	L	
sodium hydroxide (10%)	G	L	L	
sodium hydroxide (50%)	G	L	P	P
Organic acids & anhydrides				
acetic acid	L	P	P	P
acetic anhydrie	L	P	P	P
citric acid	G	G	L	P
formic acid	P	P	P	P
lactic acid	G	G	G	L
oleic acid	G	G	G	L
oxalic acid	G	G	L	P
picric acid	L	P	P	P
tartaric acid (saturated solution)	G	G	G	L
uric acid	G	G	G	L
Inorganic Salts				
alum	G	G	G	
aluminium sulphate	G	G	G	G
ammonium nitrate	G	G	G	
barium chloride	G	G	G	G
calcium arsenate (concentrated solutions or slurries)	G	G	G	
calcium chloride	G	G	G	G
calcium sulphate	G	G	L	
copper sulphate	G	G	G	G
diammonium phosphate	G	G	L	
magnesium chloride (50%)	G	G	G	G
potassium ferrocyanide	G	G	G	
potassium nitrate	G*	L*	P	P
potassium sulphate	G	G	G	G
sodium carbonate	G	G	L	P
sodium chloride (saturated)	G	G	G	G
sodium silicate	G	G	G	
sodium sulphide	G	L	L	
trisodium phosphate	G	G	G	G
Organic bases				
aniline (pure)	L	P	P	P
diethanolamine (20%)	G	G***	G***	L
pyridine (pure)	L	P	P	P
urea	G	G	L	L

LEGEND		
*	=	Slight Yellowing
**	=	Yellowing
***	=	Swelling observed
G	=	Good
L	=	Limited
P	=	Poor

SERIES 7600

Butterfly Valve

The versatile Series 7600 Grooved-End Butterfly Valve has features that can satisfy a wide range of service requirements and allow it to be used with a diverse range of fluids. Its ductile iron body is epoxy coated to resist atmospheric attack, and the elastomer encapsulated disc can be ordered with EPDM or Nitrile materials. Rugged enough to take the punishment, yet the Series 7600 Valve is light in weight for easy handling and installation.

The Series 7600 Valve is rated 200 PSI (13.8 bar) to full vacuum, at temperatures from 0° to 150° F (-17.8° to 65.6° C). Every valve is seat tested to 110% of rated pressure.

GENERAL SPECIFICATIONS

BODY: One-piece ductile iron, fully epoxy coated – light weight for easy handling.

DISC: Streamlined profile for maximum flow and minimal seat wear. The ductile iron disc is available with a choice of EPDM or Nitrile coverings.

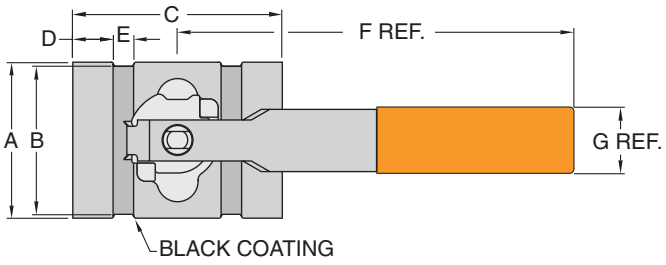
STEM/DISC ATTACHMENT: A splined interference fit creates a permanent rigid connection between the disc and stem, and eliminates the need for pins or bolts in the flow way.

STEM: Two-piece design for maximum flow. Top stem is Double D, giving positive indication of disc position at all times.

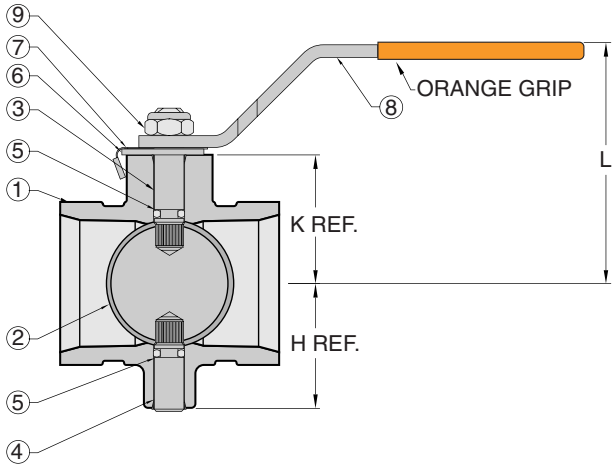
STEM SEAL: The interference between the rubber covered disc hub and the smooth, epoxy coated body provides the primary stem seal. O-rings on both upper and lower stems provide a secondary seal.

HANDLE: Two position on/off handle is standard.

TESTING AND CONFORMANCE: Testing to MSS SP-67. Grooved ends conform to the requirements of AWWA C606 for steel pipe.



MATERIAL SPECIFICATIONS



1. **BODY:** Epoxy Coated, ASTM A 536
2. **DISC:** EPDM or Nitrile, ASTM A 536
3. **LOWER STEM:** AISI 410
4. **UPPER STEM:** AISI 410
5. **STEM O-RING:** Nitrile
6. **LATCH PLATE:** Zinc Plated, ASTM A 228
7. **LATCH SPRING:** Electrolytic Coloring, ASTM A 228
8. **NUT, SELF LOCKING:** ASTM A 563
9. **HANDLE:** Zinc Plated, ASTM A 619

SERIES 7600 BUTTERFLY VALVE DIMENSIONS

Size	DIMENSIONS									
	A	B	C	D	E	F	G	H	K	L
In./mm	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*
2 *50*	2 3/8 *60.3*	2 1/4 *57.2*	3 7/16 *87.4*	5/8 *15.9*	5/16 *8.7*	6 *152.4*	1 *25.4*	1 13/16 *46.0*	2 *50.8*	3 3/16 *81.0*
2 1/2 *65*	2 15/16 *74.2*	2 3/4 *70.2*	3 13/16 *96.8*	5/8 *15.9*	3/8 *8.9*	6 *152.4*	1 *25.4*	2 1/16 *52.3*	2 7/16 *62.0*	3 5/8 *91.9*
3 *80*	3 9/16 *90.3*	3 3/8 *86.4*	3 13/16 *96.8*	5/8 *15.9*	3/8 *8.9*	8 7/16 *214.4*	1 *25.4*	2 5/8 *66.5*	2 11/16 *68.1*	4 1/4 *108.0*
4 *100*	4 9/16 *116.1*	4 3/8 *111.8*	4 5/8 *117.3*	5/8 *15.9*	3/8 *8.9*	8 7/16 *214.4*	1 *25.4*	3 5/16 *84.1*	3 5/16 *84.1*	4 15/16 *125.5*
6 *150*	6 3/4 *171.0*	6 9/16 *166.6*	5 1/4 *133.4*	5/8 *15.9*	3/8 *8.9*	12 1/4 *311.2*	1 1/4 *31.8*	4 3/8 *111.3*	4 3/8 *111.3*	7 *177.8*

SERIES 8000GR

Butterfly Valve

For use in Grooved-End Piping Systems 14" to 24"

FEATURES

- Up to 200 psig (13.8 bar) WOG (non-shock)
- Outstanding flow characteristics
- Low torque operation
- Superior flow control
- Streamline profile disc
- Suitable for HVAC applications
- Vacuum service to 29.5" (750 mm) Hg
- End-of-line service capabilities

BUTTERFLY VALVE PERFORMANCE DATA

PRESSURE RATINGS:
150 PSIG (10.3 bar) WOG (non-shock)
200 PSIG (13.8 bar) WOG (non-shock)
Special order - available upon request.
29.5" (750 mm) Hg Vacuum Service

TEMPERATURE RATINGS:

Grade E (EPDM):
-40°F to 230°F (-40°C to 110°C) (Service Temperature Range)
Recommended for water service, dilute acids, alkaline, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM SERVICES.

Grade T (Nitrile)
-20°F to 180°F (Service Temperature Range) (-29°C to 82°C)
Recommended for petroleum products, air with oil vapors, vegetable oils and mineral oils.
NOT FOR USE IN HOT WATER SERVICES.

FIGURE 8000GR - WEIGHT

Valve Size ANSI	O.D.	Weight	
		Valve Only	Valve with Gear Operator
In./DN(mm)	*In./mm*	*Lbs./Kg.*	*Lbs./Kg.*
14 *350*	14 *355.6*	354 *160.6*	378 *171.5*
16 *400*	16 *406.4*	428 *194.1*	452 *205.0*
18 *450*	18 *457.2*	524 *237.7*	548 *248.6*
20 *500*	20 *508.0*	704 *319.3*	728 *330.2*
24 *600*	24 *609.6*	1,027 *465.8*	1,097 *497.6*

SERIES 8000GR

Butterfly Valve

MATERIAL SPECIFICATIONS

BODY: Cast Iron - ASTM A 126 CL.B

EXTENSION BODY:
Pipe - ASTM A 53 Steel
Flange - ANSI B16.5 Forged Steel

LINER: Grade E (EPDM), GRADE T (Nitrile)

DISC:
Stainless Steel - ASTM A 351
Aluminum Bronze - ASTM B 148 C95400
Ductile Iron - ASTM A 536 Grade 65-45-12

DRIVE SHAFT:
Stainless Steel - ASTM A 582 Type 416
Stainless Steel - ASTM A 276 Type 316

BOTTOM SHAFT:
Stainless Steel - ASTM A 582 Type 416
Stainless Steel - ASTM A 276 Type 316

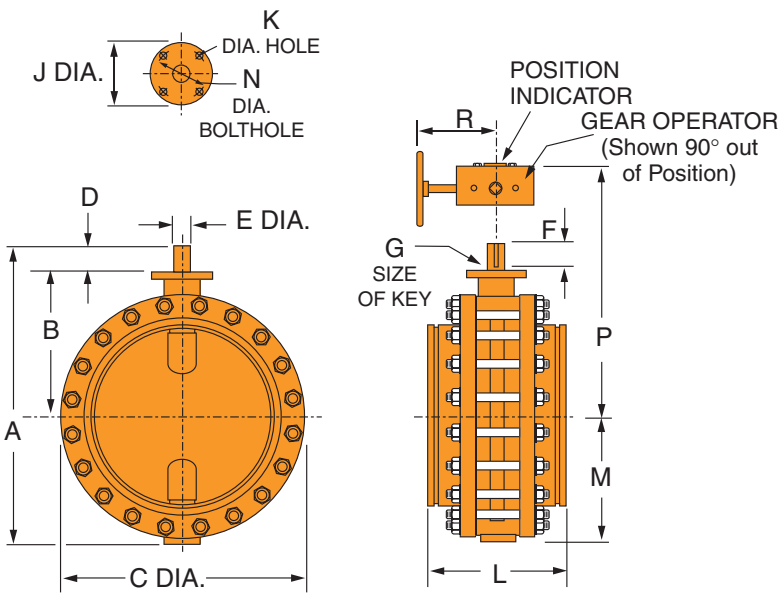
RETAINING SCREW: Steel

THRUST WASHER: Acetal

PLUG: Cast Iron - ASTM A 126 CL.B

UPPER BEARING: Teflon (Reinforced)

LOWER BEARING: Teflon (Reinforced)



SERIES 8000GR BUTTERFLY VALVES - DIMENSIONS

Valve Size ANSI	O.D.	A	B	C	D	E	F	G	J	K	L	M	N	P	R
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*
14 *350*	14.000 *356*	26¼ *667*	13¼ *337*	21 *533*	2¼ *57*	1½ *38*	2 *51*	⅜ x ⅜ *87*	6 *152*	½ *13*	13 1⁄16 *332*	10¾ *273*	5 *127*	17 5⁄16 *456*	10 *254*
16 *400*	16.000 *406*	29½ *749*	14¾ *375*	23½ *597*	2¼ *57*	1½ *38*	2 *51*	⅜ x ⅜ *87*	6 *152*	½ *13*	14 5⁄16 *364*	12½ *318*	5 *127*	19 7⁄16 *494*	10 *254*
18 *450*	18.000 *457*	32¾ *832*	15¾ *400*	25 *635*	3 *76*	1¾ *44*	2⅜ *60*	⅜ x ⅜ *87*	6¾ *171*	½ *13*	15⅜ *391*	14 *356*	5 *127*	20 7⁄16 *519*	10 *254*
20 *500*	20.000 *508*	34 *864*	16¼ *413*	27½ *699*	3 *76*	1¾ *44*	2⅝ *66*	⅜ x ⅜ *87*	6¾ *171*	½ *13*	16⅜ *416*	15 *381*	5 *127*	20 15⁄16 *532*	10 *254*
24 *600*	24.000 *610*	39⅜ *1,000*	19⅛ *486*	32 *813*	3 *76*	2¼ *57*	3¼ *83*	½ x ½ *116*	9½ *241*	13⁄16 *21*	18¼ *464*	16¾ *425*	6½ *165*	24⅜ *619*	10¼ *260*

SERIES 8000GR BUTTERFLY VALVES (ORDERING INFORMATION)

Sample Part Number
18" GC-8282-6 —>

18"	G	C -	8	2	8	2	6
Valve Size	**Body Style**	**Body Material**	**Series**	**Seat Material**	**Disc Material**	**Operator**	**Stem**
14" - 24"	**G** - Grooved End	**C** - Cast Iron	8 - 8000	**1** - Nitrile **2** - EPDM	**0** - Nickel Plate Ductile Iron **7** - 316 S.S **8** - Bronze (Al-Brz.)	**0** - None **2** - Gear Operator **3** - Pneumatic **4** - Electric **5** - Spring Return Pneumatic **6** - Square Nut (with Gear Operator) **7** - Chain Wheel (with Gear)	**6** - 416 S.S. w/ RTFE Bearing **7** - 316 S.S. w/ RTFE Bearing

SERIES 8000GR

Butterfly Valve

Torque is the rotary effort required to operate a value. This turning force in a butterfly valve is determined by three factors; the friction of the disc and seat due to interference for sealing, bearing friction, and fluid dynamic torque.

Breakaway torque is the total of the torques resulting from bearing friction and disc/seat interference friction at a given pressure differential. This value is normally the highest required torque to operate a valve, and is used to size the actuator. Listed below are recommended sizing torques.

NOTE: These values are based on testing performed in the Gruvlok Research & Development Center. These values include a safety factor and are valid for water and lubricating fluids only at 70° F (21° C).

Since torques are greatly increased for dry and non-lubricating fluids and temperature variations, contact your Anvil Sales Office for accurate values in these applications.

ACTUATOR SIZING FOR GENERAL SERVICE APPLICATION
SERIES 8000GR BREAKAWAY TORQUE

Line Pressure	Valve Size (In.)				
	14	16	18	20	24
(PSI)/Bar	*Breakaway Torque (In. - Lbs.) / N-m*				
50 *3.4*	4,000 *452*	4,800 *542*	5,400 *610*	10,000 *1,130*	13,000 *1,469*
100 *6.9*	4,800 *542*	5,200 *588*	6,200 *701*	12,500 *1,412*	18,000 *2,034*
150 *10.3*	5,500 *621*	6,500 *734*	8,500 *960*	13,500 *1,525*	21,500 *2,429*

NOTE: For Teflon seated valves, contact your Anvil Sales Office.
These values are valid for water and lubricating fluid service only.
Contact factory for information on torques for dry and non-lubricating fluid service.

CV VALUES (WATER @ 70°F SP. GR. = 1.00)

Valve Size	Disc Position (Degrees Open)							
	25°	***30°***	***40°***	***50°***	***60°***	***70°***	***80°***	***90°***
In./mm								
14 *350*	650 *44.8*	825 *56.9*	1,500 *103.4*	2,300 *158.6*	3,500 *241.3*	6,200 *427.5*	9,700 *668.8*	10,500 *723.9*
16 *400*	850 *58.6*	1,000 *68.9*	1,850 *127.6*	2,900 *199.9*	4,600 *317.2*	7,500 *517.1*	10,600 *730.8*	13,500 *930.8*
18 *450*	1,100 *75.8*	1,400 *96.5*	2,450 *168.9*	3,800 *262.0*	5,000 *344.7*	9,700 *668.8*	13,850 *954.9*	18,000 *1,241.1*
20 *500*	1,400 *96.5*	1,650 *113.8*	3,050 *210.3*	4,800 *330.9*	7,400 *510.2*	12,500 *861.8*	17,750 *1,223.8*	23,000 *1,585.8*
24 *600*	2,000 *137.9*	2,400 *165.5*	4,200 *289.6*	6,600 *455.1*	10,500 *723.9*	17,000 *1,172.1*	23,000 *1,585.8*	31,000 *2,137.4*

Fluid Dynamic Torque is the force exerted when a fluid passes over the surface of the butterfly valve disc. The magnitude of this force is dependent on valve size, disc opening and flow through the valve. Typically, fluid dynamic torque is a maximum at an approximate 75° disc opening. Generally, the effects of dynamic torque can be ignored when the velocity is less than 15 feet/second for liquids and 15,000 feet/minute for gases to minimize the effects of turbulence on the valve. For applications above these limits, consult engineering.

The formula for determining the velocity for liquids is:

$$V = 0.0022 \frac{Q}{A}$$

V = Velocity of liquid (feet/second)
Q = Flow (gallons/minute)
A = Area of upstream pipe (sq. ft.)
See "Area of Pipe" chart

The formula for determining the velocity of gases:

$$Vg = \frac{Qf}{A}$$

Vg = Velocity of gas (feet/minute)
Qf = Flow of gas @ flowing condition*
(cubic feet/minute)
A = Area of upstream pipe (sq. ft.)
See "Area of Pipe" Chart

* Flowing condition means at temperature and pressure of gas stream in the valve

AREA OF PIPE

Pipe Size (Sch 40)	Area
In./mm	*Sq. ft/Sq. cm*
14 *350*	0.940 *873.29*
16 *400*	1.227 *1,140*
18 *450*	1.553 *1,443*
20 *500*	1.931 *1,794*
24 *600*	2.792 *2,594*

FIG. 171N & FIG. 1715

International Brass Ball Valves

The Anvil Figure 171N and 1715 Brass Ball Valves have a rugged, dependable design, meeting rigid specification for world wide use. Every valve is individually tested in an open and closed position at 80 psi (5.5 bar). The two piece 1715 and 171N full port design are available in sizes 1/4" - 4". A "T" handled version of the 171N is also available as Figure 171N-T in sizes 3/8" - 1". All valves conform to MSS-SP-110, MSS-SP-25 and Federal Specification WW-V-35B Type II, Class A Style 3.

Features of these valves include triple stem seal, hard chrome plated ball, blowout proof stem, adjustable packing gland, a bubble tight shut off and a floating ball for an economical solution for residential, commercial and industrial applications.

Anvil's Brass Ball Valves are available in full port threaded end (Figure 171N), and full port soldered end (Figure 1715). Size Range: 1/4" - 4"

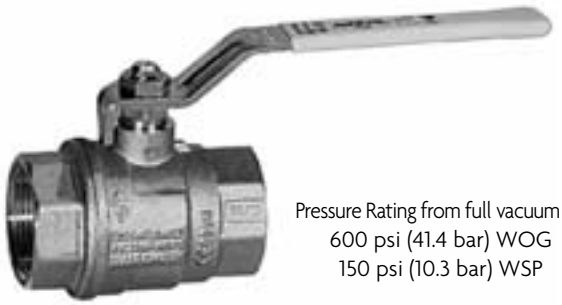


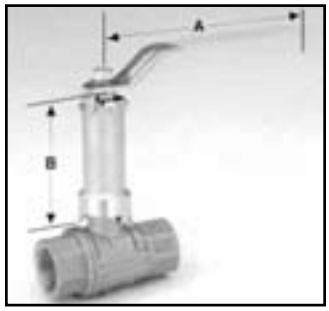
Figure 171N

Pressure Rating from full vacuum to:
600 psi (41.4 bar) WOG
150 psi (10.3 bar) WSP

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

"T" HANDLE		
Size	A	B
In./DN(mm)	*In./mm*	*In./mm*
1/4 - 3/8 - 1/2 *8 - 10 - 15*	2.0 *50*	1.08 *27.5*
3/4 - 1 *20 - 25*	2.5 *64*	1.30 *33.0*

LOCK DEVICE	
Size	A
In./DN(mm)	*In./mm*
1/4 - 3/8 - 1/2 *8 - 10 - 15*	1.28 *32.5*
3/4 - 1 *20 - 25*	1.57 *40.0*
1 1/4 - 1 1/2 *32 - 40*	1.91 *48.5*
2 *50*	1.95 *49.5*
2 1/2 - 3 *65 - 80*	3.90 *99.1*
4 *100*	4.10 *104.1*



STEM EXTENSION (BRASS)		
Size	A	B
In./DN(mm)	*In./mm*	*In./mm*
1/4 - 3/8 - 1/2 *8 - 10 - 15*	3.8 *97.0*	2.4 *60.5*
3/4 - 1 *20 - 25*	4.8 *121.5*	2.6 *67.0*
1 1/4 - 1 1/2 *32 - 40*	5.9 *151.0*	2.6 *67.0*
2 *50*	6.4 *162.0*	2.6 *67.0*
2 1/2 - 3 *65 - 80*	8.0 *203.2*	2.6 *67.0*
4 *100*	10.2 *259.1*	2.6 *67.0*

MEMORY STOP	
Size	A
In./DN(mm)	*In./mm*
1/4 - 3/8 - 1/2 *8 - 10 - 15*	3.8 *97.0*
3/4 - 1 *20 - 25*	4.8 *121.5*
1 1/4 - 1 1/2 *32 - 40*	5.9 *151.0*
2 *50*	6.4 *162.0*

MATERIAL SPECIFICATIONS

BODY: Brass CW 617N UNI EN 12165
RETAINER: Brass CW 617N UNI EN 12165
BALL: Brass CW 617N UNI EN 12165
STEM: Brass CW 614N UNI EN 12164
SEAT RING: PTFE
PACKING: PTFE
PACKING NUT: Steel 6S
PACKING GLAND: Brass CW 614N UNI EN 12164
FRICTION WASHER: PTFE
STEM O-RING: NBR
HANDLE: Steel, Zinc Plated to 2", Aluminum to 4"
HANDLE COVER: Yellow PVC Coated to 2", Yellow Enamel to 4"
HANDLE NUT: Steel, Zinc Plated

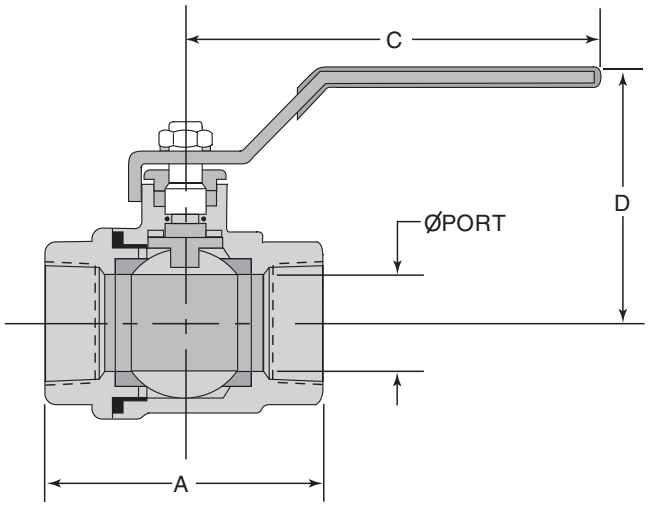
AVAILABLE OPTIONS*

LEVER HANDLE: 1/4" - 4"
LOCK DEVICE: 1/4" - 4"
MEMORY STOP: 1/4" - 2"
STEM EXTENSION: 1/4" - 4"
"T" HANDLE: 1/4" - 1"

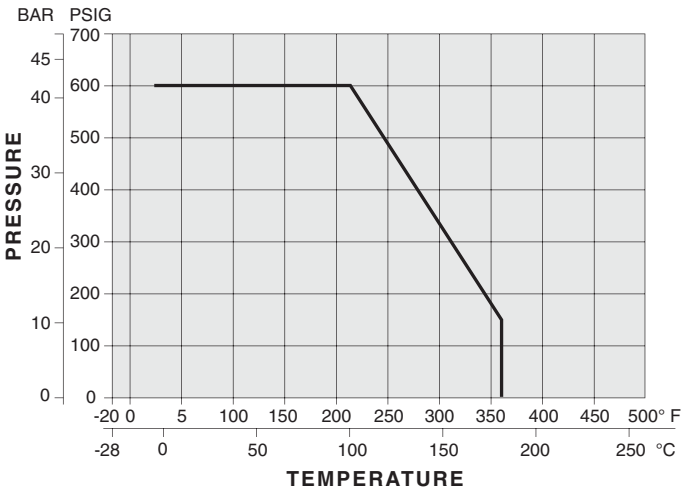
* Not all options available for all sizes. Please contact your Anvil Representative for assistance.

FIG. 171N & FIG. 1715

International Brass Ball Valves



PRESSURE VS. TEMPERATURE



NOTES

1. Dimensions of solder joint ends conform to ANSI B16.22. Solder end valves are designed to be used with solders not exceeding a melting point of 470°F/250°C. Higher temperatures may damage the seal material.
2. For solder joint valves, the pressure/temperature rating is dependent on the solder material used. Please refer to the limitations listed in ANSI B16.18.
3. Rate of Flow Calculations for liquids: To determine the flow rate of a liquid passing through a valve, use the following formula:

$$Q_L = C_V \left(\sqrt{\frac{\Delta P}{S_L}} \right)$$

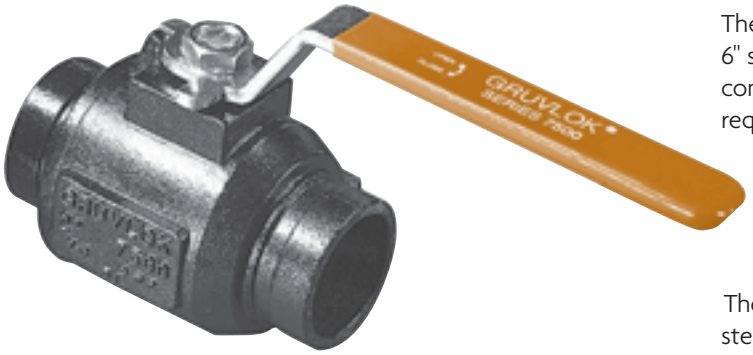
Where: Q_L = flow of liquid in gallons per minute (GPM)
C_V = flow coefficient
ΔP = pressure drop (PSI)
S_L = specific gravity of liquid

DIMENSIONS

Valve Code	Size	Port Dia.	A	C	D	Cv	Approx. Wt. Ea.
	In./mm	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*Lbs./Kg*
171N FULL PORT THREADED END	¼ *8*	⅜ *10*	2 *51*	3⅞ *98*	1¾ *45*	6	0.3 *0.1*
	⅜ *10*	⅜ *10*	2 *51*	3⅞ *98*	1¾ *45*	7	0.3 *0.1*
	½ *15*	9⁄16 *14*	2 7⁄16 *62*	3⅞ *98*	1⅞ *48*	19	0.4 *0.2*
	¾ *20*	¾ *19*	2 11⁄16 *68*	4 13⁄16 *122*	2¼ *57*	35	0.7 *0.3*
	1 *25*	15⁄16 *24*	3 1⁄16 *78*	4 13⁄16 *122*	2 7⁄16 *62*	50	1.0 *0.5*
	1¼ *32*	1¼ *32*	3 7⁄16 *87*	6 *152*	3 1⁄16 *78*	104	2.0 *0.9*
	1½ *40*	1 9⁄16 *40*	3⅞ *98*	6 *152*	3 5⁄16 *84*	268	3.1 *1.4*
	2 *50*	1 15⁄16 *49*	4 5⁄16 *110*	6⅜ *162*	3 13⁄16 *97*	309	4.2 *1.9*
	2½ *65*	2 9⁄16 *65*	5 9⁄16 *141*	8 1⁄16 *205*	5 *127*	629	8.0 *3.7*
	3 *80*	3⅛ *79*	6 7⁄16 *164*	8 5⁄16 *205*	5 7⁄16 *138*	1018	12.0 *5.9*
	4 *100*	3 15⁄16 *100*	7⅝ *194*	10¼ *260*	6 5⁄16 *160*	1622	22.0 *10.0*
1715 FULL PORT SOLDERED END	½ *15*	9⁄16 *14*	2½ *64*	3⅞ *98*	1⅞ *48*	19	0.5 *0.2*
	¾ *20*	¾ *19*	3 *76*	4 13⁄16 *122*	2 5⁄16 *59*	35	0.7 *0.3*
	1 *25*	1 *25*	3 9⁄16 *91*	4 13⁄16 *122*	2½ *64*	50	1.1 *0.5*
	1¼ *32*	1¼ *32*	4 1⁄16 *103*	6 *152*	3⅛ *79*	104	2.0 *0.9*
	1½ *40*	1 9⁄16 *40*	4 9⁄16 *116*	6 *152*	3⅜ *86*	268	2.7 *1.2*
	2 *50*	1 15⁄16 *49*	5 7⁄16 *138*	6 7⁄16 *164*	3 11⁄16 *94*	309	3.9 *1.8*
	2½ *65*	2 9⁄16 *65*	6⅞ *175*	8 1⁄16 *205*	5 *127*	629	9.4 *4.3*
	3 *80*	3⅛ *79*	8 3⁄16 *208*	8 1⁄16 *205*	5 7⁄16 *138*	1018	14.5 *6.6*
	4 *100*	3 15⁄16 *100*	10 5⁄16 *262*	10¼ *260*	6 5⁄16 *160*	1622	24.7 *11.2*

SERIES 7500

Ball-valves



The Series 7500 grooved-end ball valve line consists of a 2" to 6" standard port, two piece design, and is available in configurations to address a broad spectrum of application requirements.

The Series 7500 has generous factors of safety for pressure retention and stem torsional strength. In addition, it has a blow-out proof stem design, low operating torque, and high Cv.

The Series 7500 is compliant with NACE MR01-75 when stainless steel trim is specified.

Grooved ends conform to the requirements of AWWA C606 for steel pipe.

For special configurations, contact your Anvil representative.

For stainless steel, see the stainless steel section.

PRESSURE-RATING:

740 psig CWP (51 bar) in ASTM A 395 Ductile Iron

FIGURE 7500 MATERIAL SPECIFICATIONS

DUCTILE IRON/CARBON STEEL

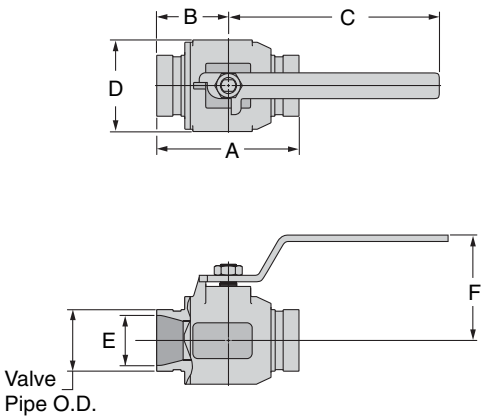
BODY: Ductile Iron ASTM A 395
ENDPLATE: Ductile Iron ASTM A 395
BALL: Carbon Steel Chrome Plated
STEM: Carbon Steel Chrome Plated
THRUST WASHER: RTFE
STEM SEAL: Flouroelastomer
RETAINING RING: Carbon Steel
HANDLE: Carbon Steel Zinc Plated
HANDLE NUT: Carbon Steel Zinc Plated
SEAT: RTFE
BODY SEAL: Flouroelastomer
LOCK PLATE*: 300 Series Stainless Steel
* Optional

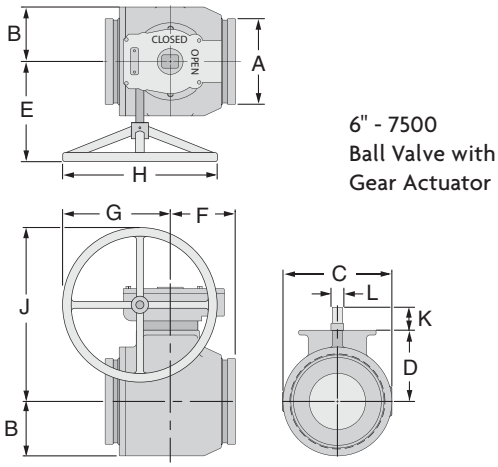
DUCTILE IRON/STAINLESS STEEL

BODY: Ductile Iron ASTM A 395
ENDPLATE: Ductile Iron ASTM A 395
BALL: Stainless Steel ASTM A 351 Grade CF8M
STEM: 316 Stainless Steel
THRUST WASHER: RTFE
STEM SEAL: Flouroelastomer
RETAINING RING: Carbon Steel
HANDLE: Carbon Steel Zinc Plated
HANDLE NUT: 300 Series Stainless Steel
SEAT: RTFE
BODY SEAL: Flouroelastomer
LOCK PLATE*: 300 Series Stainless Steel
* Optional

SERIES 7500

Ball-valves





6" - 7500
Ball Valve with
Gear Actuator

7500 BALL VALVE

Size ANSI	O.D.	Dimensions							Approx. Wt. Ea.
		A	B	C	D	E	F	Cv	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*Lbs./Kg*
2 *50*	2.375 *60.3*	5½ *140*	2¾ *70*	8¼ *209*	3 13/16 *81*	1 15/16 *49*	4⅛ *105*	165	8 *3.6*
3 *80*	3.500 *88.9*	6¾ *171*	3⅜ *85*	10 *254*	4 13/16 *122*	2⅞ *74*	4 13/16 *121*	310	18 *8.2*
4 *100*	4.500 *114.3*	8¼ *210*	4⅛ *105*	16 *406*	6 5/16 *176*	3 13/16 *97*	6 *152*	815	38 *17.2*
6 * *150*	6.625 *168.3*	10⅛ *257*	5 1/16 *128*	28 *711*	8 7/16 *215*	5 11/16 *144*	7⅝ *194*	1500	106 *48.1*

* Bare Stem

7500 BALL VALVE WITH GEAR ACTUATOR

Size ANSI	O.D.	Dimensions											Approx. Wt. Ea.
		A	B	C	D	E	F	G	H	J	K	L	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
6 *150*	6.625 *168.3*	6⅝ *168.7*	4¼ *107.4*	8 7/16 *214.6*	5½ *140.5*	10¼ *260.4*	5 1/16 *128.0*	8⅛ *206.4*	12 *304.8*	13½ *342.9*	1 13/16 *45.2*	1 *25.4*	9.6 *4.4*

SERIES 7500 BALL VALVES (ORDERING INFORMATION)

Sample Part Number 4" GI-7512-1 —>	4"	G	I -	75	1	2 -	1
	Size	Configuration	Body/End Material	Series	Ball and Stem Material	Seat Material	Operator
	2" - 6"	**G** - 2 Way Grooved End	**I** - Ductile Iron ASTM A395	75 - 7500	**1** - Chrome Plated Carbon Steel **2** - 316 Stainless Steel	**2** - RTFE / Flouroelastomer Special Requirements X - Write on Order	**1** - 2 Position Handle **2** - 2 Position Locking Handle **3** - Bare Stem **4** - Gear Actuator (6" Only)

6" is available bare stem or with gear actuator.

FIG. 400G

Grooved-End Silent Check Valve

Available in Sizes 2" thru 10"

The 400G is a center guided, spring loaded, silent check valve. Designed and engineered for silent operation with low head loss, the valve disc will close prior to the reversal of flow, thereby preventing or minimizing water hammer and damaging shock.

- The 400G can be used in any HVAC, industrial or commercial grooved piping systems.
- The valve is designed for liquid service with any pipe orientation, flow up or down.
- Bronze metal seats are standard, with Stainless Steel or resilient seats available as an option.
- Flow coefficients for this valve are some of the lowest in the industry and are listed for each size on the drawing.

NOTE: Valve is designed for liquid service only. Install 3 to 4 pipe diameters downstream from pump discharge or elbows to avoid flow turbulence.

MAX. NON-SHOCK WORKING PSI
125# ANSI B16.1 FLANGE RATING

Size	Temperature	
2" - 10"	150˚F *65˚C*	200˚F *90˚C*
	200 PSI *13.8 bar*	190 PSI *13.1 bar*

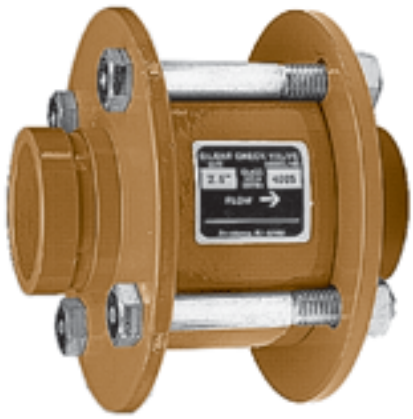


FIGURE 400G GROOVED-END SILENT CHECK VALVE

Valve Size	O.D.	Model	A	B	Cv Flow *	Approx. Wt. Each
In./mm	*In./mm*	*Number*	*In./mm*	*In./mm*		*Lbs./Kg*
2 *50*	2.375 *60.3*	402G	6 *152*	6 *152*	66 *1,676*	12 *5.4*
2½ *65*	2.875 *73.0*	4025G	6¼ *159*	7 *178*	88 *2,235*	15 *6.8*
3 *80*	3.500 *88.9*	403G	6 7/16 *164*	7½ *191*	130 *3,302*	20 *9.1*
4 *100*	4.500 *114.3*	404G	8⅛ *206*	9 *229*	228 *5,791*	36 *16.3*
5 *125*	5.563 *141.3*	405G	11¼ *286*	10 *254*	350 *8,890*	50 *22.7*
6 *150*	6.625 *168.3*	406G	12¼ *311*	11 *279*	520 *13,208*	68 *30.8*
8 *200*	8.625 *219.1*	408G	13¾ *349*	13½ *343*	900 *22,860*	140 *63.5*
10 *250*	10.750 *273.1*	410G	16 *406*	16 *406*	1,450 *36,830*	198 *89.8*

* Flow coefficient is the number of U.S. gallons/minute of 60˚ F (16˚ C) water that will flow through a valve with 1 psi (0.069 bar) of pressure drop across the valve.

MATERIAL SPECIFICATIONS

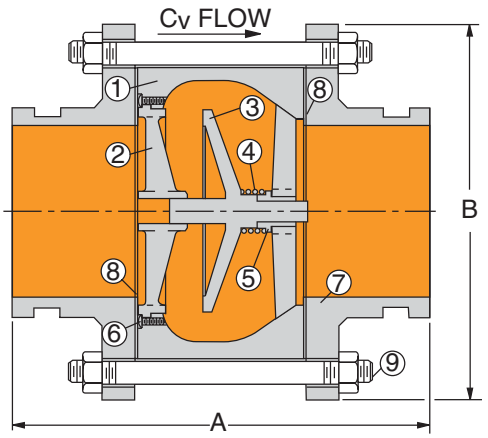
STANDARD MATERIALS:
Cast Iron body ASTM A 48, Class 35
Bronze Disc and Seat ASTM B 584 Alloy 838
Ductile Iron Grooved-Ends ASTM A 395

OPTIONAL TRIM MATERIALS:
Bronze with Nitrile seats
Stainless Steel seats
Stainless with Nitrile seats

1. **BODY:** Cast Iron ASTM A 48, Class 35
2. **SEAT:** Bronze ASTM B 584, Copper Alloy 838
3. **PLUG:** Bronze ASTM B 584, Copper Alloy 838
4. **SPRING:** Stainless Steel T304, ASTM A 313
5. **BUSHING:** Bronze ASTM B 584, Copper Alloy 836
6. **SCREWS:** Stainless Steel T304, ASTM A 276
7. **GROOVED-END:** Ductile Iron ASTM A 395
8. **GASKET:** Non Asbestos

   For gasket grade recommendations see the Technical Data section
9. **BOLTS:** Carbon Steel

Other materials and resilient seats are available... contact your Anvil representative.



SERIES 7800

Check Valves

For use in Grooved-End Piping Systems

c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

The Gruvlok Series 7800 Check Valve is a compact, cost effective valve offering low pressure-drop, non-slam performance. The Series 7800 Check Valve assembly is lighter and faster to install, and costs less than flanged and wafer valve assemblies.

In the fully open position the Series 7800 swing clapper is held tightly against the valve body, out of the flow stream, to provide maximum flow area and prevention of clapper flutter. The clapper design produces quick, non-slam closure before flow reversal can occur, while meeting FM requirements for an anti-water hammer valve rating.

Each valve is hydrostatically tested for leak tightness to 500 PSI. The clapper-seat design permits leak free sealing of back pressures in service conditions ranging from 300 PSI (20.7 bar) to as low as 1 PSI (0.07 bar) (head pressure: 28").

PERFORMANCE:

Pressure Rating:

Commercial Applications - Sizes 2" thru 12" inclusive, 300 psi (20.7 bar) maximum working pressure.

MATERIAL SPECIFICATIONS

BODY: Ductile iron conforming to ASTM A 536, Grade 65-45-12

COATING: Rust inhibiting paint on exterior and interior – color: black enamel

CLAPPER: 2"- 5" Type 304 or 302 stainless steel to ASTM A 167
6"-12" Ductile iron conforming to ASTM A 536, Grade 65-45-12

CLAPPER FACING:

Grade E EPDM: -40° to 230°F (-40° to 110°C) Service Temperature Range
Recommended for water service, dilute acids, alkaline, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM SERVICES.

Grade T Nitrile: -20° to 180°F (-29° to 80°C) Service Temperature Range
Recommended for petroleum products, air with oil vapors, vegetable oils and mineral oils.
NOT FOR USE IN HOT WATER SERVICES.

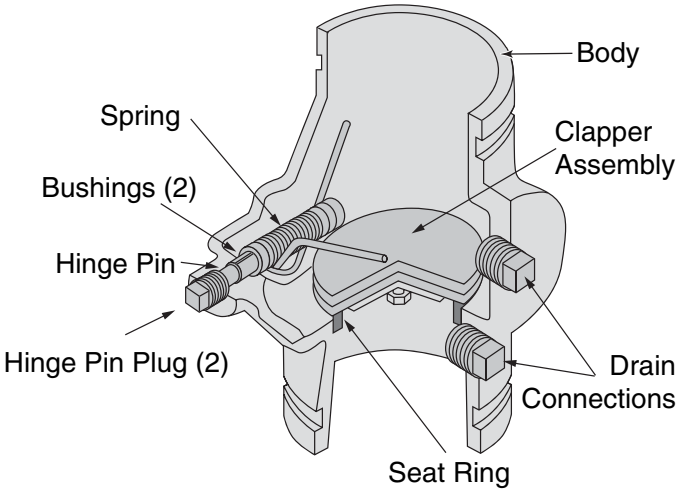
SEAT RING: Type 304 stainless steel to ASTM A 123, ASTM A 213, ASTM A 312 or ASTM A 269

SPRING: Type 302 stainless steel to ASTM A 313

HINGE PIN: Type 304 or 302 stainless steel to ASTM A 580

HINGE PIN BUSHINGS: Sintered bronze to ASTM B 438

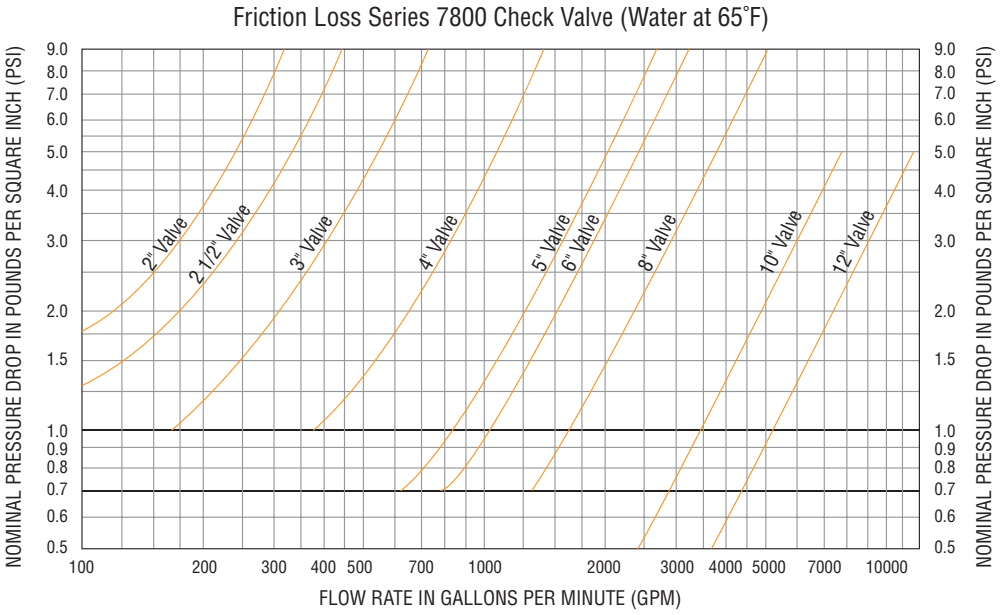
HINGE PIN PLUGS & DRAIN PLUGS: Cast iron to ASTM A 126 Class A



SERIES 7800

Check Valves

For use in Grooved-End Piping Systems



FLOW DATA:

The approximate friction losses, based on the Hazen and Williams formula, expressed in equivalent length of pipe is given below. The friction losses have been calculated on the basis of flow rates typically used with each size valve.

FLOW DATA - FRICTION LOSS (FT. OF PIPE)

Valve Size	O.D.	C=100			C=120		
		Sch. 10	Sch. 30	Sch. 40	Sch. 10	Sch. 30	Sch. 40
In./mm	*In./mm*	*Ft./m*	*Ft./m*	*Ft./m*	*Ft./m*	*Ft./m*	*Ft./m*
2 *50*	2.375 *60.3*	10 *3.0*	— —	8 *2.4*	14 *4.3*	— —	11 *3.4*
2½ *65*	2.875 *73.0*	14 *4.3*	— —	10 *3.0*	20 *6.1*	— —	15 *4.6*
3 *80*	3.500 *88.9*	17 *5.2*	— —	12 *3.7*	23 *7.0*	— —	17 *5.2*
4 *100*	4.500 *114.3*	17 *5.2*	— —	13 *4.0*	23 *7.0*	— —	18 *5.5*
5 *125*	5.563 *141.3*	14 *4.3*	— —	11 *3.4*	20 *6.1*	— —	15 *4.6*
6 *150*	6.625 *168.3*	23 *7.0*	— —	19 *5.8*	33 *10.1*	— —	26 *7.9*
8 *200*	8.625 *219.1*	35 *10.7*	32 *9.8*	30 *9.1*	50 *15.2*	45 *13.7*	43 *13.1*
10 *250*	10.750 *273.1*	28 *8.5*	25 *7.6*	24 *7.3*	40 *12.2*	36 *11.0*	34 *10.4*
12 *300*	12.750 *323.9*	31 *9.4*	28 *8.5*	26 *7.9*	44 *13.4*	39 *11.9*	37 *11.3*

IMPORTANT NOTE:

Check valve life may be shortened and system damage may occur if check valves are installed too close to a source of unstable flow. Check valves must be installed at a reasonable distance away from pumps, elbows, expanders, reducers or other similar devices. Sound piping practices dictate a minimum of five (5) times the pipe diameter for general use. Distances between three (3) and five (5) diameters are allowable provided the flow velocity is less than 8 feet per second. Distances less than 3 diameters are not recommended.

This valve may be installed vertically or horizontally. In a horizontal installation, the hinge pin is to be located on top.

Not for use in copper systems.

SERIES 7800

Check Valves

For use in Grooved-End Piping Systems

SERIES 7800 CHECK VALVES (ORDERING INFORMATION)					
Sample Part Number 4" 7811—>	4"	78	1	1	X
	Size	Series	Clapper Facing Material	Body Finish	Special Configuration
	2" - 12"	78 - 7800	**1** - EPDM (Std) **2** - Nitrile (Std)	**1** - Painted (Std)	**2** - Other*

* Contact an Anvil representative for more information.

MATERIAL SPECIFICATIONS

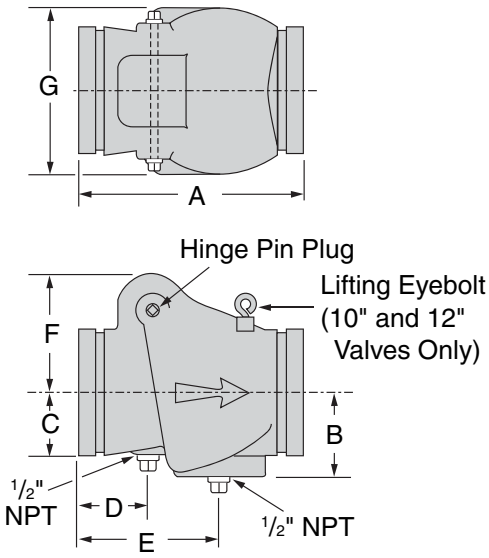


FIGURE 7800 CHECK VALVE									
Nominal Size	O.D.	Nominal Dimensions							Approx. Wt. Ea.
		A	B	C	D	E	F	G	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg.*
2 *50*	2.375 *60.3*	6¾ *171*	2⅜ *60*	1⁷⁄₁₆ *36*	1¾ *44*	4½ *114*	3³⁄₁₆ *81*	4⅜ *111*	7.5 *3.4*
2½ *65*	2.875 *73.0*	7¼ *184*	2⁷⁄₁₆ *61*	1⁹⁄₁₆ *39*	1¾ *44*	3¹³⁄₁₆ *96*	3⅝ *92*	4½ *114*	10.5 *4.8*
3 *80*	3.500 *88.9*	7¾ *197*	2⅝ *67*	2 *51*	1³⁄₁₆ *46*	4¹⁄₁₆ *103*	3¹¹⁄₁₆ *93*	4¹⁵⁄₁₆ *125*	11.5 *5.2*
4 *100*	4.500 *114.3*	8⅛ *206*	3⅛ *79*	2¼ *57*	2½ *64*	5¹⁄₁₆ *128*	4¼ *108*	6 *152*	13.5 *6.1*
5 *125*	5.563 *141.3*	9¾ *248*	3½ *89*	2¾ *70*	2⁷⁄₁₆ *61*	5¹³⁄₁₆ *147*	4⅝ *117*	6¾ *171*	19.0 *8.6*
6 *150*	6.625 *168.3*	12¾ *324*	4¼ *108*	3⁵⁄₁₆ *84*	3⅛ *79*	6¼ *159*	6¾ *171*	8½ *216*	33.5 *15.2*
8 *200*	8.625 *219.1*	14⅜ *365*	5¹⁄₁₆ *128*	3¹⁵⁄₁₆ *100*	4 *102*	5¹⁵⁄₁₆ *150*	8 *203*	10¼ *260*	59.0 *26.8*
10 *250*	10.750 *273.1*	18 *457*	6⁵⁄₁₆ *160*	4¹⁵⁄₁₆ *125*	4⁹⁄₁₆ *115*	6⅞ *175*	9³⁄₁₆ *233*	12¹¹⁄₁₆ *322*	130.0 *59.0*
12 *300*	12.750 *323.9*	21 *533*	7⁵⁄₁₆ *185*	6 *152*	5¹⁄₁₆ *128*	7¼ *184*	10⅜ *264*	14¾ *375*	183.0 *83.0*

GBV-G, GBV-A & GBV-F

Balancing Valves

Ductile Iron ASTM A536, Grade 65-45-12

The Series GBV is a multi-turn, Y-style globe valve designed for accurate determination and control of fluid flow to circuits requiring precise balancing.

Max. Working Pressure
300 PSI / 20.7 bar (PN20)

Max. Working Temperature
300°F (150°C)

Straight Shown

FEATURES & BENEFITS

- Pressure differential ports on both sides of the valve
- Convertible design, straight to 90° angle by removing and replacing four set screws
- Positive shutoff for equipment servicing
- Multi-turn adjustment
- Ergodynamically designed handwheel
- Micrometer type adjustment scale
- Tamper-proof hidden memory stop

MATERIAL SPECIFICATIONS

BODY, BONNET: Ductile Iron ASTM A536, Grade 65-45-12

STEM & DISC: Brass Alloy B16

ELASTOMERS: EPDM

HANDWHEEL: Reinforced Nylon; ABS

GBV-G – Balancing Valve
2 1/2" to 12" Ductile Iron, Grooved-End or Flanged-End Straight

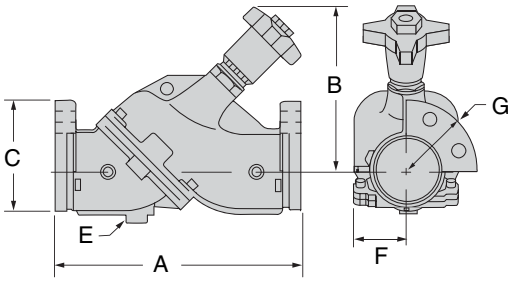


FIGURE GBV-G GROOVED-END STRAIGHT BALANCING VALVES
DUCTILE IRON, GROOVED-END OR FLANGED-END STRAIGHT

Nominal Size	O.D.	A	B Open	C	E	F	Flange Diameter		Approx. Wt. Each
							G Flange 125#	G Flange 250#	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
2½	2.875	12	9⅝	2¾	1	2⁹⁄₁₆	7	7½	25
65	*73.0*	*305*	*244*	*70*	*25*	*65*	*178*	*191*	*11.3*
3	3.500	12	10½	2⁷⁄₁₆	1	3	7½	8¼	28
80	*88.9*	*305*	*267*	*61*	*25*	*76*	*191*	*210*	*12.7*
4	4.500	14	10⁹⁄₁₆	3	1¼	3⁷⁄₁₆	9¼	10	41
100	*114.3*	*356*	*268*	*76*	*32*	*87*	*235*	*254*	*18.6*
5	5.563	17½	13¹⁄₁₆	3⅝	1¼	4¹⁵⁄₁₆	10	11	90
125	*141.3*	*445*	*331*	*92*	*32*	*125*	*254*	*279*	*40.8*
6	6.625	20¹¹⁄₁₆	13¾	4⁷⁄₁₆	2	5⅞	11	12½	130
150	*168.3*	*525*	*349*	*112*	*51*	*149*	*279*	*318*	*59.0*
8	8.625	28³⁄₁₆	24⅝	5¹¹⁄₁₆	2¼	7⅞	13½	15	310
200	*219.1*	*716*	*625*	*144*	*57*	*200*	*343*	*381*	*140.6*
10	10.750	30	26½	6⁹⁄₁₆	2¼	9¹⁵⁄₃₂	16	17½	460
250	*273.1*	*762*	*673*	*166*	*57*	*240*	*406*	*445*	*208.7*
12	12.750	38¹⁄₁₆	28⁷⁄₁₆	7⅝	2¼	12⅝	19	20½	870
300	*323.9*	*966*	*722*	*194*	*57*	*321*	*483*	*521*	*394.6*

NOTE: Grooved-Ends are for connection of components with dimensions conforming to Gruvlok® standard grooved specifications for IPS pipe.

GBV-G, GBV-A & GBV-F

Balancing Valves

Ductile Iron, Grooved-End and Cast Bronze, Solder & Threaded GBV

GBV-A – Balancing Valve

2½" to 12" Ductile Iron, Grooved-End or Flanged-End Angle

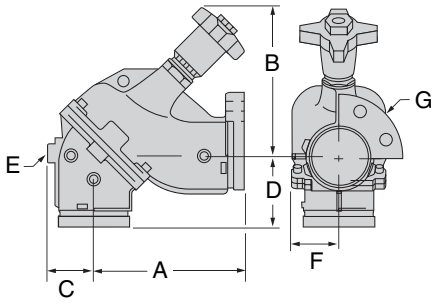


FIGURE GBV-A GROOVED-END ANGLE BALANCING VALVES
DUCTILE IRON, GROOVED-END OR FLANGED-END ANGLE

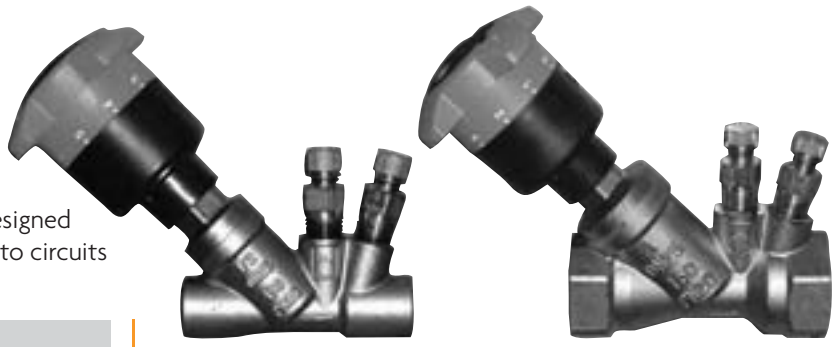
Nominal Size	O.D.	A	B Open	C	D	E	F	Flange Diameter		Approx. Wt. Each
								G Flange 125#	G Flange 250#	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
2½	2.875	7⅜	9⅝	2¾	4⅝	1	2⁹⁄₁₆	7	7½	25
65	*73.0*	*187*	*244*	*70*	*117*	*25*	*65*	*178*	*191*	*11.3*
3	3.500	8³⁄₁₆	10½	2⁷⁄₁₆	3⅞	1	3	7½	8¼	28
80	*88.9*	*213*	*267*	*61*	*98*	*25*	*76*	*191*	*210*	*12.7*
4	4.500	9⅝	10⁹⁄₁₆	3	4⅜	1¼	3⁷⁄₁₆	9¼	10	41
100	*114.3*	*244*	*268*	*76*	*111*	*32*	*87*	*235*	*254*	*18.6*
5	5.563	12	13¹⁄₁₆	3⅝	5½	1¼	4¹⁵⁄₁₆	10	11	90
125	*141.3*	*305*	*331*	*92*	*140*	*32*	*125*	*254*	*279*	*40.8*
6	6.625	14⅛	13¾	4⁷⁄₁₆	6⅝	2	5⅞	11	12½	130
150	*168.3*	*359*	*349*	*112*	*168*	*51*	*149*	*279*	*318*	*59.0*
8	8.625	18¹⁵⁄₁₆	24⅝	5¹¹⁄₁₆	9³⁄₁₆	2¼	7⅞	13½	15	310
200	*219.1*	*481*	*625*	*144*	*233*	*57*	*200*	*343*	*381*	*140.6*
10	10.750	20⁵⁄₁₆	26½	6⁹⁄₁₆	9¾	2¼	9¹⁵⁄₃₂	16	17½	460
250	*273.1*	*515*	*673*	*166*	*248*	*57*	*240*	*406*	*445*	*208.7*
12	12.750	24¹⁄₁₆	28⁷⁄₁₆	7⅝	14	2¼	12⅝	19	20½	870
300	*323.9*	*611*	*722*	*194*	*356*	*57*	*321*	*483*	*521*	*394.6*

NOTE: Grooved-Ends are for connection of components with dimensions conforming to Gruvlok® standard grooved specifications for IPS pipe. See www.anvilintl.com for installation instructions and flow data.

GBV-S & GBV-T

Five Turn Circuit Balancing Valves

Solder (GBV-S) & NPT Threaded (GBV-T)



GBV-S GBV-T

The Series GBV is a multi-turn, Y-style globe valve designed for accurate determination and control of fluid flow to circuits requiring precise balancing.

FEATURES & BENEFITS

- Multi-turn adjustment
- Pressure differential ports on both sides of the valve
- Positive shutoff for equipment servicing
- Micrometer type handwheel adjustment
- Tamper-proof memory stop
- Precision instrument function and performance
- Easiest and fastest field balancing

THROTTLING PERFORMANCE

- Ball valves adapted for balancing have only a 90° range from open to closed. A small adjustment in the ball opening can mean a huge change in flow. GBV sweat and threaded balancing valves in Cast Bronze from ½" to 2" have four full turns, providing 16 times finer adjustment than a ball valve.

See pages 179-181 for installation instructions.

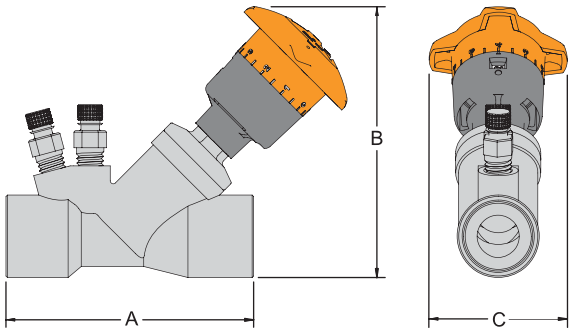
BALANCED CIRCUITS

Many systems tend to be overdesigned, causing some circuits to have too much flow, or insufficient flow, depending on their proximity to the source of the flow. The benefits of a balanced circuit:

- Save energy
- Make occupied spaces more comfortable
- Ensure that pumps operate against the lowest possible pressure
- Reduce capital and maintenance costs
- Ensure that the system operates according to the intent of the design

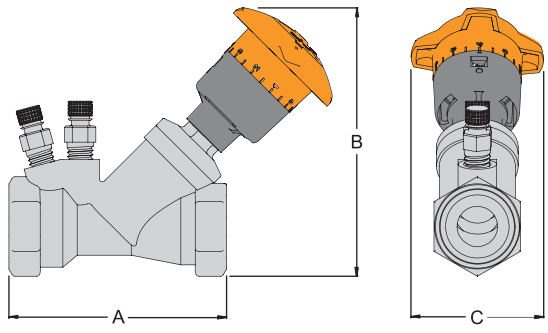
½" - 2" CAST BRONZE, SOLDER & THREADED GBV'S

- Sweat and Threaded ½" to 2"
- Unique flow control plug
  - Precision contoured channels
  - High strength accurately molded resin
- Ergodynamically designed handwheel
- Micrometer type adjustment scale
- Tamper-proof hidden memory stop



MODEL: GBV-S ½" - 2"

Model	Nominal Size	A	B	C	Approx. Wt. Ea.
	In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
GBV050VS	½" *15*	3 3/16 *81*	4 9/16 *116*	2¾ *70*	1.1 *0.5*
GBV075VS	¾" *20*	3 9/16 *93*	4 9/16 *118*	2¾ *70*	1.1 *0.5*
GBV100VS	1" *25*	4¼ *108*	4 15/16 *126*	2¾ *70*	1.7 *0.8*
GBV125VS	1¼" *32*	4 15/16 *125*	5⅜ *137*	2¾ *70*	2.3 *1.0*
GBV150VS	1½" *40*	5 11/16 *144*	5⅝ *142*	2¾ *70*	3.2 *1.5*
GBV200VS	2" *50*	7 *179*	6⅜ *162*	2¾ *70*	5.4 *2.5*



MODEL: GBV-T ½" - 2"

Model	Nominal Size	A	B	C	Approx. Wt. Ea.
	In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
GBV050VT	½" *15*	3 *80*	4⅝ *117*	2¾ *70*	1.1 *0.5*
GBV075VT	¾" *20*	3¼ *83*	4⅞ *125*	2¾ *70*	1.2 *0.6*
GBV100VT	1" *25*	3 13/16 *97*	5¼ *135*	2¾ *70*	1.9 *0.8*
GBV125VT	1¼" *32*	4 5/16 *110*	5⅝ *143*	2¾ *70*	2.3 *1.1*
GBV150VT	1½" *40*	5 1/16 *129*	5⅞ *150*	2¾ *70*	3.5 *1.6*
GBV200VT	2" *50*	6 *153*	6 11/16 *170*	2¾ *70*	6.0 *2.5*

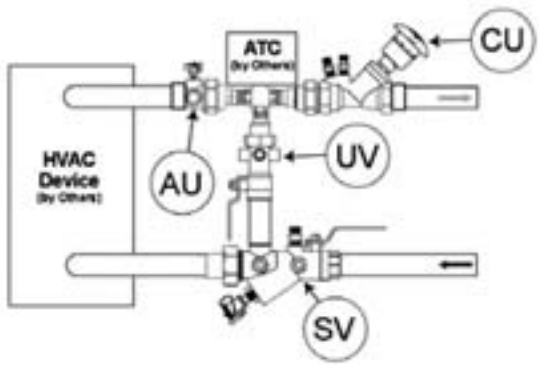
KNX SERIES

Hydronic Hook-up Kits

Gruvlok® KNX Series Hook-up Kits integrate the components required to connect piping to hydronic heating system or chiller system equipment. Common applications include: fan coils, reheat coils, VAV box coils, air handling unit coils, finned tube radiators, and heat pumps.

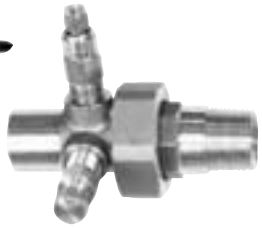
There are many different KNX hook-up kit component layouts. The components included with each kit are based on the application requirements. Ensure the correct kit is installed at each terminal unit. Check the layout diagram supplied with the kit, to identify the components required for the installation. Layout diagrams are for illustration purposes only. The actual layout required may differ, to accommodate specific HVAC device connections, ATC connections, or building architecture and obstructions.

COMPONENT LAYOUT EXAMPLE

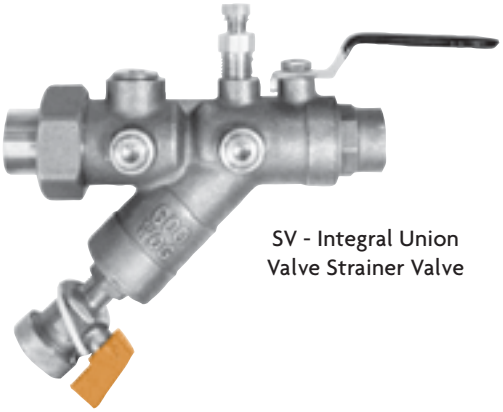


CU - CBV with Union Adapter

UV - Integral Union Valve



AU - Accessory Union



SV - Integral Union Valve Strainer Valve

KIT CONTENTS

INCLUDED:

1. All required brass valves and unions with o-rings, specified tailpieces and 1/4" tapped accessories:
   - AU – Accessory Union
   - UV – Integral Union Valve
   - SV – Integral Union Strainer Valve
   - CU – Gruvlok CBV with Union Adapter
   - CA – Gruvlok CBV with Accessory Union
2. Options:
   - SS – Stainless steel flex hoses with male NPT fittings
   - Extensions on all 1/4" tapped accessories and lever–style handles (CBV handles are not extended.)
   - Automatic temperature control (ATC) factory Installation

The HVAC device and rigid piping are not included with the KNX hook-up kit. All layouts are available with stainless steel flex hoses. Some layouts require ATC valves. If the ATC valve is included pre-assembled in the kit, it has been leak tested; do not disassemble connections. If the ATC valve is not included in the kit, and is required for the application, it is to be supplied by others and installed on-site.

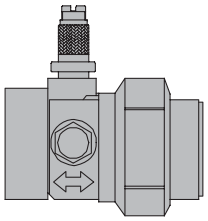
All kits come with components and tailpieces sized to make most connections. However, some additional fittings may be required, obtainable from any reputable hydronic system hardware and fitting supplier.

KNX SERIES

Hydronic Hook-up Kits

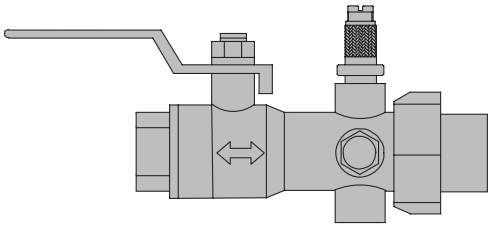
COMPONENTS

The following components are used in KNX hydronic hook-up kits. The layout illustration supplied with the kit indicates the components used for that particular installation. (Flex hoses are not shown on the images. If supplied, these are installed in place of rigid connections between the components and the HVAC device.)



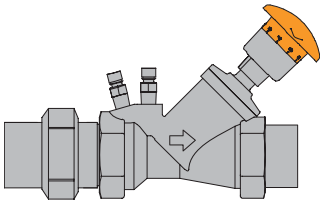
AU – Accessory Union

The AU accessory union combines an o-ring style union with two tapped ports for accessory connection. Tapped ports are located 90° apart. By default, tapped ports are fitted with a PT Port and Manual Air Vent. Ensure the air vent is mounted vertically. Otherwise, where no accessory is required, the corresponding port is plugged.

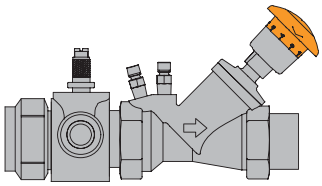


UV – Union Valve

The UV integral ball valve union combines a full port ball valve, o-ring style union, and multiple tapped ports for accessory connection. By default, one tapped port is fitted with a PT Port. Otherwise, where no accessory is specified, the corresponding port is plugged.



CU - CBV with Union Adapter

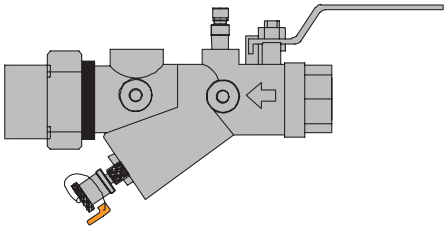


CA - CBV with Accessory Union

CU and CA CBV – Circuit Balancing Valves

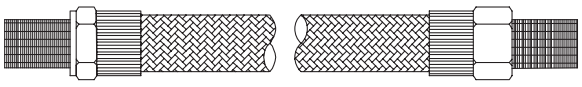
The CU and CA models combine an Gruvlok® CBV with an o-ring style union. The Gruvlok CBV is a multi-turn, wye-pattern, globe-style valve that is equipped with an integral modified venturi and two PT ports. These units enable precise pressure drop measurement, fixed Cv flow correlation, and flow adjustment. The CA model includes two 1/4" NPT tapped ports, located 90° apart, for accessory connection. Tapped ports that are not used are fitted with a brass plug.

Refer to the Installation and Operating Instructions supplied with the Gruvlok Five Turn CBV Venturi Circuit Balancing Valve.



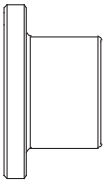
SV – Strainer Valve

The SV integral ball valve strainer combines a full port ball valve, o-ring style union, wye-pattern strainer, a bypass port, and multiple tapped ports for accessory connection. By default, one tapped port is fitted with a PT Port and another with a hose end drain valve. Otherwise, where no accessory or bypass is specified, the corresponding port is plugged.



SS Stainless Steel Flex Hoses

SS flex hoses enable fast and reliable hook-up to hydronic system coils and heat pumps. Installation speed is increased by avoiding the need for precise rigid run-out pipe length measurement and termination. System reliability is improved by reducing connection fatigue due to rigid pipe expansion and contraction. Hose connections are made on-site with customer supplied sealant and adapters, as required.



Tailpieces

Tailpieces are joined to the corresponding KNX component with a union nut. The union o-ring is compressed in the component o-ring groove to produce a liquid-tight seal when the union nut is tightened.

The tailpiece connection may be the same size as the valve body or reduced by one or more sizes.

KNX SERIES

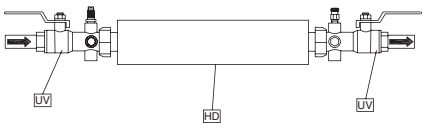
Hydronic Hook-up Kits

KNX Layout Defaults

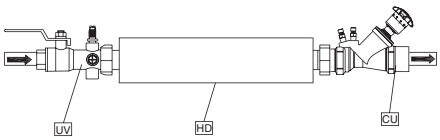
Use this table to determine which KNX Layout most closely resembles your application requirements

LINEAR RADIATOR

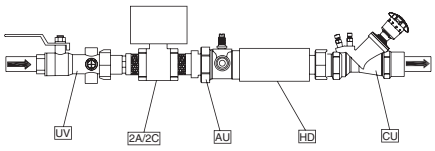
KNX - 1 Layout



KNX - 2 Layout

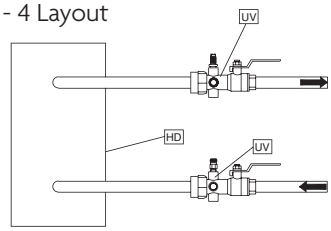


KNX - 3 Layout

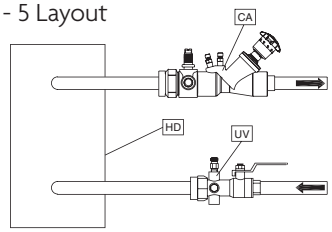


WILD COIL

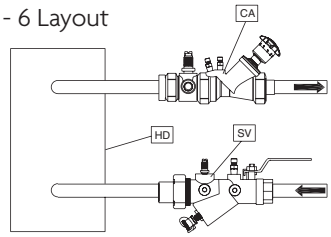
KNX - 4 Layout



KNX - 5 Layout

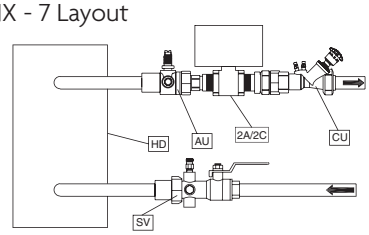


KNX - 6 Layout

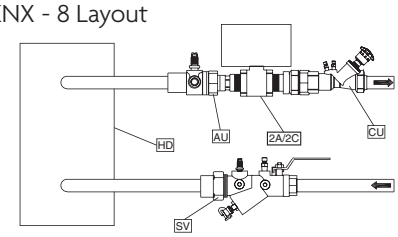


2-WAY ATC

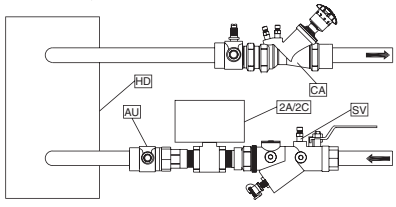
KNX - 7 Layout



KNX - 8 Layout

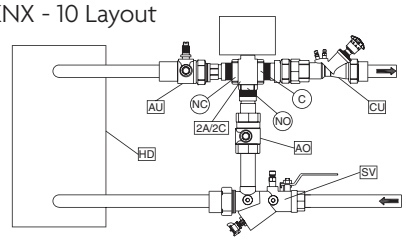


KNX - 9 Layout

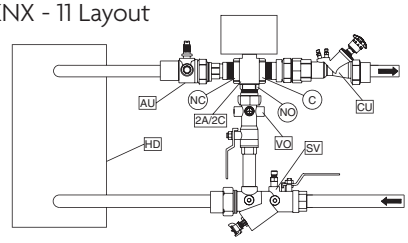


3-WAY ATC, BYPASS N.O.

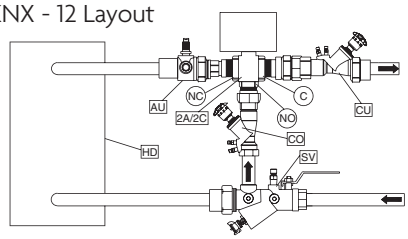
KNX - 10 Layout



KNX - 11 Layout

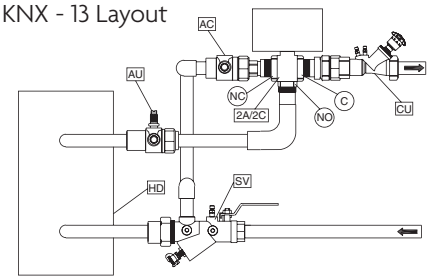


KNX - 12 Layout

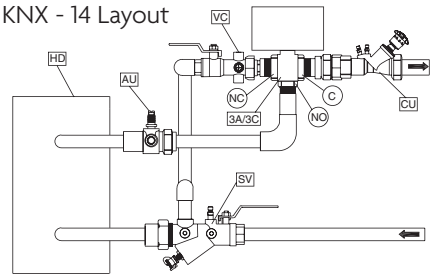


3-WAY ATC, BYPASS N.C.

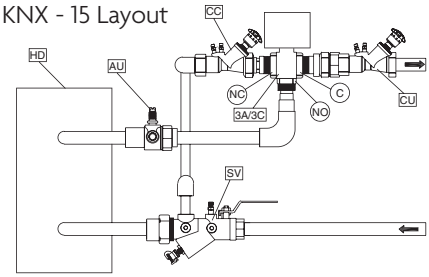
KNX - 13 Layout



KNX - 14 Layout



KNX - 15 Layout



KNX SERIES - CU (CBV UNION), CA (CBV ACCESSORY)

HVAC Hook-up Kits

Gruvlok® KNX Series Hook-up Kits integrate the components required to connect piping to hydronic heating system or chiller system equipment. These kits are available in 1/2" to 2" device sizes and are configured to the system designer's specifications. Each kit is tested, bagged, tagged and delivered to the building site ready for installation.

The CU and CA models combine a Gruvlok CBV with an o-ring style union. The Gruvlok CBV is a multi-turn, wye-pattern, globe-style valve that is equipped with an integral modified venturi and two PT ports. These units enable precise pressure drop measurement, fixed Cv flow correlation and flow adjustment. The CA model also includes two 1/4" NPT tapped ports, located 90° apart, for accessory connection. Tapped ports that are not used are fitted with a brass plug.

CU - CBV with Union Adapter

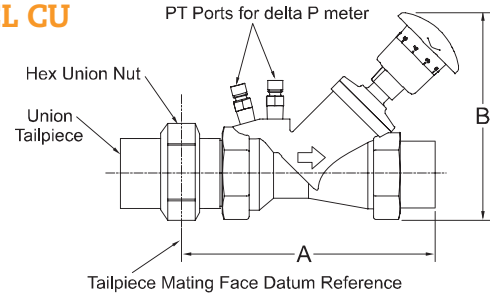
TECHNICAL DATA

MAX. WORKING PRESSURE: 300 psi (20 bar)
MIN. WORKING PRESSURE: -5 psi (-0.35 bar)
MAX. FLUID TEMPERATURE: 300°F (150°C) Non-Boiling
MIN. FLUID TEMPERATURE: -4°F (-20°C) Non-Freezing
FLOW DIRECTION: per Flow Direction Arrow

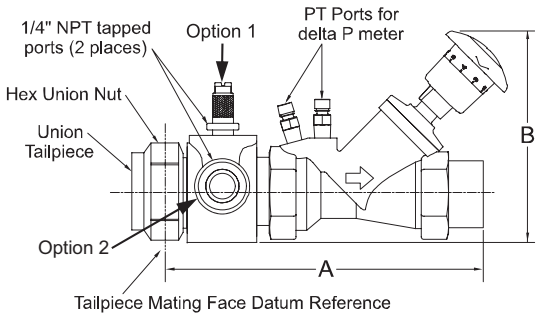
MATERIAL SPECIFICATIONS

BODY: Brass
STEM & DISC: Brass
ELASTOMERS: EPDM
HANDLE: Reinforced Nylon; ABS

MODEL CU



MODEL CA



KNX SERIES CU & CA DIMENSIONS

Model	Size	A		B	Weight
		2½	3		
	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
CU1	½ 15	3.9 99	4.9 124	4.6 117	1.7 0.77
CU2	¾ 20	4.1 104	5.5 140	4.9 124	2.0 0.91
CU3	1 25	4.8 122	6.3 160	5.3 135	3.0 1.36
CU4	1¼ 32	5.4 137	7.0 178	5.6 142	3.8 1.72
CU5	1½ 40	6.7 170	8.5 216	5.9 150	5.0 2.27
CU6	2 50	7.7 196	9.8 249	6.7 170	8.0 3.63
CA1	½ 15	5.5 140	6.5 165	4.6 117	2.0 0.91
CA2	¾ 20	5.6 142	7.0 178	4.9 124	2.4 1.09
CA3	1 25	6.2 157	7.7 196	5.3 135	3.5 1.59
CA4	1¼ 32	7.0 178	8.7 221	5.6 142	4.5 2.04
CA5	1½ 40	7.7 196	9.5 241	5.9 150	6.5 2.95
CA6	2 50	8.9 226	11.0 279	6.7 170	11.0 4.99

GRUVLOK KNX CA and CU (ORDERING INFORMATION)

Sample Part Number —> CA2-S-T2M1-MV-PO-0-SF-R (Default)

CA	2-	S-	T2M1-	MV-	PO-	0-	SF-	R
Gruvlok KNX	Body Size	Body Type	Tailpiece	Option 1	Option 2	Extensions	Flow Range	Application Orientation
CA CU	1 2 (default) 3 4 5 6	F S (default)	TXXX	AV MV (default) PT DV PO 00 (CU)	AV MV PT DV PO (default) 00 (CU)	0 (default) 1	LF SF (default)	R (default)

See Configuration Options on page 98.

KNX SERIES - CIRCUIT BALANCING VALVES

HVAC Hook-up Kits

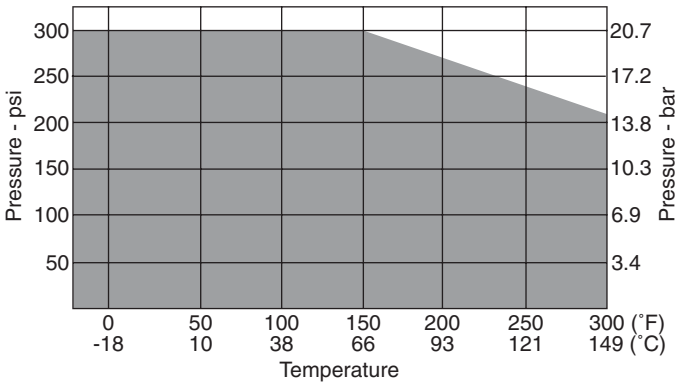
DEZINCIFICATION RESISTANT

NOTE: These instructions pertain only to Dezincification Resistant models having red and blue PT Port cap retainers. For other models, please see our website.

TYPICAL APPLICATIONS

Gruvlok® circuit balancing valves are used to regulate the flow of hydronic fluid in heating and chiller system piping circuits. When the minimum design flow requirement of each circuit is met, with the system operating at maximum design flow, the system is considered, "balanced". Suitable liquids include water, and up to 50/50 water/glycol mixtures (both ethylene and propylene glycol).adjustment. The CA model also includes two ¼" NPT tapped ports, located 90° apart, for accessory connection. Tapped ports that are not used are fitted with a brass plug.

MAXIMUM OPERATING PARAMETERS



TECHNICAL DATA

CONNECTION: Model CBV-VS Solder Joint, Model CBV-VT Threaded Joint, Model CBV-VB Threaded BSPP

MAX. WORKING PRESSURE: 300 psi/20 bar (PN20)

OPERATING TEMPERATURE RANGE: -4˚F to 300˚F (-20˚C to 150˚C)

MATERIAL SPECIFICATIONS

BODY, BONNET, STEM AND DISK: Brass alloy CW602N Dezincification Resistant (DZR) to EN12165 per ISO-6509

ELASTOMERS: EPDM

HANDWHEEL: Reinforced Nylon; ABS

FLOW RATE RANGES

Valve	Size	Minimum Flowrate	Maximum Flowrate	Flowrate Coefficients
Model	*In./mm*	*gpm/lps*	*gpm/lps*	*Cv/Kv*
CBV050V(X)CR-LF	½" LF *DN15 LF*	0.26 *0.02*	1.98 *0.12*	0.69 *0.59*
CBV075V(X)CR-LF	¾" LF *DN20 LF*	0.41 *0.03*	3.11 *0.20*	1.08 *0.93*
CBV050V(X)CR	½" *DN15*	1.22 *0.08*	9.57 *0.60*	3.20 *2.74*
CBV075V(X)CR	¾" *DN20*	1.99 *0.13*	13.76 *0.87*	5.21 *4.47*
CBV100V(X)CR	1" *DN25*	4.57 *0.29*	22.97 *1.45*	12.01 *10.29*
CBV125V(X)CR	1¼" *DN32*	4.98 *0.31*	41.02 *2.58*	13.07 *11.20*
CBV150V(X)CR	1½" *DN40*	9.02 *0.57*	50.07 *3.15*	23.69 *20.30*
CBV200V(X)CR	2" *DN50*	15.05 *0.98*	81.92 *5.16*	40.70 *34.88*

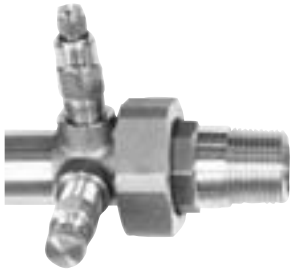
Note: In model number, (X) = Connection Type.
S = Sweat, T = NPT, B = BSPP (ISO-228)

KNX SERIES - AU (ACCESSORY UNION)

HVAC Hook-up Kits

Gruvlok® KNX Series Hook-up Kits integrate the components required to connect piping to hydronic heating system or chiller system equipment. These kits are available in 1/2" to 2" device sizes and are configured to the system designer's specifications. Each kit is tested, bagged, tagged and delivered to the building site ready for installation.

The AU accessory union combines an o-ring style union with two tapped ports for accessory connection. Tapped ports are located 90° apart on a rotational axis. By default, tapped ports are fitted with a PT Port and Manual Air Vent. Otherwise, where no accessory is required, the corresponding port is plugged.

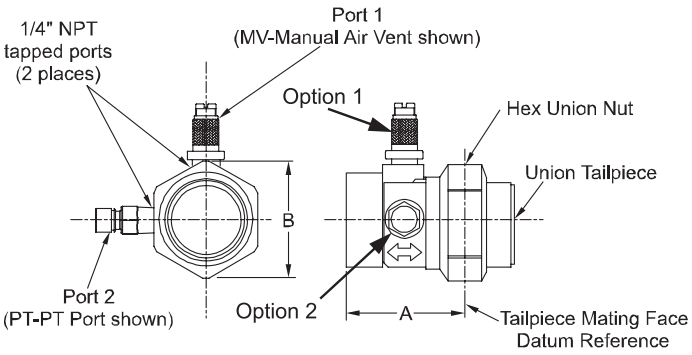


TECHNICAL DATA

MAX. WORKING PRESSURE: 600 psi (41 bar)
MIN. WORKING PRESSURE: -5 psi (-0.35 bar)
MAX. FLUID TEMPERATURE: 300°F (150°C) Non-Boiling
MIN. FLUID TEMPERATURE: -4°F (-20°C) Non-Freezing
FLOW DIRECTION: Bi-directional

MATERIAL SPECIFICATIONS

BODY: Brass
ELASTOMERS: EPDM



Both option ports are 1/4" NPT tapped. If an air vent is specified, it is installed in the Option 1 position. If a PT Port is specified, it is installed in the Option 2 position.

KNX SERIES AU DIMENSIONS

Model	Size	A			B	Weight
		MPT	FPT	Sweat		
	In./mm	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
AU1	½ *15*	2.1 *53*	2.0 *51*	2.1 *53*	1.4 *36*	1.0 *0.45*
AU2	¾ *20*	2.5 *64*	2.1 *53*	2.2 *56*	1.8 *46*	1.2 *0.54*
AU3	1 *25*	2.6 *66*	2.2 *56*	2.4 *61*	1.9 *48*	1.6 *0.73*
AU4	1¼ *32*	3.0 *76*	2.3 *58*	3.0 *76*	2.5 *64*	2.2 *1.00*
AU5	1½ *40*	3.1 *79*	2.6 *66*	3.0 *76*	3.0 *76*	3.0 *1.36*
AU6	2 *50*	3.4 *86*	2.8 *71*	3.0 *76*	3.8 *97*	4.5 *2.04*

GRUVLOK KNX AU (ORDERING INFORMATION)

Sample Part Number —> AU2-S-T2M1-MV-PT-0-S (Default)

AU	2-	S-	T2M1-	MV-	PT-	0-	S
Gruvlok KNX	Body Size	Body Type	Tailpiece	Option 1	Option 2	Extensions	Application Orientation
AU	1 2 (default) 3 4 5 6	M F S (default)	TXXX	AV MV (default) PT DV PO	AV MV PT (default) DV PO	0 (default) 1	S (default) R

See Configuration Options on page 98.

KNX SERIES - UV (INTEGRAL BALL VALVE UNION)

HVAC Hook-up Kits

Gruvlok® KNX Series Hook-up Kits integrate the components required to connect piping to hydronic heating system or chiller system equipment. These kits are available in 1/2" to 2" device sizes and are configured to the system designer's specifications. Each kit is tested, bagged, tagged and delivered to the building site ready for installation.

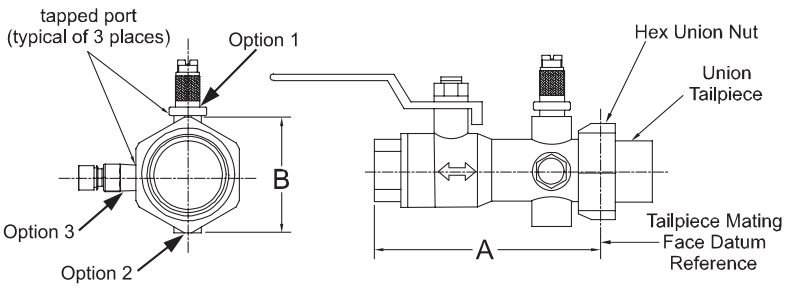
The UV integral ball valve union combines a full port ball valve, o-ring style union and multiple tapped ports for accessory connection. By default, one tapped port is fitted with a PT Port. Otherwise, where no accessory is specified, the corresponding port is plugged.

TECHNICAL DATA

MAX. WORKING PRESSURE: 600 psi (41 bar)
MIN. WORKING PRESSURE: -5 psi (-0.35 bar)
MAX. FLUID TEMPERATURE: 300°F (150°C) Non-Boiling
MIN. FLUID TEMPERATURE: -4°F (-20°C) Non-Freezing
FLOW DIRECTION: Bi-directional

MATERIAL SPECIFICATIONS

BODY: Brass
BALL VALVE: Chrome Plated Brass, Full Port
VALVE SEAT: PTFE
ELASTOMERS: EPDM
HANDLE: Chrome Plated Steel, Plastisol Coated



All option ports are ¼" NPT tapped. If an air vent is specified, it is installed in the Option 1 position. If a drain valve is specified, it is installed in the Option 2 position.

KNX SERIES UV DIMENSIONS

Model	Size	A		B	Weight
		FPT	Sweat		
	In./mm	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
UV1	½ *15*	2.9 *74*	3.2 *81*	1.7 *43*	1.6 *1.73*
UV2	¾ *20*	3.3 *84*	3.7 *94*	2.2 *56*	1.9 *0.86*
UV3	1 *25*	3.6 *91*	4.1 *104*	2.2 *56*	3.0 *1.36*
UV4	1¼ *32*	4.6 *117*	5.2 *132*	2.9 *74*	3.9 *1.77*
UV5	1½ *40*	5.1 *130*	5.8 *147*	3.5 *89*	5.3 *2.40*
UV6	2 *50*	6.0 *152*	6.8 *173*	4.0 *102*	7.7 *3.49*

GRUVLOK KNX UV (ORDERING INFORMATION)

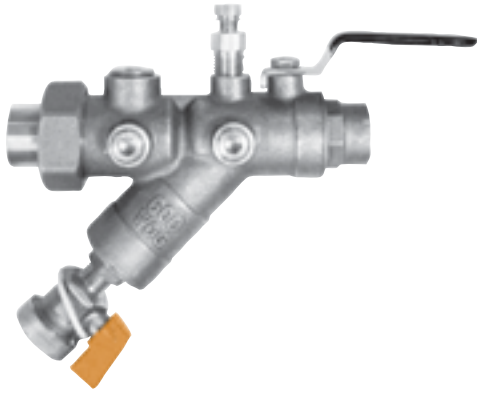
Sample Part Number —> UV2-S-T2S2-PT-P0-P0-0-S (Default)

UV	2-	S-	T2S2-	PT-	P0-	P0-	0-	S
Gruvlok KNX	Body Size	Body Type	Tailpiece	Option 1	Option 2	Option 3	Extensions	Application Orientation
UV	1 2 (default) 3 4 5 6	F S (default)	TXXX	AV MV PT (default) DV PO	AV MV PT DV PO (default)	AV MV PT DV PO (default)	0 (default) 1	S (default) R

See Configuration Options on page 98.

KNX SERIES - SV (INTEGRAL BALL VALVE STRAINER)

HVAC Hook-up Kits



Gruvlok® KNX Series Hook-up Kits integrate the components required to connect piping to hydronic heating system or chiller system equipment. These kits are available in 1/2" to 2" device sizes and are configured to the system designer's specifications. Each kit is tested, bagged, tagged and delivered to the building site ready for installation.

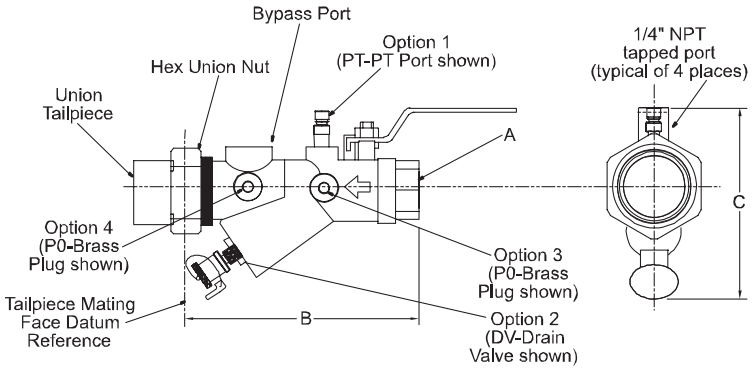
The SV integral ball valve strainer combines a full port ball valve, o-ring style union, wye-pattern strainer and multiple tapped ports for accessory connection. By default, one tapped port is fitted with a PT Port and another with a hose end drain valve. Otherwise, where no accessory or bypass is specified, the corresponding port is plugged.

TECHNICAL DATA

MAX. WORKING PRESSURE: 600 psi (41 bar)
MIN. WORKING PRESSURE: -5 psi (-0.35 bar)
MAX. FLUID TEMPERATURE: 300°F (150°C) Non-Boiling
MIN. FLUID TEMPERATURE: -4°F (-20°C) Non-Freezing
FLOW DIRECTION: Body to Union Connection

MATERIAL SPECIFICATIONS

BODY: Brass
STRAINER: 20 Mesh Stainless Steel
BALL VALVE: Chrome Plated Brass, Full Port
VALVE SEAT: PTFE
ELASTOMERS: EPDM
HANDLE: Chrome Plated Steel, Plastisol Coated



All option ports are 1/4" NPT tapped. See Dimensions and Weights for the bypass port size. If an air vent is specified, it is installed in the Option 1 position. If a drain valve is specified, it is installed in the Option 2 position.

KNX SERIES SV DIMENSIONS

Model	Size A	B		C	Bypass Port	Weight
		FPT	Sweat			
	In./mm	*In./mm*	*In./mm*	*In./mm*	*In.*	*Lbs./Kg*
SV1	½ *15*	5.0 *127*	5.2 *132*	5.5 *140*	0.50 FPT	1.6 *1.73*
SV2	¾ *20*	5.2 *132*	5.6 *142*	5.8 *147*	0.50 FPT	1.9 *0.86*
SV3	1 *25*	6.7 *170*	7.3 *185*	6.9 *175*	0.50 FPT	3.0 *1.36*
SV4	1¼ *32*	7.1 *180*	7.7 *196*	7.3 *185*	0.75 FPT	3.9 *1.77*
SV5	1½ *40*	8.7 *221*	9.4 *239*	8.4 *213*	0.75 FPT	5.3 *2.40*
SV6	2 *50*	9.4 *239*	10.3 *262*	8.8 *224*	1.00 FPT	7.7 *3.49*

GRUVLOK KNX SV (ORDERING INFORMATION)

Sample Part Number —> SV2-S-T2S2-PT-DV-P0-P0- P1-0-S (Default)	SV	2-	S-	T2S2-	PT-	DV-	P0-	P0-	P1-	0-	S
	Gruvlok KNX	Body Size	Body Type	Tailpiece	Option 1	Option 2	Option 3	Option 4	Bypass	Extensions	Application Orientation
	SV	1 2 (default) 3 4 5 6	F S (default)	TXXX	AV MV PT (default) P0	DV (default) P0	PT P0 (default)	PT P0 (default)	00 P1 (default) P2	0 (default) 1	S (default)

See Configuration Options on page 98.

KNX SERIES - CONFIGURATION OPTIONS

HVAC Hook-up Kits

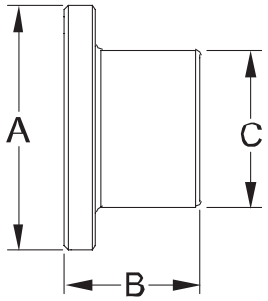
BODY SIZE	
Size	Description
	In./mm
1	½ *13*
2	¾ (default) *19*
3	1 *25*
4	1¼ *32*
5	1½ *38*
6	2 *50*

BODY TYPE	
Type	Description
F	Female NPT
S	Sweat (default)

EXTENSIONS	
Type	Description
	In.
0	No Extensions (default)
1	Handle / Options extended 1¾" for access through Insulation

OPTION / BYPASS	
Type	Description
	In.
AV	Automatic Air Vent
MV	Manual Air Vent
PT	PT Port (default)
DV	Drain Valve with Hose End and Retained Cap
P0	¼" Brass Plug (default)
P1	½" Brass Plug
P2	¾" Brass Plug

APPLICATION ORIENTATION	
Type	Description
R	Body connects to Return
S	Body connects to Supply (default)
00	Not Applicable



TAILPIECE

Model	A (Body)	B	C (MPT)
number	*In.*	*In.*	*In.*
T1M1	½	1.563	½
T2M1	¾	1.563	½
T2M2	¾	1.760	¾
T3M1	1	2.000	½
T3M2	1	2.000	¾
T3M3	1	2.000	1
T4M1	1¼	1.775	½
T4M2	1¼	2.000	¾
T4M3	1¼	2.000	1
T4M4	1¼	2.000	1¼
T5M2	1½	1.890	¾
T5M3	1½	2.500	1
T5M4	1½	2.500	1¼
T5M5	1½	2.500	1½
T6M3	2	2.047	1
T6M4	2	3.000	1¼
T6M5	2	3.000	1½
T6M6	2	3.000	2

Model	A (Body)	B	C (Sweat)
number	*In.*	*In.*	*In.*
T1S0	½	0.430	⅜
T1S1	½	0.650	½
T1S2	½	0.800	¾
T2S0	¾	0.452	⅜
T2S1	¾	0.750	½
T2S2	¾	0.790	¾
T3S1	1	0.940	½
T3S2	1	0.850	¾
T3S3	1	1.005	1
T4S2	1¼	1.170	¾
T4S3	1¼	1.330	1
T4S4	1¼	1.100	1¼
T5S3	1½	1.380	1
T5S4	1½	1.460	1¼
T5S5	1½	1.225	1½
T6S4	2	1.520	1¼
T6S5	2	1.620	1½
T6S6	2	1.446	2

Model	A (Body)	B	C (FPT)
number	*In.*	*In.*	*In.*
T1F1	½	0.650	½
T2F1	¾	1.110	½
T2F2	¾	0.800	¾
T3F1	1	1.800	½
T3F2	1	1.250	¾
T3F3	1	0.900	1
T4F2	1¼	1.800	¾
T4F3	1¼	1.990	1
T4F4	1¼	1.000	1¼
T5F3	1½	2.500	1
T5F4	1½	2.500	1¼
T5F5	1½	1.250	1½
T6F4	2	3.000	1¼
T6F5	2	3.000	1½
T6F6	2	1.160	2

FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve

SERVICE RECOMMENDATIONS:

The Model FTV-S & FTV-A Tri-Service Valve is primarily designed for installation in pump discharge piping where it functions as a spring loaded silent check valve, flow control valve and shut off valve.

OPERATION:

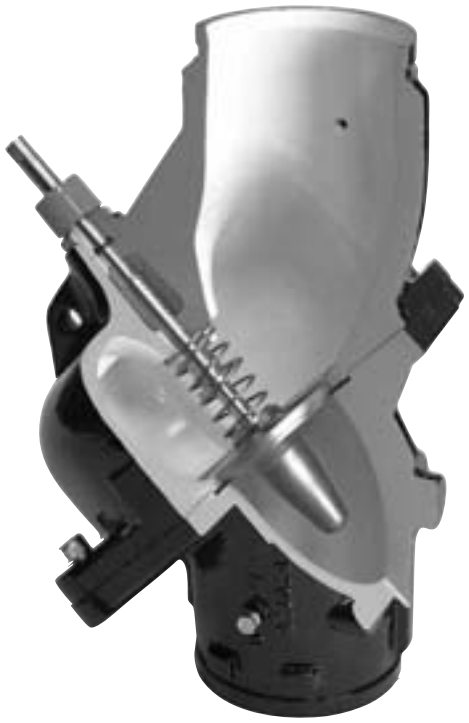
The Model FTV Tri-Service Valve operates automatically and silently. Line pressure of approximately 1/4 PSI will open the disc. The spring closes the disc as the line flow approaches zero in order to prevent flow reversal & water hammer. The flow through the valve can be adjusted from bubble tight shut off to full flow by the threaded rising stem.

FEATURES:

The unique convertible body design permits the valve to be changed on site from the straight to the angle configuration.

Flow measurement (where an approximate indication is acceptable) is obtained by flow measuring ports on each side of the valve seat. Pressure differential is easily recorded using differential pressure measurement devices. If precision accuracy is required, we recommend that a Gruvlok® Circuit Balancing Valve be installed downstream from the FTV valve.

See pages 175-178 for installation instructions and flow data.

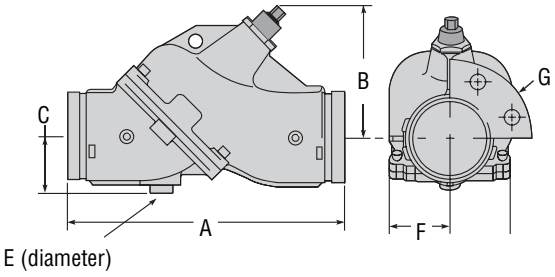


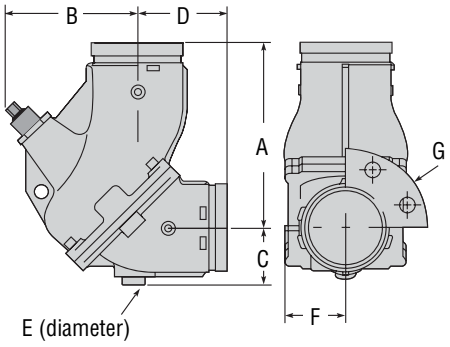
FEATURES & BENEFITS

- Three functions, one valve —
  1. Spring-closure design,
  2. Non-slam check valve,
  3. Flow throttling valve
- Reduced field installation and material cost
- Stainless steel spring
- High-strength resin seat EPDM for 8" and larger
- Anti-rotation lugs on the inlet and outlet. These lugs, combined with the Gruvlok 7401 Rigidlok Coupling or the Gruvlok flange adapter provides for a ridged rotation free installation
- Flow measurement and pump throttling capabilities
- Temperature measurement capability
- Spring-closure design check valve prevents gravity or reverse circulation when pump is not operating
- Bonnet "O" Ring can be replaced under full system pressure by back seating of valve stem
- Suitable for maximum working pressure to 375 psi (26 bar) and temperatures to 230°F. (110°C).
- Valve seat can be changed in the field without use of special tools
- Low pressure drop due to "Y" pattern valve design
- Valve Cv designed to ASHRAE flow recommendations for quiet system operation
- Drip-tight shut off valve smoke development rating of 50 or less

FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve





MODEL FTV-S (STRAIGHT)

Connection Size	A	B (fully open)	C	E	F	Flange 125/150 PSI G	Flange 250/300 PSI G	Approx. Wt. Each
In./mm	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
2 1/2 65	12 305	7 178	2 3/4 70	1 25	2 9/16 65	7 178	7 1/2 191	19 9
3 80	12 305	7 13/16 198	2 7/16 62	1 25	3 80	7 1/2 191	8 1/4 210	24 11
4 100	14 356	8 203	3 80	1 1/4 32	3 7/16 87	9 1/4 235	10 254	42 19
5 125	17 1/2 445	10 1/8 257	3 5/8 92	1 1/4 32	4 15/16 125	10 254	11 279	81 37
6 150	20 11/16 525	10 3/8 264	4 7/16 113	2 51	5 7/8 149	11 279	12 1/2 318	120 54
8 200	28 3/16 716	22 13/16 579	5 11/16 144	2 1/4 57	7 7/8 200	13 1/2 343	15 381	300 136
10 250	30 762	28 5/8 727	6 9/16 167	2 1/4 57	9 15/32 241	16 409	17 1/2 445	450 204
12 300	38 1/16 967	32 5/8 829	7 5/8 194	2 1/4 57	12 5/8 321	19 483	20 1/2 521	850 390

See Page 51 for O.D. Size

MODEL FTV-A (ANGLE)

Connection Size	A	B (fully open)	C	D	E	F	Flange 125/150 PSI G	Flange 250/300 PSI G	Approx. Wt. Each
In./mm	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
2 1/2 65	7 3/8 187	7 178	2 3/4 70	4 5/8 117	1 25	2 9/16 65	7 178	7 1/2 191	19 9
3 80	8 3/16 208	7 13/16 198	2 7/16 62	3 7/8 98	1 25	3 80	7 1/2 191	8 1/4 210	24 11
4 100	9 5/8 244	8 203	3 80	4 3/8 111	1 1/4 32	3 7/16 87	9 1/4 235	10 254	42 19
5 125	12 305	10 1/8 257	3 5/8 92	5 1/2 140	1 1/4 32	4 15/16 125	10 254	11 279	81 37
6 150	14 1/8 359	10 3/8 264	4 7/16 113	6 5/8 168	2 51	5 7/8 149	11 279	12 1/2 318	120 54
8 200	18 15/16 481	18 3/4 476	5 11/16 144	9 3/16 233	2 1/4 57	7 7/8 200	13 1/2 343	15 381	300 136
10 250	20 5/16 516	24 610	6 9/16 167	9 3/4 248	2 1/4 57	9 15/32 241	16 409	17 1/2 445	450 204
12 300	24 1/16 611	26 1/4 667	7 5/8 194	14 356	2 1/4 57	12 5/8 321	19 483	20 1/2 521	860 390

See Page 51 for O.D. Size

MATERIAL SPECIFICATIONS

BODY: Ductile Iron ASTM A 536 Grade 65-45-12

DISC: Bronze ASTM B 584 C-84400

STEM: Stainless Steel ASTM A 582 Type 416

SEAT: High Strength Engineered Resin

SPRING: Stainless Steel ASTM A 302

"O" RINGS: BUNA

COUPLINGS/FLANGES: Ductile Iron ASTM A 536 Grade 65-45-12 with EPDM[2] Gaskets (Optional)

INSULATION: Optional[1]

NOTE 1: Optional pre-formed insulation is available to meet ASTM D 1784 Class 14253-C, MEA #7-87, ASTM E 136 with a flame spread rating of 25 or less and a smoke development rating of 50 or less.

NOTE 2: EPDM is not suitable for oil service.

NOTE: For temperatures between 230°F and 300°F (110°C and 149°C) specify Viton Elastomers

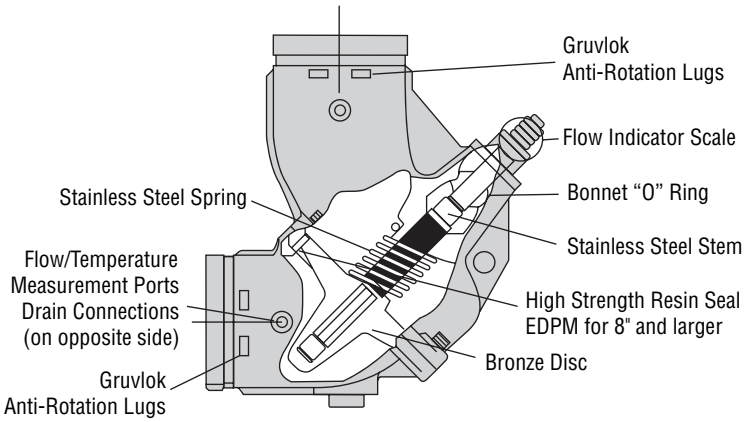


FIG. 7260

Tee Strainer

The Fig. 7260 Tee Strainer provides an economical, compact and hydraulically efficient means of protecting valuable piping system components. The in-line, twin-fold strainer basket provides more than 100% of the projected pipe area for open flow through the strainer screen which results in excellent flow performance across the strainer.

Gruvlok Strainers are designed and tested to ensure long term, reliable service in working pressures up to 750 psi (51.7 bar), depending on size and the pressure rating of the connecting coupling.

MATERIAL SPECIFICATIONS

BODY:
2" - 12" Ductile iron conforming to ASTM A 536, Grade 65-45-12

14" - 18" Carbon steel pipe conforming to ASTM A 53

STRAINER BASKET:
Stainless steel type 304 bar and woven wire screen. 12 mesh in sizes 2" - 3" and 6 mesh in sizes 4" - 18". Other mesh sizes available on request.

ACCESS COUPLING & END CAP:

2" - 12" Ductile iron conforming to ASTM A 536, Grade 65-45-12

14" - 18" Low carbon steel conforming to ASTM A 53

BOLTS & NUTS:
Heat treated, oval-neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563. Bolts and nuts are provided zinc electroplated as standard.

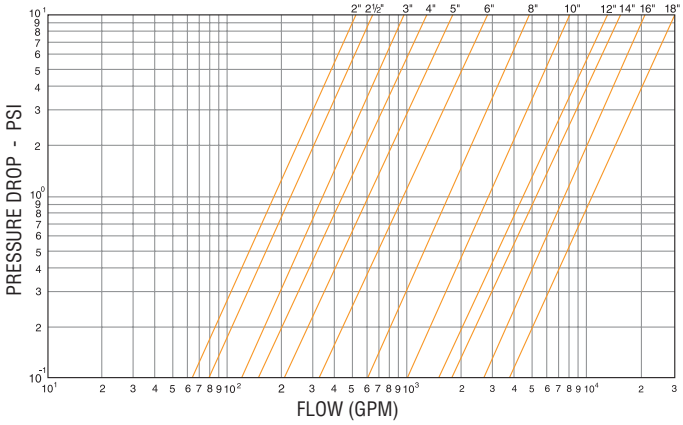
COUPLING GASKETS:
Elastomer properties as designated by ASTM D 2000
Grade "E" EPDM -40°F to +230°F (service temp. range)
Grade "EP" EPDM -40°F to +250°F (service temp. range)
Other options available upon request.

DRAIN PLUG: Carbon steel square head plug conforming to ASME B16.11

TAP SIZES: 2"-4" – ½ NPT, 5"-8" – ¾ NPT, 10"-18" – 1 NPT,

COATING:
2" - 12" - Rust-inhibiting paint — color: orange (standard)
Hot Dip Galvanized conforming to ASTM A 153 (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

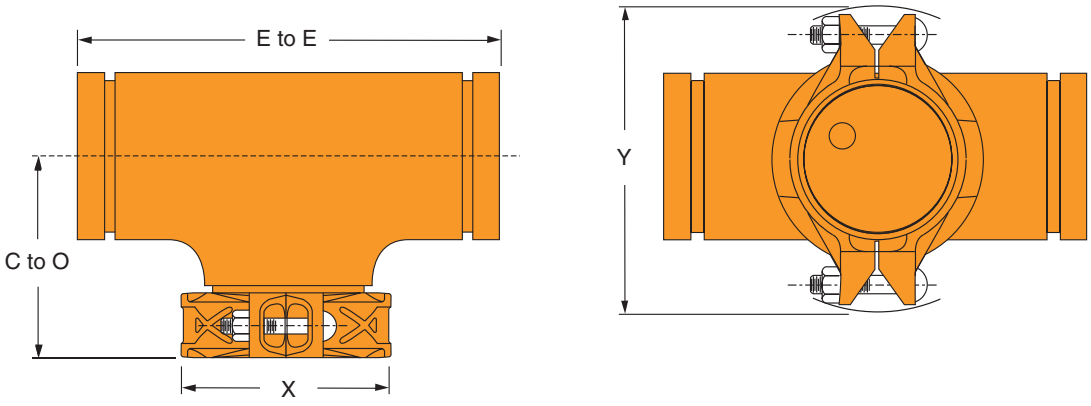
FLOW CHARACTERISTICS



NOTE: Most U.S. piping engineers specify system startup instructions for new systems which include removing and cleaning the strainer screen after system flushing of main piping before the system is put into normal operation. After flushing, replace the strainer screen. Flow data values are based on flow of clean water at ambient temperatures. The pressure drop across a strainer, 50% clogged, is approximately twice as great as that of a clean strainer. Strainer baskets need a routine maintenance program to maintain efficiency and to prevent excess pressure drop caused by a clogged screen.

FIG. 7260

Tee Strainer



NOTE: The above illustration shows the required orientation of the Rigidlok access coupling for assembly with a grooved-end flange.

FIGURE 7260 TEE STRAINER

Nominal Size	O.D.	Maximum* Working Pressure	E to E	C to O	X	Y	Basket Removal	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Clearance*	*Lbs./Kg*
2 *50*	2.375 *60.3*	750 *51.7*	6½ *165*	4¼ *108*	3½ *89*	5⅞ *149*	4⅜ *111*	6.0 *2.7*
2½ *65*	2.875 *73.0*	750 *51.7*	7½ *191*	4¾ *121*	4 *102*	6½ *165*	5⅛ *130*	8.0 *3.6*
3 *80*	3.500 *88.9*	750 *51.7*	8½ *216*	5¼ *133*	4¾ *121*	7 *178*	6 *152*	13.0 *5.9*
4 *100*	4.500 *114.3*	750 *51.7*	10 *254*	6⅛ *156*	5⅞ *149*	8⅜ *213*	7¼ *184*	19.0 *8.6*
5 *125*	5.563 *141.3*	750 *51.7*	11 *279*	6⅝ *168*	7 *178*	10⅛ *257*	8¼ *210*	30.0 *13.6*
6 *150*	6.625 *168.3*	750 *51.7*	13 *330*	7⅝ *194*	8⅛ *206*	11⅛ *283*	9¾ *248*	45.0 *20.4*
8 *200*	8.625 *219.1*	600 *41.4*	15½ *394*	9⅛ *232*	10½ *267*	14⅛ *359*	12 *305*	79.0 *35.8*
10 *250*	10.750 *273.1*	500 *34.5*	18 *457*	10⅜ *264*	12⅞ *327*	17⅛ *435*	14¼ *362*	133 *60.3*
12 *300*	12.750 *323.9*	400 *27.6*	20 *508*	11⅜ *289*	15 *381*	19⅛ *486*	16¼ *413*	187 *84.8*
14 *350*	14.000 *355.6*	300 *20.7*	22 *559*	12¾ *324*	16⅛ *410*	20½ *521*	17¼ *438*	272 *123.4*
16 *400*	16.000 *406.4*	300 *20.7*	24 *610*	12 *305*	18⅛ *460*	22¼ *565*	20 *508*	350 *158.8*
18 *450*	18.000 *457.2*	300 *20.7*	31 *787*	15½ *394*	20½ *521*	24⅜ *619*	24½ *622*	400 *181.4*

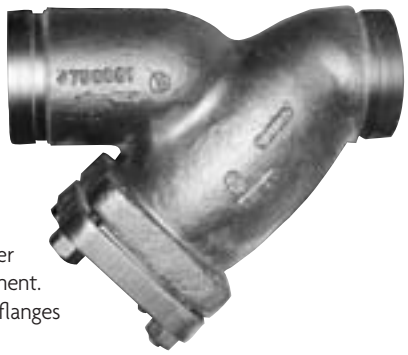
* Maximum working pressure is based upon the performance capability of the Gruvlok Strainer. Maximum system working pressure is dependent upon the couplings used for installation and the pressure capability of other system components.

14" - 18" Fabricated

Not for use with copper systems.

MODEL 758G

Grooved-End "Wye" Strainer



SERVICE RECOMMENDATIONS

For use in water, oil and gas piping to provide economical protection for pumps, meters, valves, compressors, traps and similar equipment.

SCREENS

Standard screens for Y-Strainer are perforated 304 Stainless Steel with spot welded seam. Mesh lining is available in all alloys for extra fine straining. Recommended standard perforations are listed below in the material specifications.

GRUVLOK STRAINER BASKET

Furnished as standard in sizes 8" (43 mm) and larger.
A one-quarter turn securely locks the screen in its seat and frees the serviceman for securing the cover flange to the body of the strainer.
Contact an Anvil Representative for other applications.

CONSTRUCTION

All covers have an NPT blowoff outlet at location "C". A recessed seat in the cover ensures accurate screen alignment. Bosses at the inlet and outlet flanges are provided for gauge taps.

Self-cleaning is done by opening the valve or plug connected to the blowoff outlet. (When ordering, advise when strainers are to be mounted in vertical piping, the cover can be rotated to position the blowoff at the lowest point.)

BLOWOFF OUTLETS

Tapped NPT size specified in the dimension table. Blowoff outlets are not normally furnished with plugs.

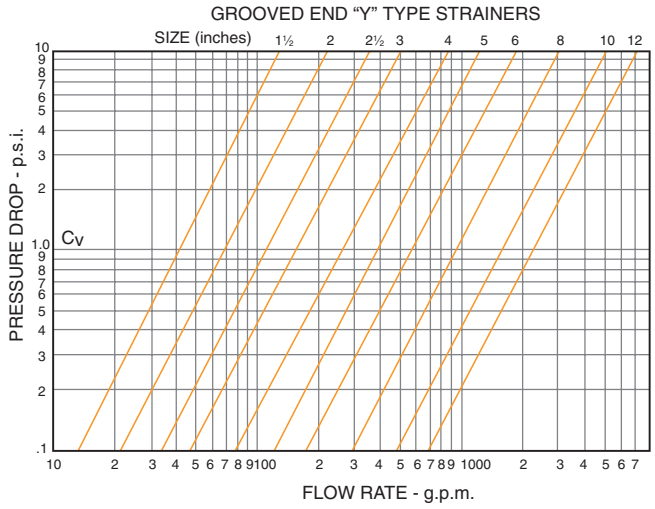
INDIVIDUALLY HYDROSTATICALLY TESTED

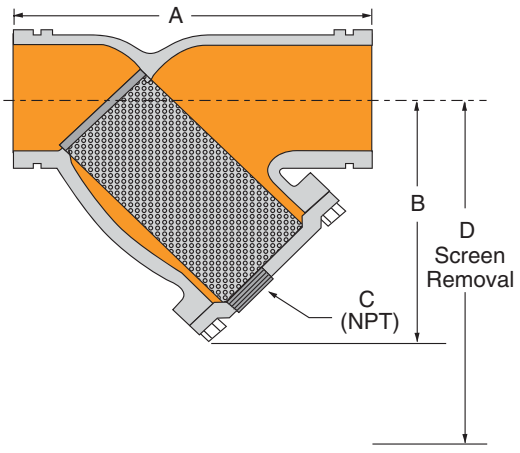
Working Pressures Non-Shock
640 PSI @ 150°F (45 Bar @ 65°C)

FLOW DATA:

NOTE 1. Most U.S. piping engineers specify system startup instructions for new systems which include removing the pre-filter screen after system flushing of the main piping before the system is put into normal operation. Flow data values are based on flow of clean water at ambient temperatures. The pressure drop across the diffuser basket strainer, 50% clogged, is approximately twice as great as that of a clean strainer.

NOTE 2. Suction Diffuser baskets need a routine maintanence program to maintain system efficiency.





MATERIAL SPECIFICATIONS

BODY & COVER: Ductile Iron ASTM A 395 Grade 60-40-18

FLAT GASKETS: Non-asbestos

SCREEN:
2" - 4" Type 304 Stainless Steel 1/16" (1.6mm) dia. holes
5" - 12" Type 304 Stainless Steel 1/8" (3.2mm) dia. holes.

COUPLING: Ductile iron ASTM A 536 Grade 65-45-12

FIGURE 758 G GROOVED-END "WYE" STRAINER

Nominal Size	O.D.	Dimensions				Approx. Wt. Each
		A	B	C Plug Size	D	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	7⅞ *200*	5¼ *133*	½ *25*	7 *178*	12.0 *5.4*
2½ *65*	2.875 *73.0*	10 *254*	6½ *165*	1 *25*	9¾ *248*	18.0 *8.2*
3 *80*	3.500 *88.9*	10⅛ *257*	7 *178*	1 *25*	10 *254*	23.0 *10.4*
4 *100*	4.500 *114.3*	12⅛ *308*	8¼ *210*	1½ *38*	12 *305*	42.0 *19.1*
5 *125*	5.563 *141.3*	15⅝ *396*	11¼ *286*	2 *51*	17 *432*	80.0 *36.3*
6 *150*	6.625 *168.3*	18½ *470*	13½ *343*	2 *51*	20 *508*	112.0 *50.8*
8 *200*	8.625 *219.1*	21⅝ *549*	15½ *394*	2 *51*	22¾ *577*	205.0 *93.0*
10 *250*	10.750 *273.1*	25¾ *654*	18½ *470*	2 *51*	28 *711*	277.0 *125.6*
12 *300*	12.750 *323.9*	30 *762*	21¾ *552*	2 *51*	30 *762*	470.0 *213.2*

* Maximum working pressure is based upon the performance capability of the Gruvlok® Strainer. Maximum system working pressure is dependant upon the couplings used for installation and the pressure capacity of other system components.
Not for use with copper systems.

MODEL 768G

Globally Sourced Grooved-end "Wye" Strainer

The Grooved-end Wye-Strainers are designed to strain debris and foreign matter from piping systems and thus provide inexpensive protection for costly pumps, meters and other components. The Strainer can be installed quickly and easily with two mechanical couplings and the straight flow through design provides for lower pressure drop. This strainer features a stainless steel screen that is secured with an end cap and mechanical coupling. Cleaning and maintenance of the screen can be accomplished easily by removing the coupling. The Strainer is suitable for vertical and horizontal installations.

MATERIAL SPECIFICATIONS

BODY: Ductile iron ASTM A 536 Grade 65-45-12

END CAP: Ductile iron ASTM A 536 Grade 65-45-12

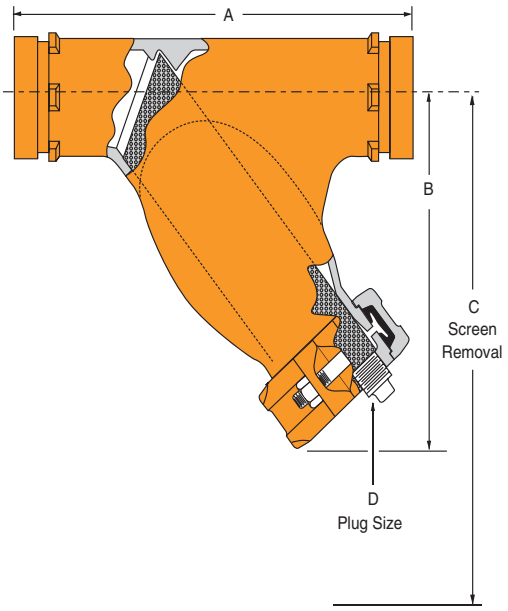
SCREEN:*
- 2" - 3" Type 304 Stainless Steel to ASTM A 240 - 1/16" (1.6 mm) perforations
- 4" - 12" Type 304 Stainless Steel to ASTM A 240 - 1/8" (3.2 mm) perforations
- Other perforations are available upon request

COUPLING: Ductile iron ASTM A 536 Grade 65-45-12

GASKET:*
- EPDM Temperature range -40°F - +230°F (-40° to 110°C)
- Nitrile Temperature range -20°F to 180°F (-29° to 82°C)

BLOW DOWN PORT:
- 2" & 2½": ½" tapped with plug,
- 3" & 4": 1" tapped with plug,
- 6" - 12": 1½" tapped with plug

* Custom screens and/or gaskets are available upon request.
Strainer baskets need a routine maintenance program to maintain efficiency and to prevent excess pressure drop caused by a clogged screen.



Values for flow of water at +60°F (+16°C)

$$C_V = \frac{Q}{\sqrt{\Delta P}}$$

Where:
- Q = Flow (GPM)
- C_V = flow coefficient
- ΔP = Pressure drop (PSI)

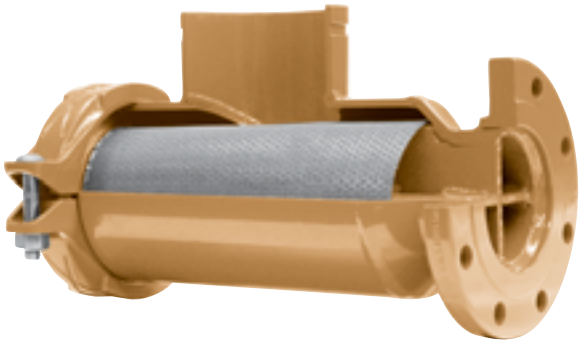
FIGURE 768 G GROOVED-END "WYE" STRAINER

Nominal Size	O.D.	Working Pressure	Dimensions				Cv Values	Approx. Wt. Each
			A	B	C	D Plug Size		
In./DN(mm)	*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*Lbs./Kg*
2 *50*	2.375 *60.3*	300 *20.7*	9¾ *248*	7⅛ *192*	4⁹⁄₁₆ *116*	½ *12*	59	9.3 *4.2*
2½ *65*	2.875 *73.0*	300 *20.7*	10¾ *273*	7¹³⁄₁₆ *211*	4¹³⁄₁₆ *122*	½ *12*	92	13.2 *6.0*
3 *80*	3.500 *88.9*	300 *20.7*	11¾ *298*	8¹¹⁄₁₆ *231*	5¹⁄₁₆ *129*	1 *25*	162	18.0 *8.2*
4 *100*	4.500 *114.3*	300 *20.7*	14¼ *362*	10⅝ *281*	6⅝ *168*	1 *25*	284	26.4 *12.0*
5 *125*	5.563 *141.3*	300 *20.7*	16½ *419*	13 *330*	10³⁄₁₆ *258*	1 *25*	410	46.4 *22.0*
6 *150*	6.625 *168.3*	300 *20.7*	18½ *470*	14¹⁄₁₆ *357*	8⅝ *219*	1½ *38*	770	70.4 *32.0*
8 *200*	8.625 *219.1*	300 *20.7*	24 *610*	17⅞ *454*	11³⁄₁₆ *284*	1½ *38*	1010	121.0 *55.0*
10 *250*	10.750 *273.1*	300 *20.7*	27 *686*	20⁹⁄₁₆ *522*	12⅝ *320*	1½ *38*	1800	182.6 *83.0*
12 *300*	12.750 *323.9*	300 *20.7*	30 *762*	24 *609*	14⅜ *366*	1½ *38*	2800	277.2 *126.0*
14 *350*	14.000 *355.6*	300 *20.7*	40 *1016*	29¹⁵⁄₁₆ *760*	18⅞ *480*	1½ *38*	4600	418.0 *190.0*
16 *400*	16.000 *406.4*	300 *20.7*	42 *1067*	30⁹⁄₁₆ *777*	19 *483*	1½ *38*	5800	495.0 *225.0*

Not for use in copper systems.
- Pressure ratings listed are CWP (cold water pressure) or maximum working pressure within the service temperature range of the gasket used in the coupling. This rating may occasionally differ from maximum working pressures listed and/or approved by UL, ULC, and/or FM as testing conditions and test pipes differ.
- Maximum working pressure and end loads listed are total of internal and external pressures and loads based on Sch. 40 steel pipe with roll grooves to ANSI C606-97 specifications.
- For one time field test only the maximum joint working pressure may be increased 1½ times the figures shown.
- Warning: Piping systems must always be depressurized and drained before attempting disassembly and or removal of any components.

FIG. 7250

Suction Diffuser



The Fig. 7250 Gruvlok Suction Diffuser protects your pump and saves you money on your overall installed cost while offering you these advantages:

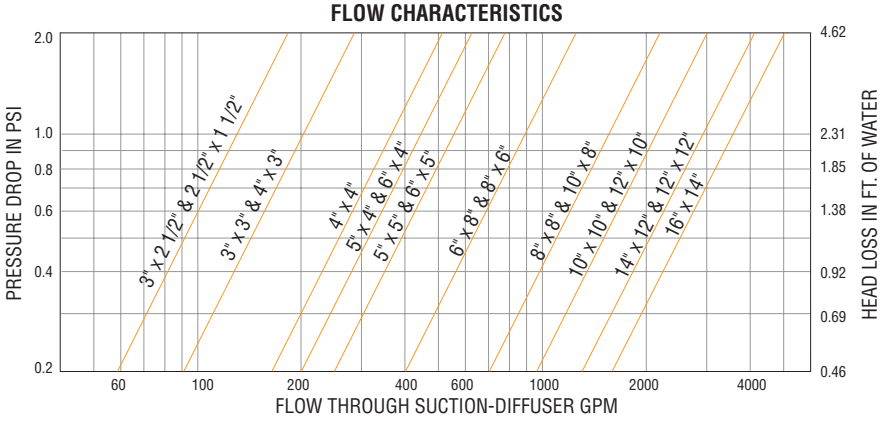
SAVES SPACE:
Mounts directly to the pump inlet.

SAVES LABOR AND MATERIAL:
The lightweight compact design is easily installed with no need for welding.

IMPROVES PUMP PERFORMANCE:
The one-piece diffuser vane and strainer design reduces flow turbulence, streamlines the flow, and traps any hazardous foreign material to better protect your pump.

PIPE SUPPORT LUG STANDARD

FLOW CHARACTERISTICS



FLOW DATA:

NOTE 1. Most U.S. piping engineers specify system startup instructions for new systems which include removing the pre-filter screen after system flushing of the main piping before the system is put into normal operation. Flow data values are based on flow of clean water at ambient temperatures. The pressure drop across the diffuser basket strainer, 50% clogged, is approximately twice as great as that of a clean strainer.

NOTE 2. Suction Diffuser baskets need a routine maintanence program to maintain system efficiency.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information

HOUSING:
Sizes 2½" x 2 ½" through 10" x 8":
Carbon steel Schedule 40 conforming to ASTM A 53, Grade B.
Sizes 10" x 10" through 16" x 14":
Carbon steel .375" standard weight wall conforming to ASTM A 53, Grade B.

DIFFUSER BASKET:
Stainless steel type 304, #16 perforated plate with 3/16" diameter holes. (51% open area). Pre-Filter: Stainless steel type 304 screen - 16 mesh. (removable).

COUPLINGS:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

FLANGES:
Carbon steel class 150# conforming to ASME B 16.5.

DRAIN & GAGE PLUGS:
Carbon steel square head plugs conforming to ASME B16.11.

COATINGS:
Rust inhibiting paint Color: ORANGE (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

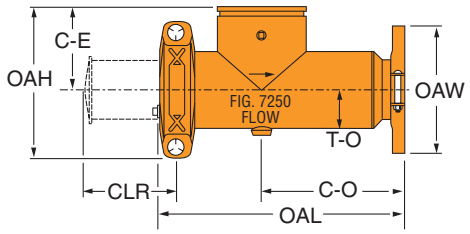
Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "EP" EPDM (Green and Red color code)
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

For hot water applications the use of Gruvlok Extreme Temperature lubricant is recommended. NSF-61 Certified for cold and hot water applications up through 12".

Grade "T" Nitrile (Orange color code) -20°F to 180°F
(Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

FIG. 7250
Suction Diffuser



SIZES 2½" X 2½" thru 16" x 14"

FIGURE 7250 SUCTION DIFFUSER

Nominal Size	O.D.	System Side (Grooved)	Pump Side (Flanged)	C-E	C-O	OAL	OAH	OAW Flange O.D.	CLR	T-O	Orifice Cylinder Open Area	Max. Working Pressure	Approx. Wt. Each
In./DN(mm)	*In./mm*	*In./DN(mm)*	*In./DN(mm)*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In. Sq./cm. Sq.*	*PSI/bar*	*Lbs./Kg*
2½ x 2½	2.875 x 2.875	2½	2½	5	8	13½	9	7	13½	2¼	48	300	32
65 x 65	*73.0 x 73.0*	*65*	*65*	*127*	*203*	*343*	*229*	*178*	*343*	*57*	*310*	*20.7*	*14.5*
3 x 2	3.500 x 2.375	3	2	5	8	13½	9	6	13½	2¼	42	300	34
80 x 50	*88.9 x 60.3*	*80*	*50*	*127*	*203*	*343*	*229*	*152*	*343*	*57*	*271*	*20.7*	*15.4*
3 x 2½	3.500 x 2.875	3	2½	5	8	13½	9	7	13½	2¼	48	300	34
80 x 65	*88.9 x 73.0*	*80*	*65*	*127*	*203*	*343*	*229*	*178*	*343*	*57*	*310*	*20.7*	*15.4*
3 x 3	3.500 x 3.500	3	3	5	8	13½	9	7½	10¼	2 13/16	58	300	35
80 x 80	*88.9 x 88.9*	*80*	*80*	*127*	*203*	*343*	*229*	*191*	*260*	*71*	*374*	*20.7*	*15.9*
4 x 2½	4.500 x 2.875	4	2½	5	8	13½	9	7	13½	2¼	48	300	36
100 x 65	*114.3 x 2.875*	*100*	*65*	*127*	*203*	*343*	*229*	*178*	*343*	*57*	*310*	*20.7*	*16.3*
4 x 3	4.500 x 3.500	4	3	5	8	13½	9	7½	10¼	2 13/16	58	300	37
100 x 80	*114.3 x 88.9*	*100*	*80*	*127*	*203*	*343*	*229*	*191*	*260*	*71*	*374*	*20.7*	*16.8*
4 x 4	4.500 x 4.500	4	4	6½	10½	17½	11¾	9	13½	3 5/16	94	300	70
100 x 100	*114.3 x 114.3*	*100*	*100*	*165*	*267*	*445*	*298*	*229*	*343*	*84*	*607*	*20.7*	*31.8*
5 x 4	5.563 x 4.500	5	4	6½	10½	17½	11¾	9	13½	3 5/16	94	300	72
125 x 100	*141.3 x 114.3*	*125*	*100*	*165*	*267*	*445*	*298*	*229*	*343*	*84*	*607*	*20.7*	*32.7*
5 x 5	5.563 x 5.563	5	5	6½	10½	17½	13¾	10	13½	4 5/16	117	300	75
125 x 125	*141.3 x 141.3*	*125*	*125*	*165*	*267*	*445*	*349*	*254*	*343*	*110*	*755*	*20.7*	*34.0*
6 x 3	6.625 x 3.500	6	3	6½	10½	17½	11¾	7½	13½	3 5/16	94	300	72
150 x 80	*168.3 x 88.9*	*150*	*80*	*165*	*267*	*445*	*298*	*191*	*343*	*84*	*607*	*20.7*	*34.0*
6 x 4	6.625 x 4.500	6	4	6½	10½	17½	11¾	9	13½	3 5/16	94	300	73
150 x 100	*168.3 x 114.3*	*150*	*100*	*165*	*267*	*445*	*298*	*229*	*343*	*84*	*607*	*20.7*	*33.1*
6 x 5	6.625 x 5.563	6	5	6½	10½	17½	13¾	10	13½	4 5/16	117	300	75
150 x 125	*168.3 x 141.3*	*150*	*125*	*165*	*267*	*445*	*349*	*254*	*343*	*110*	*755*	*20.7*	*34.0*
6 x 6	6.625 x 6.625	6	6	7¾	13¼	21½	14¾	11	16¼	4 5/16	167	300	120
150 x 150	*168.3 x 168.3*	*150*	*150*	*197*	*337*	*546*	*375*	*279*	*413*	*110*	*1,077*	*20.7*	*54.4*
8 x 5	8.625 x 5.563	8	5	7¾	13¼	21½	14¾	10	16¼	4 5/16	167	300	128
200 x 125	*219.1 x 141.3*	*200*	*125*	*197*	*337*	*546*	*375*	*254*	*413*	*110*	*1,077*	*20.7*	*58.1*
8 x 6	8.625 x 6.625	8	6	7¾	13¼	21½	14¾	11	16¼	4 5/16	167	300	130
200 x 150	*219.1 x 168.3*	*200*	*150*	*197*	*337*	*546*	*375*	*279*	*413*	*110*	*1,077*	*20.7*	*59.0*
8 x 8	8.625 x 8.625	8	8	9	15¼	24½	17¾	13½	19¾	5⅜	266	300	190
200 x 200	*219.1 x 219.1*	*200*	*200*	*229*	*387*	*622*	*451*	*343*	*502*	*137*	*1,716*	*20.7*	*86.2*
10 x 8	10.750 x 8.625	10	8	9	15¼	24½	17½	13½	19¾	5⅜	266	300	200
250 x 200	*273.1 x 219.1*	*250*	*200*	*229*	*387*	*622*	*445*	*343*	*502*	*137*	*1,716*	*20.7*	*90.7*
10 x 10	10.750 x 10.750	10	10	10	17¼	28	19⅝	16	23¾	6⅜	384	300	225
250 x 250	*273.1 x 273.1*	*250*	*250*	*254*	*438*	*711*	*498*	*406*	*603*	*162*	*2,477*	*20.7*	*102.1*
12 x 10	12.750 x 10.750	12	10	10	17¼	28	19⅝	16	23¾	6⅜	384	300	230
300 x 250	*323.9 x 273.1*	*300*	*250*	*254*	*438*	*711*	*498*	*406*	*603*	*162*	*2,477*	*20.7*	*104.3*
12 x 12	12.750 x 12.750	12	12	11	24¼	36	20½	19	34¼	8	695	300	382
300 x 300	*323.9 x 323.9*	*300*	*300*	*279*	*616*	*914*	*521*	*483*	*870*	*203*	*4,484*	*20.7*	*173.3*
14 x 10	14.000 x 10.750	14	10	11	24¼	36	20½	16	34¼	8	695	300	382
350 x 250	*355.6 x 273.1*	*350*	*250*	*279*	*616*	*914*	*521*	*406*	*870*	*203*	*4,484*	*20.7*	*173.3*
14 x 12	14.000 x 12.750	14	12	11	24¼	36	20½	19	34¼	8	695	300	382
350 x 300	*355.6 x 323.9*	*350*	*300*	*279*	*616*	*914*	*521*	*483*	*870*	*203*	*4,484*	*20.7*	*173.3*
14 x 14	14.000 x 14.000	14	14	12	26¼	39	23	21	36	9	817	300	467
350 x 350	*355.6 x 355.6*	*350*	*350*	*305*	*667*	*991*	*584*	*533*	*914*	*229*	*5,271*	*20.7*	*211.8*
16 x 14	16.000 x 14.000	16	14	12	26¼	39	23	21	36	9	817	300	467
400 x 350	*406.4 x 355.6*	*400*	*350*	*305*	*667*	*991*	*584*	*533*	*914*	*229*	*5,271*	*20.7*	*211.8*

Other sizes available on special request. Contact an Anvil Rep. for ordering information.
Dimensions may vary Contact an Anvil Rep. for certified values.
Not for use in copper systems.
Product must be supported by pipe supports (supports not included).

1. "CLR" Dimension indicates clearance needed for diffuser basket removal.
2. Drain Holes: (End Cap)
   -¾" NPT for sizes 2½ x 2½ thru 6 x 5, -1" NPT for sizes 6 x 6 thru 16 x 14.
3. Pipe Support - Use 1¼" SCH. 40 Pipe for 2½" thru 10" pipe and 2" SCH. 40 Pipe for 12" and larger diffusers.
4. "Orifice Cylinder Open Area" is the total area of the opening in the diffuser basket after the pre-filter screen has been removed.

MODEL GAV-15

Automatic Air Vents For Ultimate Performance

- Two Sizes Equip All Riser Systems
- Spherical Float for Strength
- Stainless Steel Float and Trim
- Special Design Eliminates Blow-by

The Air Vent (GAV) features a Stainless Steel spherical float design. Air in the piping system is vented through the discharge valve that is normally open. Rising water activates the float to close the valve. The valve outlet is tapped to take a safety drain line.

Simplicity of design in the GAV ensures long-lasting efficiency. The Stainless Steel float and valve mechanism involve no wearing parts, and no intricate function. The precision formed cast iron body custom fits the float and valve, and protectively houses their operation under the most demanding conditions.

Max. Working Pressure
175 PSI (12 bar) @ 150° F (66° C)
150 PSI (10 bar) @ 250° F (121° C)

Test Pressure
300 PSI (21 bar) @ 70° F (21° C)

MODEL GAV-15 AUTOMATIC AIR VENT

Valve Size	Maximum Temp.	Inlet Size NPT	Outlet Size NPT	Orifice Size	Approx. Wt. Ea
In./mm	*°F/°C*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
½ *15*	250 *120*	½ *15*	½ *15*	1/16 *2*	5½ *3*
¾ *20*	250 *120*	¾ *20*	½ *15*	1/16 *2*	5½ *3*
1 *25*	250 *120*	1 *25*	½ *15*	1/16 *2*	5½ *3*

MODEL GAV-15 AUTOMATIC AIR VENT

Type	Max. Water Pressure	Max. Temp.	Inlet Size	Outlet Size NPT	Valve Orifice	Overall			Approx. Wt. Ea
						Height	Width	Length	
	PSI/bar	*°F/°C*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
GAV-15	150 *10*	250 *120*	½, ¾ & 1 *15, 20 & 25*	3/8 *10*	1/16 *2*	5¼ *130*	4¾ *100*	4¾ *100*	5½ *2.5*

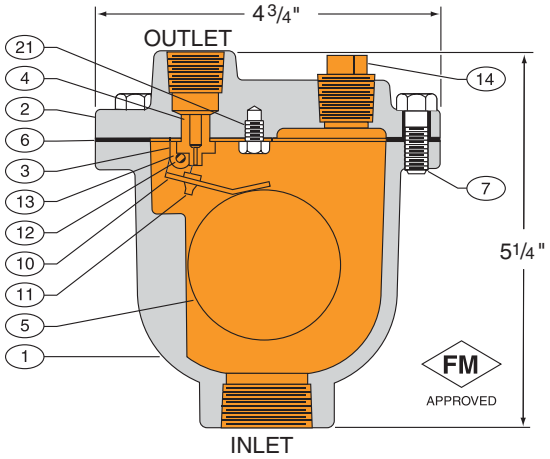
MATERIAL SPECIFICATIONS

1. **BODY:** Cast Iron ASTM A 126, Class B
2. **COVER:** Cast Iron ASTM A 126, Class B
3. **LEVER FRAME:** Stainless Steel-T304, ASTM A 240
4. **SEAT:** Stainless Steel-T303, 582
5. **FLOAT:** Stainless Steel-T304, ASTM A 240
6. **GASKET:** Non Asbestos
7. **COVER BOLT:** Carbon Steel-Sae Grade 5

10 **FLOAT ARM:** Stainless Steel-T304, ASTM A 240

11. **ORIFICE BUTTON:** Viton
12. **PIVOT PIN:** Stainless Steel-T303, 582
13. **PIN RETAINER:** Stainless Steel-Ph 15-7 MO
14. **PIPE PLUG ½":** Steel

21. **LOCATOR:** Stainless Steel-T304, ASTM F 593



MODEL GAV-30

Automatic Air Vents for Ultimate Performance

- Two Sizes Equip All Riser Systems
- Spherical Float for Strength
- Stainless Steel Float and Trim
- Special Design Eliminates Blow-by

The Air Vent (GAV) features a Stainless Steel spherical float design. Air in the piping system is vented through the discharge valve that is normally open. Rising water activates the float to close the valve. The valve outlet is tapped to take a safety drain line.

Simplicity of design in the GAV ensures long-lasting efficiency. The Stainless Steel float and valve mechanism involve no wearing parts, and no intricate function. The precision formed cast iron body custom fits the float and valve, and protectively houses their operation under the most demanding conditions.

Max. Working Pressure
300 PSI

Test Pressure
450 PSI

MODEL GAV-30 AUTOMATIC AIR VENT

Valve Size	Maximum Temp.	Inlet Size NPT	Outlet Size NPT	Orifice Size	Approx. Wt. Each.
In./mm	*°F/°C*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
½ *15*	250 *120*	½ *15*	½ *15*	1/16 *2*	8 *3*
¾ *20*	250 *120*	¾ *20*	½ *15*	1/16 *2*	8 *3*

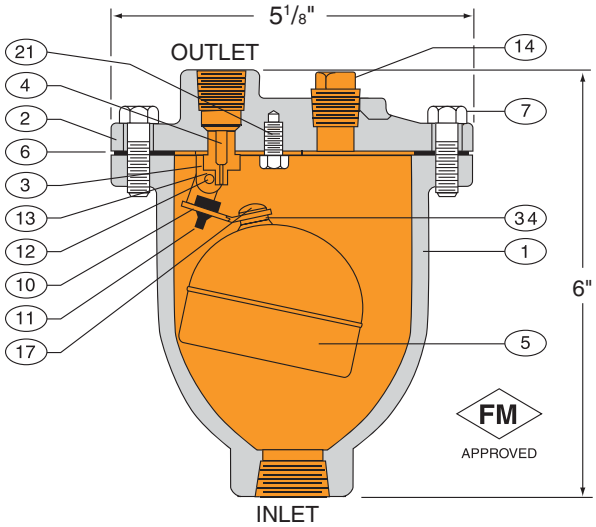
MODEL GAV-30 AUTOMATIC AIR VENT

Type	Max. Water Pressure	Max. Temp.	Inlet Size	Outlet Size NPT	Valve Orifice	Overall			Approx. Wt. Each.
						Height	Width	Length	
	PSI/bar	*°F/°C*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
GAV-30	300 *20.7*	250 *120*	½, ¾ & 1 *15, 20 & 25*	½ *15*	1/16 *2*	6 *150*	5⅛ *125*	5⅛ *125*	7½ *3.4*

MATERIAL SPECIFICATIONS

1. **BODY:** Cast Iron ASTM A 126, Class B
2. **COVER:** Cast Iron ASTM A 126, Class B
3. **LEVER FRAME:** Stainless Steel ASTM A 240
4. **SEAT:** Stainless Steel-T303, 582
5. **FLOAT:** Stainless Steel-T304, ASTM A 240
6. **GASKET:** Non Asbestos
7. **COVER BOLT:** Alloy Steel ASTM A 449 Grade 5
10. **FLOAT ARM:** Stainless Steel-T304, ASTM A 240
11. **ORIFICE BUTTON:** Viton
12. **PIVOT PIN:** Stainless Steel-T303, 582
13. **PIN RETAINER:** Stainless Steel-Ph 15-7 MO
14. **PIPE PLUG:** Steel
17. **FLOAT RETAINER:** Stainless Steel T304, ASTM F 879
21. **LOCATOR:** Stainless Steel-T304, ASTM F 593
34. **LOCK WASHER:** Stainless Steel T304, ASTM A 240

NOTE: All specification as last revised



ANVILFLEX™ FLEX CONNECTORS

AnvilFlex™ Flexible connectors are used to prevent damage to pumps caused by piping stress. AnvilFlex™ connectors also absorb vibration and noise found in pump installations. AnvilFlex™ connectors are easily installed and reduce the possibility of pump failure.

They are designed to be pressure tested 1.5 times their maximum rated working pressure and manufactured with a 4:1 safety factor. Their compact design saves valuable space.

See page 182 for installation instructions.

Working pressure of standard hose and braid up to 1,325 psi (91 bar) or full vacuum and operating temperatures of -400°F (-240° C) to +1,500°F (816° C).

AnvilFlex™ connectors are manufactured with 321 stainless steel annular corrugated close pitch metal flexible hose. Other stainless steel and corrosion resistant alloys are available. Contact your Anvil representative for additional information.

MATERIAL SPECIFICATIONS

HOSE: 300 Series Stainless Steel

BRAID: Stainless Steel Type 304

ENDS: Schedule 40 Carbon Steel Grooved-Ends

MOTION CLASSIFICATIONS

AnvilFlex™ flex connectors are braided pump connectors capable of handling the following movements:

PARALLEL

VIBRATION

PARALLEL OFFSET MOTION:

Motion that occurs when one end of the hose assembly is deflected in a plane perpendicular to the longitudinal axis with the ends remaining parallel. Offset is measured as displacement of the free end centerline from the fixed end centerline.

MOTION FREQUENCY:

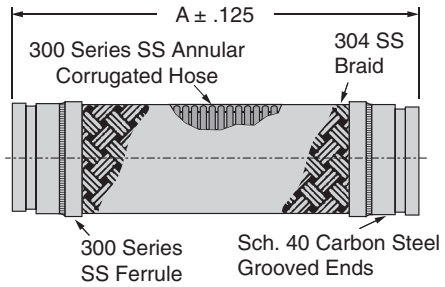
Permanent Offset - The maximum fixed parallel offset to which the corrugated metal hose assembly may be bent without damage. No further motion is to be imposed other than normal vibration.

Intermittent Offset is motion that occurs on a regular or irregular cyclic basis. It is normally the result of thermal expansion and contraction or other non-continuous actions.

NOTE: AnvilFlex™ flex connectors are manufactured with a 4:1 safety factor.

FIG. AF21-GG

Grooved Ends
Flex Connector

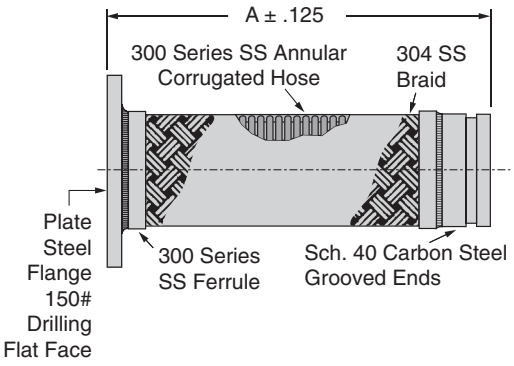


AF21-GG GRXGR FLEX CONNECTORS

Nominal Size	O.D.	Model or 10 dig. #	A	Pressure 70°F	Parallel Offset *		Approx. Wt. Ea.
					Permanent	Intermittent	
In./DN(mm)	*In./mm*		*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*Lbs./kN*
2 *50*	2.375 *60.3*	AF0390232007	12 *304.8*	450 *31.0*	1¼ *31.8*	⅜ *9.5*	2.5 *1.1*
2½ *65*	2.875 *73.0*	AF0390232106	12 *304.8*	300 *20.7*	1¼ *31.8*	⅜ *9.5*	3.5 *1.6*
3 *80*	3.500 *88.9*	AF0390232031	12 *304.8*	275 *19.0*	¾ *19.1*	¼ *6.4*	4.5 *2.0*
4 *100*	4.500 *114.3*	AF0390232114	14 *355.6*	270 *18.6*	½ *12.7*	¼ *6.4*	8.0 *3.6*
5 *125*	5.563 *141.3*	AF0390232122	16 *406.4*	225 *15.5*	⅞ *22.2*	⅜ *9.5*	12.0 *5.4*
6 *150*	6.625 *168.3*	AF0390232130	16 *406.4*	165 *11.4*	⅝ *15.9*	¼ *6.4*	14.0 *6.4*
8 *200*	8.625 *219.1*	AF0390232148	16 *406.4*	155 *10.7*	½ *12.7*	¼ *6.4*	20.0 *9.1*
10 *250*	10.750 *273.1*	AF0390232155	20 *508.0*	150 *10.3*	⅝ *15.9*	¼ *6.4*	38.0 *17.2*
12 *300*	12.750 *323.9*	AF0390232163	20 *508.0*	145 *10.0*	½ *12.7*	¼ *6.4*	46.0 *20.9*

FIG. AF21-GF

Grooved x Class 150 Flanged Flex Connectors



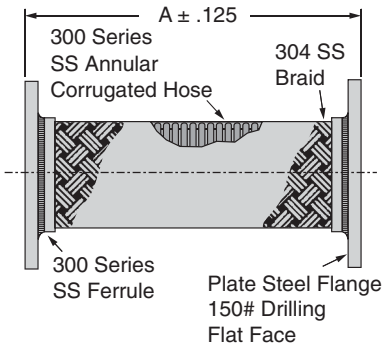
AF21-GF GRXFL FLEX CONNECTORS

Nominal Size	O.D.	Model or 10 dig. #	A	Pressure 70°F	Parallel Offset		Approx. Wt. Ea.
					Permanent	Intermittent	
In./DN(mm)	*In./mm*		*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*Lbs./kN*
2 *50*	2.375 *60.3*	AF0390232197	12 *304.8*	450 *31.0*	1⅞ *47.6*	⅝ *15.9*	7.2 *3.3*
2½ *65*	2.875 *73.0*	AF0390232213	12 *304.8*	300 *20.7*	1⅝ *41.3*	⅝ *15.9*	8.5 *3.9*
3 *80*	3.500 *88.9*	AF0390232171	12 *304.8*	275 *19.0*	1⅛ *28.6*	½ *12.7*	10.4 *4.7*
4 *100*	4.500 *114.3*	AF0390232189	12 *304.8*	270 *18.6*	⅝ *15.9*	¼ *6.4*	14.0 *6.4*
5 *125*	5.563 *141.3*	AF0390232247	14 *355.6*	225 *15.5*	⅞ *22.2*	⅜ *9.5*	18.4 *8.3*
6 *150*	6.625 *168.3*	AF0390232254	14 *355.6*	165 *11.4*	¾ *19.1*	⅜ *9.5*	23.7 *10.8*
8 *200*	8.625 *219.1*	AF0390232262	15 *381.0*	155 *10.7*	⅝ *15.9*	¼ *6.4*	39.6 *18.0*
10 *250*	10.750 *273.1*	AF0390232270	16 *406.4*	150 *10.3*	⅝ *15.9*	¼ *6.4*	40 *18.1*
12 *300*	12.750 *323.9*	AF0390232288	17 *431.8*	145 *10.0*	½ *12.7*	¼ *6.4*	50 *22.7*

* See Motion Classification on previous page for additional information.

FIG. AF21-FF

Class 150 Flanged x Class 150 Flanged Flex Connectors



AF21-FF FLXFL FLEX CONNECTORS

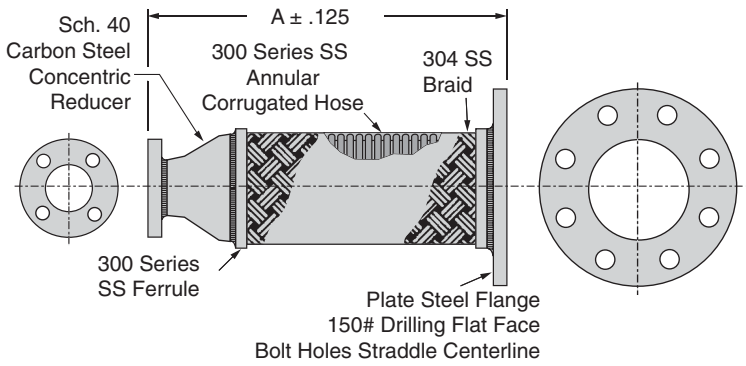
Nominal Size	O.D.	Model or 10 dig. #	A	Pressure 70°F	Parallel Offset		Approx. Wt. Ea.
					Permanent	Intermittent	
In./DN(mm)	*In./mm*		*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*Lbs./kN*
2 *50*	2.375 *60.3*	AF0390232387	9 *228.6*	450 *31.0*	1⅛ *28.6*	⅜ *9.5*	10.0 *4.5*
2½ *65*	2.875 *73.0*	AF0390232395	9 *228.6*	300 *20.7*	1 *25.4*	⅜ *9.5*	12.0 *5.4*
3 *80*	3.500 *88.9*	AF0390232403	9 *228.6*	275 *19.0*	⅝ *15.9*	¼ *6.4*	14.0 *6.4*
4 *100*	4.500 *114.3*	AF0390232429	9 *228.6*	270 *18.6*	½ *12.7*	¼ *6.4*	19.0 *8.6*
5 *125*	5.563 *141.3*	AF0390232437	11 *279.4*	225 *15.5*	¾ *19.1*	⅜ *9.5*	25.0 *11.3*
6 *150*	6.625 *168.3*	AF0390232445	11 *279.4*	165 *11.4*	⅝ *15.9*	¼ *6.4*	30.0 *13.6*
8 *200*	8.625 *219.1*	AF0390232452	12 *304.8*	155 *10.7*	½ *12.7*	¼ *6.4*	54.0 *24.5*
10 *250*	10.750 *273.1*	AF0390232460	13 *330.2*	150 *10.3*	½ *12.7*	¼ *6.4*	75.0 *34.0*
12 *300*	12.750 *323.9*	AF0390232478	14 *355.6*	145 *10.0*	½ *12.7*	¼ *6.4*	105.0 *47.6*

* See Motion Classification on previous page for additional information.

FIG. AF21-RFF

Class 150 Flanged x Class 150

Flanged Reducing Flex Connectors



AF21-RFF FLXFL REDUCING FLEX CONNECTORS

Nominal Size		Small O.D.	Large O.D.	Length	Pressure 70°F	Parallel Offset		Approx. Wt. Ea.
Small Flange	Large Flange					Permanent	Intermittent	
In./DN(mm)	*In./DN(mm)*	*In./mm*	*In./mm*	*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*Lbs./kN*
1½ *40*	2 *50*	1.660 *42.2*	2.375 *60.3*	14 *355.6*	450 *31.0*	1½ *38.1*	⅝ *15.9*	6.7 *3.0*
	2½ *65*	1.660 *42.2*	2.875 *73.0*	14 *355.6*	300 *20.7*	1¼ *31.8*	⅜ *9.5*	6.9 *3.1*
2 *50*	2½ *65*	2.375 *60.3*	2.875 *73.0*	14 *355.6*	300 *20.7*	1¼ *31.8*	⅜ *9.5*	8.1 *3.7*
	3 *80*	2.375 *60.3*	3.500 *88.9*	14 *355.6*	275 *19.0*	¾ *19.1*	⅜ *9.5*	10.1 *4.6*
	4 *100*	2.375 *60.3*	4.500 *114.3*	15 *381.0*	270 *18.6*	½ *12.7*	¼ *6.4*	12.0 *5.4*
2½ *65*	3 *80*	2.875 *73.0*	3.500 *88.9*	14 *355.6*	275 *19.0*	¾ *19.1*	⅜ *9.5*	11.2 *5.1*
	4 *100*	2.875 *73.0*	4.500 *114.3*	15 *381.0*	270 *18.6*	½ *12.7*	¼ *6.4*	14.7 *6.7*
	5 *125*	2.875 *73.0*	5.563 *141.3*	18 *457.2*	225 *15.5*	¾ *19.1*	⅜ *9.5*	18.9 *8.6*
	6 *150*	2.875 *73.0*	6.625 *168.3*	19 *482.6*	165 *11.4*	¾ *19.1*	⅜ *9.5*	25.3 *11.5*
3 *80*	4 *100*	3.500 *88.9*	4.500 *114.3*	15 *381.0*	270 *18.6*	½ *12.7*	¼ *6.4*	15.5 *7.0*
	5 *125*	3.500 *88.9*	5.563 *141.3*	18 *457.2*	225 *15.5*	¾ *19.1*	⅜ *9.5*	19.7 *8.9*
	6 *150*	3.500 *88.9*	6.625 *168.3*	19 *482.6*	165 *11.4*	¾ *19.1*	⅜ *9.5*	26.1 *11.8*
4 *100*	5 *125*	4.500 *114.3*	5.563 *141.3*	18 *457.2*	225 *15.5*	¾ *19.1*	⅜ *9.5*	21.6 *9.8*
	6 *150*	4.500 *114.3*	6.625 *168.3*	19 *482.6*	165 *11.4*	¾ *19.1*	⅜ *9.5*	28.0 *12.7*
	8 *200*	4.500 *114.3*	8.625 *219.1*	20 *508.0*	155 *10.7*	⅝ *15.9*	¼ *6.4*	38.4 *17.4*
5 *125*	6 *150*	5.563 *141.3*	6.625 *168.3*	19 *482.6*	165 *11.4*	¾ *19.1*	⅜ *9.5*	31.0 *14.1*
	8 *200*	5.563 *141.3*	8.625 *219.1*	20 *508.0*	155 *10.7*	⅝ *15.9*	¼ *6.4*	40.7 *18.5*
6 *150*	8 *200*	6.625 *168.3*	8.625 *219.1*	20 *508.0*	155 *10.7*	½ *12.7*	¼ *6.4*	41.7 *18.9*
	10 *250*	6.625 *168.3*	10.750 *273.1*	20 *508.0*	150 *10.3*	½ *12.7*	¼ *6.4*	83.1 *37.7*
8 *200*	10 *250*	8.625 *219.1*	10.750 *273.1*	20 *508.0*	150 *10.3*	½ *12.7*	¼ *6.4*	95.0 *43.1*
10 *250*	12 *300*	10.750 *273.1*	12.750 *323.9*	22 *558.8*	145 *10.0*	½ *12.7*	¼ *6.4*	125.9 *571*

FOR TEMP ABOVE 70°F (21.6° C)	
Temperature	Factor S.S.
°F / °C	
70 *21.1*	1.00
200 *93.3*	0.94
300 *148.8*	0.88
400 *204.4*	0.83
500 *260.0*	0.78
600 *315.6*	0.74

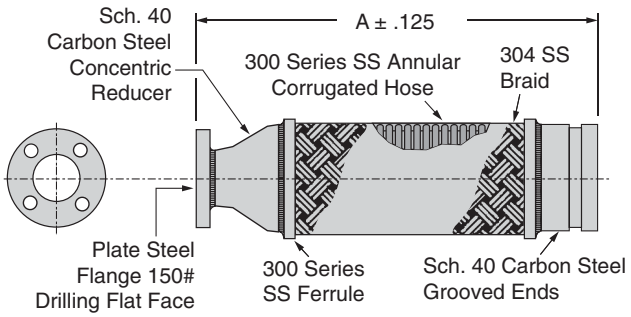
For safe working pressure above 70°F (21.1° C), Multiply pressure shown at 70°F. times correction factor of require temperature.

* See Motion Classification on page 109 for additional information.

Working pressures shown for the hose and braid are based on an operating temperature of 70° F (21° C) with a 4:1 safety factor.

FIG. AF21-RGF

Grooved x Class 150 Flanged Reducing Flex Connectors



AF21-RGF GRXFL REDUCING FLEX CONNECTORS

Nominal Size		Small O.D.	Large O.D.	Length	Pressure 70°F	Parallel Offset		Approx. Wt. Ea.
Small Flange	Large Groove & Hose					Permanent	Intermittent	
In./DN(mm)	*In./DN(mm)*	*In./mm*	*In./mm*	*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*Lbs./kN*
1½ *40*	2 *50*	1.660 *42.2*	2.375 *60.3*	14 *355.6*	450 *31.0*	1½ *38.1*	⅝ *15.9*	6.7 *3.0*
	2½ *65*	1.660 *42.2*	2.875 *73.0*	14 *355.6*	300 *20.7*	1¼ *31.8*	⅜ *9.5*	6.9 *3.1*
2 *50*	2½ *65*	2.375 *60.3*	2.875 *73.0*	14 *355.6*	300 *20.7*	1¼ *31.8*	⅜ *9.5*	8.1 *3.7*
	3 *80*	2.375 *60.3*	3.500 *88.9*	14 *355.6*	275 *19.0*	¾ *19.1*	⅜ *9.5*	10.1 *4.6*
	4 *100*	2.375 *60.3*	4.500 *114.3*	14 *355.6*	270 *18.6*	½ *12.7*	¼ *6.4*	12.0 *5.4*
2½ *65*	3 *80*	2.875 *73.0*	3.500 *88.9*	14 *355.6*	275 *19.0*	¾ *19.1*	⅜ *9.5*	11.2 *5.1*
	4 *100*	2.875 *73.0*	4.500 *114.3*	14 *355.6*	270 *18.6*	½ *12.7*	¼ *6.4*	14.7 *6.7*
	5 *125*	2.875 *73.0*	5.563 *141.3*	18 *457.2*	225 *15.5*	¾ *19.1*	⅜ *9.5*	18.9 *8.6*
	6 *150*	2.875 *73.0*	6.625 *168.3*	19 *482.6*	165 *11.4*	¾ *19.1*	⅜ *9.5*	25.3 *11.5*
3 *80*	4 *100*	3.500 *88.9*	4.500 *114.3*	15 *381.0*	270 *18.6*	½ *12.7*	¼ *6.4*	15.5 *7.0*
	5 *125*	3.500 *88.9*	5.563 *141.3*	18 *457.2*	225 *15.5*	¾ *19.1*	⅜ *9.5*	19.7 *8.9*
	6 *150*	3.500 *88.9*	6.625 *168.3*	19 *482.6*	165 *11.4*	¾ *19.1*	⅜ *9.5*	26.1 *11.8*
4 *100*	5 *125*	4.500 *114.3*	5.563 *141.3*	18 *457.2*	225 *15.5*	¾ *19.1*	⅜ *9.5*	21.6 *9.8*
	6 *150*	4.500 *114.3*	6.625 *168.3*	19 *482.6*	165 *11.4*	¾ *19.1*	⅜ *9.5*	28.0 *12.7*
	8 *200*	4.500 *114.3*	8.625 *219.1*	20 *508.0*	155 *10.7*	⅝ *15.9*	¼ *6.4*	38.4 *17.4*
5 *125*	6 *150*	5.563 *141.3*	6.625 *168.3*	19 *482.6*	165 *11.4*	¾ *19.1*	⅜ *9.5*	31.0 *14.1*
	8 *200*	5.563 *141.3*	8.625 *219.1*	20 *508.0*	155 *10.7*	⅝ *15.9*	¼ *6.4*	40.7 *18.5*
6 *150*	8 *200*	6.625 *168.3*	8.625 *219.1*	20 *508.0*	155 *10.7*	½ *12.7*	¼ *6.4*	41.7 *18.9*
8 *200*	10 *250*	8.625 *219.1*	10.750 *273.1*	23 *584.2*	150 *10.3*	½ *12.7*	¼ *6.4*	84.0 *38.1*
10 *250*	12 *300*	10.750 *273.1*	12.750 *323.9*	25 *635.0*	145 *10.0*	½ *12.7*	¼ *6.4*	102.0 *46.3*

* See Motion Classification on page 109 for additional information.

Working pressures shown for the hose and braid are based on an operating temperature of 70° F (21° C) with a 4:1 safety factor.

FOR TEMP ABOVE 70°F (21.6° C)

Temperature	Factor S.S.
°F / °C	
70 *21.1*	1.00
200 *93.3*	0.94
300 *148.8*	0.88
400 *204.4*	0.83
500 *260.0*	0.78
600 *315.6*	0.74

For safe working pressure above 70°F (21.1° C), Multiply pressure shown at 70°F. times correction factor of required temperature.

HIGH PRESSURE COUPLINGS

FIG. 7004
Coupling

The Gruvlok Fig. 7004 is designed to provide the versatility of a grooved joint while providing a rigid pipe joint.

The Fig. 7004 coupling permits working pressure ratings up to 1000 psi (68.9 bar).

This coupling is also suited for lower pressure systems which experience pressure pulses. Systems used for high pressure, including auto and truck washes, will benefit from the increased pressure capability.

Working Pressure & End Load values are based on grooved standard wall pipe.

Fig. 7004 provides a rigid joint and does not allow for expansion or contraction. The Fig. 7004 coupling is an ideal choice for higher pressure applications such as elevator services.

NOTE: Fig. 7004 can be used with EG fittings as a commercial joint only.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

WORKING PRESSURE, END LOAD, PIPE END SEPARATION & DEFLECTION FROM CENTER LINE:
Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:
Rust inhibiting paint – Color: Orange (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

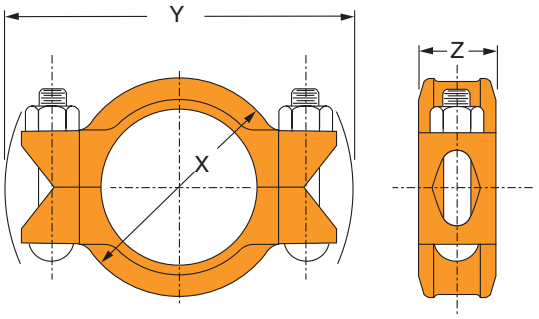
Grade "O" Fluoro-Elastomer (Blue color code)
20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)
-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:
Standard C Style
Flush Gap (2" - 12")

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™(Do Not use with Grade "L")

FIG. 7004
Coupling



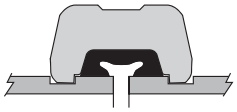


Fig. 7004 with standard gasket

FIGURE 7004 COUPLING

Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	1000 *68.9*	4,430 *19.7*	0 -1/32 *0 - 0.79*	3 5/8 *92*	6 1/4 *159*	1 7/8 *48*	2	5/8 x 2 3/4 –	3.9 *1.8*
2 1/2 *65*	2.875 *73.0*	1000 *68.9*	6,492 *28.9*	0 -1/32 *0 - 0.79*	4 1/4 *108*	6 7/8 *175*	1 7/8 *48*	2	5/8 x 3 1/2 *M16 x 85*	4.6 *2.1*
3 *80*	3.500 *88.9*	1000 *68.9*	9,621 *42.8*	0 -1/32 *0 - 0.79*	4 7/8 *124*	7 1/2 *191*	1 7/8 *48*	2	5/8 x 3 1/2 *M16 x 85*	5.2 *2.4*
4 *100*	4.500 *114.3*	1000 *68.9*	15,904 *70.8*	0 -3/32 *0 - 2.38*	6 1/4 *159*	9 1/2 *241*	2 1/4 *57*	2	3/4 x 4 1/2 *M20 x 110*	8.6 *3.9*
5 *125*	5.563 *141.3*	1000 *68.9*	24,306 *108.1*	0 -3/32 *0 - 2.38*	7 1/2 *191*	11 *279*	2 1/4 *57*	2	7/8 x 5 1/2 *M22 x 150*	14.0 *6.4*
6 *150*	6.625 *168.3*	1000 *68.9*	34,472 *153.3*	0 -3/32 *0 - 2.38*	8 3/4 *222*	12 1/8 *308*	2 1/4 *57*	2	7/8 x 5 1/2 *M22 x 150*	15.5 *7.0*
8 *200*	8.625 *219.1*	800 *55.2*	46,741 *207.9*	0 -3/32 *0 - 2.38*	11 1/8 *283*	14 7/8 *378*	2 5/8 *67*	2	1 x 5 1/2 –	25.6 *11.6*
10 *250*	10.750 *273.1*	800 *55.2*	72,610 *323.0*	0 -3/32 *0 - 2.38*	13 1/2 *343*	17 *432*	2 5/8 *67*	2	1 x 6 1/2 –	32.3 *14.7*
12 *300*	12.750 *323.9*	800 *55.2*	102,141 *454.4*	0 -3/32 *0 - 2.38*	15 7/8 *403*	19 1/4 *489*	2 5/8 *67*	2	1 x 6 1/2 –	43.9 *19.9*

For additional details, see coupling data chart notes from page 17.
See Installation & Assembly directions on page 169.
Not for use in copper systems.

FIG. 7004 with EG® Gasket

Coupling

The Gruvlok Fig. 7004 Coupling with EG® Gasket uses the specially designed "End Guard" gasket for use with "EG" grooved pipe. The "EG" gasket has a center rib which extends between the pipes in order to provide pipe end protection, which makes it ideally suited for internally lined or coated pipe applications.

The Fig. 7004 Coupling with EG® Gasket permits working pressure ratings up to 2500 psi (172.4 bar).

Working Pressure and End Load values are based on "EG" cut grooved extra heavy steel pipe. Fig. 7004 provides a rigid joint and does not allow for expansion or contraction. Beveled end pipe should not be used with "EG" gaskets.

MATERIAL SPECIFICATIONS

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, oval neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

METRIC BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts are zinc electroplated followed by a yellow chromate dip.

STAINLESS STEEL BOLTS & NUTS:
Stainless steel bolts and nuts are also available. Contact an Anvil Representative for more information.

WORKING PRESSURE, END LOAD, PIPE END SEPARATION & DEFLECTION FROM CENTER LINE
Based on standard wall steel pipe with cut or roll grooves in accordance with Gruvlok specifications. See technical data section for design factors.

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12.

COATINGS:
Rust inhibiting paint – Color: Orange (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

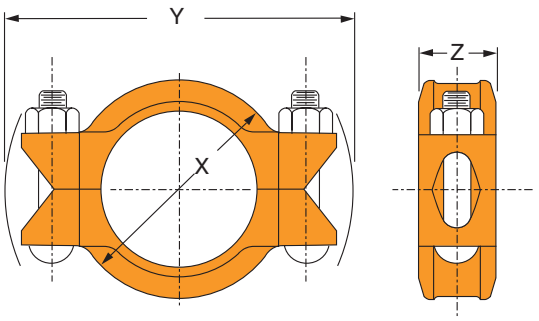
Grade "T" Nitrile (Orange color code) EG Gasket
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. Air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

GASKET TYPE:
"EG" Style

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™(Do Not use with Grade "L")

FIG. 7004 with EG® Gasket

Coupling



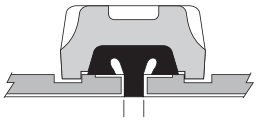


Fig. 7004 with "EG" gasket

FIGURE 7004 COUPLING WITH EG GASKET

Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	2500 *172.4*	11,075 *49.27*	0 -1/32 *0 - 0.79*	3 5/8 *92*	6 1/4 *159*	1 7/8 *48*	2	5/8 x 2 3/4 –	4.1 *1.9*
2 1/2 *65*	2.875 *73.0*	2500 *172.4*	16,230 *72.19*	0 -1/32 *0 - 0.79*	4 1/4 *108*	6 7/8 *175*	1 7/8 *48*	2	5/8 x 3 1/2 *M16 x 85*	5.1 *2.3*
3 *80*	3.500 *88.9*	2500 *172.4*	24,053 *106.99*	0 -1/32 *0 - 0.79*	4 7/8 *124*	7 1/2 *191*	1 7/8 *48*	2	5/8 x 3 1/2 *M16 x 85*	5.5 *2.5*
4 *100*	4.500 *114.3*	2500 *172.4*	39,761 *176.86*	0 -3/32 *0 - 2.38*	6 1/4 *159*	9 1/2 *241*	2 1/4 *57*	2	3/4 x 4 1/2 *M20 x 110*	9.0 *4.1*
6 *150*	6.625 *168.3*	2000 *137.9*	68,943 *306.67*	0 -3/32 *0 - 2.38*	8 3/4 *222*	12 1/8 *308*	2 1/4 *57*	2	7/8 x 5 1/2 *M22 x 150*	15.5 *7.0*
8 *200*	8.625 *219.1*	1500 *103.4*	87,639 *389.84*	0 -3/32 *0 - 2.38*	11 1/8 *283*	14 7/8 *378*	2 5/8 *67*	2	1 x 5 1/2 –	25.6 *11.6*
10 *250*	10.750 *273.1*	1250 *86.2*	113,453 *504.66*	0 -3/32 *0 - 2.38*	13 1/2 *343*	17 *432*	2 5/8 *67*	2	1 x 6 1/2 –	32.3 *14.7*
12 *300*	12.750 *323.9*	1250 *86.2*	159,595 *709.92*	0 -3/32 *0 - 2.38*	15 7/8 *403*	19 1/4 *489*	2 5/8 *67*	2	1 x 6 1/2 –	43.9 *19.9*

For additional details, see coupling data chart notes on page 17.
See Installation & Assembly directions on page 170.
Not for use in copper systems.

HIGH PRESSURE FITTINGS

Gruvlok End Guard fittings are fabricated from extra heavy (XS) materials. The groove conforms to Gruvlok End Guard cut grooving specification. These fittings may be used for high pressure systems and where lined or coated fittings are required. Gruvlok EG fittings conform to NACE STD-RP-04-72 (Contact an Anvil Representative with specific service details). End Guard fittings should only be used with Series 7004 Couplings and EG Gasket.

FITTING SIZE			
Nominal Size	O.D.	Nominal Size	O.D.
In./DN(mm)	*In./mm*	*In./DN(mm)*	*In./mm*
1 *25*	1.315 *33.7*	3 *80*	3.500 *88.9*
1¼ *32*	1.660 *42.4*	4 *100*	4.500 *114.3*
1½ *40*	1.900 *48.3*	5 *140*	5.563 *141.3*
2 *50*	2.375 *60.3*	6 *150*	6.625 *168.3*
2½ *65*	2.875 *73.0*	8 *200*	8.625 *219.1*

MATERIAL SPECIFICATIONS

ELBOWS: Extra strong forged steel fittings conforming to ASTM A 234 with welded tangents of schedule 80 steel pipe conforming to ASTM A 106.

TEES & CROSSES: Segment welded schedule 80 steel pipe conforming to ASTM A 106.

COATINGS:
Rust inhibiting paint – Color: Orange (standard)
Hot Dipped Zinc Galvanized (optional)
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

FIG. 7050 EG - High Pressure 90° LR Elbow

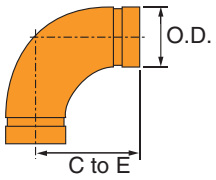


FIGURE 7050 EG, HIGH PRESSURE 90° LR ELBOW			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	3¼ *83*	2.5 *1.1*
2½ *65*	2.875 *73.0*	3¾ *95*	4.2 *1.9*
3 *80*	3.500 *88.9*	4¼ *108*	6.0 *2.7*
4 *100*	4.500 *114.3*	5 *127*	11.0 *5.0*
6 *150*	6.625 *168.3*	6½ *165*	27.2 *12.4*
8 *200*	8.625 *219.1*	* *	* *
10 *250*	10.750 *273.0*	* *	* *
12 *300*	12.750 *323.9*	* *	* *

* Contact an Anvil Representative for more information.

FIG. 7051 EG - High Pressure 45° LR Elbow

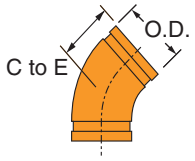


FIGURE 7051 EG, HIGH PRESSURE 45° LR ELBOW			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	2 *51*	1.8 *0.8*
2½ *65*	2.875 *73.0*	2¼ *57*	2.9 *1.3*
3 *80*	3.500 *88.9*	2½ *64*	4.3 *2.0*
4 *100*	4.500 *114.3*	3 *76*	7.5 *3.4*
6 *150*	6.625 *168.3*	3½ *89*	16.5 *7.5*

HIGH PRESSURE FITTINGS

FIG. 7060 EG - High Pressure Tee

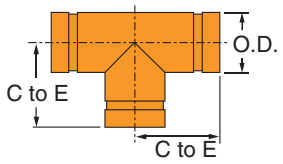


FIGURE 7060 EG - HIGH PRESSURE TEE			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	3¼ *83*	3.3 *1.5*
2½ *65*	2.875 *73.0*	3¾ *95*	5.1 *2.3*
3 *80*	3.500 *88.9*	4¼ *108*	9.3 *4.2*
4 *100*	4.500 *114.3*	5 *127*	15.9 *7.2*
6 *150*	6.625 *168.3*	6½ *165*	38.5 *17.5*

FIG. 7662 EG - High Pressure Header Tee

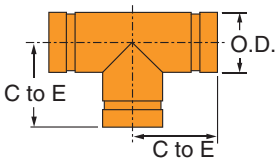


FIG. 7662 EG - HIGH PRESSURE HEADER TEE			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	6½ *165*	4.9 *2.2*
2 *50*	2.375 *60.3*	5 *127*	3.6 *1.6*

FIG. 7068 EG - High Pressure Cross

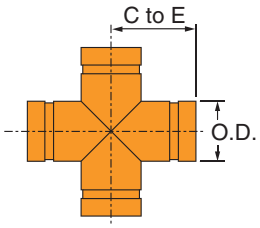


FIG. 7068 EG - HIGH PRESSURE CROSS			
Nominal Size	O.D.	Center To-End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	3¼ *83*	3.9 *1.8*
2½ *65*	2.875 *73.0*	3¾ *95*	6.8 *3.1*
3 *80*	3.500 *88.9*	4¼ *108*	11.5 *5.2*
4 *100*	4.500 *114.3*	5 *127*	19.3 *8.8*
6 *150*	6.625 *168.3*	6½ *165*	46.0 *20.9*

GRUVLOK® CTS COPPER SYSTEM

The Gruvlok® CTS Copper System offers an installer of large diameter copper tubing an alternative to the conventional soldering and brazing.

This new grooved copper system is faster and easier to install. Temperature and weather conditions are no longer a factor when planning installations. There is no sweating or brazing as this system requires only a wrench for assembly on grooved end pipe.

The copper system is "flame-free". Essentially you save time and enjoy a very reliable system that is both versatile and economical. Safety is a factor as there is no fire hazard, especially in a retrofit installation. The ease of assembly is a great benefit in new construction and ease of disassembly is ideal for renovation, retrofit or expansion.

BENEFITS

- Fast and easy to assemble.
- No flame, no sweat
- Each joint has a union.
- Provides rigidity
- Easily roll grooved
- Proven joint reliability
- Accepted and approved.
- Economical and reliable

FIG. 6400
Rigid Coupling

The Figure 6400 Rigid Coupling is specially designed to provide a rigid pipe connection to meet the specific demands of copper tubing installation size 2"-8". Fast and easy swing-over installation of the rugged lightweight housing produces a secure rigid pipe joint. Available with Grade "EP" Copper EPDM flush gap style gasket. Gasket has service temperature range of -40˚F to +250˚F. NSF 61 Certified for cold +86˚F (+30˚C) and hot +180˚F (+82˚C) potable water service.

MATERIAL SPECIFICATIONS

HOUSING:
Ductile iron conforming to ASTM A-536, Grade 65-45-12

COATINGS:
Rust inhibiting enamel paint — Color: Copper
For other coating requirements contact your Anvil Representative.

ANSI BOLTS AND HEAVY HEX NUTS:
Heat treated carbon steel oval neck bolts conforming to the physical properties of ASTM A 183 with a minimum tensile strength of 110,000 PSI. Bolts and nuts are provided zinc electroplated as standard.

GASKETS:
Grade "EP" EPDM Flush Gap Gasket (Green and Red Color Code)
Service Temperature Range: -40˚F to +250˚F(-40˚C to +121˚C)
Recommended for water service, diluted acids, alkaline solutions, oil-free air and many chemical services. NOT FOR USE IN PETROLEUM APPLICATIONS.

NSF 61 Certified for cold +86˚F (+30˚C) and hot +180˚F (+82˚C) potable water service.

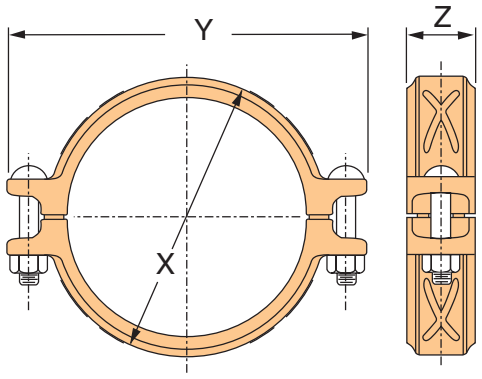


FIGURE 6400 RIGID COUPLING

Nominal Size	Copper Tube Diameter	Max Wk. Pressure	Max End Load	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	
In.	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*In./mm*				*In./mm*	*Lbs./Kg*
2	2.125 *54.0*	300 *20.7*	1063 *4.73*	0 - 0.08 *0 - 2.0*	3.00 *76*	5.00 *127*	1.68 *43*	2	⅜ x 2¼	1.53 *0.69*
2½	2.625 *66.7*	300 *20.7*	1623 *7.22*	0 - 0.08 *0 - 2.0*	3.50 *89*	5.50 *140*	1.68 *43*	2	⅜ x 2¼	1.78 *0.81*
3	3.125 *79.4*	300 *20.7*	2300 *10.23*	0 - 0.08 *0 - 2.0*	4.18 *106*	6.28 *159*	1.68 *43*	2	½ x 3	2.76 *1.25*
4	4.125 *104.8*	300 *20.7*	4007 *17.82*	0 - 0.13 *0 - 2.4*	5.20 *132*	7.50 *191*	1.70 *43*	2	½ x 3	3.27 *1.48*
5	5.125 *130.2*	300 *20.7*	6186 *27.51*	0 - 0.13 *0 - 2.4*	6.20 *157*	9.10 *231*	1.80 *46*	2	⅝ x 3¼	4.71 *2.14*
6	6.125 *155.6*	300 *20.7*	8835 *39.30*	0 - 0.13 *0 - 2.4*	7.20 *183*	10.20 *259*	1.80 *46*	2	⅝ x 3¼	5.24 *2.38*
8	8.125 *206.4*	300 *20.7*	15547 *69.15*	0 - 0.13 *0 - 2.4*	9.32 *237*	12.40 *315*	2.00 *51*	2	⅝ x 3¼	7.67 *3.48*

Pressure ratings and end loads are based on use with ASTM B88 Type K or L tubing. For pressure ratings on Type M and DWV, contact your Anvil Representative.
See Installation & Assembly directions on page 159.

CTS COPPER FITTINGS

CTS Copper Fittings are produced with groove and cup ends in a variety of fitting configurations. The fittings are constructed to ASTM B75 UNS C12200 with a minimum copper content of 99.9%. Fitting pressure ratings match the ratings of the Figure 6400 Coupling.

NSF Certified to ANSI/NSF 61

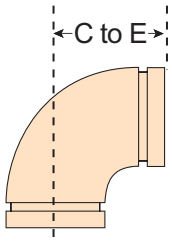


FIG. 6050

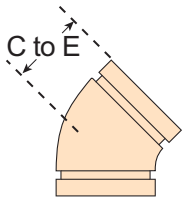


FIG. 6051

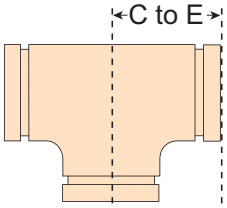


FIG. 6060

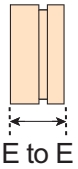


FIG. 6074

DIMENSIONS/WEIGHTS — ELBOWS, TEES & CAPS

Nominal Size	Copper Tube Diameter	Fig. 6050 90° Elbow		Fig. 6051 45° Elbow		Fig. 6060 Tee		Fig. 6074 Cap	
		C to E	Wt. Ea.	C to E	Wt. Ea.	C to E	Wt. Ea.	E to E	Wt. Ea.
In.	*In./mm*	*In./mm*	*Lbs./kg*	*In./mm*	*Lbs./kg*	*In./mm*	*Lbs./kg*	*In./mm*	*Lbs./kg*
2	2.125 *54.0*	2.91 *74*	0.75 *0.34*	2.19 *56*	0.61 *0.28*	2.69 *68*	1.45 *0.66*	2.00 *51*	0.36 *0.16*
2½	2.625 *66.7*	3.31 *84*	1.15 *0.52*	2.31 *59*	0.89 *0.40*	3.20 *81*	2.37 *1.07*	2.00 *51*	0.50 *0.23*
3	3.125 *79.4*	3.81 *97*	1.88 *0.85*	2.59 *66*	1.38 *0.63*	3.52 *89*	3.38 *1.53*	2.00 *51*	0.69 *0.31*
4	4.125 *104.8*	4.75 *121*	4.07 *1.85*	3.19 *81*	2.99 *1.36*	4.25 *108*	5.77 *2.62*	2.00 *51*	1.15 *0.52*
5	5.125 *130.2*	5.94 *151*	6.94 *3.15*	3.25 *83*	4.00 *1.81*	5.94 *151*	12.84 *5.82*	2.75 *70*	1.81 *0.82*
6	6.125 *155.6*	6.94 *176*	11.12 *5.04*	3.63 *92*	6.16 *2.79*	6.94 *176*	21.00 *9.52*	3.13 *80*	2.68 *1.22*
8	8.125 *206.4*	7.75 *197*	21.81 *9.89*	4.25 *108*	13.66 *6.20*	7.75 *197*	21.81 *9.89*	– –	– –

REDUCING TEES

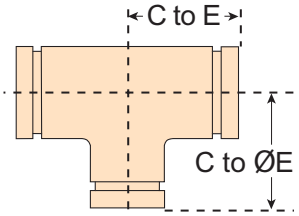


FIG. 6061

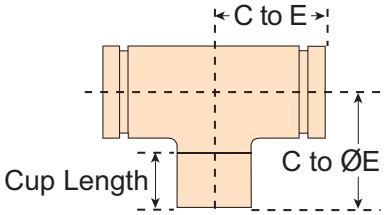


FIG. 6064

DIMENSIONS/WEIGHTS – REDUCING TEES

Nominal Size	Fig. 6061 Groove x Groove x Groove			Fig. 6064 Groove x Groove x Cup			
	C to E	C to ØE	Wt. Ea	C to E	C to ØE	Cup Length	Wt Ea.
In.	*In./mm*	*In./mm*	*Lbs./kg*	*In./mm*	*In./mm*	*In./mm*	*Lbs./kg*
2 x 2 x ¾	– –	– –	– –	2.20 *56*	1.98 *50*	0.75 *19*	0.88 *0.40*
2 x 2 x 1	– –	– –	– –	2.33 *59*	2.20 *56*	0.91 *23*	1.03 *0.47*
2 x 2 x 1¼	– –	– –	– –	2.48 *63*	2.35 *60*	0.97 *25*	1.12 *0.51*
2 x 2 x 1½	– –	– –	– –	2.55 *65*	2.28 *58*	1.09 *28*	1.25 *0.57*
2½ x 2½ x ¾	– –	– –	– –	2.27 *58*	2.18 *55*	0.75 *19*	1.25 *0.57*
2½ x 2½ x 1	– –	– –	– –	2.40 *61*	2.40 *61*	0.91 *23*	1.38 *0.63*
2½ x 2½ x 1¼	– –	– –	– –	2.52 *64*	2.57 *65*	0.97 *25*	1.56 *0.71*
2½ x 2½ x 1½	– –	– –	– –	2.70 *69*	2.68 *68*	1.09 *28*	1.88 *0.85*
2½ x 2½ x 2	3.28 *83*	3.38 *86*	2.54 *1.15*	– –	– –	– –	– –
3 x 3 x ¾	– –	– –	– –	2.45 *62*	2.60 *66*	0.75 *19*	1.88 *0.85*
3 x 3 x 1	– –	– –	– –	2.54 *65*	2.79 *71*	0.91 *23*	2.04 *0.93*
3 x 3 x 1¼	– –	– –	– –	2.63 *67*	2.89 *73*	0.97 *25*	2.13 *0.97*
3 x 3 x 1½	– –	– –	– –	2.85 *72*	3.00 *76*	1.09 *28*	2.25 *1.02*
3 x 3 x 2	3.00 *76*	3.38 *86*	2.90 *1.32*	– –	– –	– –	– –
3 x 3 x 2½	3.25 *83*	3.50 *89*	3.16 *1.43*	– –	– –	– –	– –
4 x 4 x ¾	– –	– –	– –	2.95 *75*	3.00 *76*	0.75 *19*	3.63 *1.65*
4 x 4 x 1	– –	– –	– –	3.10 *79*	3.22 *82*	0.91 *23*	3.94 *1.79*
4 x 4 x 1¼	– –	– –	– –	3.25 *83*	3.47 *88*	0.97 *25*	4.24 *1.92*
4 x 4 x 1½	– –	– –	– –	3.35 *85*	3.65 *93*	1.09 *28*	4.47 *2.03*
4 x 4 x 2	3.66 *93*	4.13 *105*	5.14 *2.33*	– –	– –	– –	– –
4 x 4 x 2½	3.94 *100*	4.06 *103*	5.36 *2.43*	– –	– –	– –	– –
4 x 4 x 3	4.19 *106*	4.16 *106*	5.88 *2.67*	– –	– –	– –	– –
5 x 5 x 3	3.75 *95*	4.63 *118*	7.45 *3.38*	– –	– –	– –	– –
5 x 5 x 4	4.25 *108*	4.56 *116*	8.13 *3.69*	– –	– –	– –	– –
6 x 6 x 2½	3.63 *92*	5.13 *130*	9.42 *4.27*	– –	– –	– –	– –
6 x 6 x 3	3.69 *94*	5.19 *132*	10.06 *4.56*	– –	– –	– –	– –
6 x 6 x 4	4.19 *106*	5.13 *130*	10.86 *4.93*	– –	– –	– –	– –
6 x 6 x 5	4.69 *119*	5.19 *132*	12.73 *5.77*	– –	– –	– –	– –

CONCENTRIC REDUCERS

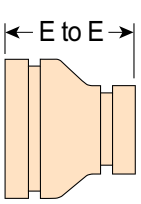


FIG. 6072

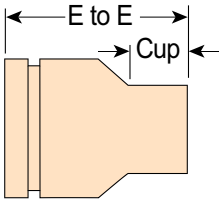


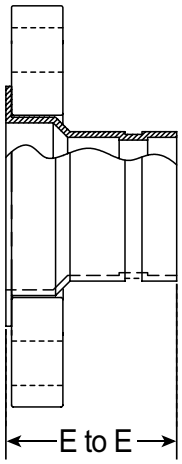
FIG. 6075

DIMENSIONS/WEIGHTS – REDUCERS

Nominal Size	Fig. 6072 Groove x Groove		Fig. 6075 Groove x Cup		
	E to E	Wt. Ea	E to E	Cup Length	Wt Ea.
In.	*In./mm*	*Lbs./kg*	*In./mm*	*In./mm*	*Lbs./kg*
2 x 1	– –	– –	2.70 *68.6*	0.91 *23.1*	0.32 *0.15*
2 x 1¼	– –	– –	3.00 *76.2*	0.97 *24.6*	0.36 *0.16*
2 x 1½	– –	– –	2.94 *74.7*	1.09 *27.7*	0.38 *0.17*
2½ x 1	– –	– –	3.25 *82.6*	0.91 *23.1*	0.53 *0.24*
2½ x 1¼	– –	– –	3.52 *89.4*	0.97 *24.6*	0.59 *0.27*
2½ x 1½	– –	– –	3.45 *87.6*	1.09 *27.7*	0.59 *0.27*
2½ x 2	3.29 *83.6*	0.58 *0.26*	3.30 *83.8*	1.34 *34.0*	0.58 *0.26*
3 x 1½	– –	– –	3.68 *93.5*	1.09 *27.7*	0.84 *0.38*
3 x 2	2.50 *63.5*	0.58 *0.26*	4.10 *104.1*	1.34 *34.0*	0.97 *0.44*
3 x 2½	2.50 *63.5*	0.62 *0.28*	– –	– –	– –
4 x 2	4.75 *120.7*	1.71 *0.78*	4.75 *120.7*	1.34 *34.0*	1.76 *0.80*
4 x 2½	3.00 *76.2*	1.12 *0.51*	– –	– –	– –
4 x 3	3.00 *76.2*	1.22 *0.55*	– –	– –	– –
5 x 3	3.88 *98.6*	2.11 *0.96*	– –	– –	– –
5 x 4	3.38 *85.9*	1.97 *0.89*	– –	– –	– –
6 x 3	4.38 *111.3*	2.96 *1.34*	– –	– –	– –
6 x 4	3.88 *98.6*	2.87 *1.30*	– –	– –	– –
6 x 5	3.38 *85.9*	2.78 *1.26*	– –	– –	– –
8 x 6	5.00 *127.0*	6.60 *2.99*	– –	– –	– –

FIG. 6084

Flange Adapter



The Gruvlok® Fig. 6084 Flange Adapter allows for direct connection of Class 125 or Class 150 flanged components to the CTS Copper System. The CTS Copper Flange Adapter (Sizes 2" thru 6") conforms to ANSI class 125/150 bolt patterns and is rated at 300 PSIG (20.7 bar). The flange is epoxy powder coated.

FIGURE 6084 FLANGE ADAPTER

Nominal Size	Copper Tube Diameter	E to E	Approx. Wt. Ea.
In.	*In./mm*	*In./mm*	*Lbs./kg*
2	2.125 *54.0*	3.0 *76.2*	0.85 *0.39*
2½	2.625 *66.7*	3.5 *88.9*	1.34 *0.61*
3	3.125 *79.4*	3.5 *88.9*	1.73 *0.78*
4	4.125 *104.8*	3.5 *88.9*	2.43 *1.10*
5	5.125 *130.2*	3.5 *88.9*	3.27 *1.48*
6	6.125 *155.6*	4.0 *101.6*	4.78 *2.17*

SERIES 6700

CTS Copper Butterfly Valve

The lever handle bronze body butterfly valve is designed for use with grooved copper tubing (CTS), fittings and couplings. This valve features a 10 position lever handle, bronze body and EPDM rubber encapsulated disc. Both bronze valve body and the EPDM rubber disc obtained certification to ANSI/NSF 61 for use in potable water systems and is rated to 300 PSI.

NSF/ANSI 61
Hot Water / Annex G

MATERIAL SPECIFICATIONS

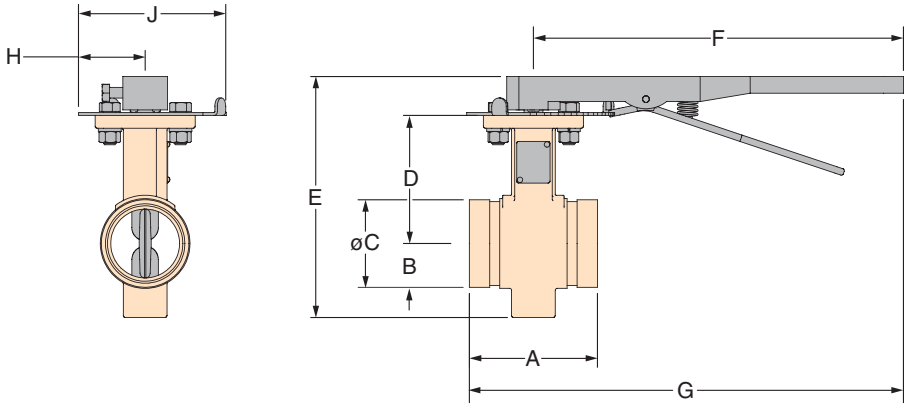
VALVE BODY:
ASTM B584 C89836; Bronze, Low Lead

DISC:
ASTM A536 Gr. 65-45-12; Ductile Iron

DISC ENCAPSUALTION:
Grade "EP" EPDM Rubber: Service temperature range: -40˚F to +250˚F (-40˚C to +121˚C). Recommended for water service, diluted acids, alkaline solutions, and oil-free air.
NOT RECOMMENDED FOR USE IN PETROLEUM APPLICATIONS.

UPPER & LOWER SHAFTS:
Stainless Steel Type 17-4PH; ASTM A564

CERTIFICATIONS:
ANSI/NSF61 for use in Cold +86F(+30C) and Hot +180F(+82C) potable water systems. Annex G. UPC.

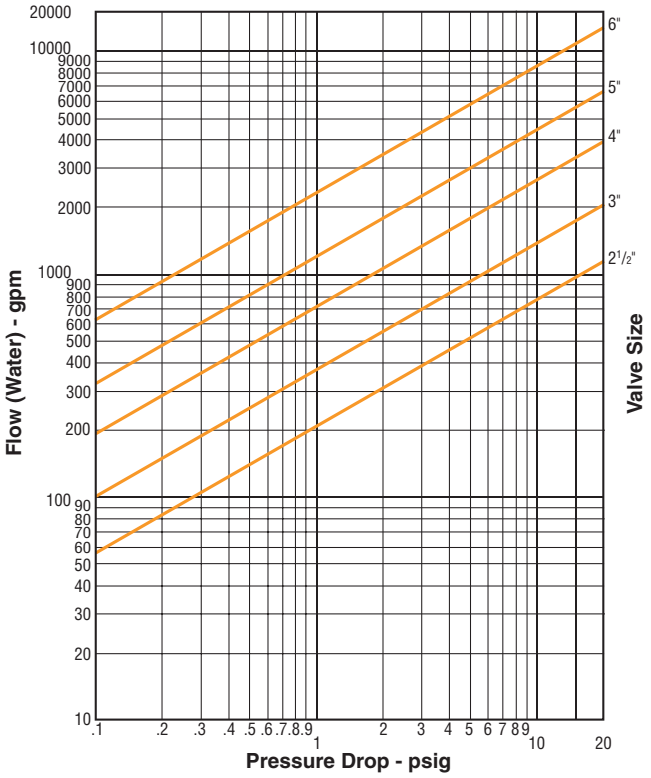


SERIES 6700 CTS COPPER BUTTERFLY VALVE DIMENSIONS

Nominal Size	Copper Tube Diameter	Dimensions									Weight
		A	B	C	D	E	F	G	H	J	
In.	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	In./mm	Lbs./kg
2½	2.625 66.7	3.77 95.8	2.22 56.4	2.63 66.7	3.83 97.3	7.20 182.5	10.50 266.7	12.39 314.6	2.00 50.8	4.43 112.5	4 1.8
3	3.125 79.4	3.77 95.8	2.60 65.9	3.13 79.4	4.08 130.5	7.84 198.2	10.50 266.7	12.39 314.6	2.00 50.8	4.43 112.5	5 2.3
4	4.125 104.8	4.63 117.6	3.10 78.7	4.13 104.9	4.72 119.9	8.97 227.8	10.50 266.7	12.81 325.5	2.00 50.8	4.43 112.5	8 3.8
5	5.125 130.2	5.88 149.4	3.85 97.8	5.13 130.2	5.22 132.6	10.27 260.9	10.50 266.7	13.44 341.4	2.00 50.8	4.43 112.5	14 6.4
6	6.125 155.6	5.88 149.4	4.36 110.8	6.13 155.6	5.75 146.2	11.31 287.3	10.50 266.7	13.44 341.4	2.00 50.8	4.43 112.5	18 8.1

SERIES 6700

CTS Copper Butterfly Valve



Values for flow of water at +60˚F (+16˚C)

$$C_v = \frac{Q}{\sqrt{\Delta P}}$$

Where: C_v = Flow coefficient
Q = Flow (GPM)
ΔP = Pressure drop (psi)

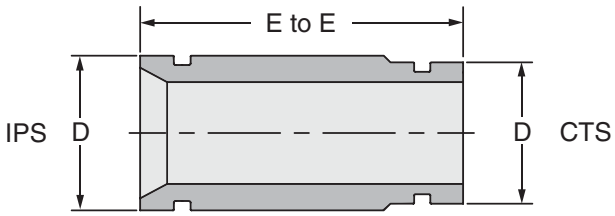
GRUVLOK CTS COPPER BUTTERFLY VALVE SERIES 6700 (ORDERING INFORMATION)					
Sample Part Number 4" 6711-1 —>	4"	67	1	1 -	1
	Size	Series	Disc Coating	Operator	Shaft
	2½" - 6"	6700	**1** - EPDM (Grade EP)	**0** - None **1** - 10 Pos. Handlever	**1** - 17-4 PH S/S

FIG. 7091

Gruvlok® DI-LOK™ CTS Groove x IPS Groove Dielectric Fitting

The Gruvlok Fig. 7091 DI-LOK Fitting prevents the formation of a galvanic cell between grooved end steel pipe and copper tube. The separation of copper from steel by the fitting virtually eliminates the galvanic cell created by the dissimilar metals.

The DI-LOK Fitting is designed for use at temperatures from -40˚F to 230˚F (-40˚C to 110˚C) and pressures to 300 psig (20.7 bar) in a wide range of applications.



MATERIAL SPECIFICATIONS

HOUSING: Seamless Carbon Steel to ASTM A106

COATING: Nylon conforming to ANSI/NSF-61

FIGURE 7091 DI-LOK NIPPLE

Nominal Size	Copper (CTS) D Actual	Steel (IPS) D Actual	End to End	Approx. Wt. Ea.
IPS	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.125 *53.98*	2.375 *60.33*	4.0 *101.60*	1.32 *.60*
2½ *65*	2.625 *66.68*	2.875 *73.03*	6.0 *152.40*	2.85 *1.29*
3 *80*	3.125 *79.38*	3.500 *88.90*	6.0 *152.40*	4.27 *1.94*
4 *100*	4.125 *104.78*	4.500 *114.30*	6.0 *152.40*	5.62 *2.55*
6 *150*	6.125 *155.58*	6.625 *168.28*	6.0 *152.40*	9.66 *4.38*

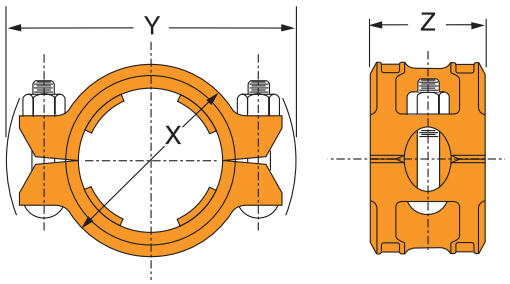
For installation and assembly of grooved-end connections, see “Fig. 6400 Gruvlok Rigid Coupling”, “Fig. 7400 Gruvlok Rigidlite Coupling” and “Fig. 7012 Gruvlok Flange”.

FIG. 7005

Roughneck® Coupling

c UL us LISTED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.



The Fig. 7005 Roughneck Coupling is an effective and reliable way of joining plain-end or beveled end pipe. The Roughneck Coupling is ideal for use in a variety of applications including mining, process piping, manifold piping and oilfield services. The unique gripper action provides a positive pipe joint and allows for working pressure ratings up to 750 PSI (52 bar).

MATERIAL SPECIFICATIONS

HOUSING: Ductile Iron conforming to ASTM A 536, Grade 65-45-12 or Malleable Iron conforming to ASTM A 47, Grade 32510.

BOLT & NUTS: Heat treated, oval-neck track head bolts conforming to ASTM A 183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

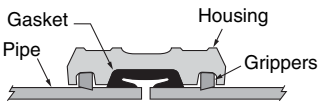
GRIPPERS: 2"-8" heat treated, electroplated carbon steel. 10"-16" heat treated stainless steel.

COATINGS: Rust inhibiting paint - Color: Orange Standard Hot dipped Zinc Galvanized (Optional) Other Colors Available (IE: RAL3000 and RAL9000). For other Coating requirements contact an Anvil Representative.

GASKET: Grade E (EPDM) or Grade T (Nitrile) Elastomers with properties as designed by ASTM D 2000 for each gasket grade.

FIGURE 7005 ROUGHNECK® COUPLING

Nominal Size	O.D.	Max. Wk. Pressure	Max. End Load	No. of Grippers	Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max	
In./DN(mm)	*In./mm*	*PSI/bar*	*Lbs./kN*		*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs./N-m*	*Ft.-Lbs./N-m*	*Lbs./Kg*
2 *50*	2.375 *60.3*	750 *51.7*	3,323 *14.78*	8	3¾ *95*	6⅜ *162*	3½ *89*	2	⅝ x 3¼ -	150 *203*	190 *257*	6.6 *3.0*
2½ *65*	2.875 *73.0*	600 *41.4*	3,895 *17.33*	8	4¼ *108*	7⅛ *181*	3½ *89*	2	⅝ x 3¼ -	150 *203*	190 *257*	7.4 *3.4*
3 *80*	3.500 *88.9*	600 *41.4*	5,773 *25.68*	8	4⅞ *124*	8⅛ *206*	3½ *89*	2	¾ x 4½ -	200 *271*	250 *339*	10.5 *4.8*
4 *100*	4.500 *114.3*	450 *31.0*	7,157 *31.84*	8	6⅜ *162*	9⅜ *238*	4⅛ *105*	2	¾ x 4½ -	200 *271*	250 *339*	16.4 *7.4*
5 *125*	5.563 *141.3*	350 *24.1*	8,507 *37.84*	8	7½ *191*	11⅛ *283*	4⅜ *111*	2	⅞ x 5 -	250 *339*	300 *406*	23.8 *10.8*
6 *150*	6.625 *168.3*	300 *20.7*	10,341 *46.00*	12	8¾ *222*	12⅞ *327*	4⅜ *111*	2	1 x 6 -	250 *339*	300 *406*	31.7 *14.4*
8 *200*	8.625 *219.1*	300 *20.7*	17,528 *77.97*	12	10⅞ *276*	14½ *368*	4½ *114*	4	⅞ x 5 -	250 *339*	300 *406*	38.6 *17.5*
10 *250*	10.750 *273.1*	300 *20.7*	27,229 *121.12*	8	12⅝ *321*	18 *457*	5⅜ *137*	4	1 x 6½ -	500 *678*	600 *814*	40 *18.1*
12 *300*	12.750 *323.9*	250 *17.2*	31,919 *141.98*	12	14⅞ *378*	20¼ *514*	5⅜ *137*	4	1 x 6½ -	550 *746*	700 *949*	56 *25.4*
14 *350*	14.000 *355.6*	200 *13.8*	30,788 *136.95*	12	16¾ *425*	22⅛ *562*	6¼ *159*	4	1 x 6½ -	550 *746*	700 *949*	88 *39.9*
16 *400*	16.000 *406.4*	150 *10.3*	30,159 *134.15*	12	18¾ *476*	24 *610*	6¼ *159*	4	1 x 6½ -	550 *746*	700 *949*	95 *43.1*



Working pressure and end load are based on a properly assembled Roughneck coupling with bolts fully torqued to the above specifications, on plain-end or beveled standard wall steel pipe and Gruvlok Plain- End Fittings.

Roughneck Couplings are designed to be used on plain-end pipe and Gruvlok Plain-End Fittings only. For externally coated pipe applications, contact an Anvil Representative.

Not recommended for use on steel pipe with a hardness greater than 150 Brinell, plastic, HDPE, cast iron or other brittle pipe.

*Bolt torque ratings shown must be applied at installation.

See Coupling data chart notes on page 17.
§ – For additional Bolt Torque information, see page 190.
Not for use in copper or PVC systems.
See Installation & Assembly directions on page 168.

GRUVLOK PLAIN-END FITTINGS

Gruvlok plain-end fittings are manufactured to provide minimum pressure drop and uniform flow. Fittings are designed for use with the Fig. 7005 Roughneck Couplings only.

Gruvlok plain-end fittings are available in sizes through 8" nominal pipe size in a variety of styles. Depending on size and configuration, fittings are either segment-welded steel or forged steel.

Fittings are normally coated with a rust inhibiting paint.
Other coatings including Hot Dipped Zinc Galvanizing, are available.

MATERIAL SPECIFICATIONS

SEGMENT WELDED STEEL FITTINGS:
Sizes 2" - 4" Carbon Steel pipe conforming to ASTM A 53, Type "F";
Sizes 5" - 8"; Carbon Steel pipe conforming to ASTM A 53, Type "E" or "S", Grade "B".

STEEL FITTINGS: Forged Steel conforming to ASTM A 106.

ADAPTER FLANGES:
Class 150 - Carbon Steel conforming to ANSI B16.5
Class 300 - Carbon Steel conforming to ANSI B16.5

FITTING SIZE			
Nominal Size	O.D.	Nominal Size	O.D.
In./DN(mm)	*In./mm*	*In./DN(mm)*	*In./mm*
2 *50*	2.375 *60.3*	4 *100*	4.500 *114.3*
2½ *65*	2.875 *73.0*	5 *140*	5.563 *141.3*
3 *80*	3.500 *88.9*	6 *150*	6.625 *168.3*
3½ *90*	4.000 *101.6*	8 *200*	8.625 *219.1*

The Fitting Size Chart is used to determine the O.D. of the pipe that the fittings is to be used with. Gruvlok® Fittings are identified by either the Nominal size in inches or the Pipe O.D. In./mm.

FIG. 7050P - 90° Elbow

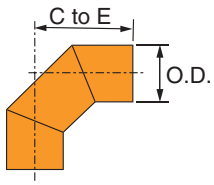


FIGURE 7050P 90° ELBOW			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	4¾ *121*	2.7 *1.2*
2½ *65*	2.875 *73.0*	5½ *140*	4.8 *2.2*
3 *80*	3.500 *88.9*	6¼ *159*	7.2 *3.3*
3½ *90*	4.000 *101.6*	7 *178*	9.4 *4.3*
4 *100*	4.500 *114.3*	7¾ *197*	12.3 *5.6*
5 *125*	5.563 *141.3*	9½ *241*	13.4 *6.1*
6 *150*	6.625 *168.3*	11 *279*	31 *14.1*
8 *200*	8.625 *219.1*	11 *279*	38.7 *17.6*

FIG. 7051P - 45° Elbow

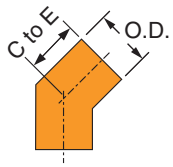


FIGURE 7051P 45° ELBOW			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	3⅛ *79*	2.0 *0.9*
2½ *65*	2.875 *73.0*	3½ *89*	3.5 *1.6*
3 *80*	3.500 *88.9*	3¾ *95*	4.8 *2.2*
3½ *90*	4.000 *101.6*	4 *102*	6.2 *2.8*
4 *100*	4.500 *114.3*	4¼ *108*	8.0 *3.6*
5 *125*	5.563 *141.3*	5⅛ *130*	9.2 *4.2*
6 *150*	6.625 *168.3*	5¾ *146*	18.5 *8.4*
8 *200*	8.625 *219.1*	6 *152*	24.9 *11.3*

FIG. 7060P - Tee

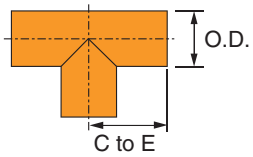


FIGURE 7060P TEE			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	4¼ *108*	3.5 *1.6*
2½ *65*	2.875 *73.0*	4¾ *121*	6.2 *2.8*
3 *80*	3.500 *88.9*	5⅛ *130*	8.6 *3.9*
3½ *90*	4.000 *101.6*	5½ *140*	11 *5.0*
4 *100*	4.500 *114.3*	5⅞ *149*	13.8 *6.3*
5 *125*	5.563 *141.3*	6⅞ *175*	21.7 *9.8*
6 *150*	6.625 *168.3*	7⅝ *194*	30.9 *14.0*
8 *200*	8.625 *219.1*	10 *254*	61.1 *27.7*

GRUVLOK PLAIN-END FITTINGS

FIG. 7068P - Cross

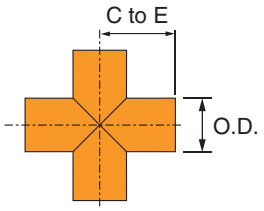


FIGURE 7068P - CROSS			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	4¼ 108	4.4 2.0
2½ 65	2.875 73.0	4¾ 121	7.8 3.5
3 80	3.500 88.9	5⅛ 130	10.7 4.9
3½ 90	4.000 101.6	5½ 140	13.7 6.2
4 100	4.500 114.3	5⅞ 149	17 7.7
5 125	5.563 141.3	6⅞ 175	26.7 12.1
6 150	6.625 168.3	7⅝ 194	37.7 17.1
8 200	8.625 219.1	10 254	74.6 33.8

FIG. 7069P - 45° Lateral

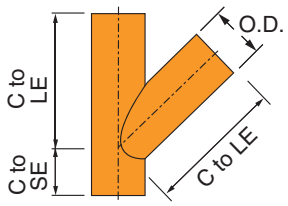


FIGURE 7069P - 45° LATERAL				
Nominal Size	O.D.	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	7¼ 184	2¾ 70	5.1 2.3
2½ 65	2.875 73.0	7¾ 197	3 76	9.5 4.3
3 80	3.500 88.9	8¾ 222	3¼ 83	12.8 5.8
3½ 90	4.000 101.6	10 254	3½ 89	20.0 9.1
4 100	4.500 114.3	10¾ 273	3¾ 95	22.2 10.1
5 125	5.563 141.3	12¾ 324	4 102	38.0 17.2
6 150	6.625 168.3	14 356	4½ 114	54.0 24.5
8 200	8.625 219.1	18 457	6 152	92.0 41.7

FIG. 7071P - 90° True Wye

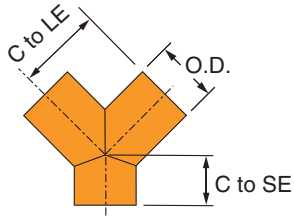


FIGURE 7071P - 90° TRUE WYE				
Nominal Size	O.D.	Center to Long End	Center to Short End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	4¼ 108	2¾ 70	3.5 1.6
2½ 65	2.875 73.0	4¾ 121	3 76	6.2 2.8
3 80	3.500 88.9	5⅛ 130	3¼ 83	8.5 3.9
3½ 90	4.000 101.6	5½ 140	3½ 89	10.0 4.5
4 100	4.500 114.3	5⅞ 149	3¾ 95	14.0 6.4
5 125	5.563 141.3	6⅞ 175	4 102	21.6 9.8
6 150	6.625 168.3	7⅝ 194	4½ 114	31.2 14.2
8 200	8.625 219.1	10 254	6 152	53.6 24.3

FIG. 7061P - Reducing Tee

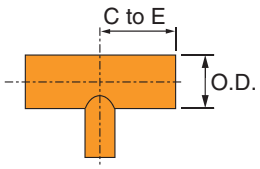


FIGURE 7061P REDUCING TEE					
Nominal Size	Center To End	Approx. Wt. Ea.	Nominal Size	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	Lbs./Kg	In./DN(mm)	In./mm	Lbs./Kg
3 x 3 x 2 80 x 80 x 50	5½ 140	7.1 3.2	8 x 8 x 4 200 x 200 x 100	10 254	46.0 20.9
4 x 4 x 2 100 x 100 x 50	5⅞ 149	11.3 5.1	8 x 8 x 5 200 x 200 x 125	10 254	48.0 21.8
4 x 4 x 2½ 100 x 100 x 65	5⅞ 149	11.6 5.3	8 x 8 x 6 200 x 200 x 150	10 254	50.0 22.7
4 x 4 x 3 100 x 100 x 80	5⅞ 149	11.9 5.4	10 x 10 x 4 250 x 250 x 100	11½ 292	74.0 33.6
6 x 6 x 2 150 x 150 x 50	7⅝ 194	24.6 11.2	10 x 10 x 6 250 x 250 x 150	11½ 292	78.0 35.4
6 x 6 x 3 150 x 150 x 80	7⅝ 194	25.4 11.5	10 x 10 x 8 250 x 250 x 200	11½ 292	86.0 39.0
6 x 6 x 4 150 x 150 x 100	7⅝ 194	26.2 11.9	12 x 12 x 6 300 x 300 x 150	13½ 343	112.0 50.8
8 x 8 x 2 200 x 200 x 50	10 254	42.0 19.1	12 x 12 x 8 300 x 300 x 200	13½ 343	118.0 53.5
8 x 8 x 3 200 x 200 x 80	10 254	44.0 20.0	12 x 12 x 10 300 x 300 x 250	13½ 343	130.0 59.0

FIG. 7050LRP - 90° LR Elbow

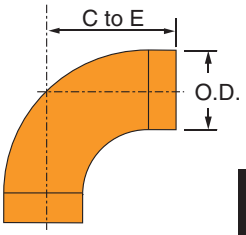


FIGURE 7050 LRP - 90° LR ELBOW			
Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
2 50	2.375 60.3	5 127	2.5 1.1
2½ 65	2.875 73.0	5¾ 146	4.9 2.2
3 80	3.500 88.9	6½ 165	6.5 2.9
3½ 90	4.000 101.6	7¼ 184	9.8 4.4
4 100	4.500 114.3	8 203	11.5 5.2
5 125	5.563 141.3	9¾ 248	21.5 9.8
6 150	6.625 168.3	11¼ 286	28.5 12.9
8 200	8.625 219.1	15 381	56.7 25.7

GRUVLOK PLAIN-END FITTINGS

FIG. 7051LRP - 45° LR Elbow

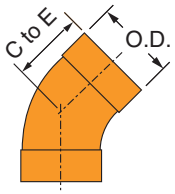


FIGURE 7051 LRP - 45° LR ELBOW

Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	3⅜ *86*	1.8 *0.8*
2½ *65*	2.875 *73.0*	3¾ *95*	3.6 *1.6*
3 *80*	3.500 *88.9*	4 *102*	4.5 *2.0*
3½ *90*	4.000 *101.6*	4¼ *108*	6.7 *3.0*
4 *100*	4.500 *114.3*	4½ *114*	7.5 *3.4*
5 *125*	5.563 *141.3*	5⅜ *137*	13.8 *6.3*
6 *150*	6.625 *168.3*	6 *152*	17.3 *7.8*
8 *200*	8.625 *219.1*	8 *203*	34.0 *15.4*

FIG. 7075P - Bull Plug

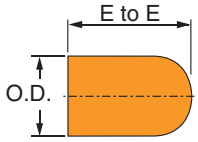


FIGURE 7075P - BULL PLUG

Nominal Size	O.D.	Center To End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	4 *102*	2.3 *1.0*
2½ *65*	2.875 *73.0*	5 *127*	3.0 *1.4*
3 *80*	3.500 *88.9*	6 *152*	4.5 *2.0*
3½ *90*	4.000 *101.6*	6½ *165*	5.5 *2.5*
4 *100*	4.500 *114.3*	7 *178*	7.5 *3.4*
5 *125*	5.563 *141.3*	8½ *216*	12.5 *5.7*
6 *150*	6.625 *168.3*	10 *254*	17.0 *7.7*
8 *200*	8.625 *219.1*	11 *279*	29.0 *13.2*

FIG. 7084P & FIG. 7085P

(Plain-End x Class 150 or 300) Flange Nipples

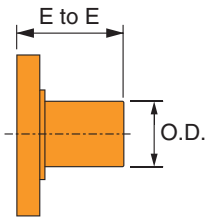


FIGURE 7084P
PLAIN-END X CLASS 150 FLANGE NIPPLES

Nominal Size	O.D.	End To End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	4 *102*	6.0 *2.7*
2½ *65*	2.875 *73.0*	4 *102*	9.2 *4.2*
3 *80*	3.500 *88.9*	4 *102*	10.4 *4.7*
3½ *90*	4.000 *101.6*	4 *102*	14.0 *6.4*
4 *100*	4.500 *114.3*	6 *152*	19.1 *8.7*
5 *125*	5.563 *141.3*	6 *152*	23.0 *10.4*
6 *150*	6.625 *168.3*	6 *152*	29.5 *13.4*
8 *200*	8.625 *219.1*	6 *152*	43.5 *19.7*

FIGURE 7085P
PLAIN-END X CLASS 300 FLANGE NIPPLES

End To End	Approx. Wt. Ea.
In./mm	*Lbs./Kg*
4 *102*	8.2 *3.7*
4 *102*	11.9 *5.4*
4 *102*	15.5 *7.0*
4 *102*	21.0 *9.5*
6 *152*	28.0 *12.7*
6 *152*	35.0 *15.9*
6 *152*	50.0 *22.7*
6 *152*	72.0 *32.7*

GRUVLOK PLAIN-END FITTINGS

ADAPTER NIPPLES

FIG. 7080P

Plain x Grooved

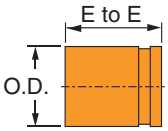


FIG. 7081P

Plain x Thread

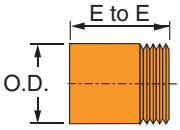


FIG. 7082P

Plain x Bevel

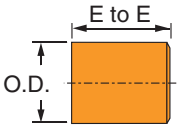


FIGURE 7080P, 7081P, 7082P
ADAPTER NIPPLES

Nominal Size	O.D.	End To End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	4 *102*	1.2 *0.5*
2½ *65*	2.875 *73.0*	4 *102*	1.9 *0.9*
3 *80*	3.500 *88.9*	4 *102*	2.5 *1.1*
3½ *90*	4.000 *101.6*	4 *102*	3.1 *1.4*
4 *100*	4.500 *114.3*	6 *152*	5.5 *2.5*
5 *125*	5.563 *141.3*	6 *152*	7.4 *3.4*
6 *150*	6.625 *168.3*	6 *152*	9.5 *4.3*
8 *200*	8.625 *219.1*	6 *152*	14.2 *6.4*

FIG. 7077P

Swaged Nipples

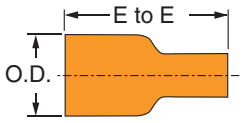
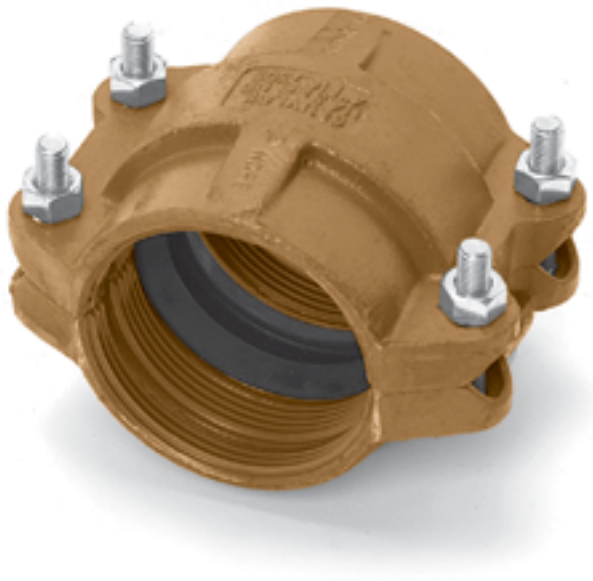


FIGURE 7077P SWAGED NIPPLES

Nominal Size	End Center To End	Approx. Wt. Ea.	Nominal Size	End Center To End	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*	*In./DN(mm)*	*In./mm*	*Lbs./Kg*
2½ x 2 *65 x 50*	7 *178*	3.0 *1.4*	6 x 2 *150 x 50*	12 *305*	17.0 *7.7*
3 x 2 *80 x 50*	8 *203*	4.5 *2.0*	6 x 2½ *150 x 65*	12 *305*	17.0 *7.7*
3 x 2½ *80 x 65*	8 *203*	4.5 *2.0*	6 x 3 *150 x 80*	12 *305*	17.0 *7.7*
4 x 2 *100 x 50*	9 *229*	7.5 *3.4*	6 x 4 *150 x 100*	12 *305*	17.0 *7.7*
4 x 2½ *100 x 65*	9 *229*	7.5 *3.4*	6 x 5 *150 x 125*	12 *305*	17.0 *7.7*
4 x 3 *100 x 80*	9 *229*	7.5 *3.4*	8 x 3 *200 x 80*	13 *330*	29.0 *13.2*
5 x 2 *125 x 50*	11 *279*	11.5 *5.2*	8 x 4 *200 x 100*	13 *330*	29.0 *13.2*
5 x 3 *125 x 80*	11 *279*	11.5 *5.2*	8 x 5 *200 x 125*	13 *330*	29.0 *13.2*
5 x 4 *125 x 100*	11 *279*	11.5 *5.2*	8 x 6 *200 x 150*	13 *330*	29.0 *13.2*

See chart on page 129 for O.D.

FIG. 7305
HDPE Coupling



The Gruvlok Figure 7305 couplings are designed for mechanically joining HDPE (high density polyethylene) pipe and fittings. Each coupling uses four bolts to drive the sharply machined housing teeth into the outside of the pipe. The teeth are arranged in two banks, each bank consisting of at least three rows of spiral teeth which effectively grip the pipe, providing a secure mechanical joint with pressure capabilities exceeding that of the HDPE pipe itself. The banks of teeth are positioned away from the gasket enhancing the sealing ability of the gasket throughout its operating temperature range.

The Figure 7305 features a low profile contoured housing with a ramp along the outside diameter allowing the coupling to glide over most obstacles, while long lengths of the pipeline are being relocated. This cost effective easy to assemble mechanical joint is used to join SDR 32.5 to 7.3 wall thickness HDPE pipe conforming to ASTM D 2447, D 3000, D 3035, or F 714 and eliminates the need for costly fusion equipment.

MATERIAL SPECIFICATIONS

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

COATING:
Rust inhibiting paint – Color: Orange
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated, carbon steel oval-neck track bolts conforming to ASTM A 183. Zinc electroplated carbon steel heavy hex nuts conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2.

GASKETS: Properties in accordance with ASTM D 2000

Grade E EPDM (Green color code)
Service Temperature Range: -30°F to 230°F (-34°C to 110°C).
Recommended for water service, dilute acids, alkaline solutions, oil free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade T Nitrile (Orange color code)
Service Temperature Range: -20°F to 180°F (-29°C to 82°C).
Recommended for petroleum applications, air with oil vapor, vegetable and mineral oils.
NOT FOR USE WITH HOT WATER OR HOT AIR.

For specific chemical applications, reference the Gruvlok Gasket Recommendations section of the Gruvlok catalog.

WARNING:

1. Gruvlok products for HDPE pipe must be installed using Gruvlok Xtreme™ Temperature Lubricant.
2. The gasket temperature rating may exceed the manufacturer temperature rating for the HDPE pipe. Consult the HDPE pipe manufacturer for the temperature and pressure ratings.

FIG. 7305

HDPE Coupling

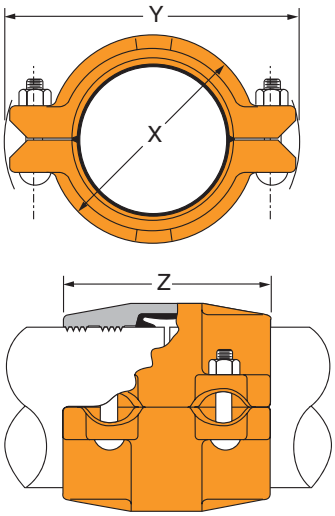


FIGURE 7305 HDPE COUPLING							
Nominal Size	O.D.	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
		X	Y	Z	Qty.	Size	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In.*	*Lbs./Kg*
2 *50*	2.375 *60.3*	3⅜ *86*	5½ *140*	4⅝ *117*	4	½ x 2⅜ -	4.5 *2.0*
3 *80*	3.500 *88.9*	4⅝ *117*	6¾ *171*	4⅝ *117*	4	½ x 3 -	8.5 *3.9*
4 *100*	4.500 *114.3*	5¼ *133*	8 *203*	5¾ *146*	4	½ x 3 -	12 *5.4*
6 *150*	6.625 *168.3*	7½ *191*	11 *279*	5⅞ *149*	4	⅝ x 3½ -	18 *8.2*
8 *200*	8.625 *219.1*	10 *254*	13¼ *337*	6 *152*	4	⅝ x 3½ -	30 *13.6*
10 *250*	10.750 *273.1*	12 *305*	15¾ *400*	6½ *165*	4	¾ x 4¾ -	43 *19.5*
12 *300*	12.750 *323.9*	14⅜ *365*	17⅞ *454*	7¼ *184*	4	¾ x 4¾ -	58 *26.3*

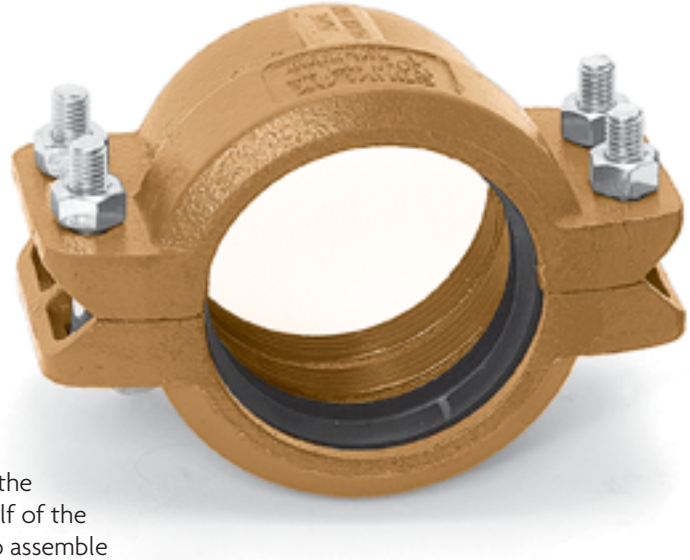
HDPE PIPE DIMENSIONAL SPECIFICATIONS										
Nominal Size	O.D. Actual	Tolerance +/-	Out Of Roundness Tolerance +/-	Pipe Wall Thickness						
				SDR 7.3	SDR 9	SDR 11	SDR 15.5	SDR 17	SDR 21	SDR 32.5
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*
2 *50*	2.375 *60.3*	0.006 *0.15*	0.035 *0.89*	0.325 *8.3*	0.264 *6.7*	0.216 *5.5*	0.153 *3.9*	0.140 *3.6*	0.113 *2.9*	-
3 *80*	3.500 *88.9*	0.016 *0.41*	0.040 *1.02*	0.479 *12.2*	0.389 *9.9*	0.318 *8.1*	0.226 *5.7*	0.206 *5.2*	0.167 *4.2*	0.108 *2.7*
4 *100*	4.500 *114.3*	0.020 *0.51*	0.040 *1.02*	0.616 *15.6*	0.500 *12.7*	0.409 *10.4*	0.290 *7.4*	0.265 *6.7*	0.214 *5.4*	0.138 *3.5*
6 *150*	6.625 *168.3*	0.030 *0.76*	0.050 *1.27*	0.908 *23.1*	0.736 *18.7*	0.602 *15.3*	0.427 *10.8*	0.327 *8.3*	0.265 *6.7*	0.204 *5.2*
8 *200*	8.625 *219.1*	0.039 *0.99*	0.075 *1.91*	1.182 *30.0*	0.958 *24.3*	0.784 *19.9*	0.556 *14.1*	0.507 *12.9*	0.340 *8.6*	0.265 *6.7*
10 *250*	10.750 *273.1*	0.048 *1.22*	0.075 *1.91*	1.473 *37.4*	1.194 *30.3*	0.977 *24.8*	0.694 *17.6*	0.632 *16.1*	0.512 *13.0*	0.331 *8.4*
12 *300*	12.750 *323.9*	0.057 *1.45*	0.075 *1.91*	1.747 *44.4*	1.417 *36.0*	1.159 *29.4*	0.823 *20.9*	0.750 *19.1*	0.607 *15.4*	0.392 *10.0*

1. Per ASTM F 714
2. Per ASTM D 2447 and D 3035

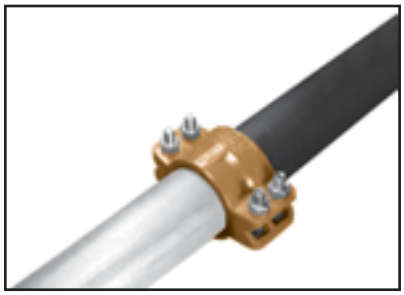
See Installation & Assembly directions on page 171.

FIG. 7307

HDPE Transition Coupling



The Gruvlok Figure 7307 HDPE transition coupling allows for transition from HDPE pipe or fittings to grooved-end pipe prepared per Gruvlok standard cut or roll groove specifications for steel pipe or Gruvlok fittings. The Figure 7307 incorporates two banks of machined teeth on one side of the housing, and a key section on the other, that engages specifically grooved steel pipe or fittings. The banks of teeth are positioned away from the gasket enhancing the sealing ability of the gasket. The temperature and pressure capabilities of the Figure 7307 exceed the highest temperature and pressure ratings of the HDPE pipe.



The Figure 7307 features a low profile contoured housing with a ramp along the outside diameter on the half of the HDPE coupling. This easy to assemble mechanical joint is used to join HDPE pipe (conforming to ASTM D 2447, D 3000, D 3035, or F 714) to roll grooved or cut grooved standard weight and, roll grooved lightweight pipe, as well as with grooved-end fittings and valves. The coupling can be used with HDPE pipe having SDR values of 7.3 to 32.5.

MATERIAL SPECIFICATIONS

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

COATING:
Rust inhibiting paint – Color: Orange
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated, carbon steel oval-neck track bolts conforming to ASTM A 183. Zinc electroplated carbon steel heavy hex nuts conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2.

GASKETS: Properties in accordance with ASTM D 2000

Grade E EPDM (Green color code)
Service Temperature Range: -30°F to 230°F (-34°C to 110°C).
Recommended for water service, dilute acids, alkaline solutions, oil free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade T Nitrile (Orange color code)
Service Temperature Range: -20°F to 180°F (-29°C to 82°C).
Recommended for petroleum applications, air with oil vapor, vegetable and mineral oils.
NOT FOR USE WITH HOT WATER OR HOT AIR.

For specific chemical applications, reference the Gruvlok Gasket Recommendations section of the Gruvlok catalog.

WARNING:

1. Gruvlok products for HDPE pipe must be installed using Gruvlok Xtreme™ Temperature Lubricant.
2. The gasket temperature rating may exceed the manufacturer temperature rating for the HDPE pipe. Consult the HDPE pipe manufacturer for the temperature and pressure ratings.

FIG. 7307

HDPE Transition Coupling

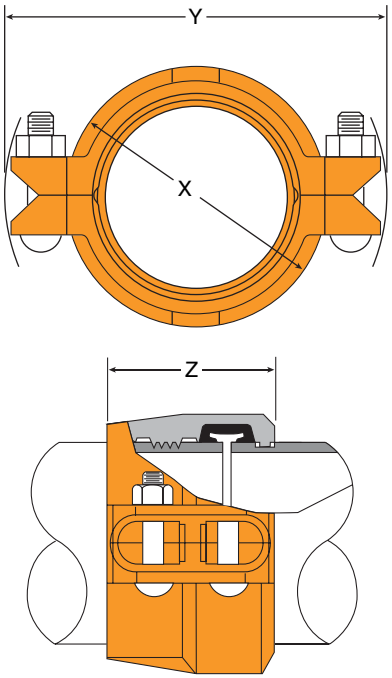


FIGURE 7307 HDPE TRANSITION COUPLING							
Nominal Size	O.D. Actual	Coupling Dimensions			Coupling Bolts		Approx. Wt. Ea.
		X	Y	Z	Qty.	Size	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Lbs./Kg*
2 *50*	2.375 *60.3*	3⅜ *86*	6 *152*	3⅛ *79*	4	½ x 2⅜ -	4.5 *2.0*
3 *80*	3.500 *88.9*	4½ *114*	7⅛ *181*	3⅛ *79*	4	½ x 3 -	6 *2.7*
4 *100*	4.500 *114.3*	5¾ *146*	8½ *216*	3¾ *95*	4	½ x 3 -	8.5 *3.9*
6 *150*	6.625 *168.3*	8 *203*	11¼ *286*	3¾ *95*	4	⅝ x 3½ -	12.5 *5.7*
8 *200*	8.625 *219.1*	10½ *267*	13⅝ *346*	4¼ *108*	4	⅝ x 3½ -	20.5 *9.3*
10 *250*	10.750 *273.1*	12⅝ *321*	17 *432*	5 *127*	4	⅞ x 5½ -	34.5 *15.6*
12 *300*	12.750 *323.9*	14¾ *375*	19½ *495*	5 *127*	4	⅞ x 5½ -	42.5 *19.3*

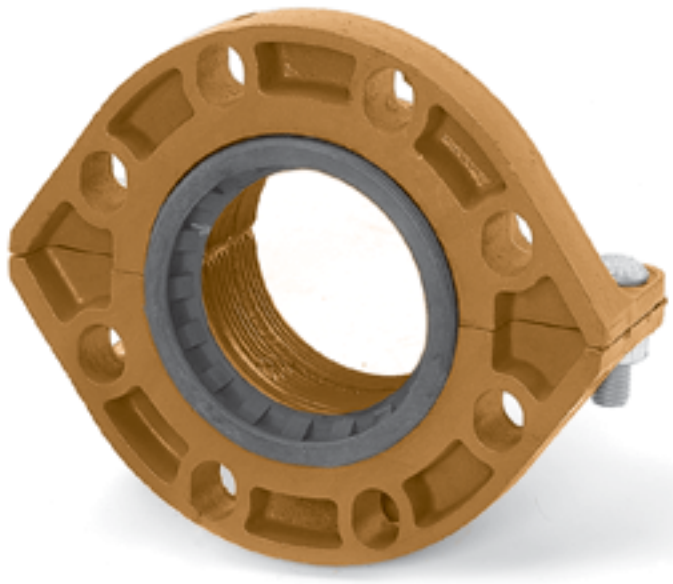
HDPE PIPE DIMENSIONAL SPECIFICATIONS										
Nominal Size	O.D. Actual	Tolerance +/-	Out of Roundness Tolerance +/-	Pipe Wall Thickness						
				SDR 7.3	SDR 9	SDR 11	SDR 15.5	SDR 17	SDR 21	SDR 32.5
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*
2 *50*	2.375 *60.3*	0.006 *0.15*	0.035 *0.89*	0.325 *8.3*	0.264 *6.7*	0.216 *5.5*	0.153 *3.9*	0.140 *3.6*	0.113 *2.9*	-
3 *80*	3.500 *88.9*	0.016 *0.41*	0.040 *1.02*	0.479 *12.2*	0.389 *9.9*	0.318 *8.1*	0.226 *5.7*	0.206 *5.2*	0.167 *4.2*	0.108 *2.7*
4 *100*	4.500 *114.3*	0.020 *0.51*	0.040 *1.02*	0.616 *15.6*	0.500 *12.7*	0.409 *10.4*	0.290 *7.4*	0.265 *6.7*	0.214 *5.4*	0.138 *3.5*
6 *150*	6.625 *168.3*	0.030 *0.76*	0.050 *1.27*	0.908 *23.1*	0.736 *18.7*	0.602 *15.3*	0.427 *10.8*	0.327 *8.3*	0.265 *6.7*	0.204 *5.2*
8 *200*	8.625 *219.1*	0.039 *0.99*	0.075 *1.91*	1.182 *30.0*	0.958 *24.3*	0.784 *19.9*	0.556 *14.1*	0.507 *12.9*	0.340 *8.6*	0.265 *6.7*
10 *250*	10.750 *273.1*	0.048 *1.22*	0.075 *1.91*	1.473 *37.4*	1.194 *30.3*	0.977 *24.8*	0.694 *17.6*	0.632 *16.1*	0.512 *13.0*	0.331 *8.4*
12 *300*	12.750 *323.9*	0.057 *1.45*	0.075 *1.91*	1.747 *44.4*	1.417 *36.0*	1.159 *29.4*	0.823 *20.9*	0.750 *19.1*	0.607 *15.4*	0.392 *10.0*

1. Per ASTM F 714
2. Per ASTM D 2447 and D 3035
3. For steel pipe requirements refer to Gruvlok Groove Specifications for steel pipe.

See Installation & Assembly directions on page 172.

FIG. 7312

HDPE Flange Adapter



The Gruvlok® Figure 7312 forms a cost-effective, easy-to-assemble mechanical joint between HDPE (high density polyethylene) pipe and fittings and ANSI Class 125 or Class 150 piping components without the need for costly fusion equipment. The flanged couplings are designed for wall thickness' SDR 32.5 to 7.3 HDPE pipe and fittings conforming to ASTM D 2447, D 3000, D 3035, or F 174. Each coupling uses two bolts to drive the sharply machined housing teeth into the outside of the pipe. The teeth are arranged in two banks, each bank consisting of at least three rows of spiral teeth that effectively grip the pipe, providing a secure mechanical joint with pressure capabilities exceeding that of the HDPE pipe itself The banks of teeth are positioned away from the gasket, enhancing the sealing ability of the gaskets throughout the entire operating temperature range.

MATERIAL SPECIFICATIONS

HOUSING:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

COATING:
Rust inhibiting paint – Color: Orange
Other Colors Available (IE: RAL3000 and RAL9000)
For other Coating requirements contact an Anvil Representative.

ANSI BOLTS & HEAVY HEX NUTS:
Heat treated, zinc electroplated, carbon steel oval-neck track bolts conforming to ASTM A 183. Zinc electroplated heavy hex nuts of carbon steel conforming to ASTM A 563 Grade A or Grade B, or J995 Grade 2.

GASKETS: Properties in accordance with ASTM D 2000

Grade E EPDM (Green color code)
Service Temperature Range: -30°F to 230°F (-34°C to 110°C).
Recommended for water service, dilute acids, alkaline solutions, oil free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

Grade T Nitrile (Orange color code)
Service Temperature Range: -20°F to 180°F (-29°C to 82°C).
Recommended for petroleum applications, air with oil vapor, vegetable and mineral oils.
NOT FOR USE WITH HOT WATER OR HOT AIR.

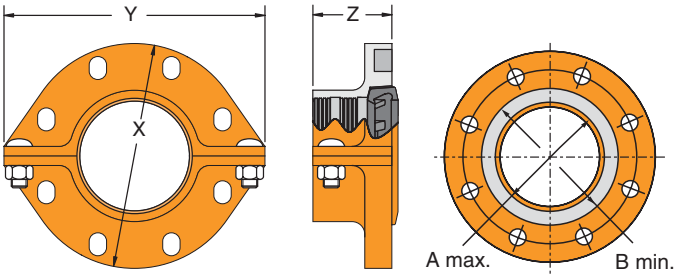
For specific chemical applications, reference the Gruvlok Gasket Recommendations section of the Gruvlok catalog.

WARNING:

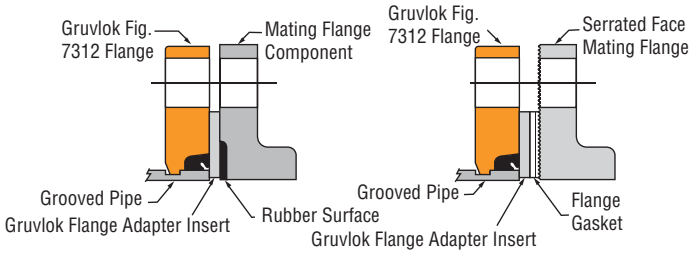
1. Gruvlok products for HDPE pipe must be installed using Gruvlok Xtreme™ Temperature Lubricant.
2. The gasket temperature rating may exceed the manufacturer temperature rating for the HDPE pipe. Consult the HDPE pipe manufacturer for the temperature and pressure ratings.

FIG. 7312

HDPE Flange Adapter



NOTE A



NOTES 1 and 2 NOTES 3 and 4

FIGURE 7312 HDPE FLANGE ADAPTER

Nominal Size	O.D.	Flange Dimensions			Sealing Surface		Latch Bolt		Mating Flange Bolts		Approx. Wt. Ea.
		X	Y	Z	A Max.	B Min.	Qty.	Size	Qty.	Size	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*		*In./mm*	*Lbs./Kg*
4 *100*	4.500 *114.3*	9 *229*	10⅜ *264*	3⅛ *79*	4½ *114*	5¾ *146*	2	⅝ x 1⅝	8	⅝ x 3	15 *6.8*
6 *150*	6.625 *168.3*	11¼ *286*	12⅜ *314*	3⅞ *98*	6⅝ *168*	7¾ *197*	2	⅝ x 2⅜	8	¾ x 3½	22 *10.0*
8 *200*	8.625 *219.1*	13½ *343*	14⅞ *378*	3½ *89*	8⅝ *219*	10¼ *260*	2	¾ x 2¾	8	¾ x 3½	26 *12.7*

A. The sealing surfaces A Max. to B Min. of the mating flange must be free from gouges, undulations and deformities of any type to ensure proper sealing of gasket.

B. Gruvlok Flanges are to be assembled on butterfly valves so as not to interfere with actuator or handle operation.

C. Do not use Gruvlok Flanges within 90 degrees of one another on standard fittings because the outside dimensions may cause interference.

D. Gruvlok Flanges should not be used as anchor points for tierods across non-restrained joints.

E. Fig. 7312 Gruvlok Flange sealing gaskets require a hard flat surface for adequate sealing. The use of a Gruvlok Flange Adapter Insert is required for applications against rubber faced valves or other equipment. The Gruvlok Flange Adapter Insert is installed between the Gruvlok Flange sealing gasket and the mating flange or surface to provide a good sealing surface area.

F. Gruvlok Flanges are not recommended for use against formed rubber flanges.

HDPE PIPE DIMENSIONAL SPECIFICATIONS

Nominal Size	O.D. Actual	Tolerance +/-	Out of Roundness Tolerance +/-	Pipe Wall Thickness						
				SDR 7.3	SDR 9	SDR 11	SDR 15.5	SDR 17	SDR 21	SDR 32.5
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*
4 *100*	4.500 *114.3*	0.020 *0.51*	0.040 *1.02*	0.616 *15.6*	0.500 *12.7*	0.409 *10.4*	0.290 *7.4*	0.265 *6.7*	0.214 *5.4*	0.138 *3.5*
6 *150*	6.625 *168.3*	0.030 *0.76*	0.050 *1.27*	0.908 *23.1*	0.736 *18.7*	0.602 *15.3*	0.427 *10.8*	0.327 *8.3*	0.265 *6.7*	0.204 *5.2*
8 *200*	8.625 *219.1*	0.039 *0.99*	0.075 *1.91*	1.182 *30.0*	0.958 *24.3*	0.784 *19.9*	0.556 *14.1*	0.507 *12.9*	0.340 *8.6*	0.265 *6.7*

1. Per ASTM F 714
2. Per ASTM D 2447 and D 3035

See Installation & Assembly directions on page 173.

APPLICATIONS WHICH REQUIRE A GRUVLOK® FLANGE ADAPTER INSERT:

1. When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok Flange.
2. When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
3. When mating to a serrated flange surface, a standard fullfaced flange gasket is installed against the serrated flange face, and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard flange gasket.
4. When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

SOCK-IT® PIPING METHOD FITTINGS

The Gruvlok® Sock-It® Piping Method provides a quick, secure and reliable method of joining plain-end steel pipe. Several Sock-It configurations are available: tees with NPT outlets, reducing run tees with NPT outlets, straight couplings, 90 elbows, straight tees and reducing elbows. Pressure energized elastomeric gaskets provide the Sock-It with a leak tight seal. Specially designed lock bolts secure the pipe in the Sock-It Fitting, providing a fast, dependable way of joining small diameter plain-end pipe.

Working pressure ratings shown are for reference only and are based on schedule 40 pipe. For the latest UL/ULC Listed and FM approved pressure ratings versus pipe schedule see www.anvilintl.com or contact your local Anvil Sales Representative.

See Installation & Assembly directions on page 174.

FITTING SIZE			
Nominal Size	O.D.	Nominal Size	O.D.
In./DN(mm)	*In./mm*	*In./DN(mm)*	*In./mm*
½ *15*	0.840 *21.3*	1½ *40*	1.900 *48.3*
¾ *20*	1.050 *26.7*	2 *50*	2.375 *60.3*
1 *25*	1.315 *33.7*	2½ *65*	2.875 *73.0*
1¼ *32*	1.660 *42.4*		

The Fitting Size Chart is used to determine the O.D. of the pipe that the fittings is to be used with. Gruvlok Fittings are identified by either the Nominal size in inches or the Pipe O.D. in mm.

c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

NOTE: All Sock-It® fittings are UL/ULC Listed and FM Approved for 175 psi working pressure when used to join XL Pipe and Dyna-Flow Pipe.

MATERIAL SPECIFICATIONS

HOUSING: Cast iron ASTM A 126 CLASS A

BOLTS: Case hardened carbon steel, dichromate finish.

GASKETS: EPDM, as specified in accordance with ASTM D 2000

FIG. 7100 - 90° Elbow (Sock-It® x Sock-It®)

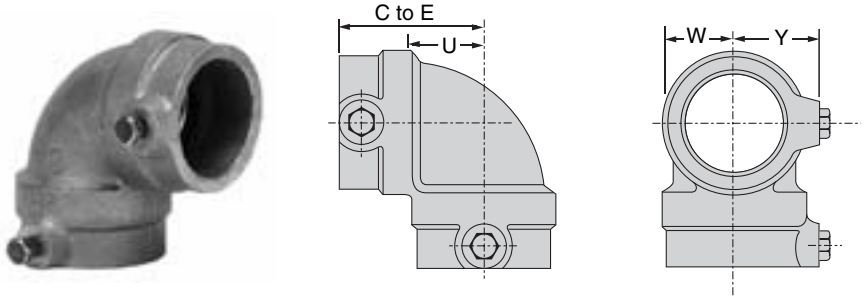
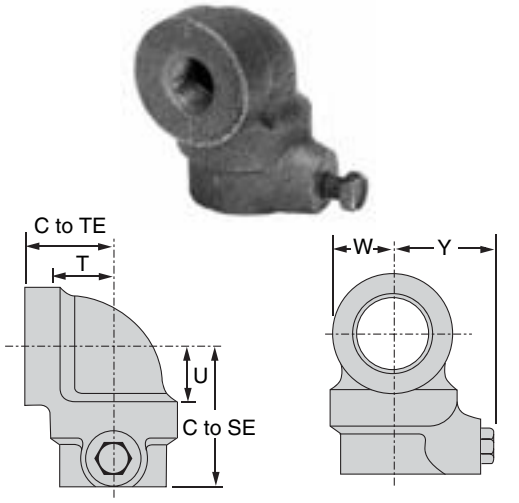


FIGURE 7100 SOCK-IT® ELBOW (S X S)								
Nominal Size	O.D.	Max. Working Pressure		Dimensions				Approx. Wt. Ea.
		UL/ULC Listed	FM Approved	Center To End	U*	W	Y	
In./DN(mm)	*In./mm*	*PSI/bar*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.7*	300 *20.7*	300 *20.7*	2 5/16 *59*	7/8 *22*	1 1/16 *27*	1 3/4 *44*	1.9 *0.9*
1¼ *32*	1.660 *42.4*	300 *20.7*	300 *20.7*	2 7/16 *62*	1 *25*	1¼ *32*	1 13/16 *46*	2.3 *1.0*
1½ *40*	1.900 *48.3*	300 *20.7*	300 *20.7*	2 5/8 *67*	1 1/8 *29*	1 3/8 *35*	1 15/16 *49*	2.7 *1.2*
2 *50*	2.375 *60.3*	175 *12.1*	250 *17.2*	3¼ *83*	1 9/16 *40*	1 5/8 *41*	2 3/16 *56*	4.0 *1.8*

* "U" - Run take-out dimension.

SOCK-IT® PIPING METHOD FITTINGS

FIG. 7101 - 90° Reducing Elbow (Sock-It® x NPT)



C to SE - Center to Sock-It® End
C to TE - Center to Thread End

* "U" - Take-out dimension, Sock-It® End.
** "T" - Take-out dimension, Thread End.

FIGURE 7101 SOCK-IT® REDUCING ELBOW (S X NPT)

Nominal Size	Max. Working Pressure		Dimensions						Approx. Wt. Ea.
	UL/ULC Listed	FM Approved	Center to TE	Center To SE	U*	T**	W	Y	
In./DN(mm)	*PSI/bar*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 x ½ *25 x 15*	300 *20.7*	300 *20.7*	1 7/16 *37*	2 5/16 *59*	7/8 *22*	1 *25*	1 1/16 *27*	1 11/16 *43*	1.7 *0.8*
1 x ¾ *25 x 20*	300 *20.7*	300 *20.7*	1 7/16 *37*	2 5/16 *59*	7/8 *22*	7/8 *22*	1 1/16 *27*	1 11/16 *43*	1.6 *0.7*
1 x 1 *25 x 25*	300 *20.7*	300 *20.7*	1 7/16 *37*	2 5/16 *59*	7/8 *22*	7/8 *22*	1 1/16 *27*	1 11/16 *43*	1.5 *0.7*
1¼ x ½ *32 x 15*	300 *20.7*	300 *20.7*	1 9/16 *40*	2½ *64*	1 1/16 *17*	1⅛ *29*	1¼ *32*	1 13/16 *46*	2.2 *1.0*
1¼ x ¾ *32 x 20*	300 *20.7*	300 *20.7*	1 9/16 *40*	2½ *64*	1 1/16 *17*	1 *25*	1¼ *32*	1 13/16 *46*	2.1 *1.0*
1¼ x 1 *32 x 25*	300 *20.7*	300 *20.7*	1 9/16 *40*	2½ *64*	1 1/16 *17*	1 *25*	1¼ *32*	1 13/16 *46*	2 *0.9*
1½ x ½ *40 x 15*	300 *20.7*	300 *20.7*	1 11/16 *43*	2½ *64*	1 *25*	1¼ *32*	1⅜ *35*	1 15/16 *49*	2.5 *1.1*
1½ x ¾ *40 x 20*	300 *20.7*	300 *20.7*	1 11/16 *43*	2½ *64*	1 *25*	1⅛ *29*	1⅜ *35*	1 15/16 *49*	2.4 *1.1*
1½ x 1 *40 x 25*	300 *20.7*	300 *20.7*	1 11/16 *43*	2½ *64*	1 *25*	1⅛ *29*	1⅜ *35*	1 15/16 *49*	2.3 *1.0*

FIG. 7103 - Straight Tee (Sock-It® x Sock-It® x Sock-It®)

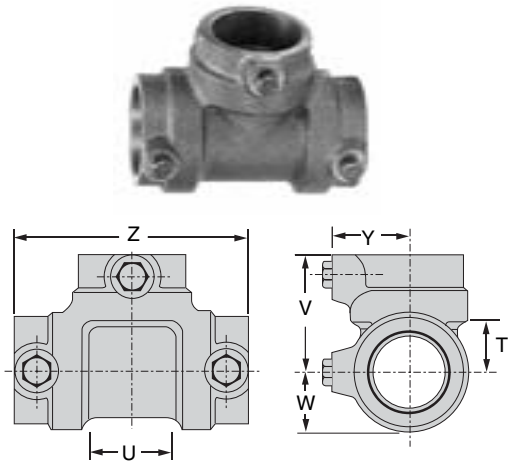


FIGURE 7103 SOCK-IT® STRAIGHT TEE (S x S x S)

Nominal Size	O.D.	Max. Working Pressure		Dimensions						Approx. Wt. Ea.
		UL/ULC Listed	FM Approved	**T	U*	V	W	Y	Z	
In./DN(mm)	*In./mm*	*PSI/bar*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.7*	300 *20.7*	300 *20.7*	1 3/16 *21*	1⅝ *41*	2¼ *57*	1 1/16 *27*	1 11/16 *43*	4½ *114*	2.3 *1.0*
1¼ *32*	1.660 *42.4*	175 *12.1*	300 *20.7*	1 *25*	2 *51*	2 7/16 *62*	1¼ *32*	1 13/16 *46*	4⅞ *124*	2.9 *1.3*
1½ *40*	1.900 *48.3*	175 *12.1*	300 *20.7*	1 1/16 *17*	2⅛ *54*	2 9/16 *65*	1⅜ *35*	1 15/16 *49*	5⅛ *130*	3.4 *1.5*
2 *50*	2.375 *60.3*	175 *12.1*	250 *17.2*	1 5/16 *23*	2⅝ *67*	3 *76*	1 11/16 *43*	2 3/16 *56*	6 *152*	5.6 *2.5*

* "U" - Run take-out dimension.
***"T" - Outlet take-out dimension.

FIG. 7107 - Coupling (Sock-It® x Sock-It®)

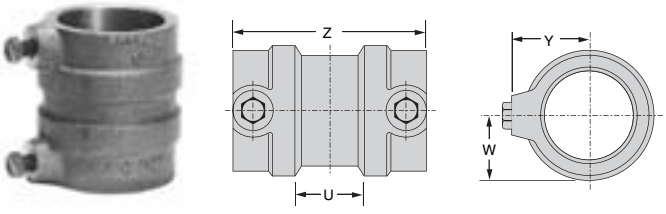


FIGURE 7107 SOCK-IT® COUPLING (S x S)

Nominal Size	O.D.	Max. Working Pressure		Dimensions				Approx. Wt. Ea.
		UL/ULC Listed	FM Approved	U*	W	Y	Z	
In./DN(mm)	*In./mm*	*PSI/bar*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 *25*	1.315 *33.7*	300 *20.7*	300 *20.7*	¼ *6*	1 1/16 *27*	1 11/16 *43*	3⅛ *79*	1.7 *0.8*
1¼ *32*	1.660 *42.4*	300 *20.7*	300 *20.7*	¼ *6*	1¼ *32*	1 13/16 *46*	3⅛ *79*	1.9 *0.9*
1½ *40*	1.900 *48.3*	300 *20.7*	300 *20.7*	¼ *6*	1⅜ *35*	1 15/16 *49*	3¼ *83*	2.1 *1.0*
2 *50*	2.375 *60.3*	175 *12.1*	250 *17.2*	¼ *6*	1⅝ *41*	2 3/16 *56*	3⅝ *92*	2.9 *1.3*

* "U" - Run take-out dimension.

SOCK-IT® PIPING METHOD FITTINGS

FIG. 7105 - Reducing Outlet Tee (Sock-It® x Sock-It® x NPT)

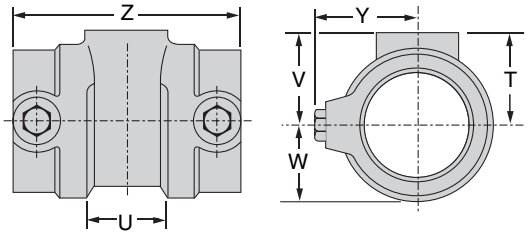


FIGURE 7105 SOCK-IT® REDUCING OUTLET TEE (S X S X NPT)

Nominal Size	Max. Working Pressure		Dimensions						Approx. Wt. Ea.
	UL/ULC Listed	FM Approved	**T	U*	V	W	Y	Z	
In./DN(mm)	*PSI/bar*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1 x 1 x ½ *25 x 25 x 15*	300 *20.7*	300 *20.7*	1 *25*	1⅜ *35*	1 7⁄16 *37*	1 1⁄16 *27*	1 11⁄16 *43*	4¼ *108*	2.0 *0.9*
1 x 1 x ¾ *25 x 25 x 20*	300 *20.7*	300 *20.7*	⅞ *22*	1⅜ *35*	1 7⁄16 *37*	1 1⁄16 *27*	1 11⁄16 *43*	4¼ *108*	1.9 *0.9*
1 x 1 x 1 *25 x 25 x 25*	300 *20.7*	300 *20.7*	⅞ *22*	1⅜ *35*	1 7⁄16 *37*	1 1⁄16 *27*	1 11⁄16 *43*	4¼ *108*	1.9 *0.9*
1¼ x 1¼ x ½ *32 x 32 x 15*	300 *20.7*	300 *20.7*	1⅛ *29*	1⅜ *35*	1⅝ *41*	1¼ *32*	1 13⁄16 *46*	4¼ *108*	2.2 *1.0*
1¼ x 1¼ x ¾ *32 x 32 x 20*	300 *20.7*	300 *20.7*	1 *25*	1⅜ *35*	1⅝ *41*	1¼ *32*	1 13⁄16 *46*	4¼ *108*	2.2 *1.0*
1¼ x 1¼ x 1 *32 x 32 x 25*	300 *20.7*	300 *20.7*	1 *25*	1⅜ *35*	1⅝ *41*	1¼ *32*	1 13⁄16 *46*	4¼ *108*	2.0 *0.9*
1½ x 1½ x ½ *40 x 40 x 15*	300 *20.7*	300 *20.7*	1¼ *32*	1⅜ *35*	1¾ *44*	1⅜ *35*	1 15⁄16 *49*	4⅜ *111*	2.7 *1.2*
1½ x 1½ x ¾ *40 x 40 x 20*	300 *20.7*	300 *20.7*	1⅛ *29*	1⅜ *35*	1¾ *44*	1⅜ *35*	1 15⁄16 *49*	4⅜ *111*	2.6 *1.2*
1½ x 1½ x 1 *40 x 40 x 25*	300 *20.7*	300 *20.7*	1⅛ *29*	1⅜ *35*	1¾ *44*	1⅜ *35*	1 15⁄16 *49*	4⅜ *111*	2.5 *1.1*
2 x 2 x ½ *50 x 50 x 15*	175 *12.1*	250 *17.2*	1½ *38*	1⅜ *35*	1 15⁄16 *49*	1⅝ *41*	2 3⁄16 *56*	4¾ *121*	3.5 *1.6*
2 x 2 x ¾ *50 x 50 x 20*	175 *12.1*	250 *17.2*	1⅜ *35*	1⅜ *35*	1 15⁄16 *49*	1⅝ *41*	2 3⁄16 *56*	4¾ *121*	3.4 *1.5*
2 x 2 x 1 *50 x 50 x 25*	175 *12.1*	250 *17.2*	1⅜ *35*	1⅜ *35*	1 15⁄16 *49*	1⅝ *41*	2 3⁄16 *56*	4¾ *121*	3.3 *1.5*
2½ x 2½ x ¾ *65 x 65 x 20*	175 *12.1*	175 *12.1*	1½ *38*	1⅜ *35*	2⅛ *54*	1 15⁄16 *49*	2 7⁄16 *62*	4¾ *121*	5.2 *2.4*
2½ x 2½ x 1 *65 x 65 x 25*	175 *12.1*	175 *12.1*	1½ *38*	1⅜ *35*	2⅛ *54*	1 15⁄16 *49*	2 7⁄16 *62*	4¾ *121*	5.2 *2.4*

* "U" - Run take-out dimension. ** "T" - Outlet take-out dimension.

FIG. 7106 - Reducing Tee (Sock-It® x Sock-It® x NPT)

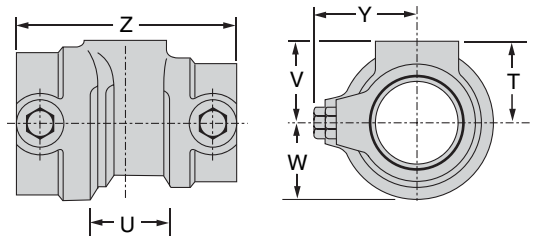


FIGURE 7106 SOCK-IT® REDUCING TEE (S x S x NPT)

Nominal Size	Max. Working Pressure		Dimensions						Approx. Wt. Ea.
	UL/ULC Listed	FM Approved	**T	U*	V	W	Y	Z	
In./DN(mm)	*PSI/bar*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./Kg*
1¼ x 1 x ½ *32 x 25 x 15*	300 *2.1*	300 *2.1*	1 *25*	1⅜ *35*	1 7⁄16 *37*	1¼ *32*	1 13⁄16 *46*	4¼ *108*	2.1 *1.0*
1¼ x 1 x ¾ *32 x 25 x 20*	300 *20.7*	300 *20.7*	⅞ *22*	1⅜ *35*	1 7⁄16 *37*	1¼ *32*	1 13⁄16 *46*	4¼ *108*	2.1 *1.0*
1¼ x 1 x 1 *32 x 25 x 25*	300 *20.7*	300 *20.7*	⅞ *22*	1⅜ *35*	1 7⁄16 *37*	1¼ *32*	1 13⁄16 *46*	4¼ *108*	2.0 *0.9*
1½ x 1¼ x ½ *40 x 32 x 15*	300 *20.7*	300 *20.7*	1⅛ *29*	1⅜ *35*	1 9⁄16 *40*	1⅜ *35*	1 15⁄16 *49*	4⅜ *111*	2.5 *1.1*
1½ x 1¼ x ¾ *40 x 32 x 20*	300 *20.7*	300 *20.7*	1 *25*	1⅜ *35*	1 9⁄16 *40*	1⅜ *35*	1 15⁄16 *49*	4⅜ *111*	2.4 *1.1*
1½ x 1¼ x 1 *40 x 32 x 25*	300 *20.7*	300 *20.7*	1 *25*	1⅜ *35*	1 9⁄16 *40*	1⅜ *35*	1 15⁄16 *49*	4⅜ *111*	2.2 *1.0*
2 x 1½ x ½ *50 x 40 x 15*	175 *12.1*	250 *17.2*	1¼ *32*	1⅜ *35*	1¾ *44*	1⅝ *41*	2 3⁄16 *56*	4 9⁄16 *116*	3.2 *1.5*
2 x 1½ x ¾ *50 x 40 x 20*	175 *12.1*	250 *17.2*	1⅛ *29*	1⅜ *35*	1¾ *44*	1⅝ *41*	2 3⁄16 *56*	4 9⁄16 *116*	3.1 *1.4*
2 x 1½ x 1 *50 x 40 x 25*	175 *12.1*	250 *17.2*	1⅛ *29*	1⅜ *35*	1¾ *44*	1⅝ *41*	2 3⁄16 *56*	4 9⁄16 *116*	3.0 *1.4*

* "U" - Run take-out dimension. ** "T" - Outlet take-out dimension.

FIG. 7400SS

Rigidlite® Coupling

The Gruvlok Figure 7400SS coupling is available in 1 1/4" – 8" sizes. The standard material is ASTM A 743 CF8M (Type 316) cast stainless steel which is ideal for corrosive environments.

Any Gruvlok gasket material may be utilized in the 7400SS coupling for a broad array of applications. Gasket properties are as designated in accordance with ASTM D 2000. The 7400SS is provided with ASTM A 193 B8M bolts and ASTM A 194 Grade 8M nuts.

MATERIAL SPECIFICATIONS

STAINLESS STEEL BOLTS & NUTS:
Hex head stainless steel bolts, Type 316 per ASTM A 193 Grade B8M class 1 and heavy hex stainless steel nuts, Type 316 per ASTM A 194 Grade 8M class 1. Nuts and bolts are zinc plated to prevent common thread galling. Contact an Anvil Representative for more information.

HOUSING:
Cast Stainless Steel (Type 316) - ASTM A 743 CF8M

GASKETS: Materials
Properties as designated in accordance with ASTM D 2000

Grade "E" EPDM (Green color code) NSF 61 Certified
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
NOT FOR USE IN PETROLEUM APPLICATIONS.

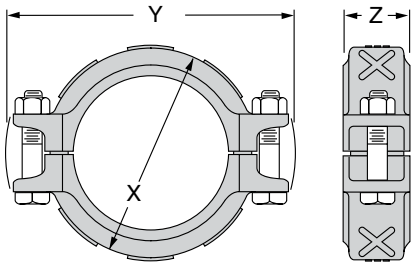
Grade "T" Nitrile (Orange color code)
-20°F to 180°F (Service Temperature Range)(-29°C to 82°C)
Recommended for petroleum applications. air with oil vapors and vegetable and mineral oils.
NOT FOR USE IN HOT WATER OR HOT AIR.

Grade "O" Fluoro-Elastomer (Blue color code)
20°F to 300°F (Service Temperature Range)(-29°C to 149°C)
Recommended for high temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated hydrocarbons and lubricants.

Grade "L" Silicone (Red color code)
-40°F to 350°F (Service Temperature Range)(-40°C to 177°C)
Recommended for dry, hot air and some high temperature chemical services.

GASKET TYPE:
Standard C Style
Flush Gap (1 1/4" – 8")

LUBRICATION:
Standard Gruvlok
Gruvlok Xtreme™ (Do Not use with Grade "L")



CAUTION: Contact your local Anvil representative for corrosive application environments.

No coatings or zinc options.

* All bolts are hex head design Type 316 Grade B8M Class 1 stainless steel to ASTM A 193, with Type 316 Grade 8M stainless steel heavy hex nuts conforming to ASTM A 194. Use of suitable anti-galling thread compound is recommended.

† Ratings apply when used with Schedule 40 ASTM A 312 Type 304 stainless steel pipe for all sizes. Refer to ratings chart for additional data.

FIGURE 7400SS - RIGIDLITE STAINLESS STEEL COUPLING

Nominal Size	O.D.	Max. Wk. Pressure†	Max. End Load†	Range of Pipe End Separation	Coupling Dimensions			Coupling Bolts*		Specified Torque		Approx. Wt. Ea.
					X	Y	Z	Qty.	Size	Min.	Max.	
In./mm	*In./mm*	*PSI/bar*	*Lbs./kN*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*	*Ft.-Lbs./N-m*		*Lbs./Kg*
1¼	1.660	300	649	0-1/32	2⅞	4⅛	1¾	2	⅜ x 2¼	15	20	1.6
32	*42.4*	*20.7*	*2.89*	*0-0.79*	*73*	*105*	*44*		*M10 x 57*	*21*	*27*	*0.7*
1½	1.900	300	851	0-1/32	3⅛	4⅝	1¾	2	⅜ x 2¼	15	20	1.7
40	*48.3*	*20.7*	*3.78*	*0-0.79*	*79*	*117*	*44*		*M10 x 57*	*21*	*27*	*0.8*
2	2.375	300	1,329	0-1/32	3⅝	5⅜	1¾	2	⅜ x 2¼	15	20	2.1
50	*60.3*	*20.7*	*5.91*	*0-0.79*	*92*	*137*	*45*		*M10 x 57*	*21*	*27*	*1.0*
2½	2.875	300	1,948	0-1/32	4⅛	5⅞	1¾	2	⅜ x 2¼	15	20	2.3
65	*73.0*	*20.7*	*8.66*	*0-0.79*	*105*	*149*	*44*		*M10 x 57*	*21*	*27*	*1.0*
3	3.500	300	2,886	0-1/32	4⅝	6⅝	1¾	2	½ x 2¾	50	60	3.1
80	*88.9*	*20.7*	*12.84*	*0-0.79*	*117*	*168*	*44*		*M12 x 70*	*68*	*80*	*1.4*
4	4.500	300	4,771	0-3/32	6	7¾	1⅞	2	½ x 2¾	50	60	4.4
100	*114.3*	*20.7*	*21.22*	*0-2.38*	*152*	*197*	*48*		*M12 x 70*	*68*	*80*	*2.0*
6	6.625	275	9,480	0-3/32	8⅛	11⅛	2	2	¾ x 3	80	100	7.8
150	*168.3*	*19.0*	*42.17*	*0-2.38*	*206*	*283*	*51*		*M20 x 76*	*110*	*150*	*3.5*
8	8.625	275	16,067	0-3/32	10⅜	13⅝	2⅜	2	¾ x 3	80	100	13.2
200	*219.1*	*19.0*	*71.47*	*0-2.38*	*264*	*346*	*60*		*M20 x 76*	*110*	*150*	*6.0*

Range of Pipe End Separation values are for roll grooved pipe and may be doubled for cut groove pipe.

GRUVLOK STAINLESS STEEL FITTINGS

Anvil offers two different sets of stainless steel fittings. The Gruvlok Series Fittings have full flow designs formed from type 304SS pipe. The Schedule 10 fittings are fabricated from segmentally welded 316SS unless otherwise noted and are also available as Schedule 40 and/or Type 304SS.

GRUVLOK COUPLING & FLANGE WORKING PRESSURE RATINGS (PSI)

The following are pressure ratings for Gruvlok Stainless Steel Piping Systems. The ratings for Schedule 10S pipe are based upon the use of roll-groover roll sets that have been specifically designed for use on Schedule 10 Stainless Steel pipe. Using roll sets that were designed for roll grooving standard wall pipe may significantly reduce the pressure ratings that can be obtained. The Model 1007/3007 roll groovers require the use of the optional Schedule 10 roll set to groove Schedule 5S and 10S. For grooving Schedule 40S on the Model 1007/3007 roll groovers, the standard steel roll grooving set should be used.

GRUVLOK COUPLING & FLANGE WORKING PRESSURE RATINGS (PSI) ON 304 AND 316 STAINLESS STEEL ROLL GROOVED PIPE

Nominal Pipe Size	Pipe O.D.	Nominal Wall Thickness	Pipe Schedule Number	Coupling and Flanges									
				Fig. 7000 Lightweight	Fig. 7001 Standard	Fig. 7003 Hingelok	Fig. 7004 HPR	Fig. 7010* Reducing	Fig. 7012 Flange	Fig. 7013 Flange	Fig. 7400 Rigidlite	Fig. 7401 Rigidlok	Fig. 7400SS Coupling
In./DN(mm)	*In./mm*	*Inches*	–	*PSI*									
1 *25*	1.315 *33.4*	0.065 0.109 0.133	5S 10S 40	400 400 500	400 500 750	– – –	– – –	– – –	– – –	– – –	300 300 300	– – –	– – –
1¼ *32*	1.660 *42.4*	0.065 0.109 0.140	5S 10S 40	400 500 500	400 500 750	– – –	– – –	– – –	– – –	– – –	300 300 300	– – –	275 300 300
1½ *40*	1.900 *48.3*	0.065 0.109 0.145	5S 10S 40	400 500 500	400 500 750	275 300 300	– – –	– – –	– – –	– – –	300 300 300	400 500 750	275 300 300
2 *50*	2.375 *60.3*	0.065 0.109 0.154	5S 10S 40	250 500 500	325 500 750	250 300 300	325 500 750	250 500 500	250 300 300	275 300 300	250 300 300	325 500 750	275 300 300
2½ *65*	2.875 *73.0*	0.083 0.120 0.203	5S 10S 40	250 500 500	325 500 750	250 300 300	325 500 750	250 500 500	250 300 300	275 300 300	250 300 300	325 500 750	200 300 300
3 *80*	3.500 *88.9*	0.083 0.120 0.216	5S 10S 40	250 500 500	325 500 750	250 300 300	325 500 750	250 500 500	250 300 300	275 300 300	250 300 300	325 500 750	200 300 300
4 *100*	4.500 *114.3*	0.083 0.120 0.237	5S 10S 40	200 300 500	250 400 750	200 300 300	250 400 750	200 300 500	200 300 300	250 300 300	200 300 300	250 400 750	200 300 300
5 *125*	5.563 *141.3*	0.109 0.134 0.258	5S 10S 40	125 200 300	200 300 500	125 200 300	200 300 500	125 200 300	125 200 300	200 300 300	125 200 300	200 300 500	– – –
6 *150*	6.625 *168.3*	0.109 0.134 0.280	5S 10S 40	75 200 300	125 200 500	75 200 300	125 200 500	75 200 300	75 200 300	125 200 300	75 200 300	125 200 500	125 250 275
8 *200*	8.625 *219.1*	0.109 0.148 0.322	5S 10S 40	50 150 300	75 200 400	50 150 300	75 200 400	50 150 300	50 150 300	75 200 300	50 150 300	75 200 400	75 150 275
10 *250*	10.750 *273.0*	0.134 0.165 0.365	5S 10S 40	– – –	50 100 400	– – –	50 100 400	– – –	50 100 300	50 100 300	– – –	50 100 400	– – –
12 *300*	12.750 *323.9*	0.156 0.180 0.375	5S 10S 40	– – –	75 125 400	– – –	75 125 400	– – –	50 100 300	75 125 300	– – –	75 125 400	– – –

Notes:

1) Pressure ratings based on ASTM A312 Type 304 stainless steel pipe or equivalent.
2) Failure to use Rollers specifically designed for Stainless Steel Pipe may significantly reduce pressure retention capabilities.
3) Pressure ratings on cut grooved pipe meet or exceed the schedule 40 pressure ratings listed above. For information regarding higher ratings contact Anvil.
4) * For pressure ratings on Figure 7010 Reducing Couplings use larger pipe size.
5) For pressure ratings for the reducing tees, concentric reducers and eccentric reducers, use the rating of the weakest end.
6) Pressure ratings on schedule 10 stainless steel pipe may be increased by using Anvil's 1007/3007 roll groovers with the schedule 10 roller set. Contact Anvil for details.

GRUVLOK STAINLESS STEEL FITTINGS - TYPE 304

Gruvlok Series Stainless Steel Fittings are full flow design with ends grooved to Gruvlok specifications. The Series standard material is formed from Type 304 Stainless Steel. The Series Fittings are annealed after forming and grooving to provide increased corrosion resistance. Gruvlok Series Stainless Steel 45° and 90° elbows and tees have compact center-to-end dimensions which make installation quick and easy with the Gruvlok Figure 7400SS Coupling, or other Gruvlok products.

PRESSURE RATINGS FOR STAINLESS STEEL PIPE & FITTINGS

Schedule 10S pipe are based upon the use of roll-groover roll sets that have been specifically designed for use on Schedule 10S stainless steel pipe. Using roll sets that were designed for roll grooving carbon steel pipe may significantly reduce the pressure ratings that can be obtained. Consult Gruvlok for applications that involve roll grooving 10" or larger stainless steel pipe or that involves Schedule 5S stainless steel pipe.

SERIES SS FITTING PRESSURE RATINGS										
Sizes	**1¼"**	**1½"**	**2"**	**2½"**	**3"**	**4"**	**6"**	**8"**	**10"**	**12"**
Pressure (psi)	500	500	500	500	500	500	400	250	100	200

FIG. A7050-SS04

90° Stainless Steel Elbow
Type 304

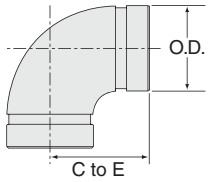


FIGURE A7050SS 90° STAINLESS STEEL ELBOW		
Nominal Size	**Center to End***	**Approx. Wt. Ea.**
In./DN(mm)	*In./mm*	*Lbs./Kg*
1¼ *32*	2 13/16 *71.44*	0.8 *0.4*
1½ *40*	3 *76.20*	1.0 *0.5*
2 *50*	3 11/16 *93.66*	1.3 *0.6*
2½ *65*	4 5/16 *109.54*	1.8 *0.8*
3 *80*	5 1/16 *128.59*	2.9 *1.3*
4 *100*	6 5/16 *160.34*	4.6 *2.1*
6 *150*	9 *228.60*	11.2 *5.1*
8 *200*	12 *304.80*	22.7 *10.3*
10 *250*	15 *381.00*	35.3 *16.0*
12 *300*	18 *457.20*	56.9 *25.8*

FIG. A7051-SS04

45° Stainless Steel Elbow
Type 304

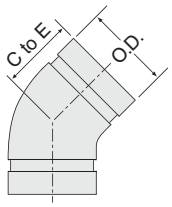


FIGURE A7051SS 45° STAINLESS STEEL ELBOW		
Nominal Size	**Center to End***	**Approx. Wt. Ea.**
In./DN(mm)	*In./mm*	*Lbs./Kg*
1¼ *32*	1¾ *44.45*	0.4 *0.2*
1½ *40*	1 7/8 *47.63*	0.5 *0.2*
2 *50*	2 1/8 *53.98*	0.7 *0.3*
2½ *65*	2⅜ *60.33*	0.9 *0.4*
3 *80*	2 13/16 *71.44*	1.5 *0.7*
4 *100*	3 5/16 *84.14*	2.4 *1.1*
6 *150*	4 1/2 *114.30*	6.0 *2.7*
8 *200*	5 7/8 *149.23*	11.7 *5.3*
10 *250*	7 1/8 *180.98*	17.6 *8.0*
12 *300*	8 5/8 *219.08*	27.6 *12.5*

FIG. A7060-SS04

Stainless Steel Tees
Type 304

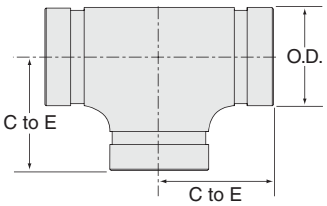


FIGURE A7060SS STAINLESS STEEL TEE		
Nominal Size	**Center to End***	**Approx. Wt. Ea.**
In./DN(mm)	*In./mm*	*Lbs./Kg*
1¼ *32*	2¾ *69.85*	1.1 *0.5*
1½ *40*	2 15/16 *74.61*	1.3 *0.6*
2 *50*	3⅜ *80.96*	3.2 *1.5*
2½ *65*	3 11/16 *93.66*	4.4 *2.0*
3 *80*	4 *101.60*	5.8 *2.6*
4 *100*	4 15/16 *125.41*	8.6 *3.9*
6 *150*	6½ *165.10*	18.5 *8.4*
8 *200*	8 1/16 *204.79*	33.4 *15.1*
10 *250*	9 1/2 *241.30*	35.3 *16.0*
12 *300*	11 *279.40*	52.7 *23.9*

FIG. A7074-SS04

Stainless Steel Caps
Type 304

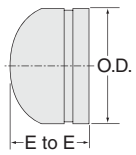


FIGURE A7074SS STAINLESS STEEL CAP		
Nominal Size	**Center to End***	**Approx. Wt. Ea.**
In./DN(mm)	*In./mm*	*Lbs./Kg*
1¼ *32*	1¾ *44.45*	0.4 *0.2*
1½ *40*	1¾ *44.45*	0.4 *0.2*
2 *50*	2 *50.80*	0.4 *0.2*
2½ *65*	2 3/16 *55.56*	0.9 *0.4*
3 *80*	2 9/16 *65.09*	1.1 *0.5*
4 *100*	2 15/16 *74.61*	1.5 *0.7*
6 *150*	3 9/16 *90.49*	3.1 *1.4*
8 *200*	4 *101.60*	6.6 *3.0*
10 *250*	5 *127.00*	9.9 *4.5*
12 *300*	6 *152.40*	15.2 *6.9*

Notes: 1) *Dimensions may differ from those shown above. Contact an Anvil Representative for more information.
2) For Series 304 SS refer to the pressure ratings chart above.

GRUVLOK STAINLESS STEEL FITTINGS - TYPE 304

FIG. A7061-SS04

Stainless Steel Reducing Tees
Type 304

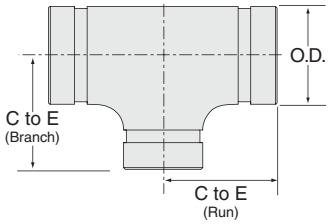


FIGURE A7061SS
STAINLESS STEEL REDUCING TEE

Nominal Size	Center to End (Run)	Center to End (Branch)	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*In./mm*	*Lbs./Kg*
1 1/2 x 1 1/4 *40 x 32*	2 15/16 *74.61*	2 3/4 *69.85*	1.3 *0.6*
2 x 1 1/4 *50 x 32*	3 3/16 *80.96*	2 15/16 *74.61*	1.8 *0.8*
2 x 1 1/2 *50 x 40*	3 3/16 *80.96*	3 1/16 *77.79*	1.8 *0.8*
2 1/2 x 1 1/2 *65 x 40*	3 1/16 *93.66*	3 5/16 *84.14*	2.7 *1.2*
2 1/2 x 2 *65 x 50*	3 1/16 *93.66*	3 9/16 *90.49*	2.7 *1.2*
3 x 1 1/2 *80 x 40*	4 *101.60*	3 9/16 *90.49*	3.1 *1.4*
3 x 2 *80 x 50*	4 *101.60*	3 1/16 *93.66*	5.1 *2.3*
3 x 2 1/2 *80 x 65*	4 *101.60*	3 7/8 *98.43*	5.4 *2.4*
4 x 2 *100 x 50*	4 15/16 *125.41*	4 5/16 *109.54*	8.0 *3.6*
4 x 2 1/2 *100 x 65*	4 15/16 *125.41*	4 5/8 *117.48*	5.3 *2.4*
4 x 3 *100 x 80*	4 15/16 *125.41*	4 3/4 *120.65*	8.6 *3.9*
6 x 3 *150 x 80*	6 1/2 *165.10*	5 13/16 *147.64*	16.8 *7.6*
6 x 4 *150 x 100*	6 1/8 *155.58*	6 *152.40*	16.8 *7.6*
8 x 4 *200 x 100*	8 1/16 *204.79*	7 3/16 *182.56*	29.7 *13.4*
8 x 6 *200 x 150*	8 1/16 *204.79*	7 1/16 *195.26*	33.4 *15.1*
10 x 6 *250 x 150*	9 1/2 *241.30*	8 7/8 *255.43*	21.6 *9.8*
10 x 8 *250 x 200*	9 1/2 *241.30*	9 1/16 *230.19*	32.2 *14.6*
12 x 8 *300 x 200*	11 *279.40*	10 1/16 *255.59*	47.2 *21.4*
12 x 10 *300 x 250*	11 *279.40*	10 9/16 *268.29*	49.2 *22.3*

FIG. A7072-SS04

Stainless Steel Concentric Reducers
Type 304

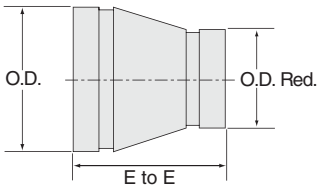


FIGURE A7072SS
STAINLESS STEEL CONCENTRIC REDUCER

Nominal Size	End to End*	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1 1/2 x 1 1/4 *40 x 32*	3 3/4 *95.25*	0.4 *0.2*
2 x 1 1/4 *50 x 32*	4 1/8 *104.78*	0.7 *0.3*
2 x 1 1/2 *50 x 40*	4 1/8 *104.78*	0.7 *0.3*
2 1/2 x 1 1/2 *65 x 40*	4 7/16 *112.71*	1.1 *0.5*
2 1/2 x 2 *65 x 50*	4 7/16 *112.71*	1.1 *0.5*
3 x 1 1/2 *80 x 40*	4 3/4 *120.65*	1.3 *0.6*
3 x 2 *80 x 50*	4 3/4 *120.65*	1.3 *0.6*
3 x 2 1/2 *80 x 65*	4 3/4 *120.65*	1.3 *0.6*
4 x 2 *100 x 50*	5 5/16 *134.94*	1.8 *0.8*
4 x 2 1/2 *100 x 65*	5 5/16 *134.94*	1.8 *0.8*
4 x 3 *100 x 80*	5 5/16 *134.94*	2.0 *0.9*
6 x 3 *150 x 80*	6 3/4 *171.45*	3.8 *1.7*
6 x 4 *150 x 100*	6 3/4 *171.45*	4.0 *1.8*
8 x 4 *200 x 100*	7 9/16 *192.09*	6.6 *3.0*
8 x 6 *200 x 150*	7 9/16 *192.09*	7.3 *3.3*
10 x 6 *250 x 150*	8 11/16 *220.66*	9.7 *4.4*
10 x 8 *250 x 200*	8 11/16 *220.66*	10.6 *4.8*
12 x 8 *300 x 200*	9 7/16 *239.71*	15.0 *6.8*
12 x 10 *300 x 250*	9 7/16 *239.71*	15.9 *7.2*

Notes: 1) *Dimensions may differ from those shown above. Contact an Anvil Representative for more information.
2) For A Series 304 SS pressure ratings refer to the chart on page 144.
3) The pressure rating for the reducing tees and concentric reducers is based upon the rating of the weakest end.

GRUVLOK STAINLESS STEEL FITTINGS - TYPE 316

Gruvlok Schedule 10 Stainless Steel Fittings are segmentally welded with ends grooved to Gruvlok specifications. The standard material is 316 Stainless Steel unless otherwise noted with 304SS and/or Schedule 40 optional. Installation is quick and easy with the Gruvlok Figure 7400SS Coupling, or other Gruvlok product.

FIG. 7050SS

90° Stainless Steel Elbow
Type 316

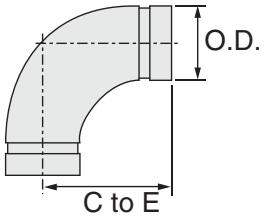


FIGURE 7050SS 90° STAINLESS STEEL ELBOW		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1¼ *32*	3⅝ *98*	1.2 *0.5*
1½ *40*	4¼ *108*	1.4 *0.6*
2 *50*	4⅜ *111*	2.3 *1.0*
2½ *65*	5¾ *146*	3.3 *1.5*
3 *80*	5⅞ *149*	4.6 *2.1*
4 *100*	7½ *191*	7.9 *3.6*
6 *150*	10¾ *273*	17.0 *7.7*
8 *200*	15 *381*	29.4 *13.4*
10 *250*	18 *457*	41.8 *18.9*
12 *300*	21 *533*	46.5 *21.1*

FIG. 7051SS

45° Stainless Steel Elbow
Type 316

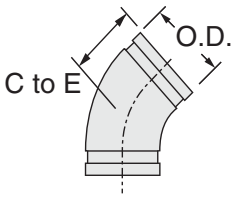


FIGURE 7051SS 45° STAINLESS STEEL ELBOW		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1¼ *32*	2½ *64*	0.7 *0.3*
1½ *40*	2½ *64*	0.9 *0.4*
2 *50*	2½ *64*	1.5 *0.7*
2½ *65*	3 *76*	1.9 *0.9*
3 *80*	3⅜ *86*	3.3 *1.5*
4 *100*	4 *102*	5.4 *2.4*
6 *150*	5½ *140*	11.2 *5.1*
8 *200*	7¼ *184*	19.8 *9.0*
10 *250*	8½ *216*	21.0 *9.5*
12 *300*	10 *254*	23.0 *10.4*

FIG. 7060SS

Stainless Steel Tees
Type 316

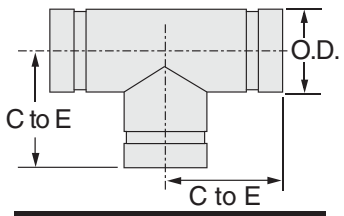


FIGURE 7060SS STAINLESS STEEL TEE		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1¼ *32*	2¾ *70*	1.5 *0.7*
1½ *40*	2¾ *70*	1.8 *0.8*
2 *50*	3¼ *83*	2.4 *1.1*
2½ *65*	3¾ *95*	4.0 *1.8*
3 *80*	4¼ *108*	5.8 *2.6*
4 *100*	5 *127*	10.3 *4.7*
6 *150*	6½ *165*	25.7 *11.7*
8 *200*	7¾ *197*	41.1 *18.6*
10 *250*	9 *229*	36.0 *16.3*
12 *300*	10 *254*	48.4 *22.0*

FIG. 7074SS

Stainless Steel Caps
Type 316

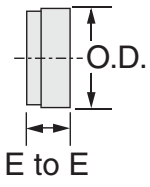


FIGURE 7074SS STAINLESS STEEL CAP		
Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1¼ *32*	1⅝ *41*	0.4 *0.2*
1½ *40*	1⅝ *41*	0.5 *0.2*
2 *50*	1⅝ *41*	0.8 *0.4*
2½ *65*	1¾ *45*	1.1 *0.5*
3 *80*	1¾ *45*	1.6 *0.7*
4 *100*	1¾ *45*	2.8 *1.3*
6 *150*	1⅞ *48*	3.7 *1.7*
8 *200*	2¼ *57*	8.8 *4.0*
10 *250*	2¼ *57*	12.1 *5.5*
12 *300*	2¼ *57*	17.3 *7.8*

Notes:

1) *Dimensions may differ from those shown above. Contact an Anvil Representative for more information.
2) Fabricated fittings weights are based on Schedule 10 pipe.
3) Fabricated Schedule 10, 316SS and Schedule 40 Center to End dimensions are the same.
4) The pressure rating for the Gruvlok Schedule 10 Stainless Steel Fittings are equal to the pressure rating of the coupling used on Schedule 10 pipe as shown in the Working Pressure Ratings Chart for Stainless Steel Roll Grooved Pipe on page 143.

GRUVLOK STAINLESS STEEL FITTINGS - TYPE 316

FIG. 7061SS

Stainless Steel Reducing Tees Type 316

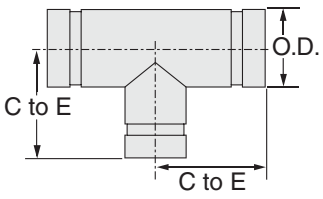


FIGURE 7061SS
STAINLESS STEEL REDUCING TEE

Nominal Size	Center to End*	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1½ x 1½ x ¾ *40 x 40 x 20*	2¾ *70*	1.3 *0.6*
1½ x 1½ x 1 *40 x 40 x 25*	2¾ *70*	1.4 *0.6*
1½ x 1½ x 1¼ *40 x 40 x 32*	2¾ *70*	1.5 *0.7*
2 x 2 x ¾ *50 x 50 x 20*	3¼ *83*	2.0 *0.9*
2 x 2 x 1 *50 x 50 x 25*	3¼ *83*	2.1 *1.0*
2 x 2 x 1¼ *50 x 50 x 32*	3¼ *83*	2.3 *1.0*
2 x 2 x 1½ *50 x 50 x 40*	3¼ *83*	2.5 *1.1*
2½ x 2½ x ¾ *65 x 65 x 20*	3¾ *95*	2.8 *1.3*
2½ x 2½ x 1 *65 x 65 x 25*	3¾ *95*	3.0 *1.4*
2½ x 2½ x 1½ *65 x 65 x 40*	3¾ *95*	3.5 *1.6*
2½ x 2½ x 2 *65 x 65 x 50*	3¾ *95*	3.8 *1.7*
3 x 3 x ¾ *80 x 80 x 20*	4¼ *108*	4.0 *1.8*
3 x 3 x 1 *80 x 80 x 25*	4¼ *108*	4.1 *1.9*
3 x 3 x 1¼ *80 x 80 x 32*	4¼ *108*	4.2 *1.9*
3 x 3 x 1½ *80 x 80 x 40*	4¼ *108*	4.3 *1.9*
3 x 3 x 2 *80 x 80 x 50*	4¼ *108*	4.5 *2.0*
3 x 3 x 2½ *80 x 80 x 65*	4¼ *108*	4.8 *2.2*
4 x 4 x 2 *100 x 100 x 50*	5 *127*	5.8 *2.6*
4 x 4 x 2½ *100 x 100 x 65*	5 *127*	5.9 *2.7*
4 x 4 x 3 *100 x 100 x 80*	5 *127*	6.0 *2.7*
6 x 6 x 3 *150 x 150 x 80*	6½ *165*	14.0 *6.4*
6 x 6 x 4 *150 x 150 x 100*	6½ *165*	14.5 *6.6*
8 x 8 x 4 *200 x 200 x 100*	7¾ *197*	29.6 *13.5*
8 x 8 x 6 *200 x 200 x 150*	7¾ *197*	31.1 *14.1*

FIG. 7072SS

Stainless Steel Concentric Reducers – Type 316

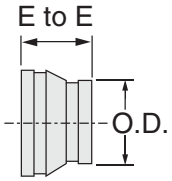


FIGURE 7072SS
STAINLESS STEEL CONCENTRIC REDUCER

Nominal Size	End to End*	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1½ x 1 *40 x 25*	6½ *165*	0.7 *0.3*
1½ x 1¼ *40 x 32*	6½ *165*	0.7 *0.3*
2 x 1 *50 x 25*	7 *178*	0.9 *0.4*
2 x 1¼ *50 x 32*	7 *178*	0.9 *0.4*
2 x 1½ *50 x 40*	7 *178*	1.2 *0.5*
2½ x 1 *65 x 25*	7½ *191*	1.1 *0.5*
2½ x 1½ *65 x 40*	7½ *191*	1.2 *0.5*
2½ x 2 *65 x 50*	7½ *191*	1.2 *0.5*
3 x 1 *80 x 25*	7½ *191*	1.8 *0.8*
3 x 1¼ *80 x 32*	7½ *191*	1.8 *0.8*
3 x 1½ *80 x 40*	7½ *191*	1.9 *0.9*
4 x 2 *100 x 50*	8 *203*	2.9 *1.3*
4 x 2½ *100 x 65*	8 *203*	3.1 *1.4*
4 x 3 *100 x 80*	8 *203*	3.1 *1.4*
6 x 2½ *150 x 65*	9½ *241*	7.1 *3.2*
6 x 3 *150 x 80*	9½ *241*	7.0 *3.2*
6 x 4 *150 x 100*	9½ *241*	7.0 *3.2*
8 x 4 *200 x 100*	10 *254*	11.7 *5.3*
8 x 6 *200 x 150*	10 *254*	11.5 *5.2*

FIG. 7073SS

Stainless Steel Eccentric Reducers – Type 316

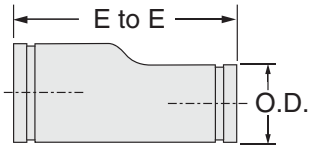


FIGURE 7073SS
STAINLESS STEEL ECCENTRIC REDUCER

Nominal Size	End to End*	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
1½ x 1 *40 x 25*	8½ *216*	1.7 *0.8*
1½ x 1¼ *40 x 32*	8½ *216*	4.5 *2.0*
2 x 1 *50 x 25*	9 *229*	2.2 *1.0*
2 x 1¼ *50 x 32*	9 *229*	2.4 *1.1*
2 x 1½ *50 x 40*	9 *229*	2.5 *1.1*
2½ x 1 *65 x 25*	9½ *241*	3.2 *1.5*
2½ x 1½ *65 x 40*	9½ *241*	3.6 *1.6*
2½ x 2 *65 x 50*	9½ *241*	4.0 *1.8*
3 x 1 *80 x 25*	9½ *241*	4.0 *1.8*
3 x 1¼ *80 x 32*	9½ *241*	4.3 *2.0*
3 x 1½ *80 x 40*	9½ *241*	4.5 *0.9*
4 x 2 *100 x 50*	10 *254*	6.7 *3.0*
4 x 2½ *100 x 65*	10 *254*	7.3 *3.3*
4 x 3 *100 x 80*	10 *254*	7.9 *3.6*
6 x 2½ *150 x 65*	11½ *292*	12.8 *5.8*
6 x 3 *150 x 80*	11½ *292*	13.6 *6.2*
6 x 4 *150 x 100*	11½ *292*	14.9 *6.8*
8 x 4 *200 x 100*	12 *305*	19.7 *8.9*
8 x 6 *200 x 150*	12 *305*	23.2 *10.5*

FIG. 7084SS

Groove x Class 150 Stainless Steel Flange Adapter Type 304

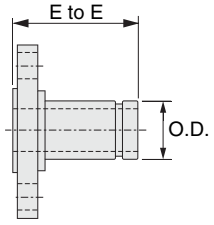


FIGURE 7084SS
STAINLESS STEEL FLANGE ADAPTER

Nominal Size	End to End*	Approx. Wt. Ea.
In./DN(mm)	*In./mm*	*Lbs./Kg*
2 *50*	3 1/8 *79.38*	5.7 *2.6*
2½ *65*	3⅜ *85.73*	8.6 *3.9*
3 *80*	3⅜ *85.73*	9.7 *4.4*
4 *100*	3 9/16 *90.49*	14.6 *6.6*
5 *125*	3¾ *95.25*	17.5 *7.9*
6 *150*	3 15/16 *100.01*	19.4 *8.8*
8 *200*	4 1/2 *114.30*	32.9 *14.9*
10 *250*	4¾ *120.65*	45.0 *20.4*
12 *300*	4¾ *120.65*	70.8 *32.1*

Notes:

1) *Dimensions may differ from those shown above. Contact an Anvil Representative for more information.
2) Fabricated fittings weights are based on Schedule 10 pipe.
3) Fabricated Schedule 10, 316SS and Schedule 40 Center to End dimensions are the same.
4) The pressure rating for the Gruvlok Schedule 10 Stainless Steel Fittings are equal to the pressure rating of the coupling used on Schedule 10 pipe as shown in the Working Pressure Ratings Chart for Stainless Steel Roll Grooved Pipe on page 143.
5) The pressure rating for the reducing tees, concentric reducers and eccentric reducers should be based upon the dimension of the weakest end.

MODEL 1007 & 3007

Roll Groovers

A. 1007 STANDARD EQUIPMENT - Roll Groover complete with groove and drive rolls for 2" - 12" steel pipe, Steel/CTS Dual Guide Roll Assembly, one and one-half horsepower electric motor drive with foot switch. Two stage hydraulic hand pump, mounting base with footed support legs. Complete set-up and operating instructions; 2" - 6" rolls on tool, 8" - 12" rolls stored in box, and three depth gauges covering the range of 2" through 12" pipe are mounted on the tool.

Shipped in closed wood crate that can be used for storage or rental tool return.

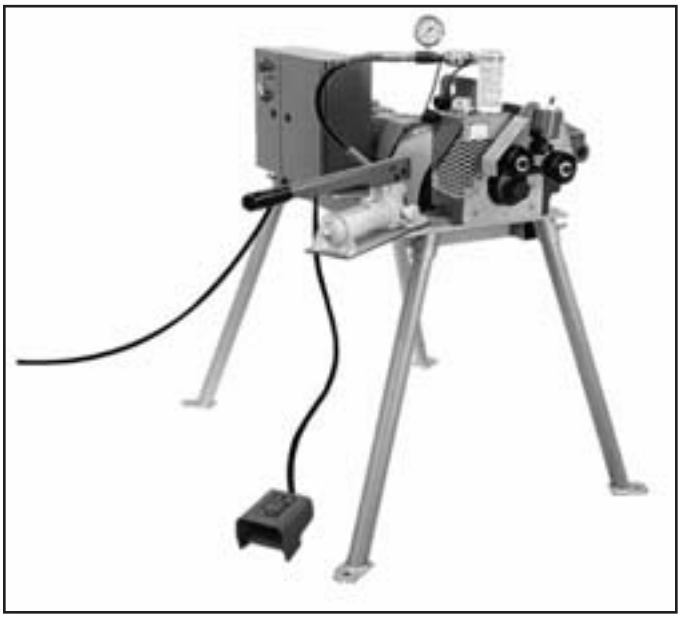
Shipping Weight: 620 lbs.

A. 3007 STANDARD EQUIPMENT – Roll Groover complete with groove and drive rolls for 2" - 12" steel pipe, Steel/CTS Dual Guide Roll Assembly, two stage hydraulic hand pump, mounting base with footed support legs for direct attachment to your Ridgid® 300 Power Drive. Complete set-up and operating instructions; 2" - 6" rolls on tool; 8" - 12" rolls stored in box, and three depth gauges covering the range of 2"-12" pipe are mounted on the tool. Required Ridgid 300 Power Drive not included.

Shipped in closed wood crate that can be used for storage or rental tool return.

Shipping Weight: 330 lbs.

MODEL 1007 ROLL GROOVERS



MODEL 3007 ROLL GROOVERS

B. OPTIONAL EQUIPMENT

Steel Pipe:

- 2"-12" Schedule 10, 10S; 40, 40S Rolls: Consisting of 2"-6" and 8"-12" roll sets.
- 14"-16" Steel Grooving Rolls (Model 1007 only).

CTS Copper System Option:

- 2"-8" CTS Copper System Grooving Rolls, 2"-4" CTS Depth Gauge, and 5"-8" CTS Depth Gauge.

Other:

- Optional 230 volt, 60Hz, 15 amp, single phase electrical panel with motor is available for the 1007 Roll Groover.

MODEL 1007 & 3007

Roll Groovers

C - GROOVER CAPABILITY

GROOVER CAPABILITY											
Pipe Material	Pipe Size/Wall Thickness (Schedule)										
In.	2	2½	3	4	5	6	8	10	12	14	16
DN(mm)	50	65	80	100	125	150	200	250	300	350	400
Steel	Schedule 10, 40									Std.	Std.
Stainless	Steel Schedule 10S, 40S									n/a	n/a
Copper	K, L, M & DWV							n/a	n/a	n/a	n/a

NOTES:

(1) All wall thickness shown are the maximum wall thickness for the indicated pipe material.

(2) Minimum wall thickness for each pipe materials and size is:

Steel: 2" - 12" – Sch. 10, 14" & 16" Standard Wall
Stainless Steel: 2" - 12" – Sch. 10S, 40
Copper: 2" - 2½" – Type M
3" - 8" – Type DWV

(3) Contact an Anvil Representative for information on grooving alternate materials

NOTE: Some sizes may require optional equipment.

D - GROOVER TIMES

MODEL 1007 & MODEL 3007 STEEL PIPE GROOVING TIMES (MIN: SEC.)										
Pipe Size (In./DN(mm)) – Sch. 40 (Std. Wall) Steel Pipe										
2	2½	3	4	5	6	8	10	12	14	16
50	65	80	100	125	150	200	250	300	350	400
0:20	0:20	0:25	0:30	1:00	1:20	1:35	1:50	2:20	2:40	3:00

This chart shows approximate grooving times with the groover setup for the proper size and groove diameter and the pipe properly positioned on the groover. The times shown are average times from the start of rotation of the pipe in the grooving rolls to completed groove.

- WIDE GROOVING RANGE— 2" thru 16" standard wall & schedule 10 steel pipe, 2" thru 12" Schedule 10S and 40S Stainless Steel and 2" thru 8" copper tube type K, L, M, and DWV.
- PIPE LENGTHS—20' random schedule 40 (standard wall) to 5" groove by groove nipples. The shortest roll groove nipple capability in the industry; hands-clear operation.
- HANDS CLEAR GROOVING OF PIPE AND NIPPLES— Enhanced operator safety provided by outboard guide roll assembly.
- ACCURATE, REPEATABLE-GROOVE DIAMETER CONTROL— Simplified direct action design provides positive, repeatable, control for grooving carbon and stainless piping. For grooving copper, universal diameter gauge must be utilized.
- FAST GROOVING TIMES— Large capacity two-stage pump. Two-stage design saves time engaging pipe while providing smooth application of optimum grooving force with reduced operator effort.
- BETTER CONTROL OF PIPE FLARE— Outboard guide roll assembly registers pipe for proper orientation.
- QUICK, EASY SETUP AND ROLL CHANGE
- RUGGED DESIGN REQUIRES ZERO MAINTENANCE— Sealed bearings eliminate need for periodic maintenance.
- USER FRIENDLY DESIGN— Pump location is adjustable for operator comfort and safety.
- EASE OF OPERATION— High grooving forces obtained through use of larger capability ram requires less pump effort.
- FOOT SWITCH POWER APPLICATION
- OPERATOR SAFE DESIGN

MODEL 3006

Roll Groover

The Gruvlok Model 3006 roll groover features a low maintenance quick roll change out design with the capability to groove 2" - 12" steel pipe, as well as 2" - 6" stainless steel. This machine is also compatible with the CTS Copper System for accurate and repeatable grooving of tube as small as 2" in diameter. Standard with each machine is the patented Gruvlok hands free nipple guide system. This one of a kind nipple guide system allows for the shortest nipple grooving in the business and is hands free for increased operator safety. A special hydraulic pump with a reduced height handle and pivoting location allow each operator to customize the machine for maximum comfort while grooving. Low cost, lightweight, user friendly, and reliable, the Model 3006 Roll Groover follows the quality Gruvlok tradition started with 1007/3007 models and takes the future of roll grooving one step further.

Gruvlok roll grooving technology is protected by U.S. Patents 5450738, 5570603, 5778715 and others pending.

- **WIDE GROOVING RANGE—**
  2" thru 8" Schedule 40 (standard wall) steel pipe,
  10" (.188" Wall), 12" (.219" wall), and 2" thru 12" Sch. 10
  2" thru 6" Schedule 10S and 40S Stainless Steel Pipe, and
  2" thru 8" copper type K, L, M, and DWV.
- **PIPE LENGTHS—** 20' random Schedule 40 (standard wall) to 5" groove by groove nipples. The shortest roll groove nipple capability in the industry: hands clear
- **HANDS-CLEAR GROOVING OF PIPE AND NIPPLES—** Enhanced operator safety provided by outboard guide roll assembly
- **ACCURATE, REPEATABLE GROOVE DIAMETER CONTROL—** Simplified direct action provided positive, repeatable control for grooving carbon and stainless piping. For grooving copper, universal diameter gauge must be utilized.
- **BETTER CONTROL OF PIPE FLARE—** Outboard guide roll assembly registers pipe for proper orientation.
- **QUICK, EASY SETUP AND ROLL CHANGE**
- **RUGGED DESIGN REQUIRES MINIMAL MAINTENANCE—** Only periodic application of grease via grease fittings required.
- **USER FRIENDLY DESIGN—** Pump has a special reduced height handle and adjustable location for operator comfort and safety.
- **EASE OF OPERATION—** High grooving forces obtained though use of large capacity ram requires less pump effort.

MODEL 3006

Roll Groover

TECHNICAL DATA – MODEL 3006

STANDARD EQUIPMENT:

Roll Groover complete with Adjustable Support Leg Assembly and roller sets for grooving 2"-6" and 8"-12" steel pipe, Steel/CTS Dual Guide Roll Assembly, hydraulic pump with pressure gauge, and two depth adjustment gauges. This unit is designed for direct attachment to your Ridgid® 300 Power Drive. Complete with comprehensive setup, operating and trouble-shooting instructions.

Shipped in a reusable wooden storage crate.

Approximate shipping weight: 225 pounds.

Required Ridgid® 300 Power Drive not included.

OPTIONAL EQUIPMENT:

Advanced Copper Method (IPS Copper) Option:

- Consisting of 2"-6" Advanced Copper Method roll set, Advanced Copper Method Guide Roll Assembly, and a 2"-6" Universal Diameter Gauge.
- 2"-6" Universal Diameter Gauge.

CTS Copper System Option:

- Consisting of 2"-8" roll set, 2"-6" CTS Depth Gauge, and 8" CTS Depth Gauge.

GROOVER CAPABILITY

GROOVER CAPABILITY

Pipe Material	Pipe Size/Wall Thickness (Schedule)[1,2]								
In.	*2*	*2½*	*3*	*4*	*5*	*6*	*8*	*10*	*12*
DN(mm)	*50*	*65*	*80*	*100*	*125*	*150*	*200*	*250*	*300*
Steel	Schedule 10, 40							0.188"	0.219"
Stainless Steel	Schedule 10S, 40S						n/a	n/a	n/a
CTS Copper System	K, L, M & DWV							n/a	n/a

NOTES:

(1) All wall thickness shown are the maximum wall thickness for the indicated pipe material.

(2) Minimum wall thickness for each pipe materials and size is:
Steel: All sizes – Sch. 10
Stainless Steel: 2" - 6" Sch. 10S, 40S
Copper: 2", 2½" – Type M
3" - 8" – Type DWV

(3) Please contact an Anvil Representative for more information on grooving alternate materials & wall thickness.

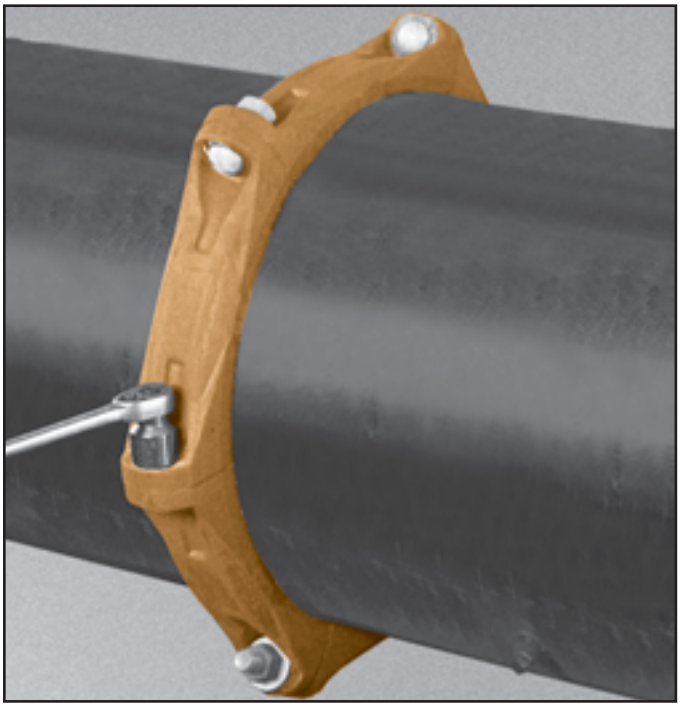
GROOVER TIMES

MODEL 3006 STEEL PIPE GROOVING TIMES (MIN: SEC.)

Pipe Size (In./DN(mm))/Max Steel Pipe Wall Thickness							
2	*2½*	*3*	*4*	*6*	*8*	*10*	*12*
50	*65*	*80*	*100*	*150*	*200*	*250*	*300*
0:20	0:20	0:25	0:30	1:20	1:55	1:40	1:20

GROOVING TIMES: This chart shows approximate grooving times with the groover set-up for the proper size and groove diameter and the pipe properly positioned on the groover. The times shown are average times from the start of rotation of the pipe in the grooving rolls to completed groove.

COUPLING INSTALLATION & ASSEMBLY



Installation & Assembly

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The instructions are based on pipe grooved in accordance with Gruvlok® grooving specifications. Check pipe ends for proper groove dimensions and assure that the pipe ends are free of indentations and projections which would prevent proper sealing.

ALWAYS USE A GRUVLOK® LUBRICANT FOR PROPER COUPLING ASSEMBLY. Thorough lubrication of the external surface of the gasket is essential to prevent pinching and possible damage to the gasket. For temperatures above 150° F (65.6° C) use Gruvlok Xtreme™ Lubricant and lubricate all gasket surfaces, internal and external. See Gruvlok Lubricants in the Technical Data section of the Gruvlok catalog for additional important information.

SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Gruvlok® couplings and flanges. The nuts must be tightened alternately and evenly until fully tightened. Caution: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

ANSI SPECIFIED BOLT TORQUE		
Bolt Size	Wrench Size	Specified Bolt Torque *
In.	*In.*	*Ft.-Lbs*
3/8	11/16	30-45
1/2	7/8	80-100
5/8	1 1/16	100-130
3/4	1 1/4	130-180
7/8	1 7/16	180-220
1	1 5/8	200-250
1 1/8	1 13/16	225-275
1 1/4	2	250-300

* Non-lubricated bolt torques.

METRIC SPECIFIED BOLT TORQUE		
Bolt Size	Wrench Size	Specified Bolt Torque *
mm	*mm*	*N-m*
M10	16	40-60
M12	22	110-150
M16	24	135-175
M20	30	175-245
M22	34	245-300
M24	36	270-340

* Non-lubricated bolt torques.

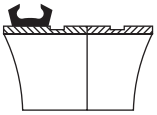
NOTE: Specified torques are to be used unless otherwise noted on Product Installation Instructions.

FIG. 7401
Rigidlok® Coupling

1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok lubricant to the exterior surface and sealing lips of the gasket. Some applications require lubrication of the entire gasket surface. Be careful that foreign particles do not adhere to lubricated surfaces.

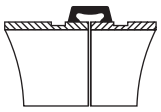
2 GASKET INSTALLATION— Slip the gasket over the pipe end making sure the gasket lip does not overhang the pipe end.

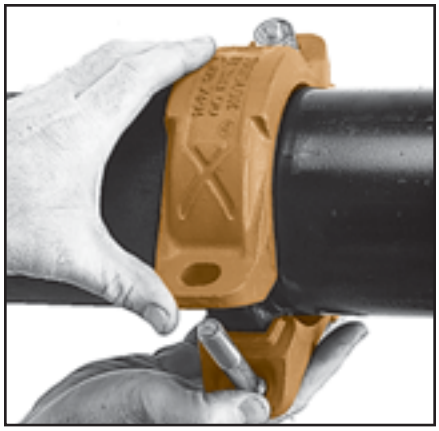
On couplings 10" and larger it may be easier to turn the gasket inside out then lubricate and slide the gasket over the pipe end as shown.



3 ALIGNMENT— After aligning the two pipe ends, pull the gasket into position centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.

On couplings 10" and larger, flip or roll the gasket into centered position.

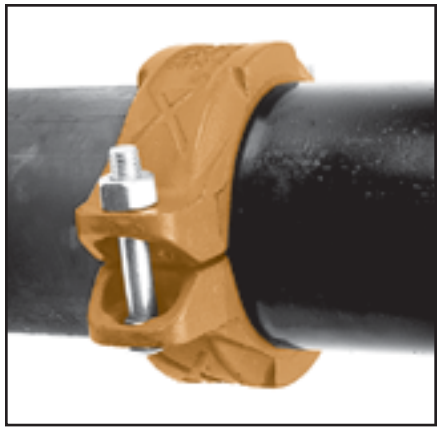




4 HOUSINGS— Remove one nut and bolt and loosen the other nut. Place one housing over the gasket, making sure the housing keys fit into the pipe grooves. Swing the other housing over the gasket and into the grooves on both pipes, making sure the tongue and recess of each housing is properly mated. Reinsert the bolt and run-up both nuts finger tight.

5 TIGHTEN NUTS— Securely tighten nuts alternately and equally to the specified bolt torque, keeping the gaps at the bolt pads evenly spaced.

CAUTION: Uneven tightening may cause the gasket to pinch. Gasket should not be visible between segments after bolts are tightened.



6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. The bolt pads are to have equal gaps on each side of the coupling.

NOTE: Sizes 16" and larger are cast in multiple segments. To install the larger sizes align the tongue and pocket of the couplings appropriately and tighten the nuts alternately to the specified bolt torque. When properly assembled there will be a small equal gap between the adjacent bolt pads.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

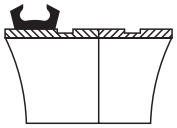
CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

FIG. 7001
Standard Coupling

1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok lubricant to the exterior surface and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

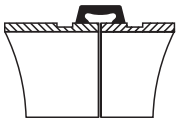
2 GASKET INSTALLATION— Slip the gasket over the pipe end making sure the gasket lip does not overhang the pipe end.

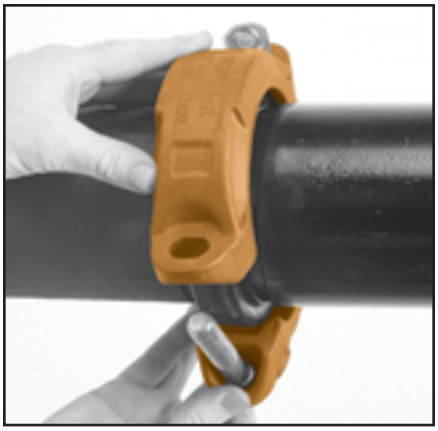
On couplings 10" and larger it may be easier to turn the gasket inside out then lubricate and slide the gasket over the pipe end as shown.



3 ALIGNMENT— After aligning the two pipe ends, pull the gasket into position centering it between the grooves on each should not extend into the groove on either pipe.

On couplings 10" and larger, flip or roll the gasket into centered position.





4 HOUSINGS— Place the coupling housing halves over the gasket making sure the housing keys engage the grooves. Insert bolts and turn nuts finger tight.

5 TIGHTEN NUTS— Tighten the nuts alternately and equally to the specified bolt torque. The housing bolt pads must make metal-to-metal contact.

CAUTION: Uneven tightening may cause the gasket to pinch.

6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.

NOTE: The housings for sizes 16" and larger are cast in four or more segments.

TO INSTALL: Loosely pre-assemble the segments into two "Housing Halves" making sure that the alignment tang(s) and slot(s) on the bolt pad(s) are properly mated. Install the "Housing Halves" as shown in steps 4 & 5. The coupling is properly installed when all bolt pads are firmly together - Metal-to-Metal.

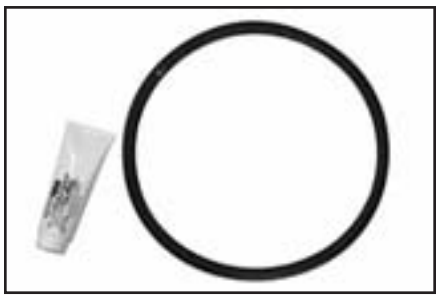
CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

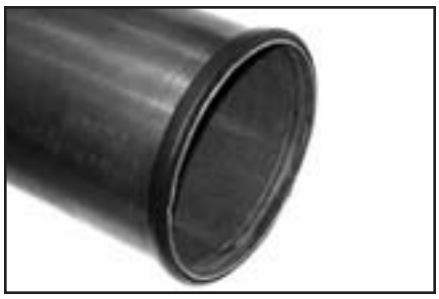
FIG. 7001-2 & FIG. 7401-2

2-Piece Large Diameter Standard Groove Couplings

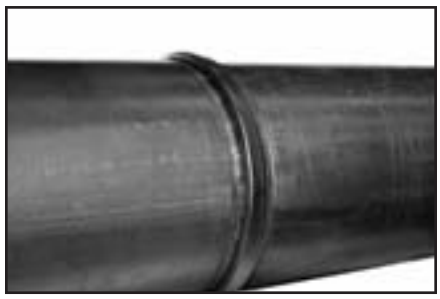
- 7001-2 & 7401-2 bolts must be lightly coated with Gruvlok Xtreme™ lube before installation. See chart for torque requirements.
- Minimum wall pipe suitable for 14" – 24": 7001-2 & 7401-2 roll grooved installation is 0.250" wall thickness
- Pipe preparation Grooved dimensions must conform to the Gruvlok Roll/Cut groove specification



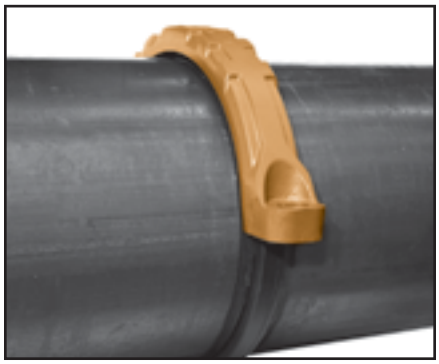
1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coat of Gruvlok lubricant to the exterior surface and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.



2 GASKET INSTALLATION— Slip the gasket over the pipe end, making sure the gasket lip does not overhang the pipe end.



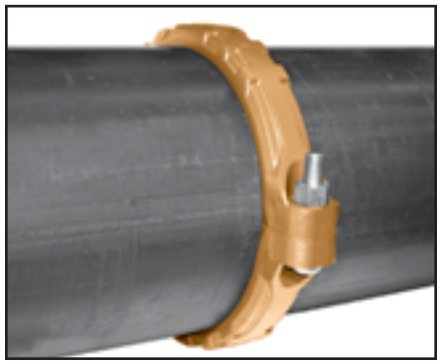
3 ALIGNMENT— After aligning the two pipe ends together, pull the gasket into position, centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.



4 HOUSING— Place each housing half on the pipe and into each groove making sure that the gasket does not slip out of position in between the pipe ends or groove.

5 BOLTS— Apply a thin coat of Xtreme lube, or Gruvlok Standard Lube to the bolt threads. Tighten the nuts alternately and equally to the specified bolt torque.

CAUTION: Uneven tightening may cause the gasket to pinch.



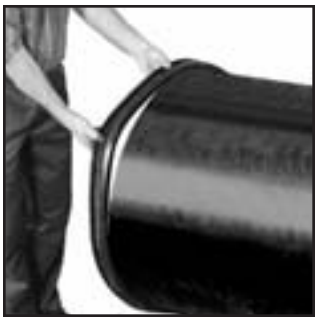
6 FINAL ASSEMBLY— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves, the bolt pads are in firm even metal-to-metal contact on both sides of the coupling, and gasket is not visible.

ANSI SPECIFIED BOLT TORQUE			
Pipe Sizes	Bolt Size	Specified Bolt Torque	Lubrication
In.	*In.*	*Ft.-Lbs*	–
14	7/8	180 - 220	Gruvlok Xtreme™ Lubricant
16	1	250 - 300	
18	1	250 - 300	
20	1 1/8	375 - 425	
24	1 1/8	375 - 425	

CAUTION: When using an impact wrench, verify that the torque output on the wrench is within the required torque range.

FIG. 7011
Standard Coupling

1 Inspect the pipe ends making sure the criteria, in the Gruvlok Large Diameter Pipe Roll and Cut Groove Specifications, are met.



2 Turn the gasket inside out and slide the gasket completely over one of the pipe ends. Turning the gasket inside out will reduce the stretching necessary to put the gasket into position. Ideally, approximately 75% of the pipe's gasket-sealing surface, (Dimension A) should be visible when the gasket is in proper position. This will aid in step 4.

3 Lubricate the gasket sealing lips. The use of Gruvlok lubricants ensures compatibility between the lubricant and the gasket.

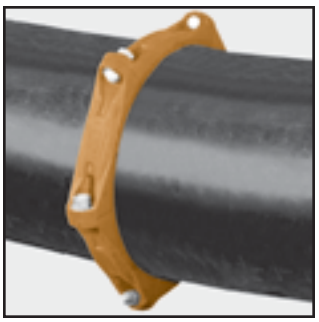
4 Pull the two pipes into contact aligning the pipe ends.

CAUTION: Be careful not to pinch fingers during this step. Working your way around the circumference of the pipe, flip the gasket toward the pipe end so that the proper side is facing out. The end of this procedure will result in the gasket snapping into place. Position the gasket centrally between the grooves of the two pipe ends.

5 Lubricate the exterior surface of the gasket. This helps prevent pinching of the gasket during assembly.

6 Secure the housings about the pipes making sure the coupling keys are engaged in the pipe end grooves. Hint: For horizontal assembly, place housing segment on top of the pipe to support the weight of the housing segment. Secure the adjacent housing with an oval neck track bolt and heavy hex nut and then rotate the secured housings, again balancing the weight of the housings on the top of the pipe. Continue this procedure for all segments.

7 Firmly torque each bolt. The specified minimum torque for each nut is 600 ft.-lbs. The specified maximum torque for each nut is 800 ft.-lbs.



8 Installation of the Figure 7011 Standard Coupling is completed.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

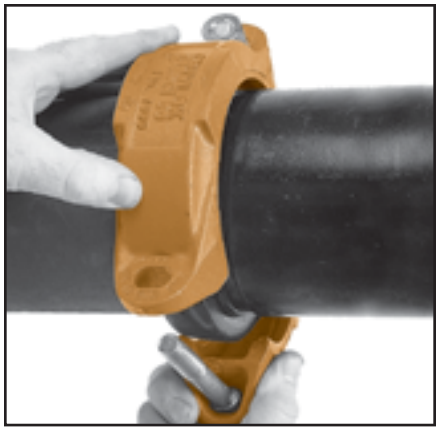
CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

FIG. 7000
Lightweight Flexible Coupling

1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok lubricant to the exterior surface and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

2 GASKET INSTALLATION— Slip the gasket over the pipe end, making sure the gasket lip does not overhang the pipe end.

3 ALIGNMENT— After aligning the two pipe ends together, pull the gasket into position, centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.



4 HOUSINGS— With one nut unthreaded to the end of the bolt, unthread the other nut completely and swing the coupling housing halves over the gasket, making sure the housing keys engage the grooves. Insert the bolt and turn the nuts finger tight.

5 TIGHTEN NUTS— Tighten the nuts alternately and equally to the specified bolt torque. The housing bolt pads must make metal-to-metal contact.

CAUTION: Uneven tightening may cause the gasket to pinch.

6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

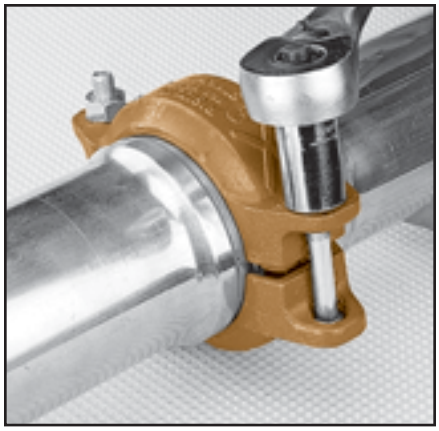
FIG. 7400
Rigidlite® Coupling

1 CHECK & LUBRICATE GASKET— Check the gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok Xtreme Lubricant to the entire surface, both internal and external, of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

2 GASKET INSTALLATION— Slip the gasket over the one tube, making sure the gasket lip does not overhang the tube end.

3 ALIGNMENT— After aligning the two tube ends together, pull the gasket into position, centering it between the grooves on each tube. The gasket should not extend into the groove on either tube.

4 HOUSINGS— Remove one nut and bolt and loosen the other nut. Place one housing over the gasket, making sure the housing keys fit into the tube grooves. Swing the other housing over the gasket and into the grooves on both tubes, making sure the tongue and recess of each housing is properly mated. Reinsert the bolt and run-up both nuts finger tight.



5 TIGHTEN NUTS— Securely tighten nuts alternately and equally to the specified bolt torque, keeping the gaps at the bolt pads evenly spaced.

CAUTION: Uneven tightening may cause the gasket to pinch. Gasket should not be visible between segments after bolts are tightened.

6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. The bolt pads are to have equal gaps on each side of the coupling.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

FIG. 6400
Rigid Coupling

The Fig. 6400 Coupling from Gruvlok is specially designed to provide a rigid pipe connection to meet the specific demands of copper tubing installation. Fast and easy swing-over installation of the rugged lightweight housing produces a secure, rigid pipe joint. Available with the EPDM flush gap style gasket as the standard gasket.

CAUTION: Uneven tightening may cause the gasket to pinch. The gasket should not be visible between segments after the bolts are tightened. Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation.

SPECIFIED BOLT TORQUE

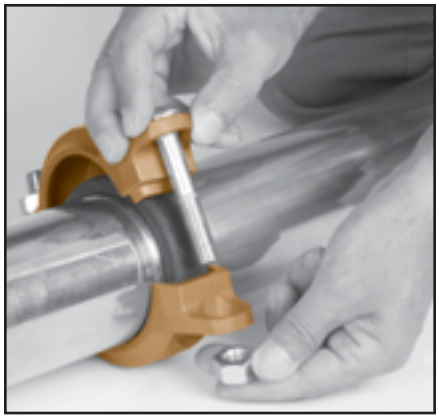
Bolt Size	Wrench Size	Specified Bolt Torque*
In.	*In.*	*Ft.-Lbs*
3/8	11/16	30-45
1/2	7/8	30-45
5/8	1 1/16	60-90

* Non-lubricated bolt torques.

1 CHECK & LUBRICATE GASKET– Check the gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok® Xtreme Lubricant to the entire surface, both internal and external, of the gasket. Be careful that foreign particles do not adhere to the lubricated surfaces.

2 GASKET INSTALLATION– Slip the gasket over one tube, making sure the gasket lip does not overhang the tube end.

3 ALIGNMENT– After aligning the two tube ends together, pull the gasket into position, centering it between the grooves on each tube. The gasket should not extend into the groove on either tube or between the tube ends.



4 HOUSINGS– Remove one nut and bolt and loosen the other nut. Place one housing over the gasket, making sure the housing keys fit into the tube grooves. Swing the other housing over the gasket and into the grooves on both tubes, making sure the tongue and recess of each housing is properly mated. Re-insert the bolt and run-up both nuts finger tight.

5 TIGHTEN NUTS– Securely tighten nuts alternately and equally to the specified bolt torque, keeping the gaps at the bolt pads evenly spaced. Assembly is complete. Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. The bolt pads are to have equal gaps on each side of the coupling.

NOTE: Copper is a soft material, in some cases, the bolt pads may come close to metal-to-metal contact.

CAUTION: Uneven tightening may cause the gasket to pinch. The gasket should not be visible between segments after the bolts are tightened. Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation.

FIG. 7003

Hingelok™ Coupling

NOTE: Remove locking pin from handle before opening coupling.

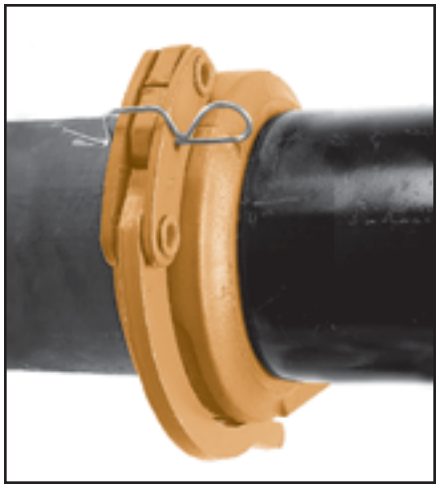
1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok lubricant to the exterior surface and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

2 GASKET INSTALLATION— Slip the gasket over the pipe end making sure the gasket lip does not overhang the pipe end.

3 ALIGNMENT— After aligning the two pipe ends, pull the gasket into position centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.

4 HOUSINGS— Put one half of the open coupling over the gasket as the coupling keys fit firmly into the grooves on each pipe end. Swing the other half of the coupling into position around the gasket and into the grooves.

5 LOCK COUPLING— Fit the nose of the locking handle in the notch of the opposite housing. Press firmly down on the handle until it makes contact with the coupling housing. Insert locking pin into handle linkage to secure handle in closed position. (See Caution.)



6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.

CAUTION:

1) Hammering or banging on the handle or coupling housing could cause serious damage to the locking device and coupling assembly. The result may be an unsuitable pipe joint and unusable coupling assembly.
2) Care needs to be taken so that fingers do not get caught or pinched when handle is placed in locked position as a result of cam action of handle assembly.
3) When re-using coupling and gasket, always inspect gasket for damage and hinge/handle assembly for looseness, distortion or any other damage.

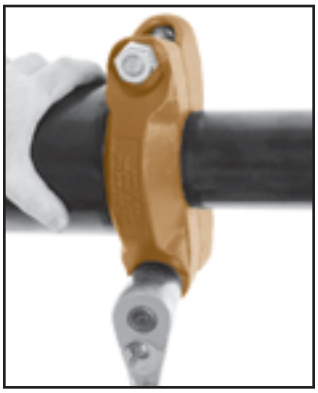
FIG. 7010
Reducing Coupling

1 CHECK & LUBRICATE GASKET— check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok lubricant to the exterior surface and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

2 GASKET INSTALLATION— Place the smaller opening of the gasket over the smaller pipe. Angle the gasket over the pipe end and pull the gasket lip open around the circumference of the pipe. The center leg of the gasket should make flush contact with the pipe end and will prevent telescoping of the smaller pipe inside the larger.

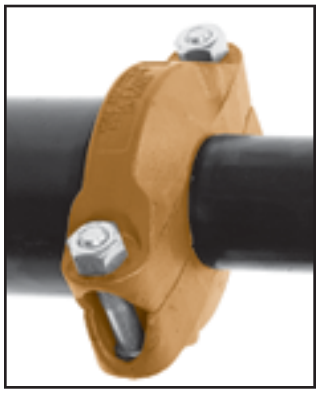
3 ALIGNMENT— Align the adjoining pipe center lines, and insert the larger pipe end into the gasket. Angle the pipe end slightly to the face of the gasket and tilt the pipe into the gasket to ease assembly.

4 HOUSINGS— Place the coupling housing halves over the gasket making sure the housing keys engage the grooves. Insert bolts and turn nuts finger tight.

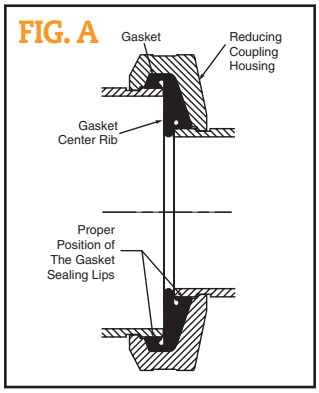


5 TIGHTEN NUTS— Tighten the nuts alternately and equally to the specified bolt torque. The housing bolt pads must make metal-to-metal contact.

CAUTION: Uneven tightening may cause the gasket to pinch.



6 ASSEMBLY COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.



NOTE: Fig. A illustrates the correct position of the Fig. 7010 Reducing Coupling gasket and housing properly assembled onto adjacent pipe ends.
CAUTION: In vertical installations the pipes must be supported to prevent telescoping during installation.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

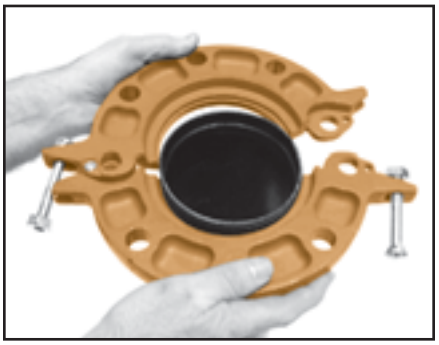
FIG. 7012

Gruvlok Flange (2"–12")

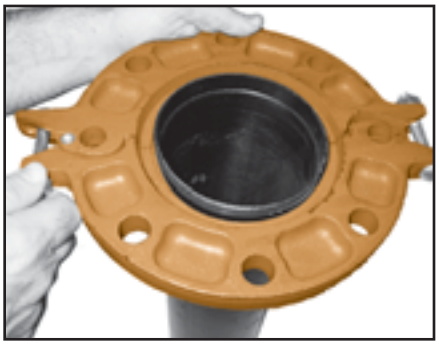
APPLICATIONS WHICH REQUIRE A GRUVLOK® FLANGE ADAPTER INSERT:

1. When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok Flange.
2. When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
3. When mating to a serrated flange surface, a standard full-faced flange gasket is installed against the serrated flange face, and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard flange gasket.
4. When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

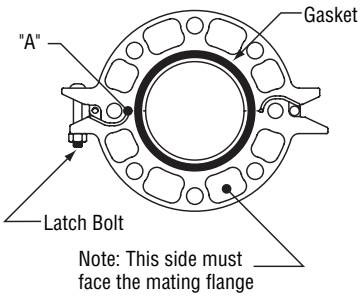
Check pipe end for proper grooved dimensions and to assure that the pipe end is free of indentations and projections that would prevent proper sealing of the Gruvlok flange gasket.



1 On the side without the hinge pin, loosen the latch bolt nut to the end of the bolt thread. (It is not necessary to remove the nut from the latch bolt.) Swing the latch bolt out of the slot. Open the Gruvlok Flange and place around the grooved pipe end with the key section fitting into the groove. The flange gasket cavity must face the pipe end.



2 Place the latch bolt back into the slotted hole. Tighten the nut until there is a 1/16" gap between the flange halves at location "A". (See Figure below)



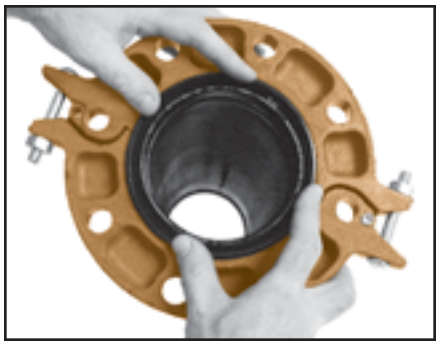
3 Check the gasket to assure that it is properly suited for the intended service. Lubricate the entire exterior surface of the gasket, including the sealing lips, using the proper Gruvlok lubricant.

⚠ WARNING

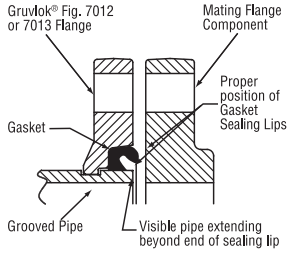
The Gruvlok Flange gasket must be inserted so that the sealing lips face toward the pipe end and the mating flange. The lip of the gasket, sealing on the pipe, should not extend beyond the pipe end. The pipe should extend out beyond the end of the sealing lip by approximately 1/8" on the 2"-6" sizes and 3/16" on the 8"-12" sizes.

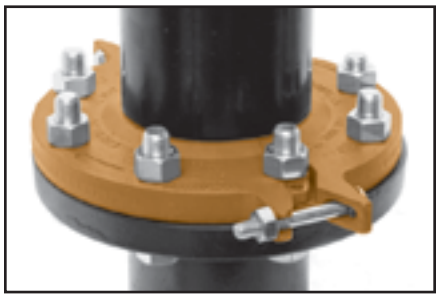
FIG. 7012

Gruvlok Flange (2"–12")



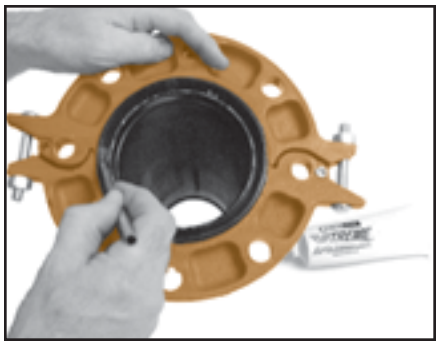
4 Stretch the Gruvlok gasket around the pipe end and then press the gasket into the cavity between the pipe O.D. and the flange. The gasket must be properly positioned as shown in the figure below.



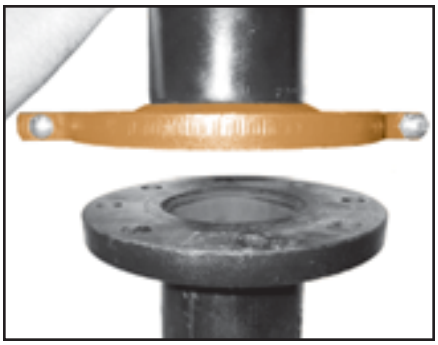


7 Insert a flange bolt or stud with material properties of SAE J429 Grade 5 or higher through the bolt holes and thread a nut on hand tight. Continue this procedure until all bolt holes have been fitted. Tighten the nuts alternately and evenly so the flange faces remain parallel. All the bolts or studs must be torqued to the mating flange bolts specified torque. The flange faces should have metal-to-metal contact.

WARNING It is important to line up the bolt holes before bringing the two flanges together. Sliding the flanges into place will dislodge the gasket and cause leakage to occur. When using a flange insert, it is important that the insert is properly aligned with the gasket prior to tightening the bolts.



5 With the gasket in place apply lubricant to the exposed gasket tip, which will seal on the mating flange. **Tighten the nuts on the latch bolts alternately to the specified latch bolt torque. The flange housings must be in firm metal-to-metal contact.**



6 Verify that the mating flange face is hard, flat and smooth, free of indentations, which would prevent proper sealing of the Gruvlok Flange gasket. Assure the gasket is still in the proper position and align Gruvlok Flange bolt holes with the mating flange, pump, tank, etc., bolt holes.

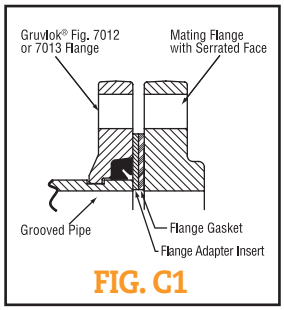


FIG. C1

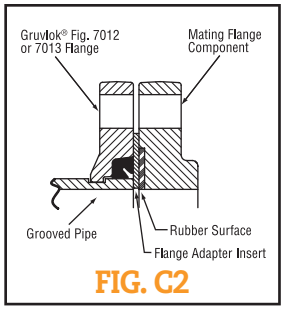


FIG. C2

NOTE: The Gruvlok Fig. 7012 Flange requires the use of a Flange Adapter Insert when used against rubber surfaces (Figure C1), serrated flange surfaces or mating flanges with inserts (Figure C2). The Flange Adapter Insert will be exposed to the fluids in the system. Ensure that the Insert is compatible with the fluids in the systems and with adjacent piping components.

WARNING Do not use a steel Flange Adapter Insert in copper systems or in systems where galvanic corrosion is possible.

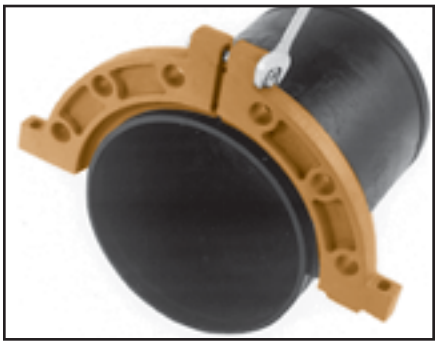
CAUTION: Proper torquing of flange bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

FIG. 7012

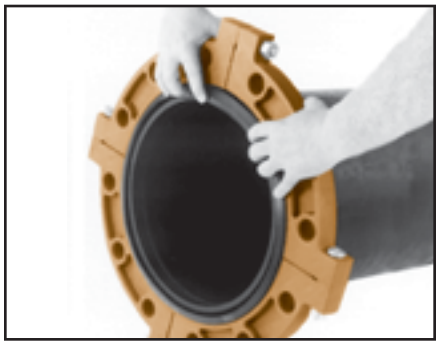
Gruvlok Flange (14"–24")

Gruvlok® Flanges of 14" size and larger are cast in four segments to ease handling during assembly. Figure 7012 Gruvlok Flanges should not be used with tie rods nor in a configuration with a wafer valve between two 7012 flanges.

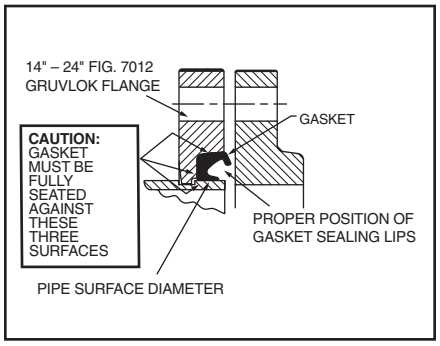


1 Place each Gruvlok Flange segment around the grooved pipe with the key section fitting into the groove and the flange gasket cavity facing the pipe end. Loosely assemble the segments using the four segment-bolts-and nuts. Alternately and equally tighten the latch bolts and nuts to the specified latch bolt torque. Bring the four flange segments into full, firm metal-to-metal contact.

NOTE: An alternative method of assembly is to loosely preassemble two segments into two equal halves of the flange leaving a small gap (approximately 1/8") between the two segments of each flange-half. Place the flange halves around the pipe and complete the assembly as described in Step 1, above.

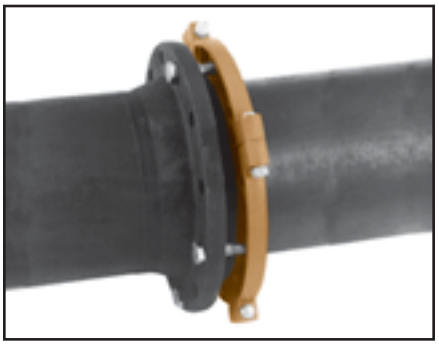


2 Check the gasket grade to verify that it is properly suited for the intended service. Lubricate the entire surface of the gasket and the flange cavity using the appropriate Gruvlok Lubricant. Place the Gruvlok Flange Gasket around the pipe end by pressing the gasket into the cavity between the pipe O.D. and flange recess. Move around the gasket in both directions until the gasket is fully seated in the flange gasket cavity.



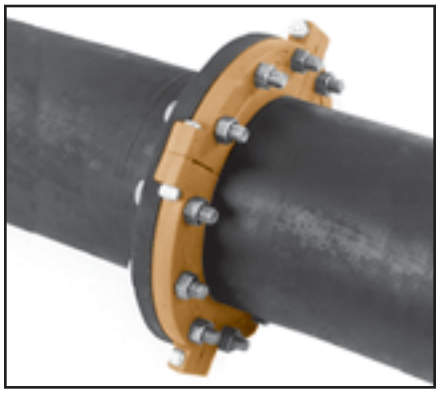
3 The correct position and relationship of the components of the Gruvlok Flange assembly is shown in the Figure above. The wide gasket lip must seal on the pipe surface diameter and the narrow gasket lip must face the mating flange. Be careful that foreign particles do not adhere to lubricated surfaces.

NOTE: Design of the Gruvlok Flange provides sealing only with the special Gruvlok Flange gasket. Only Gruvlok Flange gaskets may be used with Fig. 7012 flanges.



4 Align the Gruvlok Flange bolt holes with mating flange bolt holes. Insert a flange bolt or stud with material properties of SAE J429 Grade 5 or higher through the bolt holes and thread a nut on hand tight. Insert the next bolt or stud opposite the first and again thread the nut on hand tight. Continue this procedure until all bolt holes have been fitted. Insertion of the flange bolts prior to contact of the flanges will help in the alignment of the flanges. Pull the two flanges into contact using care to assure that the gasket remains fully seated within the gasket cavity during assembly.

NOTE: Take care to assure that the gasket lip is not bent backwards and pinched between the two flanges.



5 Tighten the nuts evenly to the specified mating face bolt torque so that the flange faces remain parallel and make firm even contact around the entire flange.

CAUTION: Proper torquing of flange bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

FIG. 7042
Outlet Coupling

These instructions are based on pipe grooved in accordance with Gruvlok® grooving specifications. Check pipe ends for proper groove dimensions and to assure that the pipe ends are free of indentations and projections which would prevent proper sealing.

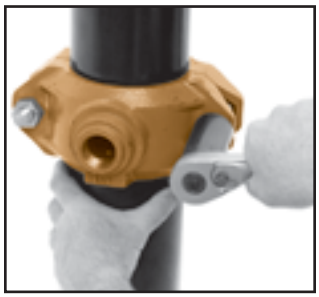
ALWAYS USE A GRUVLOK LUBRICANT FOR PROPER COUPLING ASSEMBLY. Thorough lubrication of the gasket is essential to prevent pinching and possible damage to the gasket.

1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of Gruvlok lubricant to the exterior surface and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

2 GASKET INSTALLATION— Slip the gasket over one pipe end making sure the pipe abuts the gasket's center ribs.

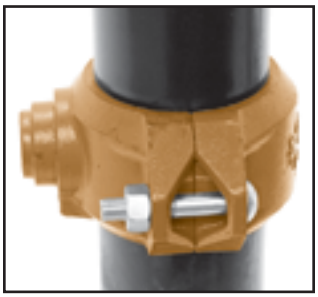
3 ALIGNMENT— Align the pipe ends and pull the pipe into the gasket until the center ribs are in contact with the pipe ends. The gasket should not extend into the groove on either pipe. Rotate the gasket to align the outlet of the gasket to the same direction as the branch outlet.

4 HOUSING ASSEMBLY— With one nut and bolt removed and the other loosened, place one side of the housing over the gasket. Make sure the ribs on the outside of the gasket align with the recesses in the housing and the keys in the housing are in the grooves on both pipes. Swing the other housing over the gasket and into the grooves on both sides of the pipe. Make sure the recess in the outlet of the housing is properly aligned with gasket outlet.



5 TIGHTEN NUTS— Re-insert the bolt and run-up both nuts finger tight. Securely tighten the nuts alternately and equally until they are completely tightened and there is no gap between the bolt pads. Continue tightening the nuts alternately and equally until the specified bolt torque is reached.

CAUTION: Make sure the ribs on the exterior of the gasket are enclosed in the housing recesses.



6 ASSEMBLY IS COMPLETE

FIG. 7042 – SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Gruvlok® couplings and flanges. The nuts must be tightened alternately and evenly until fully tightened. Caution: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

ANSI SPECIFIED BOLT TORQUE			
Coupling Size	Bolt Size	Wrench Size	Specified Bolt Torque *
In.	*In.*	*In.*	*Ft.-Lbs.*
1½	⅜ x 2⅛	11⁄16	30-45
2	⅜ x 2½	11⁄16	30-45
2½	½ x 2⅜	⅞	80-100
3	½ x 3	⅞	80-100
4	⅝ x 3½	1 1⁄16	100-130
6	⅝ x 3½	1 1⁄16	100-130

* Non-lubricated bolt torques.

FIG. 7045 & FIG. 7046

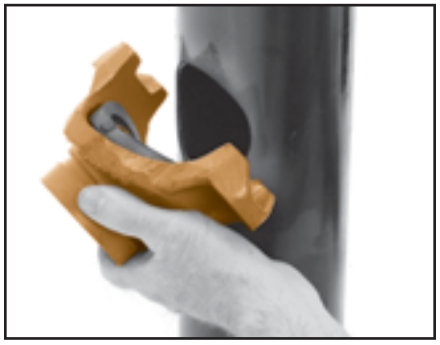
Clamp-T® Branch Outlets

ALWAYS USE A GRUVLOK LUBRICANT FOR PROPER COUPLING ASSEMBLY.
Thorough lubrication of the gasket is essential to assist the gasket into the proper sealing position.

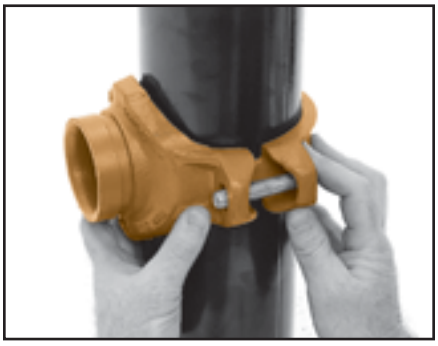
1 PIPE PREPARATION—Cut the appropriate size hole in the pipe and remove any burrs. Be sure to remove any slag from inside the pipe. Clean the gasket sealing surface within 5/8" of the hole and visually inspect the sealing surface for defects that may prevent proper sealing of the gasket.

BRANCH SIZE	HOLE SAW SIZE
(Inches)	*(Inches) (+1/8, -0)*
½, ¾, 1	1½
1¼, 1½	2
2	2½
2½	2¾
3	3½
4	4½

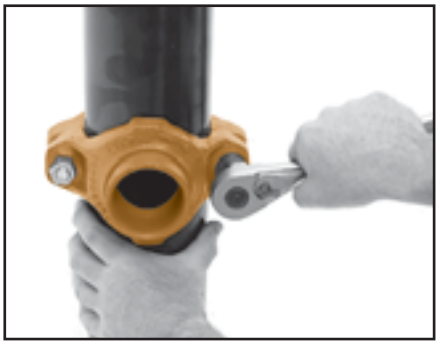
2 CHECK & LUBRICATE GASKET—Check the gasket to be sure it is compatible for the intended service. Apply a thin layer of Gruvlok lubricant to the back surface of the gasket. Be careful that foreign particles do not adhere to the lubricated surfaces. Insert the gasket back into the outlet housing making sure the tabs in the gasket line up with the tab recesses in the housing.



3 GASKET INSTALLATION—Lubricate the exposed surface of the gasket. Align the outlet housing over the pipe hole making sure that the locating collar is in the pipe hole.



4 ALIGNMENT—Align the strap around the pipe, insert the bolts and tighten the nuts finger tight. Some sizes use a U-bolt design.



5 TIGHTEN NUTS—Alternately and evenly tighten the nuts to the specified bolt torque.

6 ASSEMBLY IS COMPLETE

FIGS. 7045 & 7046—SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts and U-bolts used on the Gruvlok® Clamp-T's. The nuts must be tightened alternately and evenly until fully tightened. Caution: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure, battery strength and operational variations.

CAUTION: Proper torquing of the bolts or U-bolts is required to obtain the specified performance. Overtorquing the bolts or U-bolts may result in damage to the bolt, U-bolt and/or casting which could result in lower pressure retention capabilities, lower bend load capabilities, pipe joint leakage and pipe joint separation.

ANSI SPECIFIED BOLT TORQUE		
Bolt Size	Wrench Size	Specified Bolt Torque *
In.	*In.*	*Ft.-Lbs.*
U-Bolt	⅞	30-40
½	⅞	60-80
⅝	1 1/16	100-130
¾	1¼	130-180

* Non-lubricated bolt torques

FIG. 7044

Branch Outlet

ALWAYS USE A GRUVLOK LUBRICANT FOR PROPER BRANCH OUTLET ASSEMBLY. Thorough lubrication of the gasket is essential to to assist the gasket into the proper sealing position.

SPECIFIED BOLT TORQUE

The nuts must be tightened alternately and evenly until fully tightened. **CAUTION:** Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure, battery strength and operational variations.

CAUTION: Proper torquing of the U-bolts is required to obtain the specified performance. Over-torquing the U-bolts may result in damage to the U-bolt and/or casting which could result in lower pressure retention capabilities, lower bend load capabilities, pipe joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

1 PIPE PREPARATION AND GASKET LUBRICATION— Cut a 1 3/16" hole in the pipe and remove any burrs. Be sure to remove the slug from inside the pipe. Clean the gasket sealing surface within 5/8" of the hole and visually inspect the sealing surface for defects that may prevent proper sealing of the gasket. Remove the gasket from the housing and apply a thin layer of Gruvlok® lubricant to the back surface of the gasket. Be careful that foreign particles do not adhere to the lubricated surfaces. Insert the gasket back into the outlet housing making sure the tabs in the gasket line up with the tab recesses in the housing.

2 GASKET INSTALLATION— Lubricate the exposed surface of the gasket with Gruvlok® lubricant.

3 ALIGNMENT— Align the outlet housing over the pipe hole making sure that the locating collar is in the pipe hole.

4 HOUSING ASSEMBLY— Attach the U-bolt from the other side and fasten the nuts finger tight.

5 TIGHTEN NUTS— Making sure the fitting is properly located over the pipe hole, tighten the nuts alternately and evenly to the specifed torque of 27 to 33 Lbs.-Ft. (37 to 45 N-m).

6 ASSEMBLY IS COMPLETE— Visually inspect the assembly, the gasket will extrude out from under the housing.

FIG. 7005

Roughneck® Coupling

1 Make certain the pipe ends are free of indentations, projections, weld splatter, or other imperfections which could prevent proper sealing of the gasket.

2 Mark each pipe at a distance from the pipe end according to the pipe run size. See Image 1 and the chart.

3 Check the gasket color code to verify that the gasket grade is properly suited for the intended service. Apply a thin coating of Gruvlok Lubricant to the gasket lips and the exterior surface of the gasket and slip the gasket over one pipe. See Image 2. Make sure the gasket does not overhang the pipe end.

Pipe Size	Distance from pipe end mark	Bolt Torque	
		Min.	Max
In./DN(mm)	*In./mm*	*Ft.-Lbs./N-m*	*Ft.-Lbs./N-m*
2 - 2½ *50-65*	1 *25.4*	150 *203*	190 *257*
3 - 4 *80-100*	1 *25.4*	200 *271*	250 *339*
5 - 8 *125-200*	1¼ *31.8*	250 *339*	300 *406*
10 *250*	1¾ *44.5*	500 *678*	600 *814*
12 *300*	1¾ *44.5*	550 *746*	700 *949*
14 - 16 *350-400*	1¾ *44.5*	550 *746*	700 *949*

4 Align the second pipe and while holding the pipe in the butted position slide the gasket back over the second pipe end. The gasket should be equally spaced between the lines scribed on each pipe.

5 Place each half of the Roughneck coupling over the gasket, making sure that the tongue on one housing half is aligned with the recess on the other housing half. See Image 3.

6 Tighten the nuts alternately and uniformly until the required bolt torque is reached. See Image 4 and chart for bolt torque.

7 Reinstallation after a disassembly will require that the threads on the bolt and in the nut are clean and lubricated with a light oil.

NOTE: Torque requirements must be met and housing halves must be assembled with equal gaps between bolt pads.

Image 1

Image 2

Image 3

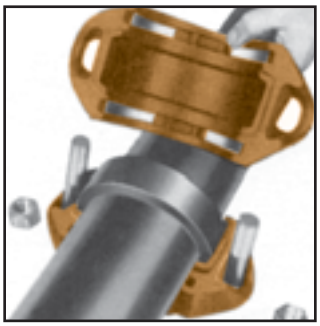
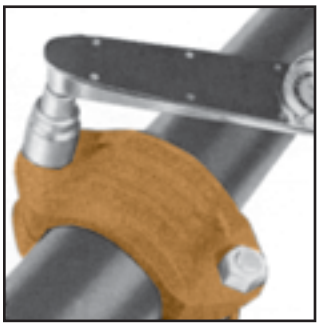


Image 4



Working pressure and end load are based on a properly assembled Roughneck coupling with bolts fully torqued to the above specifications, on plain-end or beveled standard wall steel pipe and Gruvlok Plain-End Fittings.

Roughneck Couplings are designed to be used on plain-end pipe and Gruvlok Plain-End Fittings only. For externally coated pipe applications, contact an Anvil Internationl Representative.

Not recommended for use on steel pipe with a hardness greater than 150 Brinell, plastic, HDPE, cast iron or other brittle pipe.

*Bolt torque ratings shown must be applied at installation.

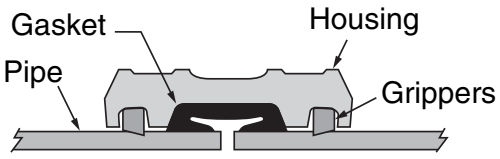
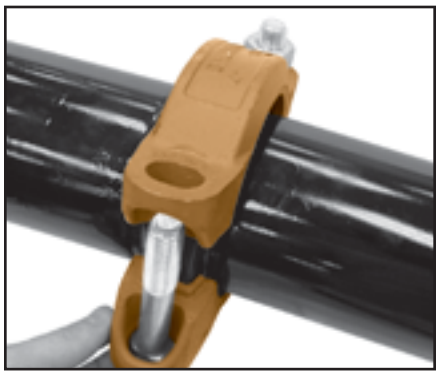


FIG. 7004
High Pressure Coupling

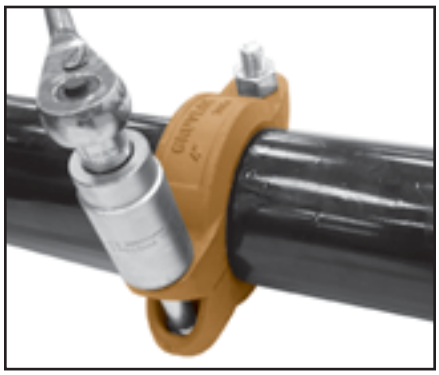
1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coat of Gruvlok Lubricant to the exterior surface and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

2 GASKET INSTALLATION— Slip the gasket over the pipe end, making sure the gasket lip does not overhang the pipe end.

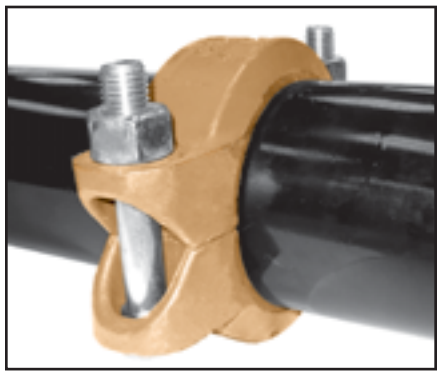
3 ALIGNMENT— After aligning the two pipe ends together, pull the gasket into position, centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe



4 HOUSINGS— Place each housing halves on the pipe making sure the housing key fits into the groove. Be sure that the tongue and recess portions of the housing mate properly. Insert the bolts and run up the nuts finger tight.



5 TIGHTEN NUTS— Securely tighten nuts alternately and equally to the required indicator. For 2" - 4" 7004 couplings, please use the table below for required torque values. For 7004 5" and larger, tighten nuts till housings are in metal-to-metal contact.



6 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. For 2" - 4", ensure the gaps on each side are evenly spaced, and for 5" and larger couplings ensure the housings are in firm even metal-to-metal contact on both sides.

SPECIFIED BOLT TORQUE

Size	Bolt Size	Torque
In.	*In.*	*Ft.-Lbs*
2	5/8	100 - 130
2½	5/8	100 - 130
3	5/8	100 - 130
4	3/4	130 - 180
5	7/8	*

Size	Bolt Size	Torque
In.	*In.*	*Ft.-Lbs*
6	7/8	*
8	1	*
10	1	*
12	1	*

* Torque required to bring housing metal-to-metal contact.

CAUTION: When using an impact wrench, verify that the output of the torque wrench is within the required torque range. It is recommended that a torque wrench be used for accurate assembly in order to obtain specified performance.

FIG. 7004 with EG® Gasket

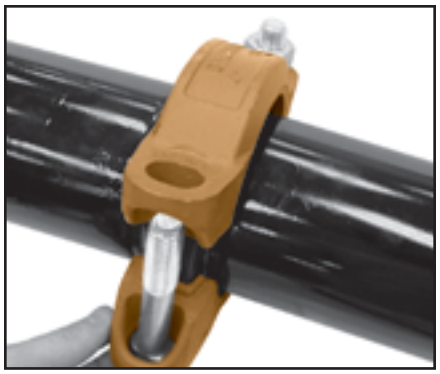
High Pressure Coupling with End Guard® Gasket

Figure 7004 with EG® gasket requires specified pipe end groove dimensions and fittings, see page 203 for groove dimensions.

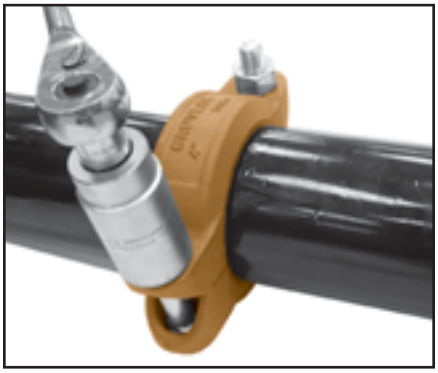
CAUTION: Not using the correct groove dimensions will result in pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coat of Gruvlok Lubricant to the exterior surface and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.

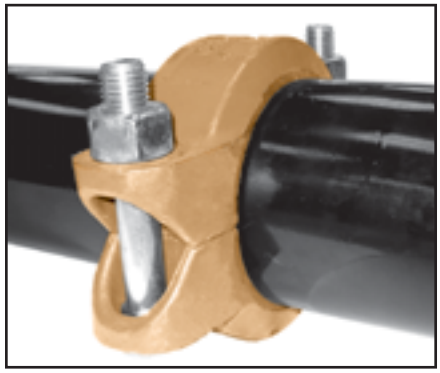
2 GASKET & PIPE INSTALLATION— Slip the gasket half way on to the pipe end, stop when the center gasket leg comes in contact with the pipe end. Slide the second pipe end half way into the gasket, stopping then the pipe end comes in contact with the center gasket leg. Ensure pipes are aligned properly.



3 HOUSINGS— Place each housing halves on the pipe making sure the housing key fits into the groove. Be sure that the tongue and recess portions of the housing mate properly. Insert the bolts and run up the nuts, finger tight.



4 TIGHTEN NUTS— Securely tighten nuts alternately and equally to the required indicator. For 2" - 4" couplings, please use the table below for required torque values. For 5" and larger, tighten nuts till housings are in firm metal-to-metal contact.



5 ASSEMBLY IS COMPLETE— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves. For 2" - 4", ensure the gaps on each side are evenly spaced, and for 5" and larger couplings ensure the housings are in firm even metal-to-metal contact on both sides.

SPECIFIED BOLT TORQUE

Size	Bolt Size	Torque
In.	*In.*	*Ft.-Lbs*
2	5/8	100 - 130
2½	5/8	100 - 130
3	5/8	100 - 130
4	3/4	130 - 180
5	7/8	*

Size	Bolt Size	Torque
In.	*In.*	*Ft.-Lbs*
6	7/8	*
8	1	*
10	1	*
12	1	*

* Torque required to bring housing metal-to-metal contact.

CAUTION: When using an impact wrench, verify that the output of the torque wrench is within the required torque range. It is recommended that a torque wrench be used for accurate assembly in order to obtain specified performance.

FIG. 7305
HDPE Coupling

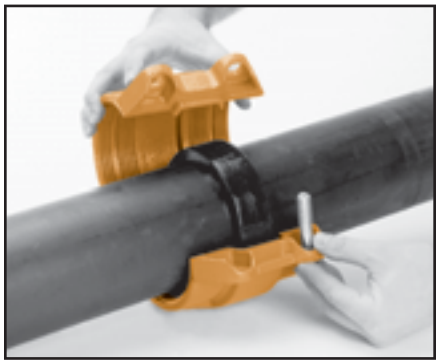
1 Make certain the pipe ends are free of indentations, projections or other imperfections, which could prevent proper sealing of the gasket. Mark each pipe at a distance from the end of the pipe according to the pipe size:

Size Inches	Distance to Mark
2-4" (51 - 102 mm)	1" (25.4 mm)
5-8" (127 - 203 mm)	1¼" (31.8 mm)
10 & 12" (254 - 305 mm)	1¾" (44.5 mm)

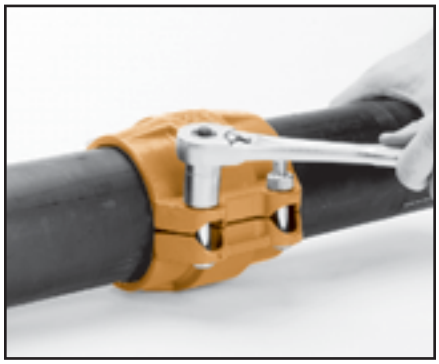
NOTE: Make certain the HDPE pipe end is square cut to ⅛" maximum for the 2" to 4" and 5/32" maximum for the 6" and larger sizes.

2 Check to assure the gasket material is acceptable for the intended service. The Gasket color code is green for EPDM and orange for Nitrile (Buna-N). **CAUTION:** Use only Gruvlok Xtreme™ Lubricant. Gruvlok Xtreme™ Lubricant contains silicone. If silicone is unacceptable for the application contact Gruvlok for the lubrication recommendation. Apply a thin coating of Gruvlok Xtreme™ Lubricant to the gasket lip and the exterior surface of the gasket.

3 Slip the gasket over one of the pipe ends. Make sure the gasket does not overhang the pipe end. Align the second pipe and while keeping the pipes in the butted position slide the gasket back over the second pipe end. The gasket must be positioned centrally between the lines on the pipe ends.



4 Place the Figure 7305 housing casting over the gasket, making sure the tongue on one casting is aligned with the recess of the other casting.



5 Insert the bolts and secure the nuts alternately and uniformly until the bolt pads are in contact. Torque all bolts to the required bolt torque levels. Refer to the Specified Bolt Torque Table. There is no gap between the bolt pads and the bolt torque should be within the range given when the coupling is properly assembled. Alternate and even tightening of the bolts will significantly reduce the torque needed to close the gap at the pipe joint.

SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Gruvlok® couplings. The nuts must be tightened alternately and evenly until fully tightened. Caution: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. **Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.** Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

FIG. 7305 SPECIFIED BOLT TORQUE

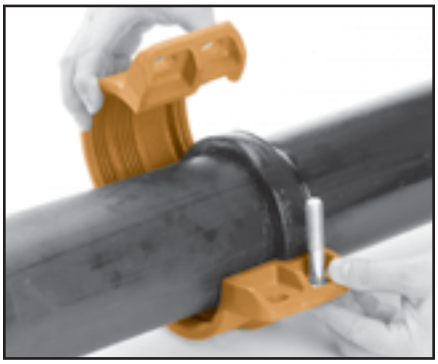
Coupling Bolts	Minimum	Maximum
In.	*Ft.-Lbs./N-m*	*Ft.-Lbs./N-m*
½ x 2⅜	80 *110*	100 *150*
½ x 3	80 *110*	100 *150*
⅝ x 3½	100 *135*	130 *175*
¾ x 4¾	130 *175*	180 *245*

FIG. 7307
HDPE Transition Coupling

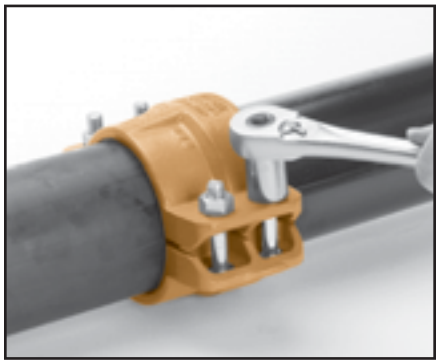
1 Make certain the HDPE pipe end is square cut to 1/8" maximum for the 2" to 4" and 5/32" maximum for the 6" and larger sizes. The steel pipe must be grooved in accordance with Gruvlok® Grooving Specifications for Steel Pipe. The pipe ends must be free of scratches, indentations, projections or other imperfections, which could prevent proper sealing of the gasket.

2 Check to assure the gasket material is acceptable for the intended service. The Gasket color code is green for EPDM and orange for Nitrile (Buna-N). **CAUTION:** Use only Gruvlok Xtreme™ Lubricant. Gruvlok Xtreme™ Lubricant contains silicone. If silicone is unacceptable for the application contact Gruvlok for the lubrication recommendation. Apply a thin coating of Gruvlok Xtreme™ Lubricant to the gasket lips and the exterior surface of the gasket.

3 Slip the gasket over one of the pipe ends. Make sure the gasket does not overhang the pipe end. Align the second pipe and while holding it in the butted position, slide the gasket back over the second pipe end. The gasket must be positioned on the gasket seat surface of the grooved steel pipe. Make sure the gasket does not overhang into the pipe groove.



4 Place each half of the coupling housing over the gasket, making sure the housing grooved end is directed into the pipe groove.



5 Insert the bolts and secure the nuts alternately and uniformly until the bolt pads are in contact. Torque all bolts to the required bolt torque levels. Refer to the Specified Bolt Torque Table. There is no gap between the bolt pads and the bolt torque should be within the range given when the coupling is properly assembled. Alternate and even tightening of the bolts will significantly reduce the torque needed to close the gap at the pipe joint.

SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Gruvlok® couplings. The nuts must be tightened alternately and evenly until fully tightened. **CAUTION:** Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. **Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.** Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

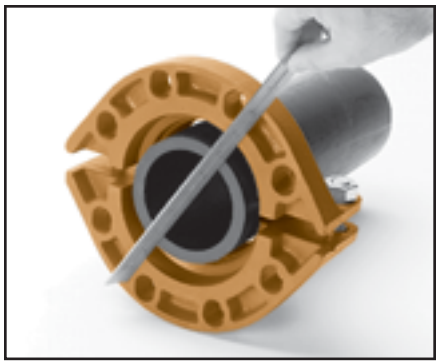
FIG. 7307 SPECIFIED BOLT TORQUE

Coupling Bolts	Minimum	Maximum
In.	*Ft.-Lbs./N-m*	*Ft.-Lbs./N-m*
½ x 2⅜	80 *110*	100 *150*
½ x 3	80 *110*	100 *150*
⅝ x 3½	100 *135*	130 *175*
⅞ x 5½	180 *245*	220 *300*

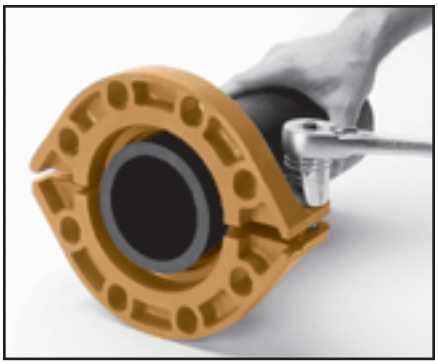
FIG. 7312
HDPE Flange Adapter

1 Make certain the pipe end is square cut to 1/8" maximum for the 4" and 5/32" maximum for the 6" and 8" sizes. Inspect the surface of the mating flange to be assured the surface is free of dimensions of the mating flange to be assured that the scratches, indentations, projections, or other imperfections, which could prevent proper sealing of the gasket.

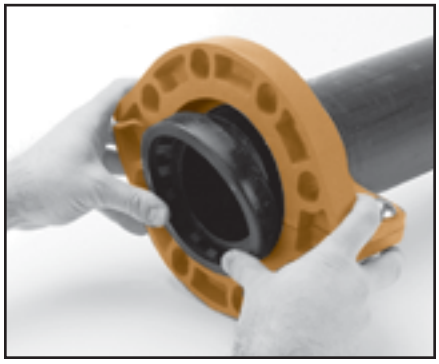
2 Check to assure the gasket material is acceptable for the intended service. The gasket color code is green for EPDM and orange for Nitrile (Buna-N). **CAUTION:** Use only Gruvlok Xtreme™ Lubricant. Gruvlok Xtreme™ Lubricant contains silicone. If Silicone is unacceptable for the application contact Gruvlok for the lubrication recommendation. Apply a thin coating of Gruvlok Xtreme™ Lubricant to the gasket lips and outside surface of the gasket.



3 Place the housing over the end of the pipe and using a straight edge, align the face and the flange face with the end of the pipe. Do not let the pipe extend beyond the flange face.

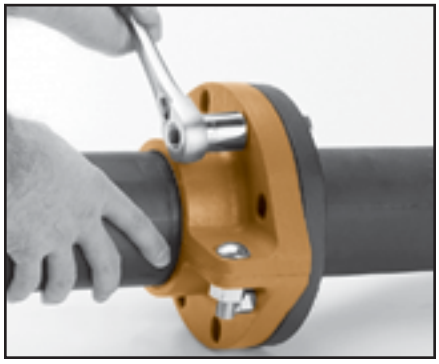


4 Tighten the housing nut until the housing bolt pads make firm metal to metal contact. Torque all bolts to the required latch bolt torque levels. Refer to the Specified Latch Bolt Torque Table.



5 Position the Gruvlok Flange gasket around the pipe end and press the gasket into the flange gasket pocket. Be sure the flange sealing lips are facing out.

6 Align the Gruvlok Flange bolt holes with the mating flange bolt holes. Insert a standard bolt or stud through one bolt hole and thread the nut on hand tight. Insert the next bolt or stud opposite the first and thread the nut on hand tight. Continue this procedure until all holes have been fitted. Note: Take care to assure the gasket lip is not bent backwards and pinched between the two flanges.



7 Tighten the flange face nuts alternately and evenly so that the flange faces remain parallel and make firm contact around the entire flange. Torque all bolts to the required mating flange joint torque levels. Refer to the Specified Mating Flange Bolt Torque Table.

SPECIFIED BOLT TORQUE FOR LATCH & MATING FLANGE BOLTS

Specified bolt torque is for the latch and mating flange bolts used on Gruvlok® flanges. The nuts must be tightened alternately and evenly until fully tightened. **CAUTION:** Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of latch and mating flange bolts is required to obtain specified performance. **Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.** Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

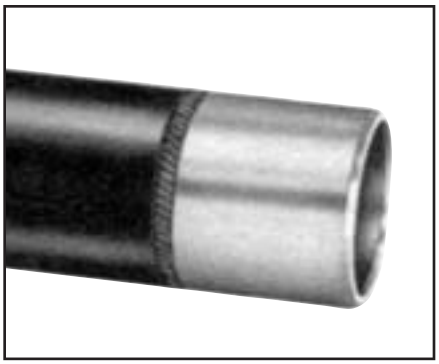
FIG. 7312 LATCH BOLT TORQUE

Latch Bolts	Minimum	Maximum
In.	*Ft.-Lbs./N-m*	*Ft.-Lbs./N-m*
5/8 x 2 3/8	100 *135*	130 *175*
3/4 x 2 3/4	130 *175*	180 *245*

FIG. 7312 MATING FLANGE BOLT TORQUE

Mating Flange Bolts	Minimum	Maximum
In.	*Ft.-Lbs./N-m*	*Ft.-Lbs./N-m*
5/8 x 3	110 *149*	140 *190*
3/4 x 3 1/2	220 *298*	250 *339*

Gruvlok Sock-It® Fitting



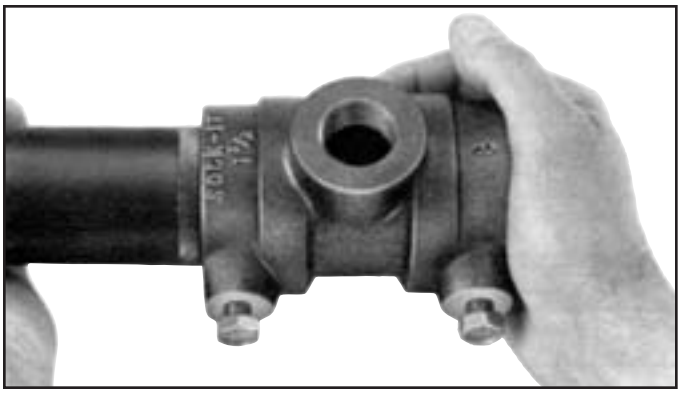
1 Pipe surface shall be cleaned at least 1" from the end of the pipe to remove any coating, indentations, projections, and sharp edges which could affect proper gasket sealing. As a guide for installation, mark the pipe at a distance of 1½" from the end for 1", 1¼", and 1½" size fittings and 1¾" for the 2" & 2½" size fittings.

NOTE: When Allied XL pipe is used it is necessary only to remove sharp edges and burrs at the end of the pipe. No additional cleaning is required.

2 Check all lock bolts to be sure they do not extend into the I.D. of the Sock-It Fittings as this would prevent proper insertion of the pipe.

3 Apply a light coating of GRUVLOK Lubricant to the gaskets located in each end of the Sock-It Fitting. Also apply a light coating of lubricant to the pipe ends to further ease insertion of the pipe into the Sock-It Fitting.

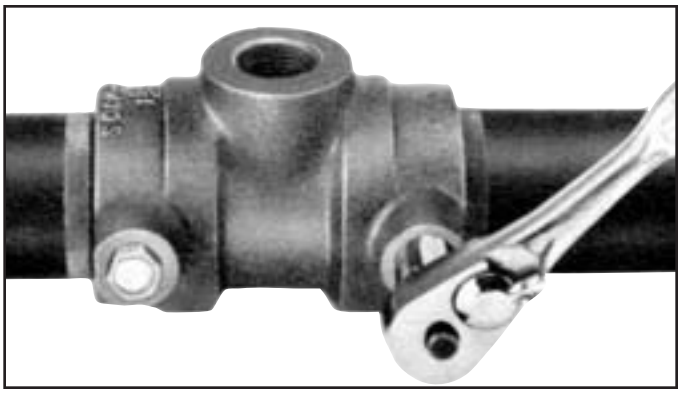
NOTE: Use only Gruvlok Lubricants. Other lubricants may affect gasket performance.



4 Insert the prepped and lubricated pipe end into the Sock-It Fitting until the pipe end makes contact with the internal pipe stop. A slight twist while pushing fitting and pipe together will ease the required insertion force. The end of the Sock-It Fitting should be within 1/16" from the edge of the marking on the pipe. (See Step 1). Rotate the fitting until the desired position is obtained. Tighten the lock bolt until the bolt head bottoms against the threaded boss. (NOTE: The 2½" Sock-It fitting has 2 locking bolts for each pipe end.)

Install the other prepped and lubricated pipe end into the Sock-It fitting in the same manner.

CAUTION: Do NOT hammer fitting on.



5 Sock-It Fittings may be removed by loosening the lock bolts. Reinstallation may be accomplished as described in Steps 1-4.

WARNING: System pressure must be relieved and vented, and the system drained of fluid prior to loosening the lock bolts to remove or reposition the Sock-It Fitting.

Bolt end must be inspected to assure bolts ability to cut into pipe. Replace bolts in cases where bolt end sharpness has been comprised.

FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve

INSTALLATION:

1 The valve should be mounted to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 12" for pump sizes 2" x 2" to 6" x 6" and 24" for pump sizes 8" x 8" to 12" x 12".

2 It is not recommended to mount a valve directly to the pump as this could cause undesirable noise in the system.

3 Sufficient clearance around the valve should be left for valve removal or repair.

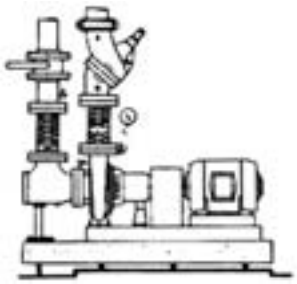
4 Install valve in the direction of the flow arrows on the valve body.

5 The valve can be mounted to flanged equipment using Gruvlok Flange Adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.

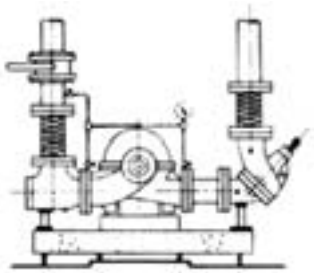
6 The Gruvlok Tri-Service valve bodies have anti-rotation lugs on the inlet and outlet. These lugs, combined with the Flange Adapters, provide a ridged rotation free installation.

7 The valve body has been designed to handle the weight of the pump on vertical in-line installations. The body is not designed to support the piping weight. It is recommended that the piping be supported by hangers. Pipe supports should be provided under the valve and strainer bodies.

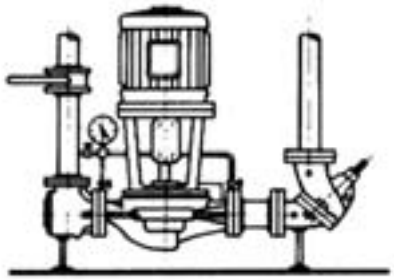
TYPICAL INSTALLATIONS



Base-Mounted Single Suction



Base-Mounted Double Suction



Vertical In-Line

FIELD CONVERSION (Straight to Angle Pattern Valve)

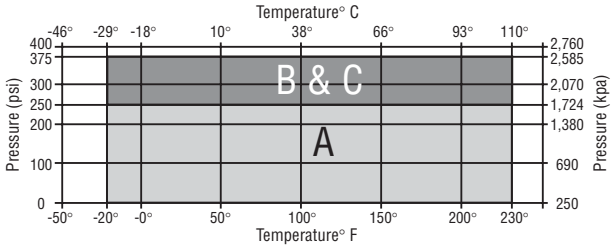
1 Open valve at least one complete turn,

2 Remove the body bolts from valve body using Allen Key.

3 Rotate one half of the valve body 180° making sure the lower valve seat and "O" Ring stay in position. Inspect the "O" Ring for any cuts or nicks and replace if necessary.

4 Replace body bolts and torque evenly to 70 ft./lbs.

PRESSURE – TEMPERATURE LIMITS



Note: for temperatures between 230°F and 300°F (110°C and 149°C) specify Viton Elastomers.

LEGEND	
A	Gruvlok ductile iron flange adapters for ANSI 150# flanges
B	Gruvlok ductile iron flange adapters for ANSI 300# flanges
C	Grooved end with 375 psi rated pipe coupling

FLOW MEASUREMENT

Where approximate indication of flow is acceptable the Gruvlok Tri-Service valve can be used.

FLOW MEASUREMENT VALVE IN WIDE OPEN POSITION

Measure and record the differential pressure across the valve using a Flow Meter with high pressure range transducer or pressure gauges with PMP adapters.

Refer to Tri-Service Performance Curves with valve in full open position (See Determining Flow Rate with Valve in Throttled Position Section on page 177). Locate Pressure Differential on left hand side of chart and extend line horizontally across to valve size being used. Drop line vertically down and read flow rate from bottom of chart.

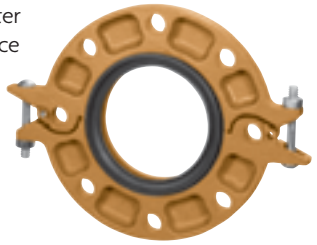
CAUTION:
Safety glasses should be used and the probe should not be left inserted into fittings for prolonged periods of time (overnight, etc.), as leakage from the PMP may occur when probe is removed.

FTV-S (Straight) & FTV-A (Angle Body)

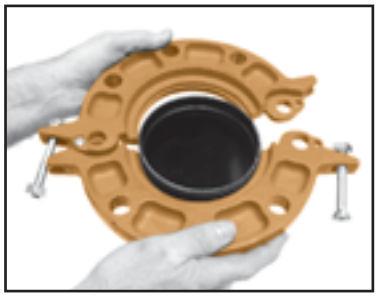
Tri-Service Valve

FLANGE ADAPTER INSTALLATION:

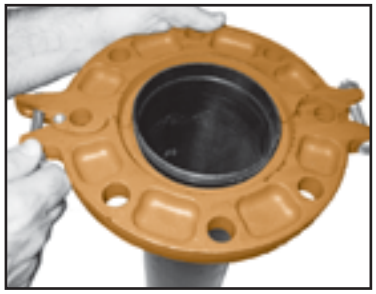
1 The Fig. 7012 Gruvlok Flange Adapter can be used with the FTV Tri-Service Valve. Installation is similar to the installation of the Figure 7012 with grooved pipe.



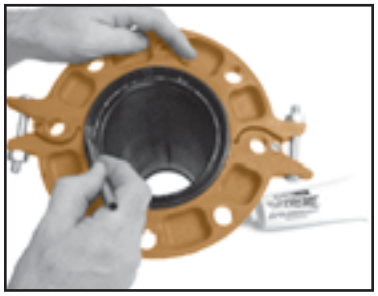
2 Loosen the nut on the latch bolt to the end of the bolt thread. (It is not necessary to remove the nut from the latch bolt.) Swing the latch bolt out of the slot. Open the Gruvlok Flange and place it around the grooved pipe with the key section fitting into the groove. The flange gasket cavity must face the pipe end.



3 Swing the latch bolt back into the slotted hole. Tighten the nut until the flange halves make solid contact.

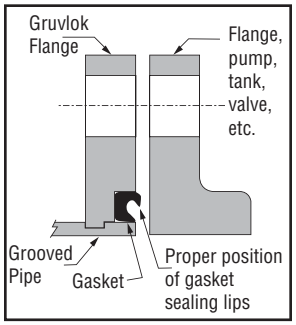


4 Check the gasket grade to verify that it is properly suited for the intended service. Lubricate the entire surface of the gasket and the flange gasket cavity using Gruvlok lubricant. Position the Gruvlok Flange Gasket around the pipe end and press the gasket into the cavity between the pipe O.D. and the flange recess. The gasket must be properly positioned as shown in Step 5. Be careful that foreign particles do not adhere to lubricated surfaces.

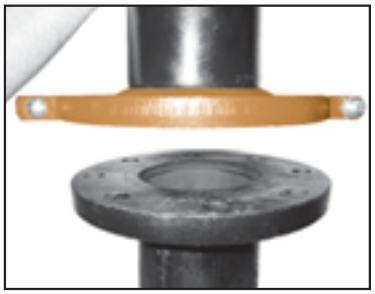


5 The correct positioning and relationship of all components comprising a Gruvlok Flange joint. The Fig. 7012 Gruvlok Flange gasket must be inserted so that the sealing lips face toward the pipe end and the mating flange face and away from the Gruvlok Flange itself.

NOTE: Design of the Gruvlok Flange provides sealing only with the special Gruvlok Flange gasket. Only Gruvlok Flange gaskets may be used with Fig. 7012 Gruvlok Flanges.

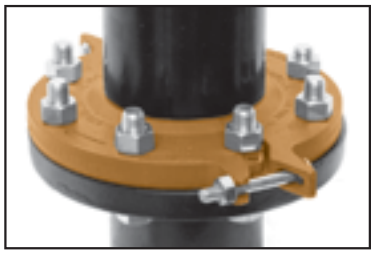


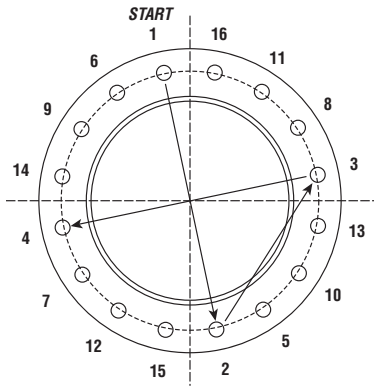
6 Align the Gruvlok Flange bolt holes with the mating flange bolt holes. Insert a standard bolt or stud through the bolt hole, and thread a nut on hand tight. Insert the next bolt or stud opposite the first and again thread the nut on hand tight. Continue this procedure until all holes have been fitted. (See illustration)



NOTE: Take care to assure that the gasket lip is not bent backwards or pinched between the two flanges.

7 Tighten the nuts evenly so that the flange faces remain parallel and make firm even contact around the entire flange. Torque all bolts to required flange joint torque levels.





Recommended Bolt Tightening Sequence

FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve

DETERMINING FLOW RATE WITH VALVE IN THROTTLED POSITION:

1 Record the size of valve and stem position using the Flow Indicator Scale (See Flow Indicator Section at bottom of page). Calculate percentage of valve opening referring to table below:

VALVE SIZE	2½	3	4	5	6	8	10	12
Number of Rings (valve full open)	5	5	6	9	10	12	18	28

2 Measure and record the differential pressure across the valve in the throttled position.

3 Locate percentage of valve opening on the bottom scale of Flow Characteristic Curve. Project line vertically up to intersect with the Valve Characteristic Curve and from this point project line horizontally across to the left of the chart and record the percentage of maximum flow rate.

4 On the Tri-Service Performance Curve locate the differential pressure obtained in Step 2 and project line horizontally across to intercept with Valve Performance Curve. Drop a line vertically down to read the flow rate at the bottom of the chart.

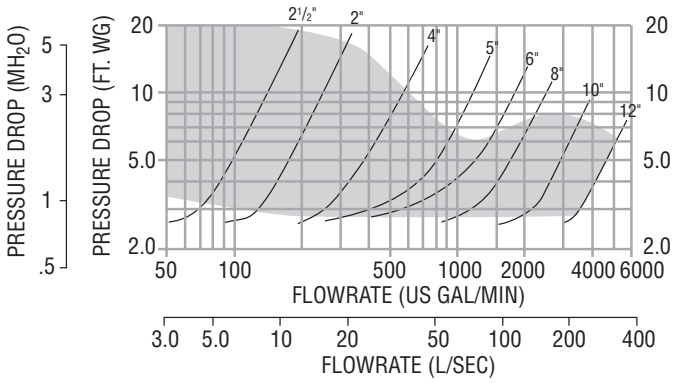
5 To calculate flow rate of valve in the throttled position, multiply the flow rate from Step 4 by the percentage flow rate from Step 2 divided by 100.

Example: Valve size 4 in.
Differential Pressure in 5.4 ft. (1.65 m)
Number of rings open 3, (3 rings / 6 rings X 100) = 50% throttle

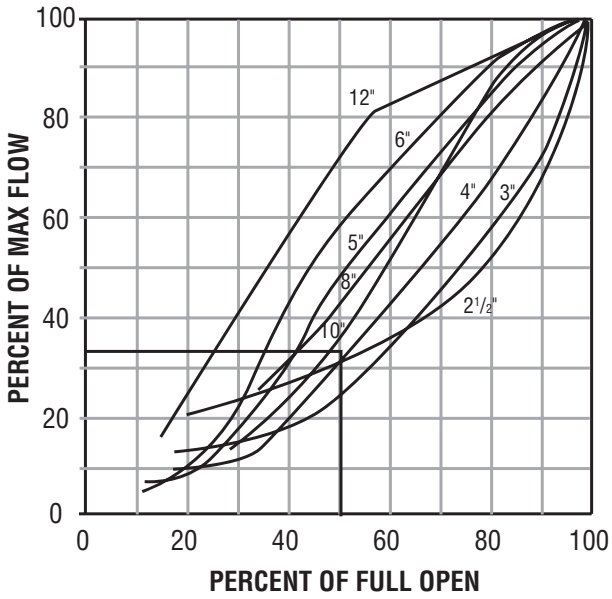
Solution:
- From the Tri-Service Performance Curve (fig. 5), a 4 in. valve with 5.4 ft. pressure drop (1.65 m) represents a flow of 400 USgpm (25.2 L/s).
- From Flow Characteristic Curve (fig, 6), a 4 in. valve, 50% open, represents 34% of maximum flow.
- Approximate flow of a 4 in. valve, with a 5.4 ft. (1.65 m) pressure drop when 50% throttled is:
  (400 x 34)/100 = 136 USgpm
  (25.2 x 34)/100 = 8.57 L/sec.

Note: To prevent premature valve failure it is not recommended that the valve operate in the throttled position with more than 25 ft. pressure differential. Instead the pump impeller should be trimmed or valves located elsewhere in the system to partially throttle the flow.

Tri-Service Performance Curve with Valve in Full Open Position



Inherent Flow Characteristic Curve with Valve in Throttled Position



FLOW INDICATOR SCALE

The valve stem with its grooved rings and positioning sleeve indicates the throttled position of the valve. The quarter turn graduations on the sleeve, with the scribed line on the stem, provide for approximate flow measurement.

Note: The valve is shipped in the closed position. The indicator on the plastic sleeve is aligned with the vertical scribed line on the stem.

FTV-S (Straight) & FTV-A (Angle Body)

Tri-Service Valve

OPERATION

To assure tight shut off the valve must be closed using a wrench with 25 to 30 ft./lbs of torque.

To assure trouble-free check valve operation and shut off operation, the valve should be periodically opened and closed to keep valve seat and valve disc guide stem free of build up of system contaminants.

REPACKING OF FTV VALVE UNDER FULL SYSTEM PRESSURE

Should it be necessary, stem "O" Ring can be changed under full system pressure.

CAUTION: Safety glasses should be worn.

1. Record the valve setting.
2. Turn the valve stem counterclockwise until the valve is fully open and will not turn any further. Torque to a maximum force of 45 ft./lbs. This will ensure good metal-to-metal contact and minimum leakage.
3. The valve bonnet may now be removed. There may be a slight leakage, as the metal-to-metal backseating does not provide a drip-tight seal.
4. Clean exposed portion of valve stem (Do not scratch).
5. Remove and replace the "O" Ring and gasket.
6. Install the valve bonnet.
7. Tightening valve bonnet is necessary to stop any leaks.
8. Open valve to balance set point as recorded in Step 1.

MAXIMUM NUMBER OF TURNS FULL OPEN VALVE

On valve sizes 2 1/2" and 3", full open position of valve is 5 turns. However, valve will open to 5 1/2 turns which is just back of seating of valve.

SEAT REPLACEMENT

1. Drain system and remove valve from piping.
2. Remove the body bolts from the body using an Allen Key.
3. Remove seat and "O" Ring. "O" Ring is not used on valves 8" and larger.
4. Clean exposed portion of valve stem (Do not scratch).
5. Remove and replace the "O" Ring and gasket.
6. Inspect and clean "O" Ring cavity and install new "O" Ring and seat. Valve disc stem also should be inspected and replaced if worn. Valve stem "O" Ring should be replaced at this time.

FIG. GBV-S & GBV-T

Five Turn Circuit Balancing Valves

INSTALLATION:

1 Clean the system piping of debris (pipe scale, rust, welding slag) and other contaminants. As with any water system it is important to make provisions to keep the system clean. For optimum operation, air entrapment in the fluid must be removed.

2 The operation of the valve is dependent on the fluid characteristics such as specific gravity and viscosity, which vary with the fluid temperature. For installations using fluids other than 100% water, flow rates must be corrected for the changes created by the fluid medium. See www. anvilintl.com for appropriate correction factors, or call your local Anvil representative.

3 To ensure accuracy of measurement Circuit Balancing Valves (GBV's) should be located at least five pipe diameters downstream from any fitting and at least ten pipe diameters downstream from a pump (as illustrated in Fig. 1).

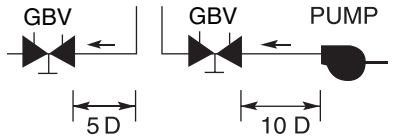


Fig. 1

4 All GBV's are marked with an arrow on the valve body to indicate direction of flow. The arrow must point in the direction of flow for proper operation.

5 GBV's may be installed in horizontal or vertical piping (as illustrated in Fig. 2). Provisions must be made for easy access to the probe metering ports (P.M.P.'s), reading scale, and memory stop.

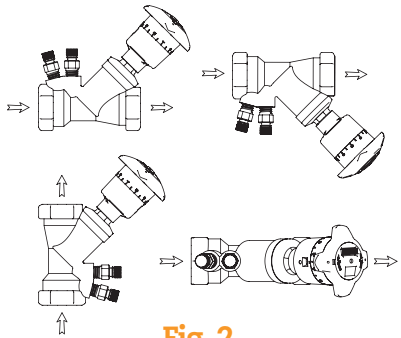


Fig. 2

GBV-S - SWEAT (SOLDER) CONNECTIONS:

6 GBV-S models are supplied with sweat style connections. Caution should be used when sweat style connection valves are installed to prevent overheating the valve.

7 Solder the valve body in line using 95/5 (95% tin, 5% antimony) type solder or equal. Always follow local plumbing codes for installation best practices.

CAUTION:
Before soldering, ensure the valve is opened at least one full turn to avoid damage to the sealing O-ring due to overheating. Anvil recommends that the GBV be protected during installation by wrapping a damp rag around the handle / bonnet assembly prior to soldering the valve into the line.

GBV-T - NPT THREADED CONNECTIONS

6 GBV-T models are tapped with NPT threaded connections. All threaded connections should be sealed using an approved pipe sealant per industry standards. Once the GBV installation has been completed and the system has been filled and purged, each valve loop must be adjusted to the correct flow setting. Employ piping best practice when engaging pipe to threaded valves. Overtightening when installing valves may result in fracturing of the valve body at the threads. (Go to Step 8)

WARNING:
Anvil does NOT recommend leak testing an HVAC system with air due to safety concerns. Testing HVAC systems with pressurized air can be dangerous due to the high compressibility of air, as compared to water.

OPERATION:

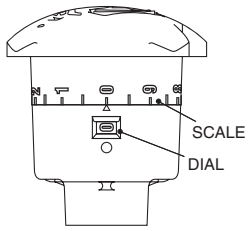
8 Valves are circuit balancing valves that are selected to deliver the correct flow in a piping circuit based on line size and design flow rate.

9 To set the system flow, adjust the handwheel position until the differential pressure reading across the venturi corresponds to the required GPM.

10 The valve operates from fully open to closed by a clockwise rotation of the orange handwheel using five 360° turns. Two indicators describe the position of the valve: the handwheel turns dial and the micrometer scale.

- **"Handwheel Turns" Dial:** This dial is printed on the outer surface of a gearing mechanism located inside the lower half of the handle assembly (Fig. 6). Each complete 360° revolution of the handwheel is visible through a display window and is scaled 0 - 5 to indicate the valve position in terms of the number of full turns. (Fig. 3)
- **Micrometer Scale:** This scale is marked 0 - 9 and is located on the upper half of the handle assembly. Each mark represents 1/10th of a full, 360° turn of opening when lined up with an arrowhead symbol, located above the handwheel turns display window. (Fig. 3)

Fig. 3: GBV setting of 0.0 indicates that the valve is closed. Both the handwheel turns dial and the micrometer scale indicate a valve position reading of 0.



11 The valve is considered "zeroed" when fully closed hand tight. The "0" on the micrometer scale should be within one half of 1/10th of a turn of the arrowhead symbol when the valve is closed hand tight. **DO NOT USE A WRENCH ON THESE VALVES – THEY SHOULD BE OPENED AND CLOSED HAND-TIGHT ONLY!**

Fig. 4: GBV setting of 2.3 indicates that the valve is partially open (2.3 turns open).

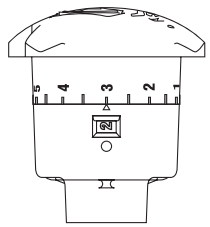


FIG. GBV-S & GBV-T

Five Turn Circuit Balancing Valves

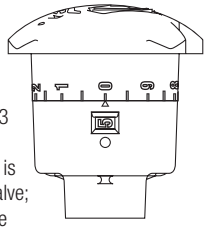
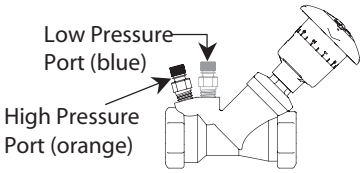


Fig. 5: GBV setting of 5.0 indicates that the valve is fully opened. In some cases, the valve may open as much as 5.3 turns, due to the depth of the stem threads. This is not a problem with the valve; however, the performance curves for these GBVs are calibrated only to 5.0 turns.

CAUTION: Hot water leakage can occur from metering ports (P.M.P.'s) during probe insertion and hookup of metering device. Wear protective eyewear and clothing to prevent personal injury when measuring pressure.



12 Connect pressure measuring device to the GBV metering ports as follows:

- Remove protective cap from metering ports (¼" NPT connection).
- Insert the meter probe into the metering ports. The hose with orange fitting, up stream; the hose with blue fitting downstream.

CAUTION:

When inserting probe, do not bend, as this will cause permanent damage to the probe, adversely affecting the pressure measurement. Do not use any lubrication on the probes when inserting them. If necessary, simply wet the probes with clean water.

The probe should not be left inserted into the fitting for prolonged periods of time, overnight, etc., as leakage of the P.M.P. may occur when the probe is removed.

The locking nut on the probe is designed to hold it in the P.M.P. when taking readings. As sealing is accomplished internally on the probe stem, it is only necessary to tighten the locking nut FINGER-TIGHT. Over-tightening may cause damage to the P.M.P. or locking nut threads.

13 Before taking a measurement reading, set the valve to its fully open position (5.0) or at a preset position. Read the pressure drop across the venturi with a digital meter. Determine flow rate by use of venturi Cv performance curves on page 4 or the Anvil Balancing Slide Rule.

14 The handle of the GBV is not designed to be removable. Do not try to take it off the valve, or it may become damaged. If for any reason, the handle is damaged, replace the entire handle assembly with the appropriate replacement part indicated in the table below.

PART NUMBER	SIZE
571155-022	½"
571155-022	¾"
571155-022	1"
571155-022	1¼"
571155-022	1½"
571155-022	2"

MEMORY SETTING:

15 After valve has been properly adjusted and without moving the handwheel, the locking memory stop should be set. The memory stop will allow the valve to be fully closed for isolation and then reopened to the preset flow position.

16 Insert a 2.5 mm (or 3⁄32") Allen key through the hole provided in the valve's handle cap. (Fig. 6)

17 Turn the setscrew in a clockwise direction until it stops. It is not necessary to tighten. The memory has now been set. This establishes the maximum opening position for this particular valve.

18 The valve may now be closed tightly, as needed, for isolating the piping during system maintenance. To return the valve to its preset "balanced" position, simply open the valve by turning the handwheel counter-clockwise until the handle stops turning (the valve stem inside the handle has hit the memory setscrew). **DO NOT APPLY EXCESSIVE FORCE WHEN REOPENING THE VALVE – OPEN ONLY UNTIL THE VALVE STOPS TURNING UNDER "HAND TIGHT" CONDITIONS. DO NOT USE A WRENCH TO OPEN, CLOSE, OR TIGHTEN VALVES.**

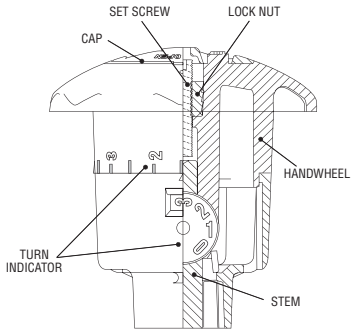


Fig. 6

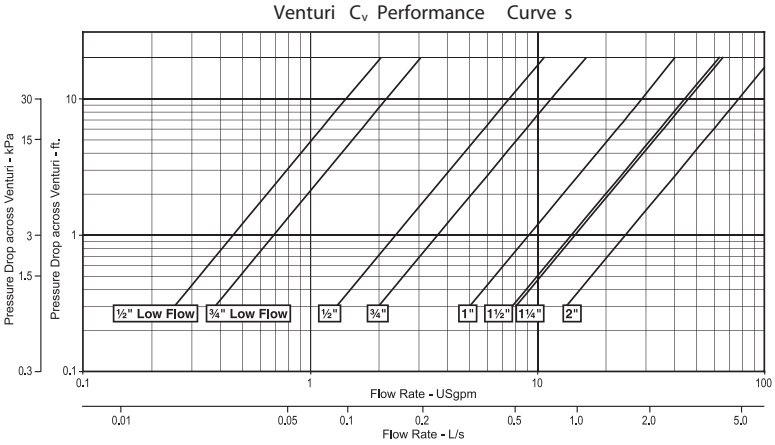


Fig. 7: These curves are for balancing contractors' use when balancing an HVAC system. For pressure drop vs. flow across the entire valve, please refer to Fig. 8.

See next page for Fig. 8 for both the GBV-S & GBV-T and a troubleshooting chart

FIG. GBV-S & GBV-T

Five Turn Circuit Balancing Valves

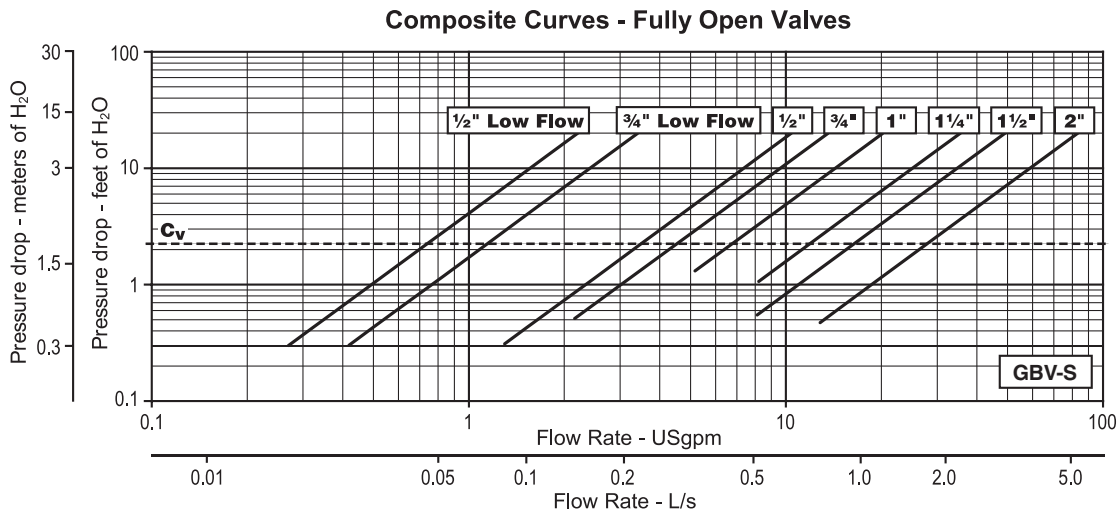


Fig. 8: These curves show the pressure drop across the balancing valves and are for use in valve sizing. For "pressure drop / flow" curves – required for system balancing, please refer to Fig. 7.

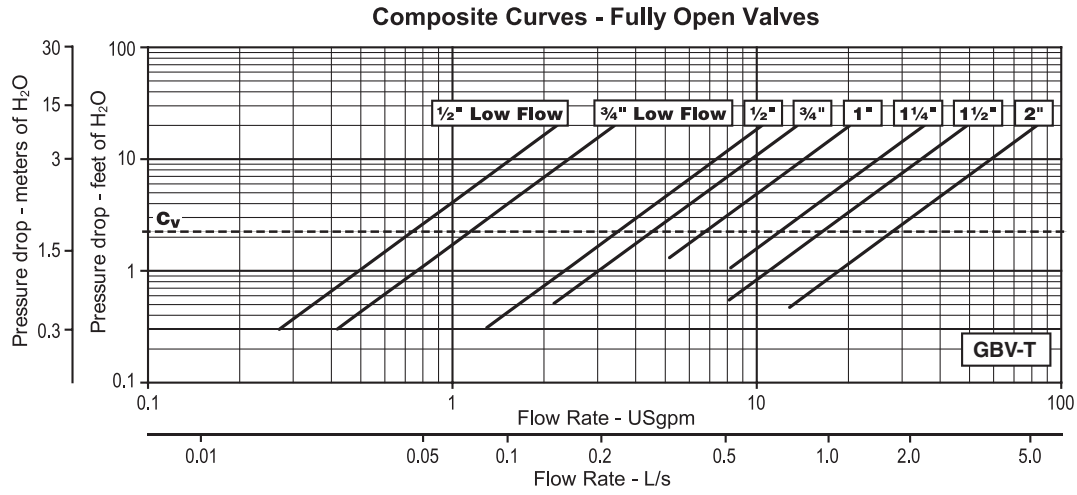


Fig. 8: These curves show the pressure drop across the balancing valves and are for use in valve sizing. For "pressure drop / flow" curves – required for system balancing, please refer to Fig. 7.

TROUBLESHOOTING:

Symptom	Likely Cause	Solution
1. Valve is leaking:		
• At the bonnet / body joint	Bonnet o-ring has been damaged.	Remove the handle / stem assembly and replace with the appropriate replacement part indicated in Table 1.
• At the pipe connection	If solder joint - the joint has failed, or was not soldered properly.	Re-solder the connection and recheck for leakage.
	If threaded - the connection is not sufficiently tight, or	Tighten and re-check for leakage.
	the valve was over-tightened during installation and the valve body has cracked (fractured).	Remove and reinstall a new valve, being careful not to over-tighten.
2. Valve does not shut off completely when closed (hand tight).	The seat o-ring has been deformed due to overheating during soldering.	Remove the handle / stem assembly and replace with the appropriate replacement part indicated in Table 1.

ANVILFLEX™ FIG. AF21-GG, -GF & -FF

Flex Connectors

Installation

1 Avoid torque. Do not twist the hose assembly during installation when aligning the bolt holes in a flange or in making up pipe threads. The utilization of lap joint flanges or pipe unions will minimize this condition.

2 To install a thread end braided metal hose assembly unions must be used. Do not place wrenches on the braided portion or the collar of the braided metal hose assembly. Use care not to torque the braided metal hose assembly while tightening the union. It is recommended that two wrenches be used in making the union connection; one to prevent the hose from twisting and the other to tighten the coupling.

3 Install the braided metal hose assembly with neutral face-to-face dimension as shown on the submittal drawing. Do not install a braided metal hose assembly compressed (bagged braid). The corrugated inner hose contains the fluid, the braid is designed to take the stress of system pressurization and contain the core.

4 If the braided metal hose assembly must be installed with an initial offset then the maximum allowable movement is reduced by the amount of the initial deflection.

5 Avoid over bending. The repetitive bending of a hose assembly to a radius smaller than the radius specified will result in early hose failure. Always provide sufficient length to prevent over bending and to eliminate strain on the hose assembly. Utilize sound geometric configurations that avoid sharp bends, especially near the end fittings of the assembly.

6 Verify that the movements of the system are within the design parameters of the braided metal hose assembly being installed.

7 Prevent out-of-plane flexing in an installation. Always install the hose assembly so that the flexing takes place in only one plane—this being the plane in which the bending occurs.

8 The maximum system test pressure must not exceed 150% of the maximum rated working pressure as shown.

9 Check system pressure and temperature and do not exceed recommended performance limits. Operation beyond design limits will result in premature failure.

10 The corrugated metal hose alloy must be chemically compatible with the media in the piping system. If in doubt as to suitability, refer to a Chemical Resistance Data table or contact your Anvil rep. for guidance.

11 The flanges on a concentric increasing braided metal hose assembly have the bolt holes straddling the hose centerline. The mating flanges should also straddle the centerline to avoid torque on the braided metal hose assembly.

12 When installing weld end, or sweat end, braided metal hose assemblies, or when welding in the area of a braided metal hose assembly, extreme care is necessary in ensure no weld spatter comes in contact with the braided hose sections.

13 A piping system, which utilizes braided metal hose to absorb movement, must be properly anchored and/or guided. Always support the piping to prevent excessive weight from compressing the hose and relaxing the braid tension.

14 Use care when handling the braided metal hose assembly during transportation, storage, and installation. The braided hose sections must not be allowed to bend, deflect, sag, or otherwise extend beyond their rated capabilities.

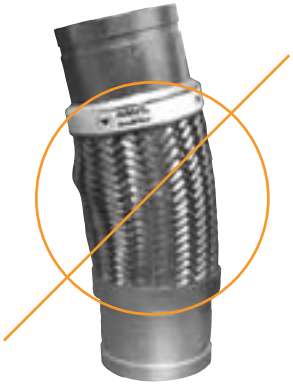
15 The shipping sticks, on flanged units, are to keep the braided metal hose assembly in its neutral end-to-end dimension during shipping and installation. After installation, the shipping sticks should be removed.

Maintenance

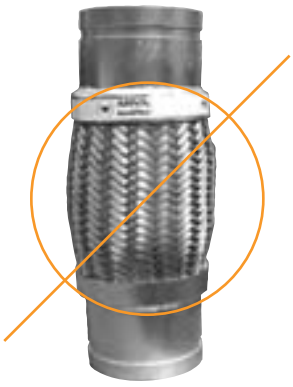
1 The braided metal hose assembly should be inspected during routine maintenance to ensure there are no signs of external damage. Inspect for frayed or broken braid wires. Also inspect to ensure there is no damage to the hose. In the event that such damage is found, the braided metal hose assembly should be replaced.

2 During system shutdown braided metal hose assembly should be examined to verify no thermal axial motion has occurred causing compression of the assembly.

Groove x Groove
Proper Installation



Groove x Groove
Improper Installation
Parallel



Groove x Groove
Improper Installation
Compressed

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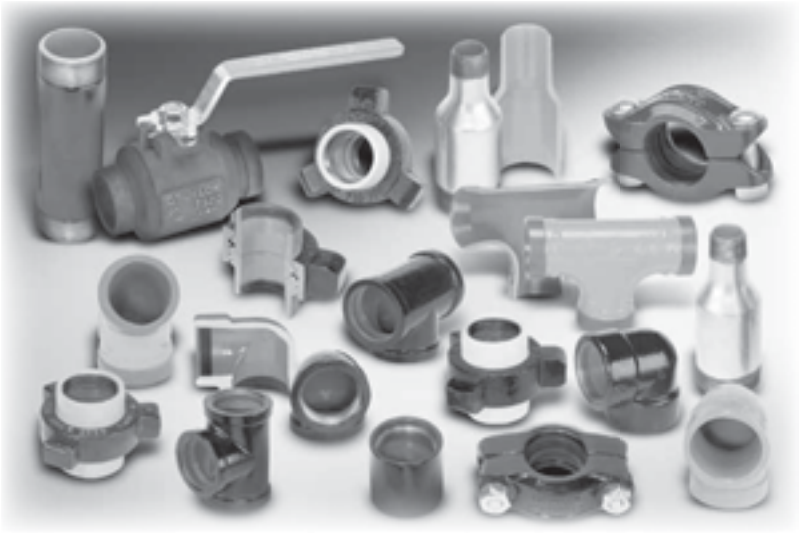
Did you know that Anvil can provide you with **significant cost-savings** for your underground piping applications?



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- **Scotchcote 134** — A fusion bonded epoxy coating designed to resist wastewater, corrosive soils, hydrocarbons, harsh chemicals, brine and saltwater.
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- Petrochemical Plants
- Power Plants
- Paper Mills

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offers both Basic and Extended Services...

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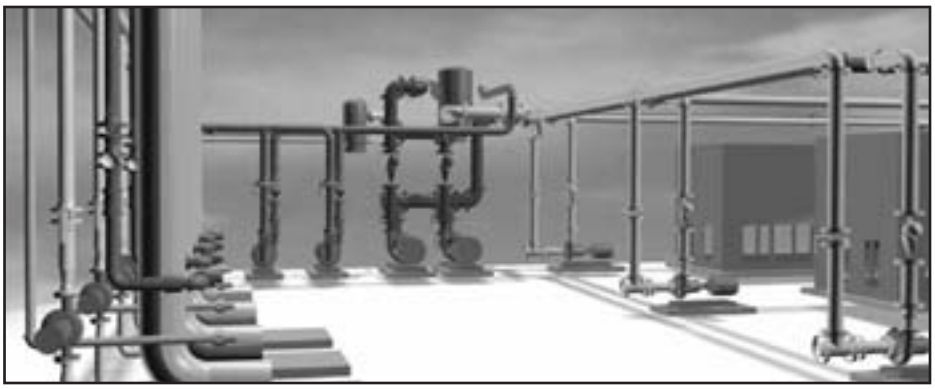
BASIC SERVICES

Anvil Design Services produces fabrication drawings of mechanical room piping 2½" and larger including chillers, heat exchangers, boilers, and pumps from contractor supplied flow diagrams, mechanical drawings, and approved submittals and specifications.



The drawings include a Bill of Materials with tags referencing the components in the mechanical room. The piping is color coded by service and is represented in 3-D with plan, isometric, and elevation views.

Initially, Anvil personnel meet with you to determine your piping preferences. The project scope and fee is agreed upon in a Design Services contract.

The plans and specifications are then interpreted in terms of economy, accuracy, and compliance. We may suggest modifications in arrangement, construction, equipment location, or product to attain the desired results. Piping layouts are carefully analyzed to determine whether further economies can be attained in the piping system.

Piping drawings are then prepared to determine the most efficient pipe routing, taking equipment location and any interferences into consideration. Preliminary prints are sent to you for revision or approval.

Upon approval, (4) sets of drawings with tags and Bills of Materials of the included system components are sent to you. Copies of the electronic data file of the project drawings are available at no extra charge. This brochure is an example of the finished product.

With Basic Services, you can plan the mechanical room. The preliminary drawings can be taken to coordination meetings with other trades to "reserve" space by "getting in" first. Also, your field supervisor can spend more time supervising and not calculating pipe lengths and pipe routing. The components can be grouped from the finished drawings for better workflow planning.

We usually reduce fitting counts by 10%-15% by moving equipment whenever possible, usually less than a foot. The more movement that is allowed, the more savings can be realized.

EXTENDED SERVICES:

Extended Services include any scope beyond Basic Services. There are many different types of services offered as extended:

- BOM by component (pump, chiller) or by system
- Unique Tagging – adding unique tags to individual components
- Air Handling Units – with associated ductwork
- Single Line Routing – non-dimensional
- Distribution Piping
- Dimensioned Floor Penetrations
- AWWA Piping - Total Scope
- Commercial Piping
- Oil Field Piping
- Retrofit Projects - Field Survey
- Hybrid Systems
- Anything Else

Contact your Anvil representative for more information.

For a full-size printed brochure with systems coded by color contact your local Anvil representative and ask for Item #105 or visit http://www.anvilintl.com/SharedContent/Pdf/Literature_ProductBrochures/design_brochure.pdf

PIPE

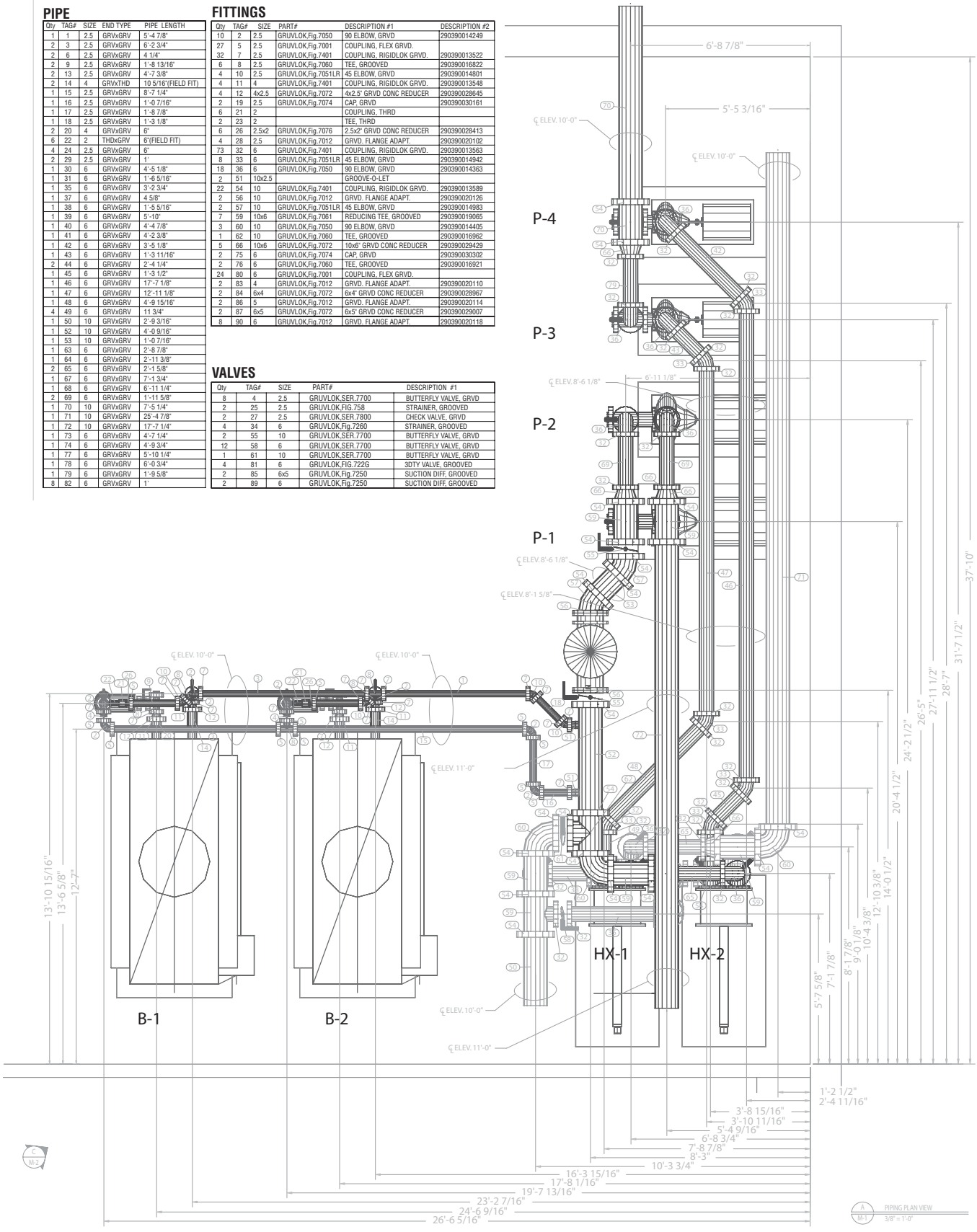
Qty	TAG#	SIZE	END TYPE	PIPE LENGTH
1	1	2.5	GRVxGRV	5'-4 7/8"
2	3	2.5	GRVxGRV	6'-2 3/4"
2	6	2.5	GRVxGRV	4 1/4"
2	9	2.5	GRVxGRV	1'-8 13/16"
2	13	2.5	GRVxGRV	4'-7 3/8"
2	14	4	GRVxTHD	10 5/16"(FIELD FIT)
1	15	2.5	GRVxGRV	8'-7 1/4"
1	16	2.5	GRVxGRV	1'-0 7/16"
1	17	2.5	GRVxGRV	1'-8 7/8"
1	18	2.5	GRVxGRV	1'-3 1/8"
2	20	4	GRVxGRV	6"
6	22	2	THDxGRV	6"(FIELD FIT)
4	24	2.5	GRVxGRV	6"
2	29	2.5	GRVxGRV	1'
1	30	6	GRVxGRV	4'-5 1/8"
1	31	6	GRVxGRV	1'-6 5/16"
1	35	6	GRVxGRV	3'-2 3/4"
1	37	6	GRVxGRV	4 5/8"
1	38	6	GRVxGRV	1'-5 5/16"
1	39	6	GRVxGRV	5'-10"
1	40	6	GRVxGRV	4'-4 7/8"
1	41	6	GRVxGRV	4'-2 3/8"
1	42	6	GRVxGRV	3'-5 1/8"
1	43	6	GRVxGRV	1'-3 11/16"
2	44	6	GRVxGRV	2'-4 1/4"
1	45	6	GRVxGRV	1'-3 1/2"
1	46	6	GRVxGRV	17'-7 1/8"
1	47	6	GRVxGRV	12'-11 1/8"
1	48	6	GRVxGRV	4'-9 15/16"
4	49	6	GRVxGRV	11 3/4"
1	50	10	GRVxGRV	2'-9 3/16"
1	52	10	GRVxGRV	4'-0 9/16"
1	53	10	GRVxGRV	1'-0 7/16"
1	63	6	GRVxGRV	2'-8 7/8"
1	64	6	GRVxGRV	2'-11 3/8"
2	65	6	GRVxGRV	2'-1 5/8"
1	67	6	GRVxGRV	7'-1 3/4"
1	68	6	GRVxGRV	6'-11 1/4"
2	69	6	GRVxGRV	1'-11 5/8"
1	70	10	GRVxGRV	7'-5 1/4"
1	71	10	GRVxGRV	25'-4 7/8"
1	72	10	GRVxGRV	17'-7 1/4"
1	73	6	GRVxGRV	4'-7 1/4"
1	74	6	GRVxGRV	4'-9 3/4"
1	77	6	GRVxGRV	5'-10 1/4"
1	78	6	GRVxGRV	6'-0 3/4"
1	79	6	GRVxGRV	1'-9 5/8"
8	82	6	GRVxGRV	1'

FITTINGS

Qty	TAG#	SIZE	PART#	DESCRIPTION #1	DESCRIPTION #2
10	2	2.5	GRUVLOK,Fig.7050	90 ELBOW, GRVD	290390014249
27	5	2.5	GRUVLOK,Fig.7001	COUPLING, FLEX GRVD.	
32	7	2.5	GRUVLOK,Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013522
6	8	2.5	GRUVLOK,Fig.7060	TEE, GROOVED	290390016822
4	10	2.5	GRUVLOK,Fig.7051LR	45 ELBOW, GRVD	290390014801
4	11	4	GRUVLOK,Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013548
4	12	4x2.5	GRUVLOK,Fig.7072	4x2.5" GRVD CONC REDUCER	290390028645
2	19	2.5	GRUVLOK,Fig.7074	CAP, GRVD	290390030161
6	21	2		COUPLING, THRD	
2	23	2		TEE, THRD	
6	26	2.5x2	GRUVLOK,Fig.7076	2.5x2" GRVD CONC REDUCER	290390028413
4	28	2.5	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020102
73	32	6	GRUVLOK,Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013563
8	33	6	GRUVLOK,Fig.7051LR	45 ELBOW, GRVD	290390014942
18	36	6	GRUVLOK,Fig.7050	90 ELBOW, GRVD	290390014363
2	51	10x2.5		GROOVE-O-LET	
22	54	10	GRUVLOK,Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013589
2	56	10	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020126
2	57	10	GRUVLOK,Fig.7051LR	45 ELBOW, GRVD	290390014983
7	59	10x6	GRUVLOK,Fig.7061	REDUCING TEE, GROOVED	290390019065
3	60	10	GRUVLOK,Fig.7050	90 ELBOW, GRVD	290390014405
1	62	10	GRUVLOK,Fig.7060	TEE, GROOVED	290390016962
5	66	10x6	GRUVLOK,Fig.7072	10x6" GRVD CONC REDUCER	290390029429
2	75	6	GRUVLOK,Fig.7074	CAP, GRVD	290390030302
2	76	6	GRUVLOK,Fig.7060	TEE, GROOVED	290390016921
24	80	6	GRUVLOK,Fig.7001	COUPLING, FLEX GRVD.	
2	83	4	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020110
2	84	6x4	GRUVLOK,Fig.7072	6x4" GRVD CONC REDUCER	290390028967
2	86	5	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020114
2	87	6x5	GRUVLOK,Fig.7072	6x5" GRVD CONC REDUCER	290390029007
8	90	6	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020118

VALVES

Qty	TAG#	SIZE	PART#	DESCRIPTION #1
8	4	2.5	GRUVLOK,SER.7700	BUTTERFLY VALVE, GRVD
2	25	2.5	GRUVLOK,FIG.758	STRAINER, GROOVED
2	27	2.5	GRUVLOK,SER.7800	CHECK VALVE, GRVD
4	34	6	GRUVLOK,Fig.7260	STRAINER, GROOVED
2	55	10	GRUVLOK,SER.7700	BUTTERFLY VALVE, GRVD
12	58	6	GRUVLOK,SER.7700	BUTTERFLY VALVE, GRVD
1	61	10	GRUVLOK,SER.7700	BUTTERFLY VALVE, GRVD
4	81	6	GRUVLOK,FIG.722G	3DTY VALVE, GROOVED
2	85	6x5	GRUVLOK,Fig.7250	SUCTION DIFF. GROOVED
2	89	6	GRUVLOK,Fig.7250	SUCTION DIFF. GROOVED



PIPE

Qty	TAG#	SIZE	END TYPE	PIPE LENGTH
1	1	2.5	GRVxGRV	5'-4 7/8"
2	3	2.5	GRVxGRV	6'-2 3/4"
2	6	2.5	GRVxGRV	4 1/4"
2	9	2.5	GRVxGRV	1'-8 13/16"
2	13	2.5	GRVxGRV	4'-7 3/8"
2	14	4	GRVxTHD	10 5/16"(FIELD FIT)
1	15	2.5	GRVxGRV	8'-7 1/4"
1	16	2.5	GRVxGRV	1'-0 7/16"
1	17	2.5	GRVxGRV	1'-8 7/8"
1	18	2.5	GRVxGRV	1'-3 1/8"
2	20	4	GRVxGRV	6"
6	22	2	THDxGRV	6"(FIELD FIT)
4	24	2.5	GRVxGRV	6"
2	29	2.5	GRVxGRV	1'
1	30	6	GRVxGRV	4'-5 1/8"
1	31	6	GRVxGRV	1'-6 5/16"
1	35	6	GRVxGRV	3'-2 3/4"
1	37	6	GRVxGRV	4 5/8"
1	38	6	GRVxGRV	1'-5 5/16"
1	39	6	GRVxGRV	5'-10"
1	40	6	GRVxGRV	4'-4 7/8"
1	41	6	GRVxGRV	4'-2 3/8"
1	42	6	GRVxGRV	3'-5 1/8"
1	43	6	GRVxGRV	1'-3 11/16"

PIPE

Qty	TAG#	SIZE	END TYPE	PIPE LENGTH
2	44	6	GRVxGRV	2'-4 1/4"
1	45	6	GRVxGRV	1'-3 1/2"
1	46	6	GRVxGRV	17'-7 1/8"
1	47	6	GRVxGRV	12'-11 1/8"
1	48	6	GRVxGRV	4'-9 15/16"
4	49	6	GRVxGRV	11 3/4"
1	50	10	GRVxGRV	2'-9 3/16"
1	52	10	GRVxGRV	4'-0 9/16"
1	53	10	GRVxGRV	1'-0 7/16"
1	63	6	GRVxGRV	2'-8 7/8"
1	64	6	GRVxGRV	2'-11 3/8"
2	65	6	GRVxGRV	2'-1 5/8"
1	67	6	GRVxGRV	7'-1 3/4"
1	68	6	GRVxGRV	6'-11 1/4"
2	69	6	GRVxGRV	1'-11 5/8"
1	70	10	GRVxGRV	7'-5 1/4"
1	71	10	GRVxGRV	25'-4 7/8"
1	72	10	GRVxGRV	17'-7 1/4"
1	73	6	GRVxGRV	4'-7 1/4"
1	74	6	GRVxGRV	4'-9 3/4"
1	77	6	GRVxGRV	5'-10 1/4"
1	78	6	GRVxGRV	6'-0 3/4"
1	79	6	GRVxGRV	1'-9 5/8"
8	82	6	GRVxGRV	1'

FITTINGS

Qty	TAG#	SIZE	PART#	DESCRIPTION #1	DESCRIPTION #2
10	2	2.5	GRUVLOK,Fig.7050	90 ELBOW, GRVD	290390014249
27	5	2.5	GRUVLOK,Fig.7001	COUPLING, FLEX GRVD.	
32	7	2.5	GRUVLOK,Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013522
6	8	2.5	GRUVLOK,Fig.7060	TEE, GROOVED	290390016822
4	10	2.5	GRUVLOK,Fig.7051LR	45 ELBOW, GRVD	290390014801
4	11	4	GRUVLOK,Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013548
4	12	4x2.5	GRUVLOK,Fig.7072	4x2.5" GRVD CONC REDUCER	290390028645
2	19	2.5	GRUVLOK,Fig.7074	CAP, GRVD	290390030161
6	21	2		COUPLING, THRD	
2	23	2		TEE, THRD	
6	26	2.5x2	GRUVLOK,Fig.7076	2.5x2" GRVD CONC REDUCER	290390028413
4	28	2.5	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020102
73	32	6	GRUVLOK,Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013563
8	33	6	GRUVLOK,Fig.7051LR	45 ELBOW, GRVD	290390014942
18	36	6	GRUVLOK,Fig.7050	90 ELBOW, GRVD	290390014363
2	51	10x2.5		GROOVE-O-LET	
22	54	10	GRUVLOK,Fig.7401	COUPLING, RIGIDLOK GRVD.	290390013589
2	56	10	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020126
2	57	10	GRUVLOK,Fig.7051LR	45 ELBOW, GRVD	290390014983
7	59	10x6	GRUVLOK,Fig.7061	REDUCING TEE, GROOVED	290390019065
3	60	10	GRUVLOK,Fig.7050	90 ELBOW, GRVD	290390014405
1	62	10	GRUVLOK,Fig.7060	TEE, GROOVED	290390016962
5	66	10x6	GRUVLOK,Fig.7072	10x6" GRVD CONC REDUCER	290390029429
2	75	6	GRUVLOK,Fig.7074	CAP, GRVD	290390030302
2	76	6	GRUVLOK,Fig.7060	TEE, GROOVED	290390016921
24	80	6	GRUVLOK,Fig.7001	COUPLING, FLEX GRVD.	
2	83	4	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020110
2	84	6x4	GRUVLOK,Fig.7072	6x4" GRVD CONC REDUCER	290390028967
2	86	5	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020114
2	87	6x5	GRUVLOK,Fig.7072	6x5" GRVD CONC REDUCER	290390029007
8	90	6	GRUVLOK,Fig.7012	GRVD. FLANGE ADAPT.	290390020118

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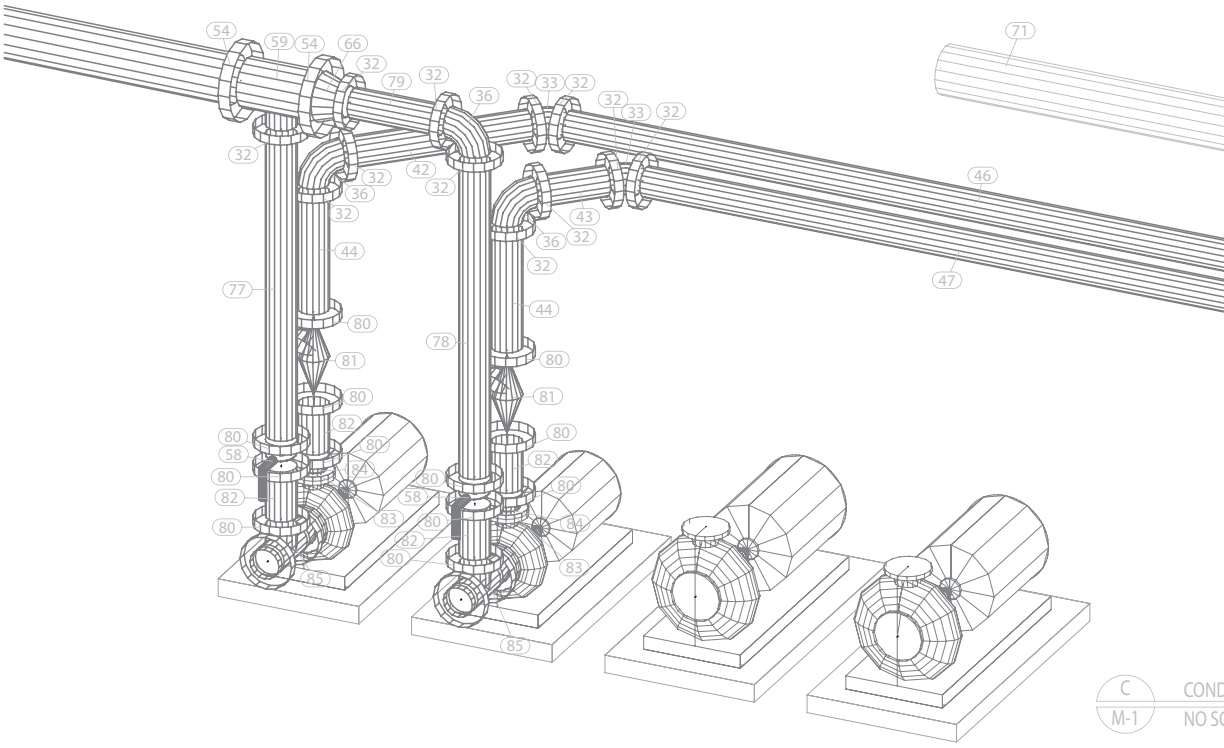
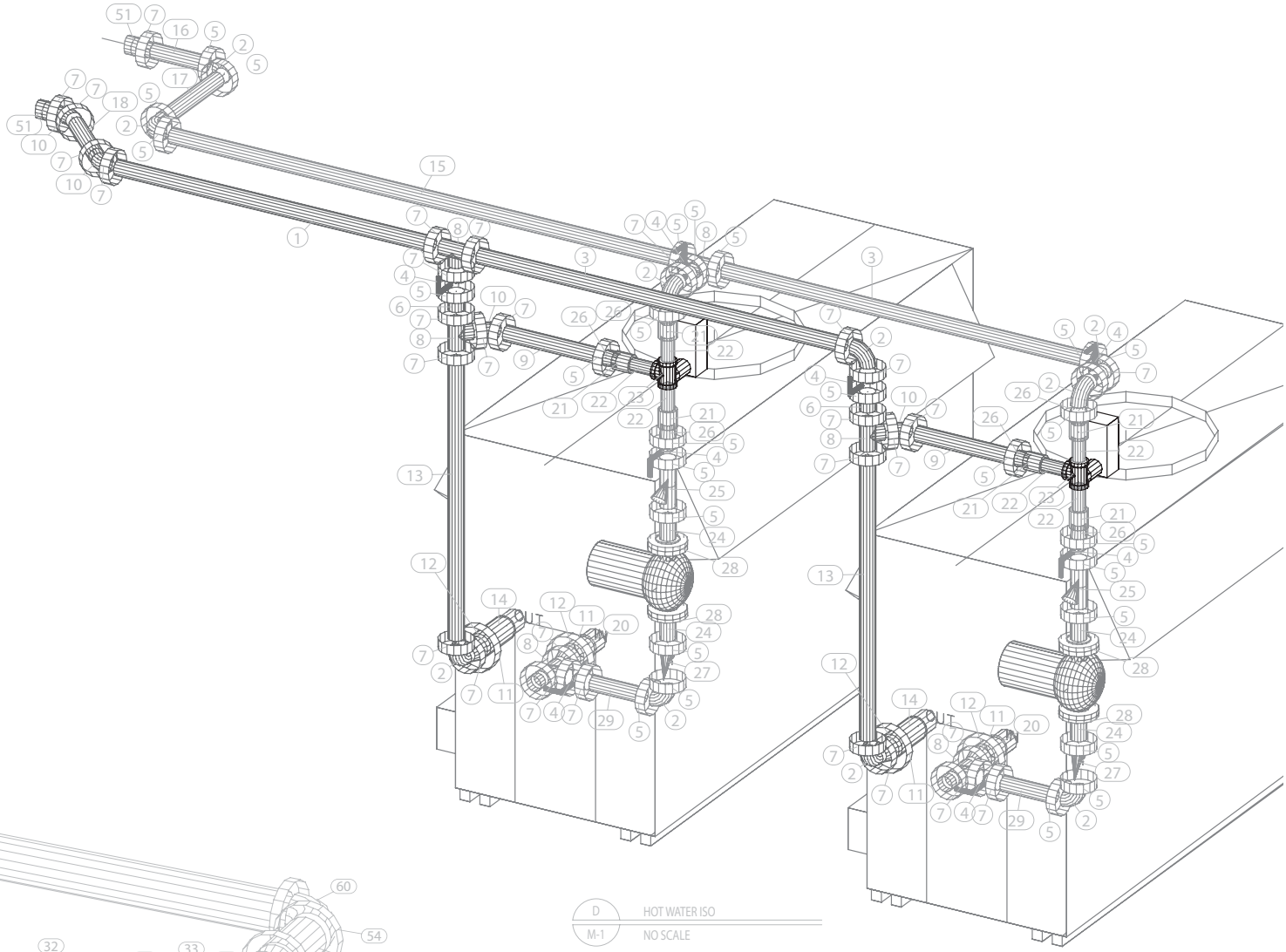
1	61	10	GRUVLOK,SER.7700	BUTTERFLY VALVE, GRVD
4	81	6	GRUVLOK,FIG.722G	3DTY VALVE, GROOVED
2	85	6x5	GRUVLOK,Fig.7250	SUCTION DIFF, GROOVED
2	89	6	GRUVLOK,Fig.7250	SUCTION DIFF, GROOVED



For a full-size printed brochure with systems coded by color contact your local Anvil representative and ask for Item #105 or visit http://www.anvilintl.com/SharedContent/Pdf/Literature_ProductBrochures/design_brochure.pdf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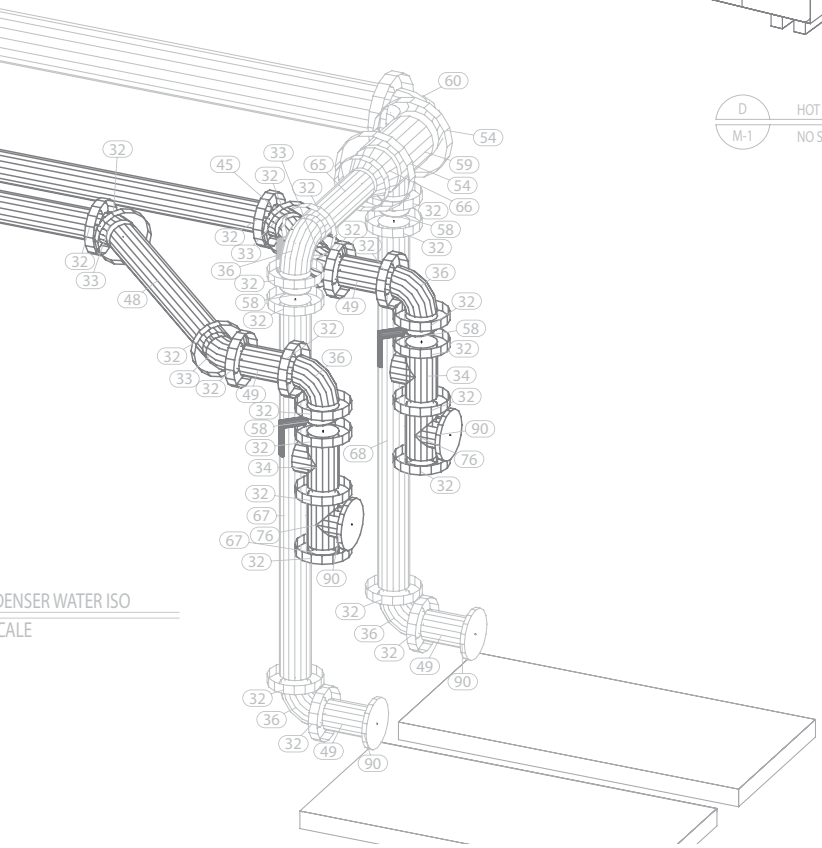
DENSER WATER ISO
CALE

TECHNICAL DATA

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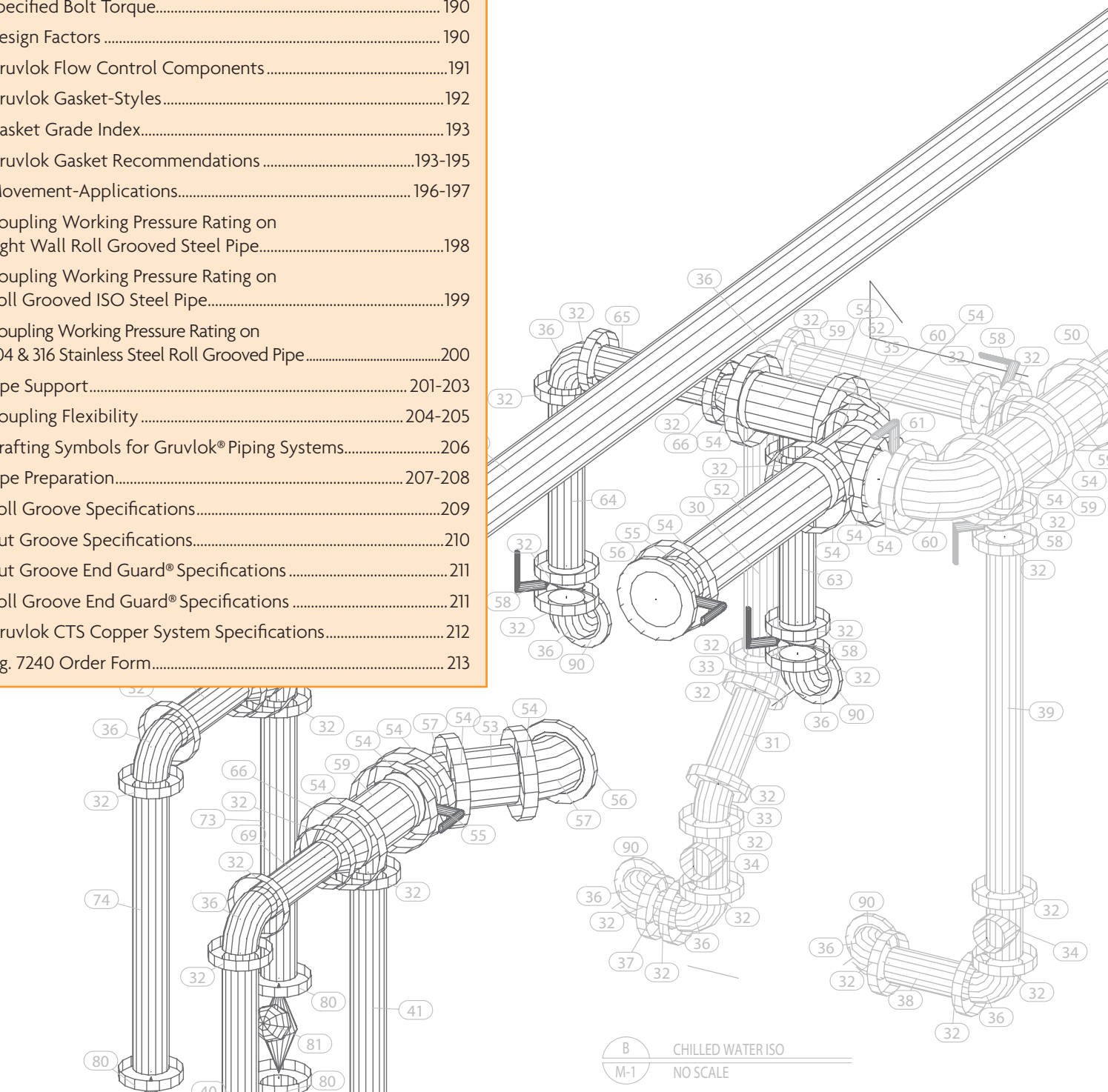


GRUVLOK® LUBRICANTS

GRUVLOK® XTREME™ LUBRICANT

Gruvlok® Xtreme™ Lubricant has been developed for use with Gruvlok couplings in services where improved lubrication is beneficial. This lubricant has an operating temperature range from -65°F to 400°F (-53.8°C to 204°C), well exceeding the temperature range of Gruvlok gaskets. This lubricant is waterproof, thereby eliminating water wash-out and it will not dry out in the absence of water. There are five primary applications where the Xtreme Lubricant will provide increased benefits: low temperature applications below 32°F (0°C), high temperature applications above 150°F (65.6°C), applications where increased pipe joint flexibility is needed, lubrication of gaskets in copper systems, and for the lubrication of gaskets on HDPE couplings. Since it is formulated from a non-hydro carbon base, it can be used with EPDM, Nitrile and Fluoroelastomer gasket materials. **It is not to be used with Silicone gaskets.**

- In low temperature applications the gasket will shrink, thereby lowering the sealing force on the gasket sealing lips. The temperature change will also force the gasket to slightly re-position itself. This will cause pipe end sealing surfaces, with small cuts or damage, to become more susceptible to leakage. Gruvlok Xtreme Lubricant will maintain it's lubricating properties at lower temperatures allowing a properly lubricated pipe end and gasket (assembly) to reposition itself during temperature cycles.
- For high temperature service and copper systems, it is required that the gasket be lubricated not only on the outside, as with the normal installation of a Gruvlok gasket, but also on the inside. Lubrication on the inside of the gasket is easily accomplished by turning the gasket inside out and applying the lubricant. Gruvlok Xtreme Lubricant will maintain it's lubricating properties at higher temperatures, allowing a properly lubricated pipe end and gasket assembly to re-position itself during temperature cycles. Lubrication of the pipe end and gasket will help the gasket to adjust into the proper sealing position during temperature cycles. The lubricant on the interior of the gasket will act to improve the chemical resistance of the gasket material by providing a thin lubricant barrier between the piping system fluid and the gasket surface. This is particularly important at higher temperatures where oxidizing agents in the piping system become more aggressive. **However, gasket chemical compatibility must still be considered.**
- The Gruvlok Xtreme Lubricant has been formulated from low viscosity, non-petroleum based oils to ease spreading of the lubricant. In applications where pipe movement is expected, proper lubrication of the gasket's exterior assists the gasket into the proper sealing position as pipe system movement occurs. This lubricating film enhances our flexible coupling gasket's ability to compensate for axial, transverse and rotational pipe movements.

- Gruvlok Xtreme Lubricant is the only Gruvlok lubricant that is to be used with Gruvlok couplings and gaskets in HDPE and copper piping systems. It's low temperature capability and lubricity ensure a highly reliable connection.

Gruvlok® Xtreme™ Lubricant is a Teflon® fortified white, tasteless and odorless grease made from Silicone Oil and other ingredients that are safe to ingest. It is sanctioned by the FDA under C.F.R. 21.172.878 & 21.177.1550 (Incidental Food Contact). It is NSF approved for use with potable water.

CAUTION: Silicone based lubricants are not allowed in some facilities. ®Teflon is a registered trademark of Dupont.

GRUVLOK® QUICK DRY LUBRICANT

Gruvlok® Quick Dry Lubricant is a fast drying lubricant that has been developed for applications where the piping system is exposed. The service temperature range for this lubricant is from 0° F to 150° F (-17.8°C to 65.6°C) and may be used with all Gruvlok gasket material grades. The lubricant is made from a water emulsion that is non-toxic, it will not impart taste or odor, and does not support bacterial growth. Gruvlok Quick Dry Lubricant is non-corrosive, non-flammable, and is NSF approved for use with potable water.

This lubricant is easy to apply by brush or hand, and it quickly dries to a thin film when in contact with air. It is water-soluble. The quick drying quality of the lubricant eliminates lubricant drips caused by over lubrication. If necessary, reapply lubricant prior to assembly. Do not thin or mix with solvents.

GRUVLOK® LUBRICANT

Gruvlok® Lubricant is the standard lubricant that has been provided for use with Gruvlok products for years. Gruvlok Lubricant is water soluble, non-toxic, non-corrosive, non-flammable, and will not impart taste or odor. It is NSF approved for use with potable water. This lubricant is acceptable for most applications, however, the Gruvlok Xtreme Lubricant and Gruvlok Quick Dry Lubricant are now available to improve the performance of the couplings and flanges in certain applications.

CAUTION: HDPE pipe requires the use of Gruvlok Xtreme Lubricant and should not be used with Gruvlok Lubricant.

SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Gruvlok couplings and flanges. The nuts must be tightened alternately and evenly until fully tightened. **CAUTION:** Use of an Impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

CAUTION: Proper torquing of coupling bolts is required to obtain specified performance. **Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.** Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

NOTE: Use specified bolt torque unless otherwise indicated on product installation pages.

ANSI SPECIFIED BOLT TORQUE

Bolt Size	Wrench Size	Specified Bolt Torque *
In.	*In.*	*Ft.-Lbs.*
3/8	11/16	30-45
1/2	7/8	80-100
5/8	1 1/16	100-130
3/4	1 1/4	130-180
7/8	1 7/16	180-220
1	1 5/8	200-250
1 1/8	1 13/16	225-275
1 1/4	2	250-300

* Non-lubricated bolt torques

METRIC SPECIFIED BOLT TORQUE

Bolt Size	Wrench Size	Specified Bolt Torque *
mm	*mm*	*N-m*
M10	16	40-60
M12	22	110-150
M16	24	135-175
M20	30	175-245
M22	34	245-300
M24	36	270-340

* Non-lubricated bolt torques

DESIGN FACTORS

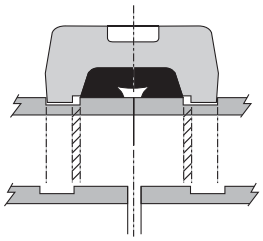
MOVEMENT:

Each flexible design Gruvlok coupling can provide for pipe system movement up to the design maximum for the specific size and type of coupling being utilized. Movement is possible in the Gruvlok coupling due to two factors: (1) designed-in clearance between the key of the coupling and the groove diameter and groove width, and (2) the gap between pipe ends joined by the coupling.

LINEAR MOVEMENT:

FLEXIBLE COUPLING LINEAR MOVEMENT

Linear movement is accommodated within the coupling by allowing the pipe ends to move together or apart in response to pressure thrusts and temperature changes. The available linear movement provided by Standard Gruvlok couplings is shown below:



Represents Linear Movement Capabilities

LINEAR MOVEMENT

Sizes	Roll Groove Pipe	Cut Groove Pipe
1" through 3½"	1/32"	1/16"
4" though 24"	3/32"	3/16"

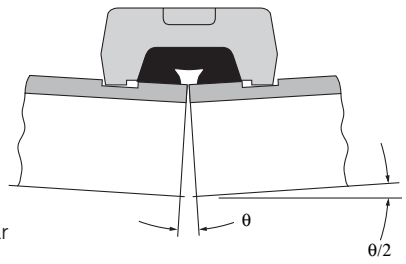
RIGID COUPLINGS

Gruvlok rigid couplings Fig. 7400, Fig. 7401 and Fig. 7004 HPR are designed to provide a joint with the attributes of a welded or flanged connection. Therefore, these joints would remain in strict alignment and would resist deflection and linear movement during service.

ANGULAR MOVEMENT:

FLEXIBLE COUPLING ANGULAR MOVEMENT

Designed-in clearances allow limited deflection of the pipe joint within the coupling, without introducing eccentric loads into the coupling joint.



The maximum available angular movement of Gruvlok flexible couplings on roll groove joints is shown in the performance data for each coupling. The amount of angular flexibility varies for each coupling size and type. The values account for pipe, groove, and coupling tolerances.

FLEXIBLE COUPLINGS

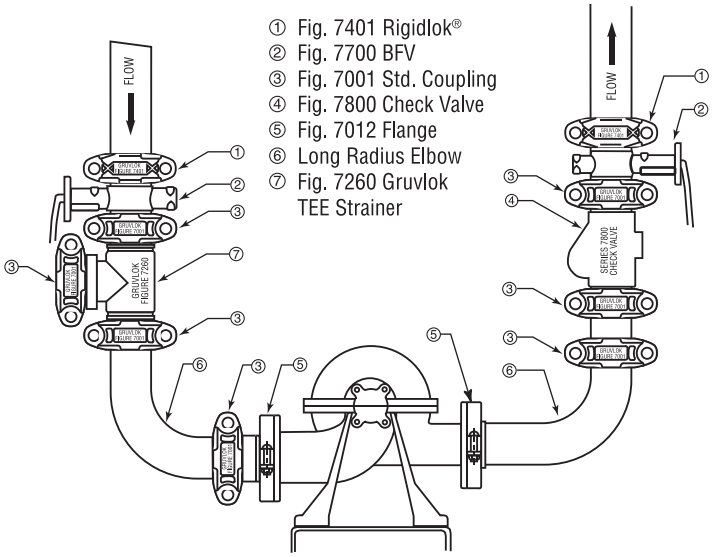
Figs. 7000, 7001, 7003, 7010 are the flexible couplings provided in the Gruvlok product line. The following information on movement applies to these flexible couplings.

GRUVLOK® FLOW CONTROL

Components

Anvil has put together a complete array of Gruvlok components necessary to provide pump protection for HVAC and industrial piping needs. With the combination of the Fig. 7401 Rigidlok and Fig. 7001 Standard coupling, flex connectors can be eliminated thus reducing cost. The Series 7700 Gruvlok® Butterfly valve has superior flow characteristics. The Gruvlok® Series 7800 Check Valve is full waterway valve and can be stacked directly to the Series 7700 Butterfly Valve. The Fig. 7250 Suction Diffuser and Fig. 7260 Tee Strainer complete the Gruvlok® pump protection package.

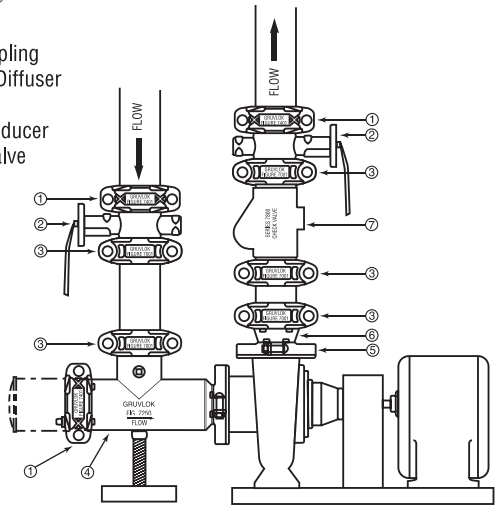
HORIZONTAL SPLIT CASE PUMP



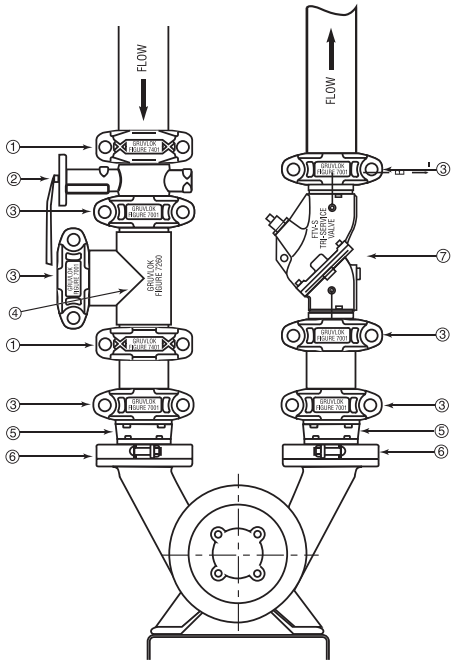
① Fig. 7401 Rigidlok®
② Fig. 7700 BFV
③ Fig. 7001 Std. Coupling
④ Fig. 7800 Check Valve
⑤ Fig. 7012 Flange
⑥ Long Radius Elbow
⑦ Fig. 7260 Gruvlok TEE Strainer

END SUCTION PUMP

① Fig. 7401 Rigidlok®
② Fig. 7700 BFV
③ Fig. 7001 Std. Coupling
④ Fig. 7250 Suction Diffuser
⑤ Fig. 7012 Flange
⑥ Fig. 7072 Conc. Reducer
⑦ Fig. 7800 Check Valve



VERTICAL SPLIT CASE PUMP

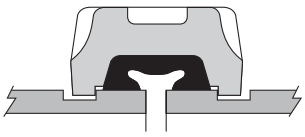


① Fig. 7401 Rigidlok®
② Fig. 7700 BFV
③ Fig. 7001 Std. Coupling
④ Fig. 7260 TEE Strainer
⑤ Fig. 7072 Conc. Reducer
⑥ Fig. 7012 Flange
⑦ FTV-S Tri Service Valve

GRUVLOK GASKET-STYLES

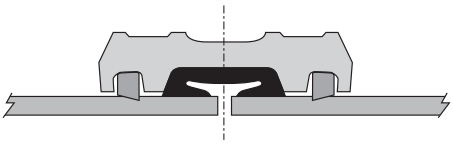
Gruvlok offers a variety of pressure responsive gasket styles. Each serves a specific function while utilizing the same basic sealing concept. Proper installation of the gasket compresses the inclined gasket lips on the pipe O.D., forming a leak tight seal. This sealing action is reinforced when the gasket is encompassed and compressed by the coupling housings. The application of internal line pressure energizes the elastometric gasket and further enhances the gasket sealing action.

"C" STYLE



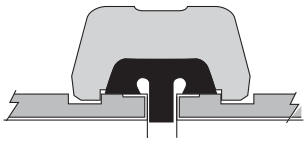
The "C" Style cross section configuration is the most widely used gasket. It is the gasket style provided as standard in many Gruvlok Couplings (Fig. 7000, 7001, 7003, 7004HPR, 7307, 7400 and 7401). Grade "E" and "T" are standard grades while other grades are available for special applications.

ROUGHNECK®



This "C" style gasket is similar in appearance and design to the Standard gasket but is only used with Fig. 7005 Roughneck Couplings and Fig. 7305 HDPE Couplings. The Roughneck gasket is wider, which allows for minor pipe end separation as line pressure sets the grippers into the plain end pipe.

END GUARD™

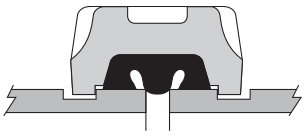


The projecting rib fits between the ends of lined pipe to prevent damage to unprotected pipe ends during coupling joint assembly.

The E.G. gasket is provided as standard with the Fig. 7004 E.G. Coupling.

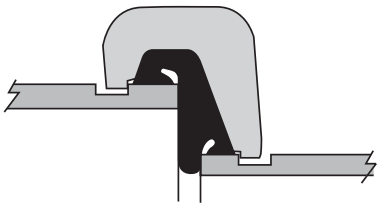
Grade "E" and "T" gaskets are available.

FLUSH GAP™



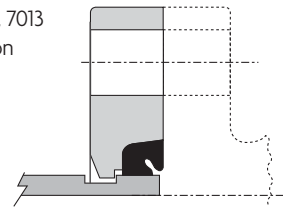
Designed to prohibit contaminates from building up in the gasket cavity. The centering rib fits flush over the gap between the two pipe ends thus closing off the gasket cavity. It can be used with Fig. 7000, 7001, 7400 and 7401 Couplings for many applications. Recommended for use in dry fire protection systems.

REDUCING COUPLING



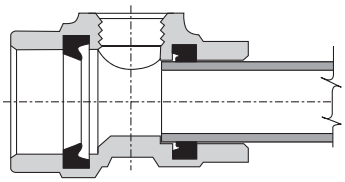
The centering rib allows for pipe positioning and serves to keep the smaller pipe from telescoping during installation. Used only with the Fig. 7010 Reducing Coupling.

FLANGE



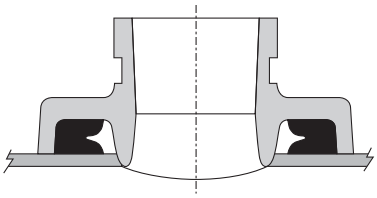
A specially designed gasket for the Fig. 7012, 7013 and 7312 Flange provides for a reliable seal on both the pipe and the mating flange.

SOCK-IT®



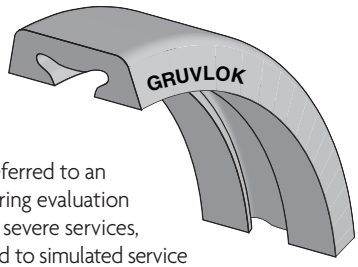
Used in Sock-It fittings only, this pressure energized gasket provides a leak-tight seal on plain end seal pipe. Available in Grade "E" material only.

CLAMP-T™



These gaskets conform to the curved exterior of the pipe to provide a pressure responsive seal. This unique design is only used with Fig. 7045, 7046 Clamp-T and Fig. 7047, 7048, and 7049 Clamp-T Crosses.

GASKET GRADE INDEX & GASKET RECOMMENDATION



The lists are provided as an aid in selecting the optimum gasket grade for a specific application to assure the maximum service life.

The recommendations have been developed from current information supplied by manufacturers of the elastomers, technical publications, and industry applications. The information supplied should be considered as a basis for evaluation but not as a guarantee.

Selection of the optimum gasket grade for a specific service requires the consideration of many factors; primarily temperature, fluid concentration, and continuity of service. Unless otherwise noted, all gasket recommendations are based on 100°F (38°C) maximum temperature service condition. Where more than one gasket grade is shown, the preferred grade is listed first.

Combinations of fluids should be referred to an Anvil Representative for an engineering evaluation and recommendation. In unusual or severe services, gasket materials should be subjected to simulated service conditions to determine the most suitable gasket grade.

Gasket recommendations apply only to Gruvlok gaskets. Contact an Anvil Representative for recommendations for services not listed. These listings do not apply to Gruvlok Butterfly Valves.

All Gruvlok products marked with UL/ULC Listed, FM approved VdS and/or LPC symbols are Listed/Approved with EPDM material. For other Listed/Approved materials, please contact an Anvil Representative for more information.

GASKET GRADE INDEX

STANDARD GASKETS

Grade	Temp. Range	Compound	Color Code	General Service Applications
E	-40°F to +230°F (-40°C to 110°C)	EPDM	Green	Water, dilute acids, alkalies, salts, and many chemical services not involving hydrocarbons, oils, or gases. Excellent oxidation resistance. **NOT FOR USE WITH HYDROCARBONS**
EP	-40°F to +250°F (-40°C to 121°C)	EPDM	Green and Red	Water, dilute acids, alkalies, salts, and many chemical services not involving hydrocarbons, oils, or gases. Excellent oxidation resistance. **NOT FOR USE WITH HYDROCARBONS**
T	-20°F to +180°F (-29°C to 82°C)	Nitrile (Buna-N)	Orange	Petroleum products, vegetable oils, mineral oils, and air contaminated with petroleum oils. **NOT FOR USE IN HOT WATER SERVICES**

SPECIAL GASKETS

Grade	Temp. Range	Compound	Color Code	General Service Applications
O	+20°F to +300°F (-20°C to 149°C)	Fluoro Elastomer	Blue	High temperature resistance to oxidizing acids, petroleum oils, hydraulic fluids, halogenated, hydrocarbons and lubricants
L	-40°F to +350°F (-40°C to 177°C)	Silicone	Red Gasket	Dry, hot air and some high temperature chemical services.
E Type A	-40°F to +150°F (-40°C to 66°C)	Pre-Lubricated	Violet	Wet & Dry (oil free air) Pipe in Fire Protection Systems. For dry pipe systems, Gruvlok Xtreme™ Temperature Lubricant is required.

GASKET RECOMMENDATION LISTING

WATER & AIR

Service	Gasket Grade
Air, (no oil vapors) Temp. -40°F to 230°F (-40°C to 110°C)	E/EP
Air, (no oil vapors) Temp. -40°F to 350°F (-40°C to 177°C)	L
Air, Oil vapor Temp. -20°F to 150°F (-29°C to 66°C)	T
Air, Oil vapor Temp. 20°F to 300°F (-7°C to 149°C)	O
Water, Temp to 150°F (66°C)	E/EP/T
Water, Temp to 230°F (110°C)	E
Water, Acid Mine	E/T
Water, Chlorine	(E/EP/O)
Water, Deionized	E/EP/T
Water, Seawater	E/EP/T
Water, Waste	E/EP/T
Water, Lime	E/EP/T

Where more than one gasket grade is shown the preferred gasket grade is listed first. Where the gasket grade is shown in parentheses, Contact an Anvil Representative for an engineering evaluation and recommendation. Specify gasket grade when ordering. Use Gruvlok lubricant on gasket. Check gasket color code to be certain it is recommended for the service intended.

PETROLEUM PRODUCTS

Service	Gasket Grade
Crude Oil - Sour	T
Diesel Oil	T
Fuel Oil	T
Gasoline, Leaded	T
Gasoline, Unleaded*	(O)
Hydraulic Oil	T
JP-3, JP-4 and JP-5	T/O
JP-6, 100°F (38°C) Maximum Temp.	O
Kerosene	T
Lube Oil, to 150°F (66°C)	T
Motor Oil	T
Tar and Tar Oil	T
Transmission Fluid —Type A	O
Turbo Oil #15 Diester Lubricant	O

Unless otherwise noted, all gasket listings are based upon 100°F (38°C) maximum temperature service conditions.

For services not listed, contact an Anvil Representative for recommendation.

*Contact an Anvil Representative for service evaluation.

VACUUM SERVICE

VACUUM SERVICE

Size	Vacuum Level	Gasket Recommendation
1" - 12" (25 - 300mm)	0" - 10" Hg	Standard or Flush Gap
1½" - 12" (40 - 200mm)	10" - 29.9" Hg	Flush Gap

LARGER SIZES: Contact an Anvil Representative for more information.

GRUVLOK GASKET-RECOMMENDATIONS

CHEMICAL SERVICES	
Chemical Composition	Gasket Grade
Acetic Acid 50%	E/EP
Acetic Acid Glacial	L/E/EP
Acetone	E/EP
Acethlene	E/EP/T
Alkalis	T/E/EP
Alums	E/EP/T/O
Aluminum Chloride	E/EP/T
Aluminum Fluoride	E/EP/T/O
Aluminum Hydroxide	E/EP/O
Aluminum Nitrate	E/EP/T
Aluminum Salts	E/EP
Ammonia Gas, Cold	E/EP
Ammonia Liquid	E/EP
Ammonium Chloride	T/E/EP
Ammonium Fluoride	E/EP
Ammonium Hydroxide	E/EP
Ammonium Nitrate	T/E/EP
Amyl Acetate	E/EP
Amyl Alcohol	E/EP
Aniline	E/EP
Animal Fats	T
Argon-Gas	L
Arsenic Acid, to 75%	T/E/EP/O
Barium Carbonate	E/EP/T
Barium Chloride	E/EP/T
Barium Hydroxide	E/EP/T
Barium Nitrate	E/EP/O
Barium Sulphide	E/EP/T
Beet Sugar Liquors	T
Benzene	O
Benzene Sulfonic (Aromatic Acid)	(E/EP)
Benzoic Acid	O
Benzyl Alcohol	E/EP
Benzyl Chloride	E/EP
Black Sulphate Liquor	T
Bleach, 5% Active Cl2	E/EP/O
Borax	E/EP/O
Boric Acid	E/EP/T
Bromine	O
Butyl Alcohol	E/EP/T
Butyl Stearate	E/EP
Butylene	T/O
Calcium Bisulfate	T/O
Calcium Bisulphide	T/O
Calcium Bisulphite	T/O
Calcium Carbonate	E/EP/T
Calcium Chloride	E/EP/T
Calcium Hydroxide (Lime)	E/EP/T

CHEMICAL SERVICES	
Chemical Composition	Gasket Grade
Calcium Sulfate	E/EP/T
Calcium Sulfide	E/EP/T
Caliche Liquors	E/EP/T
Cane Sugar Liquors	T
Carbitol	E/EP/T
Carbon Dioxide, Dry	E/EP/T
Carbon Dioxide, Wet	E/EP/T
Carbon Monoxide	E/EP
Carbon Tetrachloride	O
Castor Oil	T
Caustic Potash	E/EP
Caustic Soda	E/EP
Cellosolve	E/EP
Chlorine Dry	(O)
Chlorinate Solvents	(O)
Chlorobenzene	O
Chlorobenzene Chloride	O
Chlorobromomethane	O
Chloroform	O
Chrome Alum	E/T
Chrome Plating Solutions	O
Chromic Acid, to 50%	O
Citric Acid	E/EP/T
Coconut Oil	T
Cod Liver Oil	T
Coke Oven Gas	T/O
Copper Carbonate	E/EP/T
Copper Chloride	E/EP/T
Copper Cyanide	E/EP/T
Copper Sulphate	E/EP/T
Corn Oil	T
Cotton Seed Oil	T
Cresole, Cresylic Acid	T/O
Creosote, Coal Tar	(T/O)
Creosote, Wood	T/O
Cupric Chloride	E/EP/T
Cupric Fluoride	E/EP/T
Cupric Sulphate	E/EP/T
Cychohexanol	O
Diacetone Alcohol	E/EP
Dichlorobenzene	O
Dichloroethylene	O
Dioctyl Phthalate	(E/EP)
Epson-Salt	E/EP/T
Ethane	E/EP
Ethanolamine	E/EP
Ethyl Acetate	(E/EP)
Ethyl Alcohol	E/EP/T

CHEMICAL SERVICES	
Chemical Composition	Gasket Grade
Ethyl-Chloride	E/EP/T
Ethyl Ether	(T)
Ethylene Chloride	E/EP
Ethylene Chlorohydrin	E/EP
Ethylene Diamine	E/EP/T
Ethylene Dichloride (Dichloroethane)	O
Ethylene Glycol	E/EP/T
Ethylene Oxide	(E/EP)
Ferric Chloride, to 35%	E/EP/T
Ferric Nitrate	E/EP/T
Ferric Sulphate	E/EP/T
Ferrous Chloride	E/EP/T
Fish Oils	T
Fluroboric Acid	E/EP
Fluorosilicic Acid	E/EP
Fly-Ash	E/EP
Formaldehyde	E/EP/T
Formamide	E/EP/T
Formic Acid	E/EP/O
Freon 11, 130°F (54°C) Max.	T
Freon 12, 113, 114, 115, 130°F (54°C) Max.	T
Fructose	T
Furfuryl Alcohol	(E/EP)
Glucose	E/EP/T
Glue	T
Glycerin	E/EP/T
Glycerol	E/EP/T
Glycol	E/EP/T
Heptane	T
Hexaldehyde	E/EP
Hexane	T
Hexylene Glycol	T
Hydrochloric Acid, to 36%, 75°F (24°C)-Max.	E/EP
Hydrochloric Acid, to 36%, 158°F (70°C)-Max.	(O)
Hydrofluoric Acid, to 75%, 158°F (70°C)-Max.	(O)
Hydrofluosilicic Acid	T/E/EP
Hydrogen Peroxide, to 50%	E/EP/T/O
Hydrogen Peroxide, to 90%	(L/O)
Hydroquinone	T/O
Iodine,-Wet	E/EP
Isoamyl Alcohol	E/EP
Isooctane	T
Isobutyl Alcohol	E/EP
Isopropyl Alcohol	E/EP
Lacquer	(O)
Lacquer Solvent	(O)
Lactic Acid	T
Lard Oil	T

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Check gasket grade when ordering. Use Gruvlok lubricant on gasket.

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Check gasket color code to be certain it is recommended for the service intended.

GRUVLOK GASKET-RECOMMENDATIONS (CONT.)

CHEMICAL SERVICES	
Chemical Composition	**Gasket Grade**
Latex (1% Styrene &-Butadiene)	O
Lead Acetate	E/EP/T
Linseed Oil	T
Lithium Bromide	T/O
Magnesium Chloride	E/EP/T
Magnesium Hydroxide	E/EP/T
Magnesium Nitrate	E/EP
Magnesium Sulphate	E/EP/T
Malonyl Nitrile	E/EP/T
Mercuric Chloride	E/EP/T
Mercuric Cyanide	E/EP/T
Mercury	E/EP/T
Methyl Acetate	(E/EP)
Methyl Alcohol, Methanol	E/EP/T
Methyl Cellosolve (Ether)	E/EP
Methyl Chloride	(O)
Methyl Ethyl Ketone	(E/EP)
Methyl Formate	E/EP
Methyl Isobutyl Carbinol	E/EP/T
Methyl Isobutyl Ketone	(E/EP)
Mineral Oils	T
Naphtha, 160°F (71°C)-Max.	O
Naphthalene 176°F	O
Nickel Chloride	E/EP/T
Nickel Nitrate	E/EP
Nickel Plating Solution 125°F (52°C)-Max.	E/EP
Nitric Acid, to 10%, 75°F-(24°C)-Max.	E/EP
Nitric Acid, 10-50%, 75°F-(24°C)-Max.	O
Nitric Acid, 50-86%, 75°F (24°C)-Max.	(O)
Nitric Acid, Red Fuming	(O)
Nitro Benzene	(O)
Nitrous Oxide	E/EP
Octyl Alcohol	T
Olive Oil	T
Oxalic Acid	E/EP
Ozone	E/EP
Phenol (Carbolic acid) 300°F (149°C)-Max.	O
Phenylhydrazine	(O)
Phosphate Ester	E/EP
Phosphoric Acid, to 75% & 70°F (21°C)-Max.	E/EP/T

CHEMICAL SERVICES	
Chemical Composition	**Gasket Grade**
Phosphoric Acid, to 85% & 150°F (66°C) Max.	O
Photographic Solutions	T
Potassium Bromide	E/EP/T
Potassium Carbonate	E/EP/T
Potassium Chloride	E/EP/T
Plating Solutions (gold, brass cadmium, copper, lead, silver, tin, zinc)	E/EP
Potassium Chromate	T
Potassium Cyanide	E/EP/T
Potassium Ferricyanide	E/EP/T
Potassium Ferrocyanide	E/EP/T
Potassium Hydroxide	T
Potassium Iodide	E/EP/T
Potassium Nitrate	E/EP/T
Potassium Permanganate, saturated, to 25%	E/EP
Potassium Sulphate	E/EP/T
Propanol	E/EP
Propyl Alcohol	E/EP/T
Propylene Glycol	E/EP/T
Pydraul 312C	O
Pyroguard "C" &-"D"	T
Pyroguard 55	E/EP
Pyrrole	E/EP
Salicylic Acid	E/EP/T
Silver Cyanide	E/EP
Silver Nitrate	E/EP
Skydrol, 200°F (93°C)-Max.	L
Skydrol 500 Phosphate Ester	(L/E/EP)
Soda Ash,-Sodium Carbonate	E/EP/T
Sodium Bicarbonate	E/EP/T
Sodium Bisulphate	E/EP/T
Sodium Bisulphite (black liquor)	E/EP/T
Sodium Bromide	E/EP/T
Sodium Chlorate	E/EP/T
Sodium Chloride	E/EP/T
Sodium Cyanide	E/EP/T
Sodium Hydroxide, to 50%	E/EP
Sodium Hypochlorite, to 20%	E/EP
Sodium Metaphosphate	E/EP/T
Sodium Nitrate	E/EP/T

CHEMICAL SERVICES	
Chemical Composition	**Gasket Grade**
Sodium Peroxide	E/EP
Sodium Phosphate	E/EP/T
Sodium Silicate	E/EP/T
Sodium Sulphide	E/EP/T
Sodium Sulphite Solution, to 20%	E/EP/T
Sodium Thiosulphate, "Hypo"	E/EP/T
Soybean Oil	T
Stannous Chloride, to 15%	E/EP/T/O
Starch	E/EP/T
Stearic Acid	T
Styrene	O
Sucrose Solutions	T
Sulphur	E/EP
Sulphuric Acid, to 25%, 150°F (66°C)-Max.	E/EP
Sulphuric Acid, 25-50%, 200°F (93°C) Max.	O
Sulphuric Acid, 50-95%, 150°F-(66°C)-Max.	O
Sulphuric Acid, Fuming	(O)
Sulphuric Acid, Oleum	(O)
Sulphurous Acid	(O)
Tetrachloroethylene	O
Toluene	O
Tributyl Phosphate	(E/EP)
Trichloroethylene, 200°F-(93°C)-Max	O
Triethanolamine	E/EP/T
Trisodium Phosphate	(E/EP/T)
Turpentine 158°F-(70°C)-Max.	T/O
Urea	E/EP/T
Vegetable Oils	T
Vinegar	T
Vinyl Acetate	(E/EP)
White Liquor	E/EP
Xylene (Xylol)-158°F (70°C)-Max.	O
Zinc Sulphate	E/EP/T

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Check gasket grade when ordering. Use Gruvlok lubricant on gasket.

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MOVEMENT-APPLICATIONS

THERMAL MOVEMENT

A sufficient amount of coupling joints must be provided to accommodate the calculated movement (expansion or contraction) in a pipe run or segment thereof .

EXAMPLE:
A 200 foot long straight run of 4" steel cut grooved pipe between anchor points . Minimum Temperature: 40° F (4 .4° C) . (at time of installation) .
Maximum Oper . Temperature: 160° F (71 .1° C) .

Thermal expansion tables show this system will expand a total of 1 .80" due to the temperature change .

DESIGN QUESTION:
How many couplings are required to account for the thermal growth?

AVAILABLE LINEAR MOVEMENT PER FLEXIBLE COUPLING:
Using the table on page 190, we see that there is 0 .188" linear movement per coupling (4" Flexible Coupling)

COUPLINGS REQUIRED
As indicated above, the total movement is 1 .80". Thus, the number of couplings is determined as follows:

No . of Couplings = Tot . Movement / Avail . Movement per Coupling

FOR OUR EXAMPLE:
No . of Couplings = (1 .80") / (0 .187") = 9 .6,
Therefore 10 couplings are needed

POSITION OF COUPLINGS
In order for the couplings to provide for the movement indicated by the above example, it would be necessary to install all couplings with the maximum gap between pipe ends. Conversely, if the thermal movement was contraction due to a reduction of system temperature, the coupling joints would have be installed with the pipe ends butted, thus accommodating the "shrink" of the pipe system.

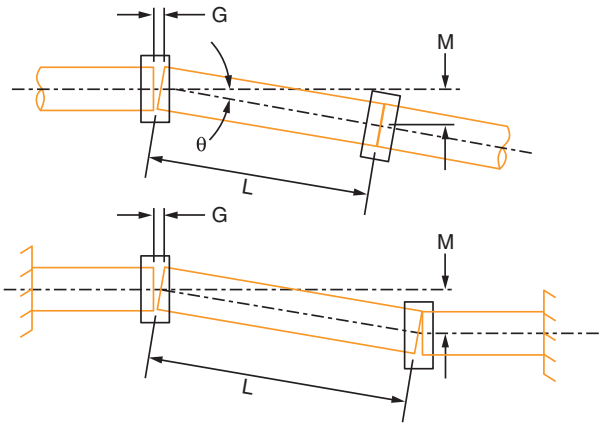
In either case the pipe run in question would have to be anchored at the proper locations to direct pipe system expansion or contraction into the coupling joints.

As can be seen from the above example, the pipe end gap within the coupling joint must be considered when designing a grooved end pipe system to accommodate thermal movement. The couplings do not automatically provide for expansion and contraction of piping.

MISALIGNMENT & DEFLECTION

The angular movement capability of the Gruvlok coupling permits the assembly of pipe joints where the piping is not properly aligned. At least two couplings are required to provide for lateral pipe misalignment. Deflection (longitudinal misalignment) may be accommodated within a single coupling as long as the angle of deflection does not exceed the value shown in the coupling performance data for the particular size and coupling type.

A pipe joint that utilizes the angular deflection capability of the Gruvlok coupling will react to pressure and thermal forces dependent upon the manner in which it is restrained. An unrestrained joint will react to these forces by straightening, thus reducing, if not eliminating, the deflection at the joint. If joint deflection has been designed into the pipe layout and must be maintained, then sufficient anchors must be provided to resist the lateral forces and hold the joint in the deflected condition.



The amount of deflection from pipe run centerline can be calculated utilizing the following equations:

$M = L (\text{Sin } \theta)$
$\theta = \text{ArcSin } (G/D)$
$M = (G \times L)/D$

WHERE:
M = Misalignment (inches)

G = Maximum Allowable Pipe End Movement (Inches) as shown under "Performance Data"

θ = Maximum Deflection (Degrees) from centerline as shown under "Performance Data"

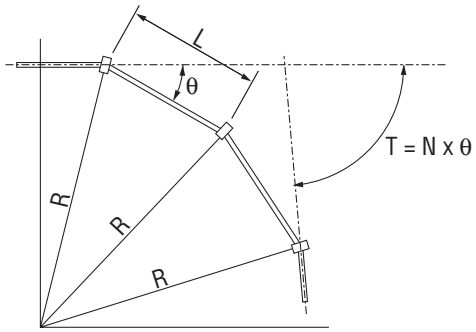
D = Pipe Outside Diameter (Inches)

L = Pipe Length (Inches)

MOVEMENT-APPLICATIONS (CONT.)

CURVE LAYOUT:

Utilizing the angular deflection at each coupling joint curves may be laid out using straight pipe lengths and Gruvlok Couplings.



This example shows how to calculate the curve radius, required pipe lengths, and number of required couplings.

$$R = L/(2 \times \sin(\theta/2))$$
$$L = 2 \times R \times \sin(\theta/2)$$
$$N = T/\theta$$

WHERE:

N = Number of Couplings

R = Radius of Curve (feet)

L = Pipe Length (feet)

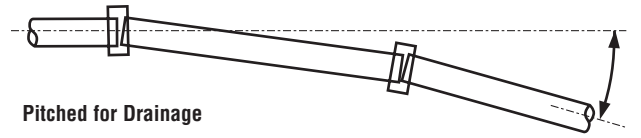
θ = Deflection from centerline (Degrees, Minutes) of each Coupling (See coupling performance data)

T = Total Angular Deflection of all Couplings.

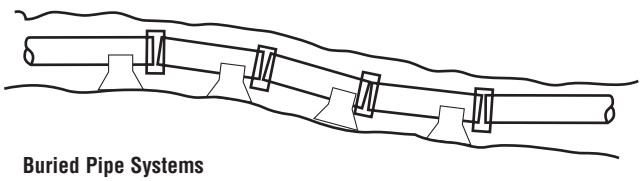
DRAINAGE, BURIED SYSTEMS, ETC.:

The flexible design of the Gruvlok coupling makes it ideal for use in a wide variety of systems in which random changes of the pipe direction can be accommodated by the Gruvlok coupling's angular deflection capability rather than requiring the use of special fittings.

Pitched drainage systems, buried pipe systems where pipe laying conditions are subject to settlement, and exposed pipe systems laid on rough ground are but a few of the many types of pipe installations that present conditions where the functional capability of the Gruvlok coupling are useful.



Pitched for Drainage

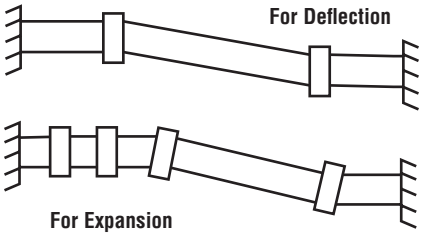


Buried Pipe Systems

COMBINED LINEAR & ANGULAR MOVEMENT:

The clearance in the grooved coupling joint, will allow a limited capability for combined linear and angular movement. A partially deflected joint will not provide full linear movement capability. A fully deflected coupling joint provides no linear movement capability. The Gruvlok coupling will not allow for both maximum linear and maximum angular movement simultaneously.

In systems where both are expected, additional joints may be required.



NOTE: Fully Deflected Joint Will Not Allow For Linear Expansion.

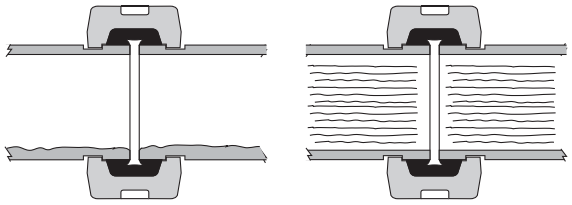
In the example above, two couplings were added to account for thermal expansion and the other couplings accommodate only the misalignment.

The additional stress from the combined movement is therefore relieved.

ROTATIONAL MOVEMENT:

Piping systems designed with Gruvlok Couplings can accommodate minor rotational movement from thermal expansion, settlement, vibration, or other similar movements. However, Gruvlok Couplings ***should never be used as a continuous swivel joint.***

EXAMPLE:



Before Pipe Rotation **After Pipe Rotation**

Utilizing the rotational capability of the Gruvlok Coupling, the pipe life of a slurry or similar coarse material piping system can be extended.

For pipe rotation, the system must be shut down and internal pressure relieved.

The pipe may then be rotated one-quarter turn, the couplings re-tightened, and service resumed. If performed on a regular basis, pipe rotation will evenly distribute wear over the entire inner surface of the pipe.

COUPLING WORKING PRESSURE RATING

on Light Wall Roll Grooved Steel Pipe

GRUVLOK COUPLING WORKING PRESSURE RATING (PSI) ON LIGHT WALL ROLL GROOVED STEEL PIPE

Nominal Size	O.D.	Nom. Wall Thickness	Pipe Schedule	Maximum Working Pressure (PSI*)								
				Fig. 7000	Fig. 7001	Fig. 7003	Fig. 7004	Fig. 7010*	Fig. 7012	Fig. 7013	Fig. 7400	Fig. 7401
In./DN(mm)	*In./mm*	*In.*	*Number*	*Lightweight*	*Standard*	*Hingelok*	*HPR*	*Reducing*	*Flange*	*Flange*	*Rigidlite*	*Rigidlok*
1 *25*	1.315 *33.4*	0.065 0.085 0.109	5 XL 10	300 300 600	500 300 750	– – –	– – –	– – –	– – –	– – –	175 300 300	– – –
1¼ *32*	1.660 *42.2*	0.065 0.085 0.109	5 XL 10	300 300 600	500 300 750	– – –	– – –	– – –	– – –	– – –	175 300 300	– – –
1½ *40*	1.900 *48.3*	0.065 0.090 0.109	5 XL 10	300 300 600	500 300 750	200 250 300	– – –	– – –	– – –	– – –	175 300 300	500 300 750
2 *50*	2.375 *60.3*	0.065 0.090 0.109	5 XL 10	300 300 600	500 300 750	200 250 300	500 300 800	250 300 350	200 300 300	500 300 720	175 300 300	500 300 750
2½ *65*	2.875 *73.0*	0.083 0.130 0.120	5 XL 10	300 300 600	500 300 750	200 250 300	500 300 800	250 300 350	200 300 300	500 300 720	175 300 300	500 300 750
3 *80*	3.500 *88.9*	0.083 0.130 0.120	5 XL 10	300 300 600	500 300 750	200 250 300	500 300 800	250 300 350	200 300 300	500 300 720	175 300 300	500 300 750
3½ *90*	4.000 *101.6*	0.083 0.120	5 10	300 600	500 750	– –	– –	– –	– –	– –	– –	– –
4 *100*	4.500 *114.3*	0.083 0.120	5 10	300 600	500 750	200 300	400 600	200 300	200 300	500 720	175 300	500 750
5 *125*	5.563 *141.3*	0.109 0.134	5 10	250 500	400 500	200 250	400 600	200 300	200 300	400 500	175 300	400 500
6 *150*	6.625 *168.3*	0.109 0.134 0.188	5 10 –	250 400 400	350 500 500	150 200 200	400 500 700	200 300 350	200 300 300	350 500 500	175 300 300	350 500 500
8 *200*	8.625 *219.1*	0.109 0.148 0.188 0.250	5 10 – 20	250 350 350 350	300 400 400 500	150 200 200 250	300 400 500 600	150 250 300 300	200 300 300 300	300 400 400 500	175 175 300 300	300 400 400 500
10 *250*	10.750 *273.1*	0.134 0.165 0.188 0.250	5 10 – 20	– – – –	250 350 350 400	– – – –	300 400 400 500	– – – –	200 200 300 300	250 350 350 400	– – – –	250 350 350 400
12 *300*	12.750 *323.9*	0.156 0.180 0.188 0.250	5 10 – 20	– – – –	200 350 350 400	– – – –	200 300 300 400	– – – –	200 200 300 300	200 350 350 400	– – – –	200 350 350 400
14 *350*	14.000 *355.6*	0.156 0.250 0.312	5 10 20	– – –	125 250 275	– – –	– – –	– – –	125 250 250	– – –	– – –	125 250 275
16 *400*	16.000 *406.4*	0.165 0.250 0.312	5 10 20	– – –	125 175 275	– – –	– – –	– – –	100 175 250	– – –	– – –	100 175 275
18 *450*	18.000 *457.2*	0.250 0.312	10 20	– –	100 175	– –	– –	– –	100 175	– –	– –	100 175
20 *500*	20.000 *508.0*	0.250 0.375	10 20	– –	100 300	– –	– –	– –	100 250	– –	– –	100 250
24 *600*	24.000 *609.6*	0.250 0.375	10 20	– –	75 300	– –	– –	– –	75 250	– –	– –	75 250

Maximum line pressure, including surge, to which a joint should be subjected on pipe roll grooved to standard roll grooving specification with coupling properly assembled. For coupling performance on standard wall steel pipe, refer to individual Gruvlok Coupling performance listing.

* Rating based on larger pipe size.

COUPLING WORKING PRESSURE RATING

on Roll Grooved ISO Size Steel Pipe

GRUVLOK COUPLING WORKING PRESSURE RATING (BAR) ON ROLL GROOVED ISO SIZE STEEL PIPE

Nominal Size	O.D.	Nom. Wall Thickness	Maximum Working Pressure (bar)								
			Fig. 7000	Fig. 7001	Fig. 7003	Fig. 7004	Fig. 7010*	Fig. 7012	Fig. 7013	Fig. 7400	Fig. 7401
In./DN(mm)	*In./mm*	*mm*	*Lightweight*	*Standard*	*Hingelok*	*HPR*	*Reducing*	*Flange*	*Flange*	*Rigidlite*	*Rigidlok*
1 *25*	1.315 *33.4*	1.8 2.9 3.2	20.7 41.4 41.4	34.5 51.7 69.0	– – –	– – –	– – –	– – –	– – –	12.1 20.7 20.7	– – –
1¼ *32*	1.660 *42.2*	1.8 2.9 3.6	20.7 41.4 41.4	34.5 51.7 69.0	– – –	– – –	– – –	– – –	– – –	12.1 20.7 20.7	– – –
1½ *40*	1.900 *48.3*	1.8 2.9 3.6	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	– – –	– – –	– – –	– – –	12.1 20.7 20.7	34.5 51.7 51.7
2 *50*	2.375 *60.3*	1.8 2.9 3.6	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	34.5 55.2 82.3	17.2 24.1 24.1	13.8 20.7 20.7	34.5 51.7 69.0	12.1 20.7 20.7	34.5 51.7 51.7
2½ *65*	2.875 *73.0*	2.0 3.2 5.0	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	34.5 55.2 82.3	17.2 24.1 24.1	13.8 20.7 20.7	34.5 51.7 69.0	12.1 20.7 20.7	34.5 51.7 51.7
3 O.D. 76.1	*2.996* 76.1	2.0 3.2 5.0	20.7 41.4 41.4	34.5 51.7 69.0	– – –	– – –	– – –	13.8 20.7 20.7	– – –	12.1 20.7 20.7	34.5 51.7 51.7
3 *80*	3.500 *88.9*	2.0 3.2 5.6	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	34.5 55.2 82.3	17.2 24.1 24.1	13.8 20.7 20.7	34.5 51.7 69.0	12.1 20.7 20.7	34.5 51.7 51.7
3½ *90*	4.000 *101.6*	2.0 3.2 5.6	20.7 41.4 41.4	34.5 51.7 69.0	– – –	– – –	– – –	– – –	– – –	– – –	– – –
4 *100*	4.500 *114.3*	2.0 3.2 5.6	20.7 41.4 41.4	34.5 51.7 69.0	13.8 17.2 20.7	27.6 41.4 82.3	13.8 20.7 24.1	13.8 20.7 20.7	34.5 51.7 69.0	12.1 20.7 20.7	34.5 51.7 51.7
4¼ O.D. 108.0	*4.250* 108.0	2.0 3.2 5.6	20.7 41.4 41.4	– – –	– – –	– – –	– – –	– – –	– – –	– – –	– – –
5 *125*	5.563 *141.3*	2.9 3.6 6.3	17.2 34.5 34.5	27.6 34.5 69.0	10.3 13.8 20.7	27.6 41.4 82.3	13.8 20.7 24.1	13.8 20.7 20.7	27.6 34.5 69.0	12.1 20.7 20.7	27.6 34.5 51.7
5¼ O.D. 133.0	*5.236* 133.0	2.9 3.6 6.3	17.2 34.5 34.5	– – –	– – –	– – –	– – –	– – –	– – –	– – –	– – –
5½ O.D. 139.7	*5.500* 139.7	2.9 3.6 6.3	17.2 34.5 34.5	– – –	– – –	– – –	– – –	13.8 20.7 20.7	– – –	12.1 20.7 20.7	– – –
6 *150*	6.625 *168.3*	2.9 3.6 7.1	17.2 27.6 27.6	24.1 34.5 69.0	10.3 13.8 20.7	27.6 34.5 82.3	13.8 20.7 24.1	13.8 20.7 20.7	24.1 34.5 69	12.1 20.7 20.7	24.1 34.5 51.7
6¼ O.D. 159.0	*6.259* 159.0	2.9 3.6 7.1	17.2 27.6 27.6	– – –	– – –	– – –	– – –	– – –	– – –	– – –	– – –
6½ O.D. 165.1	*6.500* 165.1	2.9 3.6 7.1	17.2 27.6 27.6	24.1 34.5 69.0	– – –	– – –	– – –	13.8 20.7 20.7	– – –	12.1 20.7 20.7	24.1 34.5 51.7
8 *200*	8.625 *219.1*	2.9 5.0 8.0	17.2 24.1 24.1	20.7 34.5 55.2	10.3 13.8 20.7	20.7 35.4 69	10.3 24.1 24.1	13.8 20.7 20.7	20.7 34.5 55.2	12.1 20.7 20.7	20.7 34.5 51.7
10 *250*	10.750 *273.1*	3.6 5.0 8.0	– – –	17.2 24.1 55.2	– – –	20.7 27.6 55.2	– – –	13.8 20.7 20.7	17.2 24.1 55.2	– – –	17.2 24.1 51.7
12 *300*	12.750 *323.9*	4.0 5.0 8.0	– – –	17.2 24.1 55.2	– – –	13.8 20.7 55.2	– – –	13.8 20.7 20.7	17.2 24.1 55.2	– – –	17.2 24.1 51.7
14 *350*	14.000 *355.6*	4.0 6.3 8.8	– – –	8.6 17.2 20.7	– – –	– – –	– – –	8.6 17.2 20.7	– – –	– – –	8.6 17.2 20.7
16 *400*	16.000 *406.4*	4.0 6.3 8.8	– – –	6.9 12.1 20.7	– – –	– – –	– – –	6.9 12.1 20.7	– – –	– – –	6.9 12.1 20.7
18 *450*	18.000 *457.2*	5.0 6.3 8.8	– – –	5.2 6.9 17.2	– – –	– – –	– – –	5.2 6.9 17.2	– – –	– – –	5.2 6.9 17.2
20 *500*	20.000 *508.0*	5.0 6.3 8.8	– – –	3.4 6.9 17.2	– – –	– – –	– – –	3.4 6.9 17.2	– – –	– – –	3.4 6.9 17.2
24 *600*	24.000 *609.6*	5.0 6.3 8.8	– – –	1.7 5.2 17.2	– – –	– – –	– – –	1.7 5.2 17.2	– – –	– – –	1.7 5.2 17.2

Maximum line pressure, including surge, to which a joint should be subjected on pipe roll grooved to standard roll grooving specification with coupling properly assembled. For coupling performance on standard wall steel pipe, refer to individual Gruvlok Coupling performance listing.

* Rating based on larger pipe size.

COUPLING & FLANGE WORKING PRESSURE RATING

on 304 and 316 Stainless Steel Roll Grooved Pipe

The following are pressure ratings for Gruvlok Stainless Steel Piping Systems. The ratings for Schedule 10S pipe are based upon the use of roll-groover roll sets that have been specifically designed for use on Schedule 10 Stainless Steel pipe. Using roll sets that were designed for roll grooving standard wall pipe may significantly reduce the pressure ratings that can be obtained. The Model 1007/3007 roll groovers require the use of the optional Schedule 10 roll set to groove Schedule 5S and 10S. For grooving Schedule 40S on the Model 1007/3007 roll groovers, the standard steel roll grooving set should be used.

GRUVLOK COUPLING & FLANGE WORKING PRESSURE RATINGS (PSI)
ON 304 AND 316 STAINLESS STEEL ROLL GROOVED PIPE

Nominal Pipe Size	Pipe O.D.	Nominal Wall Thickness	Pipe Schedule Number	Coupling and Flanges									
				Fig. 7000 Lightweight	Fig. 7001 Standard	Fig. 7003 Hingelok	Fig. 7004 HPR	Fig. 7010* Reducing	Fig. 7012 Flange	Fig. 7013 Flange	Fig. 7400 Rigidlite	Fig. 7401 Rigidlok	Fig. 7400SS Coupling
In./DN(mm)	*In./mm*	*Inches*	–	*PSI*									
1 *25*	1.315 *33.4*	0.065	5S	400	400	–	–	–	–	–	300	–	–
		0.109	10S	400	500	–	–	–	–	–	300	–	–
		0.133	40	500	750	–	–	–	–	–	300	–	–
1¼ *32*	1.660 *42.4*	0.065	5S	400	400	–	–	–	–	–	300	–	275
		0.109	10S	500	500	–	–	–	–	–	300	–	300
		0.140	40	500	750	–	–	–	–	–	300	–	300
1½ *40*	1.900 *48.3*	0.065	5S	400	400	275	–	–	–	–	300	400	275
		0.109	10S	500	500	300	–	–	–	–	300	500	300
		0.145	40	500	750	300	–	–	–	–	300	750	300
2 *50*	2.375 *60.3*	0.065	5S	250	325	250	325	250	250	275	250	325	275
		0.109	10S	500	500	300	500	500	300	300	300	500	300
		0.154	40	500	750	300	750	500	300	300	300	750	300
2½ *65*	2.875 *73.0*	0.083	5S	250	325	250	325	250	250	275	250	325	200
		0.120	10S	500	500	300	500	500	300	300	300	500	300
		0.203	40	500	750	300	750	500	300	300	300	750	300
3 *80*	3.500 *88.9*	0.083	5S	250	325	250	325	250	250	275	250	325	200
		0.120	10S	500	500	300	500	500	300	300	300	500	300
		0.216	40	500	750	300	750	500	300	300	300	750	300
4 *100*	4.500 *114.3*	0.083	5S	200	250	200	250	200	200	250	200	250	200
		0.120	10S	300	400	300	400	300	300	300	300	400	300
		0.237	40	500	750	300	750	500	300	300	300	750	300
5 *125*	5.563 *141.3*	0.109	5S	125	200	125	200	125	125	200	125	200	–
		0.134	10S	200	300	200	300	200	200	300	200	300	–
		0.258	40	300	500	300	500	300	300	300	300	500	–
6 *150*	6.625 *168.3*	0.109	5S	75	125	75	125	75	75	125	75	125	125
		0.134	10S	200	200	200	200	200	200	200	200	200	250
		0.280	40	300	500	300	500	300	300	300	300	500	275
8 *200*	8.625 *219.1*	0.109	5S	50	75	50	75	50	50	75	50	75	75
		0.148	10S	150	200	150	200	150	150	200	150	200	150
		0.322	40	300	400	300	400	300	300	300	300	400	275
10 *250*	10.750 *273.0*	0.134	5S	–	50	–	50	–	50	50	–	50	–
		0.165	10S	–	100	–	100	–	100	100	–	100	–
		0.365	40	–	400	–	400	–	300	300	–	400	–
12 *300*	12.750 *323.9*	0.156	5S	–	75	–	75	–	50	75	–	75	–
		0.180	10S	–	125	–	125	–	100	125	–	125	–
		0.375	40	–	400	–	400	–	300	300	–	400	–

Notes:

1) Pressure ratings based on ASTM A312 Type 304 stainless steel pipe or equivalent.
2) Failure to use Rollers specifically designed for Stainless Steel Pipe may significantly reduce pressure retention capabilities.
3) Pressure ratings on cut grooved pipe meet or exceed the schedule 40 pressure ratings listed above. For information regarding higher ratings contact Anvil.
4) * For pressure ratings on Figure 7010 Reducing Couplings use larger pipe size.
5) For pressure ratings for the reducing tees, concentric reducers and eccentric reducers, use the rating of the weakest end.
6) Pressure ratings on schedule 10 stainless steel pipe may be increased by using Anvil's 1007/3007 roll groovers with the schedule 10 roller set. Contact Anvil for details.

PIPE SUPPORT

When designing the hangers, supports and anchors for a grooved-end pipe system, the piping designer must consider certain unique characteristics of the grooved type coupling in addition to many universal pipe hanger and support design factors. As with any pipe system, the hanger or support system must provide for

1) the weight of the pipe, couplings, fluid and pipe system components;

2) reduce stresses at pipe joints; and

3) permit required pipe system movement to relieve stress.

The following factors should be considered when designing hangers and supports for a grooved-end pipe system.

PIPE HANGER SPACING:

The following charts show the maximum span between pipe hangers for straight runs of standard weight steel pipe filled with water or other similar fluids.

Do not use these values where critical span calculations are made or where there are concentrated loads between supports.

HANGER SPACING LINEAR MOVEMENT NOT REQ'D

Nominal Pipe Size Range	Maximum Span Between Supports
In./DNmm	*Feet/meters*
1 *25*	7 *2.1*
1¼-2 *32-50*	10 *3.0*
2½-4 *65-100*	12 *3.7*
5-8 *125-200*	14 *4.3*
10-12 *250-300*	16 *4.9*
14-16 *350-400*	18 *5.5*
18-24 *450-600*	20 *6.1*

For straight runs without concentrated loads and where full linear movement is ***NOT*** required use the table on right.

For straight runs without concentrated loads and where full linear movement ***IS*** required use the following tables.

HANGER SPACING - FLEXIBLE SYSTEM, STEEL PIPE FULL LINEAR MOVEMENT IS REQ'D AVERAGE HANGERS PER PIPE LENGTH EVENLY SPACED

Nominal Pipe Size Range	Pipe Length in Feet/Meters									
In.	*7*	*10*	*12*	*15*	*20*	*22*	*25*	*30*	*35*	*40*
DNmm	*2.1*	*3.3*	*3.7*	*4.6*	*6.1*	*6.7*	*7.6*	*9.1*	*10.7*	*12.2*
1-2 *25-50*	1	2	2	2	3	3	4	4	5	6
2½-4 *65-100*	1	1	2	2	2	2	2	3	4	4
5-24 *125-600*	1	1	1	2	2	2	2	3	3	3

HANGER SPACING - RIGID SYSTEMS SUGGESTED MAXIMUM SPAN BETWEEN SUPPORTS

Nominal Size	Steel Pipe Suggested Maximum Span Between Supports-Feet/Meters						Copper Tube	
	Water Service			Air Service			Water Service	Gas & Air Service
In./DNmm	*	**	***	*	**	***	**	**
1 *25*	7 *2.1*	9 *2.7*	12 *3.7*	9 *2.7*	10 *3.0*	12 *3.7*	–	–
1¼ *32*	7 *2.1*	11 *3.4*	12 *3.7*	9 *2.7*	12 *3.6*	12 *3.7*	–	–
1½ *40*	7 *2.1*	12 *3.7*	15 *4.6*	9 *2.7*	13 *4*	15 *4.6*	–	–
2 *50*	10 *3*	13 *4*	15 *4.6*	13 *4*	15 *4.6*	15 *4.6*	9 *2.7*	12 *3.6*
2½ *65*	11 *3.4*	15 *4.6*	15 *4.6*	14 *4.3*	17 *5.1*	15 *4.6*	9 *2.7*	12 *3.6*
3 O.D. 76.1	*11* 3.4	*15* 4.6	*15* 4.6	*14* 4.3	*17* 5.1	*15* 4.6	–	–
3 *80*	12 *3.7*	16 *4.8*	15 *4.6*	15 *4.6*	19 *5.7*	15 *4.6*	10 *3*	14 *4.2*
3½ *90*	13 *4*	18 *5.4*	15 *4.6*	15 *4.6*	21 *6.3*	15 *4.6*	–	–
4 *100*	14 *4.3*	18 *5.4*	15 *4.6*	17 *5.2*	21 *6.4*	15 *4.6*	12 *3.7*	17 *5.1*
4¼ O.D. 108.0	*14* 4.3	*18* 5.4	*15* 4.6	*17* 5.2	*19* 5.7	*15* 4.6	–	–
5 *125*	16 *4.9*	20 *6.0*	15 *4.6*	20 *6.1*	24 *7.3*	15 *4.6*	13 *4*	18 *5.7*
5¼ O.D. 133.0	*15* 4.6	*18* 5.5	*15* 4.6	*19* 5.2	*22* 6.6	*15* 4.6	–	–
5½ O.D. 139.7	*16* 4.9	*19* 5.8	*15* 4.6	*20* 6.1	*24* 7.3	*15* 4.6	–	–
6 *150*	17 *5.2*	21 *6.3*	15 *4.6*	21 *6.4*	26 *7.8*	15 *4.6*	14 *4.2*	21 *6.3*
6¼ O.D. 159.0	*16* 4.9	*20* 6.0	*15* 4.6	*20* 6.1	*24* 7.3	*15* 4.6	–	–
6½ O.D. 165.1	*17* 5.2	*21* 6.3	*15* 4.6	*21* 6.4	*25* 7.6	*15* 4.6	–	–
8 *200*	19 *5.8*	23 *6.9*	15 *4.6*	24 *7.3*	29 *8.7*	15 *4.6*	–	–
10 *250*	19 *5.8*	25 *7.5*	15 *4.6*	24 *7.3*	33 *9.9*	15 *4.6*	–	–
12 *300*	23 *7*	26 *7.8*	15 *4.6*	30 *9.1*	36 *10.8*	15 *4.6*	–	–
14 *350*	23 *7*	26 *7.8*	15 *4.6*	30 *9.1*	37 *11.1*	15 *4.6*	–	–
16 *400*	27 *8.2*	26 *7.8*	15 *4.6*	35 *10.7*	40 *12.0*	15 *4.6*	–	–
18 *450*	27 *8.2*	27 *8.1*	15 *4.6*	35 *10.7*	42 *12.6*	15 *4.6*	–	–
20 *500*	30 *9.1*	27 *8.1*	15 *4.6*	39 *11.9*	45 *13.5*	15 *4.6*	–	–
24 *600*	32 *9.8*	26 *7.8*	15 *4.6*	42 *12.8*	48 *14.7*	15 *4.6*	–	–

* Spacing by ANSI-B31.1 Power Piping Code.

** Spacing by ANSI-B31.9 Building Service Piping Code, (1996 Edition), Fig. 921.1.3c, Table a, 250 psi and Fig. 921.1.3D, table a

*** Spacing by NFPA-13 Installation of Sprinkler Systems, (1999 Edition), Table 6-2.2.

PIPE SUPPORT

Considerations for the Hanging or Supporting of Grooved Piping Systems

Grooved piping products have an excellent maintenance track record out in the field. Whenever there is a "perceived" problem with installed grooved product, a high percentage are often related to the hanging or supporting method or application chosen. Although supported very similarly to welded piping systems, a few considerations should be given to assure the proper selection and application of hangers and supports used on a grooved piping system such as Anvil's Gruvlok® brand.

REVIEW REQUIREMENTS AND LOGISTICS

A variety of hangers and supports are typically used on grooved piping systems, ranging from a simple band hanger, clevis hanger, and trapeze supports to more intricate rack designs using structural steel or a mechanical framing/strut system. All of these are acceptable hanging or supporting methods but they are dependent on the project's type, design and specification requirements. With this in mind, a vital first step is to refer to the project and code requirements when choosing the proper hanging or supporting method.

Project logistics is another consideration regardless of system type. Quite often hangers and supports are an afterthought on a project simply because the big-ticket items, such as labor, major equipment and schedule, are the focus of the project team. However, hangers and supports are one of the first components needed on a project since you cannot hang pipe without them.

In nearly every hanger or support assembly there are three components that make up the assembly. These components are an upper attachment (beam or structural attachment), intermediate attachment (rod, couplings, eye nuts, etc.) and the lower attachment (pipe clamps, U-bolts, trapezes). See accompanying illustrations for examples of typical assemblies. All three components should arrive on the project site together and early. To save costly field labor hours, consideration might be given to having the hangers or supports pre-assembled by the manufacturer or fabricated in the contractor's shop. Components can also be bundled and tagged by system or area of the project so they can be easily assembled and located on-site.

MAKE A MATCH

The type of grooved coupling used on a project is the next consideration to choosing the correct hanger or support method. The proper maximum spacing allowables governed by project specifications, the applicable code and/or the hanger manufacturer's recommendations all must also be reviewed. Flexible couplings used on horizontal runs of pipe need to be supported at every coupling and usually require intermediate supports to satisfy the maximum spacing allowable requirements. Rigid couplings, on the other hand, can be hung or supported based on the maximum spacing requirements only. In addition, wherever there is a change in direction of the piping system a hanger or support is usually required immediately following that change in direction and then the system is hung or supported accordingly.

PRESSURE POINT

System pressurization should also be reviewed when choosing the proper hanging or support method. As the couplings are installed, the pipe ends can either be butted up tight to one another or a gap can exist. Once the system is pressurized, those areas or joints where the pipe ends are butted up tight and held by a grooved coupling can "pop" or grow to the maximum gap depending on the coupling chosen. The joint at a flexible grooved coupling can expand about $^{1}/_{4}$" at each coupling whereas the joint at a rigid grooved coupling can grow about $^{3}/_{32}$". If there is a long run of horizontal or vertical pipe with multiple joints the overall length of the system will grow depending upon which grooved coupling you have chosen.

For example, if you have a grooved piping system that is 400 ft. long there will be roughly 19 grooved joints (assuming 21 ft. lengths of pipe are used). If you multiply the number of joints by the growth of each joint you can determine the overall growth of the system due to pressurization. If it is a flexible system, 19 joints x .25" = 4.75" of overall growth. A rigid system would be 19 joints x .0938" = 1.78" of overall growth.

As one can see, this growth due to pressurization can have a significant impact on the hangers or supports used on a project. One way to avoid this growth is to install the grooved joints at full gap so that pressurization has no impact at testing or start up. If this is not possible, then periodic air pressurization as the system is installed will expand the grooved joints to full gap and the hangers or supports can be adjusted accordingly.

HOT AND COLD

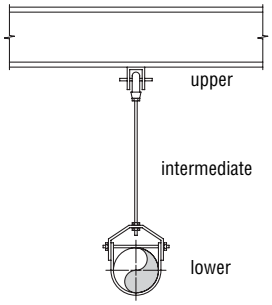
Thermal expansion is another important consideration when choosing hangers or supports for a grooved system. This is especially important on hot systems versus chilled systems since the amount of thermal expansion will be greater on hot systems as opposed to the thermal contraction that will occur on chilled systems. This is all due to the temperature variation from ambient conditions when the pipe is installed to operating conditions.

For example, if you again take 400 ft. of grooved piping, let us assume the system is heating hot water that will operate at 170°F. The pipe is installed under ambient conditions assumed to be at 70°F so you have a 100°F variation in temperature. At 70°F the pipe has a coefficient of thermal expansion of 0.0 in/ft but at 170°F the pipe has a coefficient of thermal expansion of 0.0076 in/ft. To determine the total thermal expansion of the pipe from ambient temperature to operating temperature you multiply the length of pipe by the coefficient of thermal expansion. In this case 400 ft. x 0.0076 in/ft. = 3.04 in. In other words the pipe has grown in length over 3 inches because of the thermal expansion.

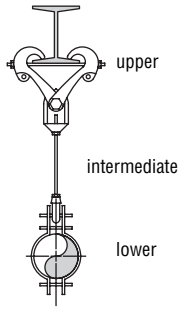
This is significant growth especially if there is a change of direction at the end of the 400 ft. pipe run or there are branch lines coming off the main run. If this thermal growth exceeds the allowable deflection of a grooved joint, especially where a change of direction or a branch line connects, then problems could occur.

PIPE SUPPORT

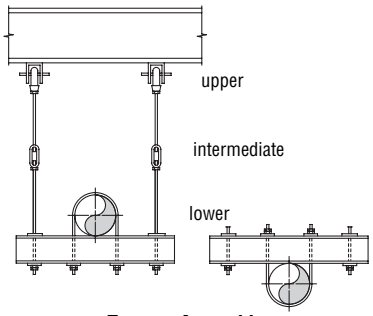
Considerations for the Hanging or Supporting of Grooved Piping Systems



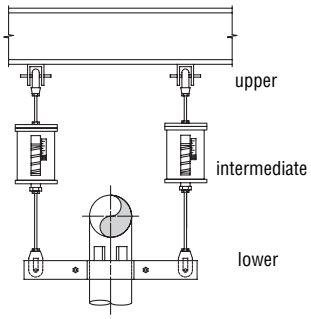
Clevis Hanger Assembly



Double Bolt Pipe Clamp Assembly



Trapeze Assembly



Spring Riser Hanger Assembly

Thermal growth cannot be stopped. It can only be controlled by the use of anchors and expansion joints or expansion loops.

It is also important to hang or support the pipe with rolls or slides and use guides to control the thermal expansion of the pipe into an expansion joint or expansion loop. The use of static hangers, such as clevis hangers, should not be considered on pipe that is thermally expanding. When using trapeze hangers for multiple systems it is important to have "like" systems on the trapeze, that is, systems that are operating near the same temperature. If you combine hot systems with cold systems on a trapeze, the thermal expansion of the hot system can cause the trapeze to possibly twist and fail or excessive stress could be induced on the grooved joints on all of the systems on the trapeze. Hot systems should be hung or supported independently of cold or ambient systems or a means should be provided, such as pipe rolls or pipe slides, to allow the hot systems to thermally expand on the trapeze.

If the pipe is a vertical riser then consideration must be given to the use of spring hangers to allow the pipe to grow vertically up or down depending upon how the pipe is anchored while still supporting the pipe. Vertical pipe thermally expands the same amount as horizontal pipe and this has to be taken into consideration relating to supports, expansion joints or expansion loops. If the vertical pipe is supported by friction/riser clamps only and the pipe expands vertically upward, the clamps will grow with the pipe off the penetration or supporting structure and no longer provide support. If the growth is downward, the friction clamps resting on the penetration or supporting structure can either fail or the pipe may overcome the friction force and push it's way through the clamp as the pipe thermally expands downward. In either case the clamps are no longer supporting the pipe as intended and this may induce excessive stress on the grooved joints.

Whether it is horizontal or vertical grooved pipe, growth of the piping system due to pressurization and thermal expansion must be considered. On hot systems, both must be taken into account and added together to determine the overall growth of the system and the effect on the hangers or supports that are used. In the previous examples, pressurization expansion on the 400 ft. run of pipe was 4.75" for a flexible joint system and 1.78" for a rigid joint system and the thermal expansion was 3.04". Adding these combinations together would result in a total pipe growth of 7.79" for a flexible system or 4.82" for a rigid system, regardless of the horizontal or vertical orientation of the pipe. Again, this is a significant amount of growth relating to hangers and supports and the resulting stresses induced on grooved joints.

CONSIDER SOME RESTRAINT

Although grooved systems in seismic zones perform extremely well, consideration should be given to how a grooved system is seismically restrained. If you have growth due to pressurization and/or thermal expansion consideration should be given on how to restrain the system while still allowing growth to occur. Seismic restraints in the longitudinal direction of a long pipe run may restrict the growth of the pipe inducing stresses into the grooved couplings. Seismic restraints in the lateral direction should have little impact on expansion except where the system has a change in direction. If the seismic restraints are placed laterally after a change in direction at the end of a long run of pipe, the expansion of the long pipe run may be restricted and this could induce excessive stress into the grooved joints.

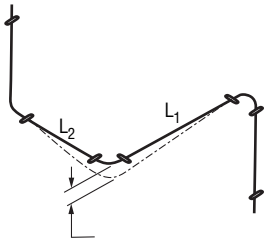
By reviewing the couplings to be used on a project, pressurization, thermal expansion and seismic restraints, one can best determine the proper selection and application of hangers and supports for a grooved piping system. This will, in turn, help ensure that grooved piping systems will continue to enjoy a solid reputation in the areas of maintenance and downtime.

COUPLING FLEXIBILITY:

The grooved coupling's capability to allow angular and rotational movement within the coupling joint must be considered when deciding hanger and support locations. Spring hangers and supports providing for movement in more than one plane are often used to allow the pipe system to move without introducing additional stress into the pipe system.

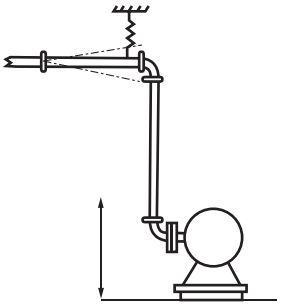
EXAMPLE 1

This example demonstrates the need for each pipe length in a grooved system to be supported. The sag due to the flexibility of the Gruvlok joint could be eliminated with the proper positioning of hangers on both pipe segments "L1" and "L2".



EXAMPLE 2

This illustrates the effect of pump oscillation on a piping system. A spring hanger should be used to support the pipe section and also respond to the induced vibrations. The couplings in the horizontal run above the riser, should accommodate the deflection without transmitting bending stresses through the pipe system.



PRESSURE THRUSTS:

Gruvlok couplings react to the application of system pressure and restrain the pipe ends from separation due to the pressure force. However, the coupling joint may not be in the self-restraining configuration prior to the application of system pressure. The Gruvlok coupling does not restrain adjacent pipe sections from separation due to pressure forces until the coupling key sections engage the groove walls.

Random flexible coupling joint installation will produce installed coupling conditions ranging from pipe ends full butted to fully separated to the maximum available gap. Thus, only after system pressurization will the self-restraining function of the coupling be in effect.

The designer must account for the movement to be encountered when the system is pressurized and the joints are fully separated. Anchor and guide positions must be defined to direct the pipe joint movement that it is not detrimental to the pipe system.

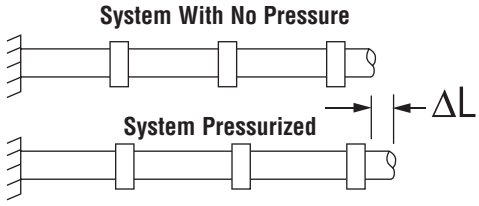
Examples of the effect of pressure thrust are shown in the following illustrations.

EXAMPLE 1

The coupling joints have been installed butted or partially open. When pressurized the pipe ends in the coupling joints will separate to the maximum amount permitted by the coupling design.

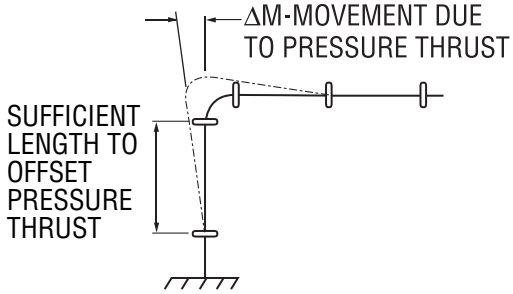
The coupling key sections will make contact with the groove walls and restrain the pipe from further separation.

The movement at each coupling joint will add with all other joints and produce ΔL.



EXAMPLE 2

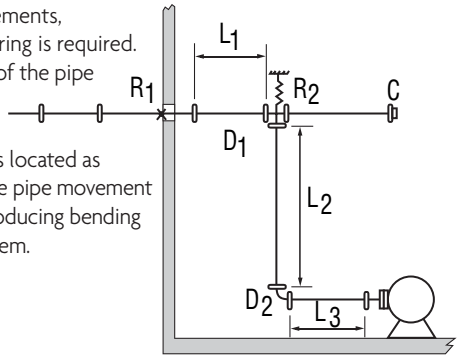
In the system shown here, the pipe will move and deflect at the elbow joint due to pressure thrust.



The pipe designer must assure himself that the system has the capability of deflecting sufficiently to absorb this movement without introducing additional stresses into the pipe system. In the deflected condition shown, temperature increases would produce further expansion of the pipe system thus increasing the deflection.

EXAMPLE 3

To restrain this system provide a pressure thrust anchor at "R1" to resist the pressure thrust acting through the tee "D1" at the cap "C". Provide a hanger at Point "R2", or a base support at Point "D2" to support the vertical column. If the offsets L1, L2, and L3 are of adequate length to handle expected pipe movements, no additional anchoring is required. Thermal movement of the pipe system should also be considered, and intermediate anchors located as required, to direct the pipe movement so as to prevent introducing bending stresses into the system.

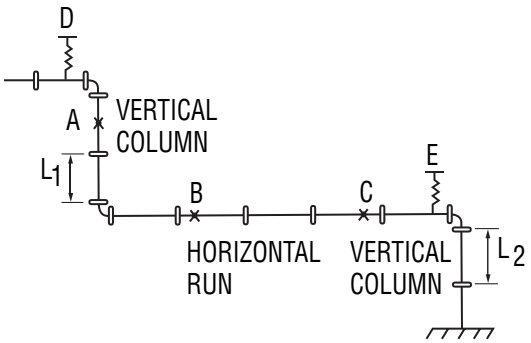


COUPLING FLEXIBILITY (CONT.)

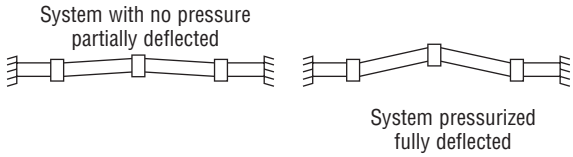
EXAMPLE 4

Anchor at "A" to support weight of vertical water column. Use spring hanger at "D" and "E" to allow movement of vertical piping.

Anchors at "B" and "C" if offsets at L1 and L2 are insufficiently long to handle expected pipe movements.



LATERAL RESTRAINT



EXAMPLE 5

A grooved coupling joint installed in a partially deflected condition between anchor locations will deflect to its fully deflected condition when pressurized. Hangers and supports must be selected with consideration of the hanger's capability to provide lateral restraint.

Light duty hangers, while acceptable in many installations, may deflect against the application of lateral forces and result in "snaking" conditions of the pipe system.

RISER DESIGN:

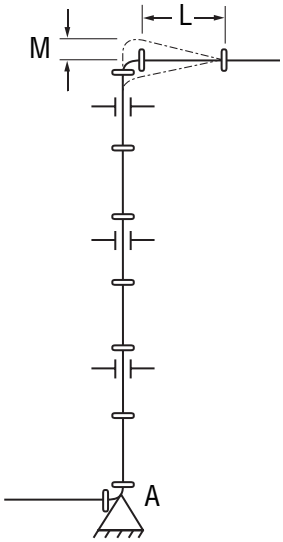
Risers assembled with Gruvlok Flexible couplings are generally installed in either of two ways. In the most common method, the pipe ends are butted together within the coupling joint. Note that when installing risers, the gasket is first placed onto the lower pipe and rolled back away from the pipe end prior to positioning the upper pipe. Anchoring of the riser may be done prior to pressurization with the pipe ends butted or while pressurized, when, due to pressure thrust, the pipe ends will be fully separated.

An alternative method or riser installation is to place a metal spacer of a predetermined thickness, between the pipe ends when an additional length of pipe is added to the riser stack. The upper pipe length is anchored, the spacer removed and the coupling is then installed. This method creates a predetermined gap at each pipe joint which can be utilized in pipe systems where thermal movement is anticipated and in systems with rigid (threaded, welded, flanged) branch connections where shear forces due to pressure thrust could damage the rigid connections.

The following examples illustrate methods of installing commonly encountered riser designs.

RISERS WITHOUT BRANCH CONNECTIONS

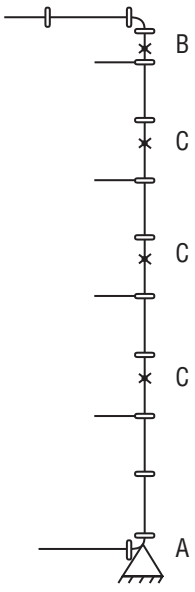
Install the riser with the pipe ends butted.



Locate an anchor at the base of the riser (A) to support the total weight of the pipe, couplings and fluid. Provide pipe guides on every other pipe length, as a minimum, to prevent possible deflection of the pipe line at the coupling joints as the riser expands due to pressure thrust or thermal growth. Note that no intermediate anchors are required.

When the system is pressurized the pipe stack will "grow" due to pressure thrust which causes maximum separation of pipe ends within the couplings. The maximum amount of stack growth can be predetermined (see Linear Movement). In this example the pipe length "L" at the top of the riser must be long enough to permit sufficient deflection (see Angular Movement) to accommodate the total movement "M" from both pressure thrust and thermal gradients.

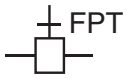
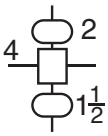
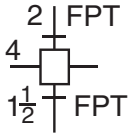
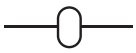
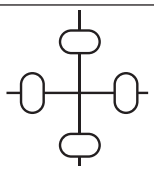
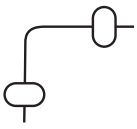
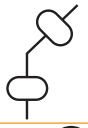
RISERS WITH BRANCH CONNECTIONS



Install the riser with the predetermined gap method. Anchor the pipe at or near the base with a pressure thrust anchor "A" capable of supporting the full pressure thrust, weight of pipe and the fluid column. Anchor at "B" with an anchor capable of withstanding full pressure thrust at the top of the riser plus weight of pipe column. Place intermediate anchors "C" as shown, between anchors "A" and "B". Also place intermediate clamps at every other pipe length as a minimum.

When this system is pressurized, the pipe movement due to pressure thrust will be strained and there will be no shear forces acting at the branch connections.

DRAFTING SYMBOLS FOR GRUVLOK® PIPING SYSTEMS

COMPONENT	FIG. NO.	SYMBOL
BULL-PLUG	7075	
CAP	7074	
CLAMP-T		
GROOVED OUTLET	7046	
FEMALE THREADED OUTLET	7044 7045	
CLAMP-T-CROSS		
GROOVED OUTLETS	7048	
FEMALE THREADED OUTLETS	7047	
COUPLINGS		
STRAIGHT	7000 7001 7003 7004 7011 7400 7401	
REDUCING	7010	
CROSS	7068	
ELBOW		
90°	7050	
45°	7051	
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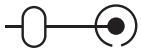
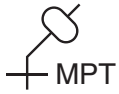
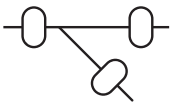
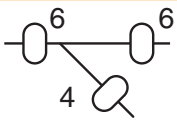
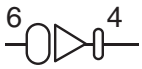
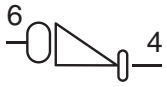
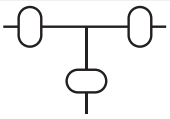
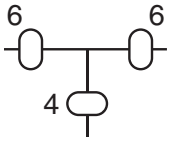
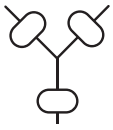
TURNED-UP	–	

COMPONENT	FIG. NO.	SYMBOL
ELBOW		
90° ADAPTER	7055	
45° ADAPTER	7056	
EXPANSION JOINT	7092	
GRUVLOK FLANGE	7012 7013	
LATERAL 45°		
STRAIGHT	7069	
REDUCING	7070	
REDUCER		
CONCENTRIC	7072	
ECCENTRIC	7073	
TEE		
STRAIGHT	7060	
REDUCING	7061	
TURNED-DOWN	–	
TURNED-UP	–	
TRUE-WYE	7071	
GRUVLOK	SERIES	
BUTTERFLY	7700	
BALL VALVE	7500	
CHECK VALVE	7800	

All fittings are shown with couplings attached at the grooved-ends.

PIPE-PREPARATION:

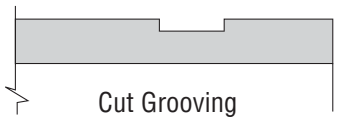
To create a Gruvlok pipe joint, all pipe must be prepared to receive a Gruvlok coupling or other Gruvlok pipe system components. Required pipe preparations may include: grooving or cleaning the pipe ends, or cutting a hole in the pipe wall.

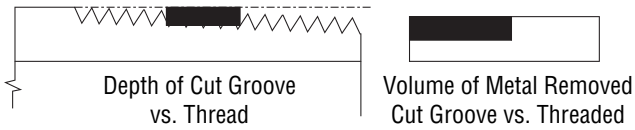
For grooved-end joints, pipe may be grooved by either of two methods; cut or roll grooving. Branch outlet connections require a properly sized and correctly located hole to be cut into the pipe. Sock-it connections require cleaning of the pipe end. Gruvlok plain-end pipe couplings require that the pipe be free of burrs and other sharp projections which could damage the gasket; grooving is not required.

Gruvlok pipe grooving and hole cutting machines are available in a wide variety of designs to meet specific or general requirements. Gruvlok roll grooving machines produce a groove to proper dimensional tolerances, concentric with the pipe O.D., even on out-of-round pipe. Gruvlok hole cutting tools properly center holes for correct assembly of Gruvlok branch outlet components.

CUT GROOVING:

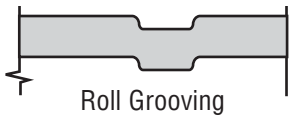
Cut grooving is intended for use with standard and heavier wall pipe. Cut grooving produces a groove in the pipe wall by removing metal from the pipe O.D. The groove removes less than one half of the pipe wall and does not cut as deeply into the pipe wall as do standard pipe threads. The square cut edge of the groove allows for the full expansion, contraction, and deflection capabilities of the Gruvlok coupling.

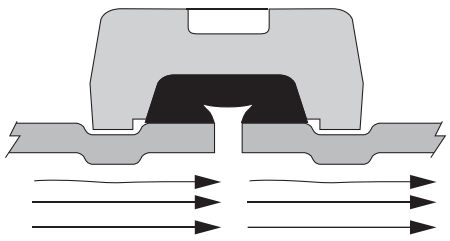




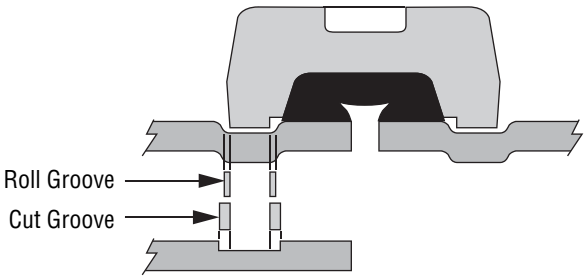
ROLL GROOVING:

Roll grooving does not remove metal. Instead, metal is displaced while a groove is formed into the outer surface of the pipe wall. The groove configuration has slightly rounded edges resulting in a less flexible joint than a cut groove joint. This reduces available pipe joint movement by 50% over cut grooved coupling joints. Roll grooving is commonly used on a wide range of pipe thicknesses up to 0.375" wall steel pipe and sizes to 24" O.D.





The I.D. “dimple" formed from roll grooving reduces the I.D. (on an average) less than 2%.

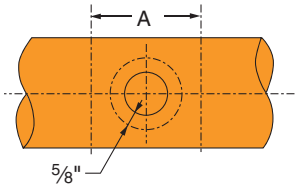


Available Movement
Roll Groove vs. Cut Groove

PIPE-PREPARATION:

BRANCH OUTLET PIPE: CLAMP-T®

Clamp-T installations require the cutting of a hole through the pipe wall. The hole must be properly sized and located on the centerline of the pipe to assure reliable performance of the Clamp-T gaskets.



After the hole has been cut into the pipe wall, any burrs and sharp or rough edges must be removed from the hole. The outside pipe surfaces within 5/8" of the hole must be clean and smooth. Any scale, projections or indentation which might effect the gasket sealing on the pipe must be removed. The surface around the entire circumference of the pipe within the "A" dimension in the charts must be free from dirt, scale, or projections which might effect the proper assembly of the Clamp-T.

CLAMP-T INSTALLATION

Branch Size	Hole Dimensions		Surface Prep. "A"
	Hole Saw Size	Max. Perm. Diameter	
DN/mm	*In./mm*	*In./mm*	*In./mm*
½, ¾, 1 *15, 20, 25*	1½ *38.1*	1⅝ *41.3*	3½ *88.9*
1¼, 1½ *32, 40*	2 *50.8*	2⅛ *54.0*	4 *101.6*
2 *50*	2½ *63.5*	2⅝ *66.7*	4½ *114.3*
2½ *65*	2¾ *69.9*	2⅞ *73.0*	4¾ *120.7*
3 *80*	3½ *88.9*	3⅝ *92.1*	5½ *139.7*
4 *100*	4½ *114.3*	4⅝ *117.5*	6½ *165.1*

SOCK-IT®

For Sock-It Fittings, the pipe ends must be square cut as measured from a true square line.

The maximum allowable tolerance is 0.030" (0.76mm) for all sizes. Any sharp edges, burrs, etc. left on the pipe from cutting must be removed. If these are not removed, they may damage the gasket as the pipe is inserted into the Sock-It Fitting.

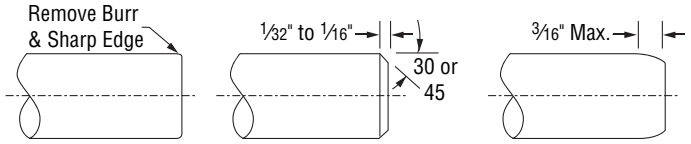
After cutting, pipe ends must be completely cleaned a minimum of 1" (25.4mm) back from the pipe end to remove all pipe coating, weld beads, rust, sharp projections, etc., which might effect gasket sealing integrity.

NOTE: When Allied XL pipe is used it is necessary only to remove sharp edges and burrs at the end of the pipe. No additional cleaning is required.

PIPE TOLERANCES

Size	Schedule 10 & 40		Min. O.D.	XL Min. O.D.
	Nom O.D.	Max. O.D.		
DN/mm	*In./mm*	*In./mm*	*In./mm*	*In./mm*
1 *25*	1.315 *33.4*	1.325 *33.6*	1.295 *32.9*	1.285 *32.6*
1¼ *32*	1.660 *42.2*	1.670 *42.4*	1.642 *41.7*	1.630 *41.4*
1½ *40*	1.900 *48.3*	1.910 *48.5*	1.882 *47.8*	1.875 *47.6*
2 *50*	2.375 *60.3*	2.385 *60.6*	2.357 *59.9*	2.352 *59.7*
2½ *65*	2.875 *73.0*	2.904 *73.8*	2.846 *72.3*	2.837 *72.1*

ACCEPTABLE PIPE END CONFIGURATION

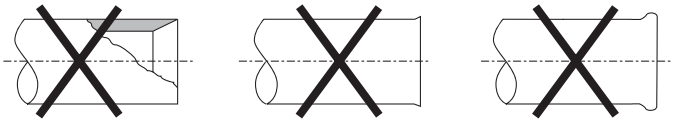


Square cut pipe with O.D. burr & sharp edge removed is preferred configuration.

Beveled pipe. Bevel not to exceed 1/16".

Soft pipe when roll cut may be swaged inward. Swaged portion not to exceed 3/16"

UNACCEPTABLE



Excessive chamfer on I.D. will tend to cut gasket during assembly.

Abrasive wheels & saws leave edge burrs especially pronounced on one side.

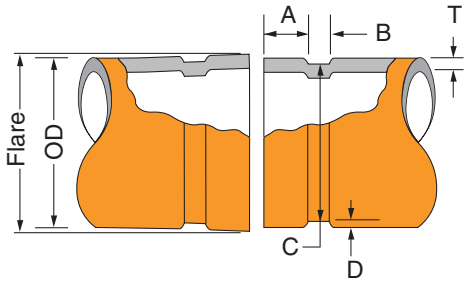
Dull wheel cutter produces a raised ridge at the pipe O.D. giving an oversize diameter.

The sharp O.D. edge left by different methods of cutting pipe ***must be removed***. If this sharp edge is not removed, it may damage the gasket as the pipe is inserted into the Sock-It Fitting.

ROUGHNECK®

Plain-End pipe for use with Fig. 7005 Roughneck Couplings must be free of any notches, bumps, weld bead, score marks, etc. for at least 1½" (38 mm) back from the pipe end to provide a smooth sealing surface for the gasket. Pipe ends (plain or beveled end) must be square cut as measured from a true square line with the maximum allowable tolerance as follows: 0.030" (0.7 mm) for 2" through 3"; 0.045 (1.1 mm) for 4" through 6"; and 0.060" (1.5 mm) for 8" sizes. The nominal outside diameter of pipe should not vary more than ±1% for sizes up to 2½", +1%-1/32" for sizes 3"-5"; +1/16"-1/32" for sizes 6" and larger. Pipe ends must be marked a distance of 1" from the pipe end for Sizes 2"-4" and 1¼" from the pipe end for Sizes 5"-8" as a guide for centering of the gasket on the pipe ends.

ROLL GROOVE SPECIFICATIONS



COLUMN 1 - Nominal IPS Pipe size. Nominal ISO Pipe size.

COLUMN 2 - IPS outside diameter. ISO outside diameter.

COLUMN 3 - Gasket seat must be free from scores, seams, chips, rust or scale which may interfere with proper sealing of the gasket. Gasket seat width (Dimension A) is to be measured from the pipe end to the vertical flank in the groove wall.

COLUMN 4 - Groove width (Dimension B) is to be measured between vertical flank of the groove size walls.

COLUMN 5 - The groove must be of uniform depth around the entire pipe circumference. (See column 6).

COLUMN 6 - Groove depth: for reference only. Groove must conform to the groove diameter "C" listed in column 5.

COLUMN 7 - Minimum allowable wall thickness which may be roll grooved.

COLUMN 8 - Maximum allowable pipe end flare diameter. Measured at the most extreme pipe end diameter of the gasket seat area.

Out of roundness: Difference between maximum O.D. and minimum O.D. measured at 90° must not exceed total O.D. tolerance listed (reference column 2).

For IPS pipe, the maximum allowable tolerance from square cut ends is 0.03" for 1" thru 3½"; 0.045" for 4" thru 6"; and 0.060" for sizes 8" and above measured from a true square line.

For ISO size pipe, the maximum allowable tolerance from square cut ends is 0.75mm for sizes 25mm-80mm; 1.15mm for sizes 100mm-150mm; and 1.50mm for sizes 200mm and above, measured from a true square line.

Beveled-End Pipe in conformance with ANSI B16.25 (37½°) is acceptable, however square cut is preferred. Seams must be ground flush with the pipe O.D. and ID prior to roll grooving. Failure to do so may result in damage to the roll grooving machine and unacceptable roll grooves may be produced.

Weld Seams must be ground flush with the pipe O.D. and ID prior to roll grooving. Failure to do so may result in damage to the roll grooving machine and unacceptable roll grooves may be produced.

▼ "A" tolerance +0.030" / -0.060" (+0.77 / -1.54 mm)

GRUVLOK STANDARD ROLL GROOVE SPECIFICATION FOR STEEL & OTHER IPS OR ISO SIZE PIPE

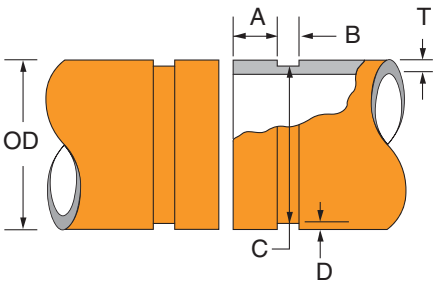
-1-	-2-			-3-	-4-	-5-		-6-	-7-	-8-
Nominal Pipe Size	O.D.			"A" ±0.030/ ±0.76	"B" ±0.030/ ±0.76	"C" Actual	"C" Tol. +0.000	"D" (Ref. Only)	"T" Min. Allow. Wall Thick	Max. Flare Dia.
	Actual	Tolerance								
In./DN(mm)	*In./mm*	*+In./mm*	*-In./mm*	*In./mm*	*In./mm*	*In./mm*	*-In./mm*	*In./mm*	*In./mm*	*In./mm*
1 *25*	1.315 *33.4*	+0.028 *+0.71*	-0.015 *-0.38*	0.625 *15.88*	0.281 *7.14*	1.190 *30.23*	-0.015 *-0.38*	0.063 *1.60*	0.065 *1.7*	1.430 *36.3*
1¼ *32*	1.660 *42.2*	+0.029 *+0.74*	-0.016 *-0.41*	0.625 *15.88*	0.281 *7.14*	1.535 *38.99*	-0.015 *-0.38*	0.063 *1.60*	0.065 *1.7*	1.770 *45.0*
1½ *40*	1.900 *48.3*	+0.019 *+0.48*	-0.019 *-0.48*	0.625 *15.88*	0.281 *7.14*	1.775 *45.09*	-0.015 *-0.38*	0.063 *1.60*	0.065 *1.7*	2.010 *51.1*
2 *50*	2.375 *60.3*	+0.024 *+0.61*	-0.024 *-0.61*	0.625 *15.88*	0.344 *8.74*	2.250 *57.15*	-0.015 *-0.38*	0.063 *1.60*	0.065 *1.7*	2.480 *63.0*
2½ *65*	2.875 *73.0*	+0.029 *+0.74*	-0.029 *-0.74*	0.625 *15.88*	0.344 *8.74*	2.720 *69.09*	-0.018 *-0.46*	0.078 *1.98*	0.083 *2.1*	2.980 *75.7*
3 O.D. 76.1	*2.996* 76.1	*+0.030* +0.76	*-0.030* -0.76	*0.625* 15.88	*0.344* 8.74	*2.845* 72.26	*-0.018* -0.46	*0.076* 1.93	*0.083* 2.1	*3.100* 78.7
3 *80*	3.500 *88.9*	+0.035 *+0.89*	-0.031 *-0.79*	0.625 *15.88*	0.344 *8.74*	3.344 *84.94*	-0.018 *-0.46*	0.078 *1.98*	0.083 *2.1*	3.600 *91.4*
3½ *90*	4.000 *101.6*	+0.040 *+1.02*	-0.031 *-0.79*	0.625 *15.88*	0.344 *8.74*	3.834 *97.38*	-0.020 *-0.51*	0.083 *2.11*	0.083 *2.1*	4.100 *104.1*
4¼ O.D. 108.0	*4.250* 108.0	*+0.042* +1.07	*-0.031* -0.79	*0.625* 15.88	*0.344* 8.74	*4.084* 103.73	*-0.020* -0.51	*0.083* 2.11	*0.083* 2.1	*4.350* 110.5
4 *100*	4.500 *114.3*	+0.045 *+1.14*	-0.031 *-0.79*	0.625 *15.88*	0.344 *8.74*	4.334 *110.08*	-0.020 *-0.51*	0.083 *2.11*	0.083 *2.1*	4.600 *116.8*
5¼ O.D. 133.0	*5.236* 133.0	*+0.052* +1.32	*-0.031* -0.79	*0.625* 15.88	*0.344* 8.74	*5.084* 129.13	*-0.020* -0.51	*0.076* 1.93	*0.109* 2.8	*5.350* 135.9
5½ O.D. 139.7	*5.500* 139.7	*+0.055* +1.40	*-0.031* -0.79	*0.625* 15.88	*0.344* 8.74	*5.334* 135.48	*-0.020* -0.51	*0.083* 2.11	*0.109* 2.8	*5.600* 142.2
5 *125*	5.563 *141.3*	+0.056 *+1.42*	-0.031 *-0.79*	0.625 *15.88*	0.344 *8.74*	5.395 *137.03*	-0.022 *-0.56*	0.084 *2.13*	0.109 *2.8*	5.660 *143.8*
6¼ O.D. 159.0	*6.259* 159.0	*+0.063* +1.60	*-0.031* -0.79	*0.625* 15.88	*0.344* 8.74	*6.084* 154.53	*-0.022* -0.56	*0.088* 2.24	*0.109* 2.8	*6.350* 161.3
6½ O.D. 165.1	*6.500* 165.1	*+0.063* +1.60	*-0.031* -0.79	*0.625* 15.88	*0.344* 8.74	*6.334* 160.88	*-0.022* -0.56	*0.085* 2.16	*0.109* 2.8	*6.600* 167.6
6 *150*	6.625 *168.3*	+0.063 *+1.60*	-0.031 *-0.79*	0.625 *15.88*	0.344 *8.74*	6.455 *163.96*	-0.022 *-0.56*	0.085 *2.16*	0.109 *2.8*	6.730 *170.9*
8 *200*	8.625 *219.1*	+0.063 *+1.60*	-0.031 *-0.79*	0.750 *19.05*	0.469 *11.91*	8.441 *214.40*	-0.025 *-0.64*	0.092 *2.34*	0.109 *2.8*	8.800 *223.5*
10 *250*	10.750 *273.1*	+0.063 *+1.60*	-0.031 *-0.79*	0.750 *19.05*	0.469 *11.91*	10.562 *268.27*	-0.027 *-0.69*	0.094 *2.39*	0.134 *3.4*	10.920 *277.4*
12 *300*	12.750 *323.9*	+0.063 *+1.60*	-0.031 *-0.79*	0.750 *19.05*	0.469 *11.91*	12.531 *318.29*	-0.030 *-0.76*	0.109 *2.77*	0.156 *4.0*	12.920 *328.2*
14 O.D. *355.6*	14.000 *355.6*	+0.063 *+1.60*	-0.031 *-0.79*	0.938 *23.83*	0.469 *11.91*	13.781 *350.04*	-0.030 *-0.76*	0.109 *2.77*	0.156 *4.0*	14.100 *358.1*
16 O.D. *406.4*	16.000 *406.4*	+0.063 *+1.60*	-0.031 *-0.79*	0.938 *23.83*	0.469 *11.91*	15.781 *400.84*	-0.030 *-0.76*	0.109 *2.77*	0.165 *4.2*	16.100 *408.9*
18 O.D. *457.2*	18.000 *457.2*	+0.063 *+1.60*	-0.031 *-0.79*	1.000 *25.40*	0.469 *11.91*	17.781 *451.64*	-0.030 *-0.76*	0.109 *2.77*	0.165 *4.2*	18.160 *461.3*
20 O.D. *508.0*	20.000 *508.0*	+0.063 *+1.60*	-0.031 *-0.79*	1.000 *25.40*	0.469 *11.91*	19.781 *502.44*	-0.030 *-0.76*	0.109 *2.77*	0.188 *4.8*	20.160 *512.1*
24 O.D. *609.6*	24.000 *609.6*	+0.063 *+1.60*	-0.031 *-0.79*	1.000 *25.40*	0.500 *12.70*	23.656 *600.86*	-0.030 *-0.76*	0.172 *4.37*	0.218 *5.5*	24.200 *614.7*
30 O.D. *762.0*	30.000 *762.0*	+0.093 *2.36*	-0.031 *0.79*	1.750 ▼ *44.45*	0.625 *15.88*	29.500 *749.30*	-0.063 *1.60*	0.250 *6.35*	0.250 *6.35*	30.200 *761.1*

NOTE: VdS - Roll Grooving Approval Specifications, see the Technical Data/Install Instructions section on Anvil's web site - www.anvilintl.com

CUT GROOVE SPECIFICATIONS

GRUVLOK STANDARD CUT GROOVE SPECIFICATION FOR STEEL & OTHER IPS OR ISO SIZE PIPE

-1-	-2-			-3-	-4-	-5-		-6-	-7-
Nominal IPS Pipe Size	O.D.			Gasket Seat "A" ±0.030 ±0.76	Groove Width "B" ±0.030 ±0.76	Groove Diameter "C"		Actual Groove Depth "D" (Ref. Only)	Min. Allow. Wall Thick. "T"
	Actual	Tolerance				Actual	Tol. +0.000		
In./DN(mm)	*In./mm*	*+In./mm*	*-In./mm*	*In./mm*	*In./mm*	*In./mm*	*-In./mm*	*In./mm*	*In./mm*
1 *25*	1.315 *33.4*	+0.028 *+0.71*	-0.015 *-0.38*	0.625 *15.88*	0.312 *7.92*	1.190 *30.23*	-0.015 *-0.38*	0.062 *1.6*	0.133 *3.4*
1¼ *32*	1.660 *42.2*	+0.029 *+0.74*	-0.016 *-0.41*	0.625 *15.88*	0.312 *7.92*	1.535 *38.99*	-0.015 *-0.38*	0.062 *1.6*	0.140 *3.6*
1½ *40*	1.900 *48.3*	+0.019 *+0.48*	-0.019 *-0.48*	0.625 *15.88*	0.312 *7.92*	1.775 *45.09*	-0.015 *-0.38*	0.062 *1.6*	0.145 *3.7*
2 *50*	2.375 *60.3*	+0.024 *+0.61*	-0.024 *-0.61*	0.625 *15.88*	0.312 *7.92*	2.250 *57.15*	-0.015 *-0.38*	0.062 *1.6*	0.154 *3.9*
2½ *65*	2.875 *73.0*	+0.029 *+0.74*	-0.029 *-0.74*	0.625 *15.88*	0.312 *7.92*	2.720 *69.09*	-0.018 *-0.46*	0.078 *2.0*	0.187 *4.8*
3 O.D. 76.1	*2.996* 76.1	*+0.030* +0.76	*-0.030* -0.76	*0.625* 15.88	*0.312* 7.92	*2.845* 72.26	*-0.018* -0.46	*0.076* 1.9	*0.188* 4.8
3 *80*	3.500 *88.9*	+0.035 *+0.89*	-0.031 *-0.79*	0.625 *15.88*	0.312 *7.92*	3.344 *84.94*	-0.018 *-0.46*	0.078 *2.0*	0.188 *4.8*
3½ *90*	4.000 *101.6*	+0.040 *+1.02*	-0.031 *-0.79*	0.625 *15.88*	0.312 *7.92*	3.834 *97.38*	-0.020 *-0.51*	0.083 *2.1*	0.188 *4.8*
4¼ O.D. 108.0	*4.250* 108.0	*+0.042* +1.07	*-0.031* -0.79	*0.625* 15.88	*0.375* 9.53	*4.084* 103.73	*-0.020* -0.51	*0.083* 2.1	*0.203* 5.2
4 *100*	4.500 *114.3*	+0.045 *+1.14*	-0.031 *-0.79*	0.625 *15.88*	0.375 *9.53*	4.334 *110.08*	-0.020 *-0.51*	0.083 *2.1*	0.203 *5.2*
5¼ O.D. 133.0	*5.236* 133.0	*+0.052* +1.32	*-0.031* -0.79	*0.625* 15.88	*0.375* 9.53	*5.084* 129.13	*-0.020* -0.51	*0.076* 1.9	*0.203* 5.2
5½ O.D. 139.7	*5.500* 139.7	*+0.055* +1.40	*-0.031* -0.79	*0.625* 15.88	*0.375* 9.53	*5.334* 135.48	*-0.020* -0.51	*0.083* 2.1	*0.203* 5.2
5 *125*	5.563 *141.3*	+0.056 *+1.42*	-0.031 *-0.79*	0.625 *15.88*	0.375 *9.53*	5.395 *137.03*	-0.022 *-0.56*	0.084 *2.1*	0.203 *5.2*
6¼ O.D. 159.0	*6.259* 159.0	*+0.063* +1.60	*-0.031* -0.79	*0.625* 15.88	*0.375* 9.53	*6.084* 154.53	*-0.022* -0.56	*0.088* 2.2	*0.249* 6.3
6½ O.D. 165.1	*6.500* 165.1	*+0.063* +1.60	*-0.031* -0.79	*0.625* 15.88	*0.375* 9.53	*6.334* 160.88	*-0.022* -0.56	*0.085* 2.2	*0.219* 5.6
6 *150*	6.625 *168.3*	+0.063 *+1.60*	-0.031 *-0.79*	0.625 *15.88*	0.375 *9.53*	6.455 *163.96*	-0.022 *-0.56*	0.085 *2.2*	0.219 *5.6*
8 *200*	8.625 *219.1*	+0.063 *+1.60*	-0.031 *-0.79*	0.750 *19.05*	0.437 *11.10*	8.441 *214.40*	-0.025 *-0.64*	0.092 *2.3*	0.238 *6.1*
10 *250*	10.750 *273.1*	+0.063 *+1.60*	-0.031 *-0.79*	0.750 *19.05*	0.500 *12.70*	10.562 *268.27*	-0.027 *-0.69*	0.094 *2.4*	0.250 *6.4*
12 *300*	12.750 *323.9*	+0.063 *+1.60*	-0.031 *-0.79*	0.750 *19.05*	0.500 *12.70*	12.531 *318.29*	-0.030 *-0.76*	0.109 *2.8*	0.279 *7.1*
14 O.D. *355.6*	14.000 *355.6*	+0.063 *+1.60*	-0.031 *-0.79*	0.938 *23.83*	0.500 *12.70*	13.781 *350.04*	-0.030 *-0.76*	0.109 *2.8*	0.281 *7.1*
16 O.D. *406.4*	16.000 *406.4*	+0.063 *+1.60*	-0.031 *-0.79*	0.938 *23.83*	0.500 *12.70*	15.781 *400.84*	-0.030 *-0.76*	0.109 *2.8*	0.312 *7.9*
18 O.D. *457.2*	18.000 *457.2*	+0.063 *+1.60*	-0.031 *-0.79*	1.000 *25.40*	0.500 *12.70*	17.781 *451.64*	-0.030 *-0.76*	0.109 *2.8*	0.312 *7.9*
20 O.D. *508.0*	20.000 *508.0*	+0.063 *+1.60*	-0.031 *-0.79*	1.000 *25.40*	0.500 *12.70*	19.781 *502.44*	-0.030 *-0.76*	0.109 *2.8*	0.312 *7.9*
24 O.D. *609.6*	24.000 *609.6*	+0.063 *+1.60*	-0.031 *-0.79*	1.000 *25.40*	0.563 *14.30*	23.656 *600.86*	-0.030 *-0.76*	0.172 *4.4*	0.375 *9.5*
28 I.D. *733.4*	28.875 *733.4*	+0.063 *+1.60*	-0.031 *-0.79*	1.000 *25.40*	0.563 *14.30*	28.531 *724.69*	-0.030 *-0.76*	0.172 *4.4*	0.437 *11.1*
30 I.D. *787.4*	31.000 *787.4*	+0.063 *+1.60*	-0.031 *-0.79*	1.250 *31.75*	0.625 *15.88*	30.594 *777.09*	-0.030 *-0.76*	0.203 *5.2*	0.500 *12.7*
30 O.D. *762.0*	30.000 *762.0*	0.093 *2.36*	0.031 *0.79*	1.750▼ *44.45*	0.625 *15.88*	29.500 *749.30*	0.063 *1.60*	0.250 *6.35*	0.625 *15.88*



COLUMN 1 -
Nominal IPS Pipe size.
Nominal ISO Pipe size.

COLUMN 2 -
IPS outside diameter.
ISO outside diameter.

COLUMN 3 & 4 -
Gasket seat must be free from scores, seams, chips, rust or scale which may interfere with proper coupling assembly.

COLUMN 5 -
The groove must be of uniform depth around the entire pipe circumference. (See column 6).

COLUMN 6 -
Groove depth: for reference only. Groove must conform to the groove diameter "C" listed in column 5.

COLUMN 7 -
Minimum allowable wall thickness which may be cut grooved.

Out of roundness: Difference between maximum O.D. and minimum O.D. measured at 90° must not exceed total O.D. tolerance listed.

For IPS pipe, the maximum allowable tolerance from square cut ends is 0.03" for 1" thru 3½"; 0.045" for 4" thru 6"; and 0.060" for sizes 8" and above measured from a true square line.

For ISO size pipe, the maximum allowable tolerance from square cut ends is 0.75mm for sizes 25mm-80mm; 1.15mm for sizes 100mm- 150mm; and 1.50mm for sizes 200mm and above, measured from a true square line.

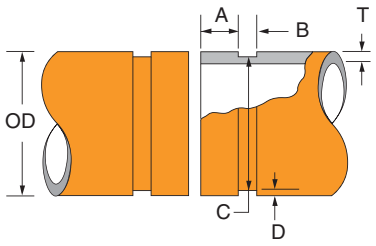
Beveled-End Pipe in conformance with ANSI B16.25 (37½°) is acceptable, however square cut is preferred.

Not to be used with End Guard gaskets.

▼ "A" tolerance +0.030" / -0.060" (+0.77 / -1.54 mm)

CUT GROOVE END GUARD® SPECIFICATION

End Guard (EG) cut groove is designed for standard or heavier wall thickness pipe to be joined by HPR 7004 EG couplings. Gruvlok EG fittings are grooved in accordance with these dimensions



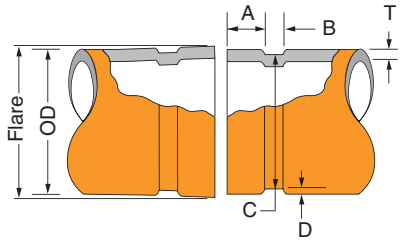
END GUARD (EG) CUT GROOVE SPECIFICATIONS*

Nominal IPS Pipe Size	Pipe Outside Diameter			Gasket Seat "A"		Groove Width "B"		Groove Diameter "C"		Groove Depth (Ref. Only) "D"	Min. Allow. Wall Thick. "T"
	Actual	Tolerance		Actual	Tol.+/-	Actual	Tol.(+0.010)	Actual	Tol.		
In./DN(mm)	*In./mm*	*+In./mm*	*-In./mm*	*In./mm*	*In./mm*	*In./mm*	*-In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*
2 *50*	2.375 *60.3*	+0.024 *+0.61*	-0.024 *-0.61*	0.562 *14.27*	+0.010 *0.25*	0.255 *6.48*	-0.005 *-0.13*	2.250 *57.15*	-0.015 *-0.38*	0.062 *1.6*	0.154 *4.0*
2½ *65*	2.875 *73.0*	+0.029 *+0.74*	-0.029 *-0.74*	0.562 *14.27*	+0.010 *0.25*	0.255 *6.48*	-0.005 *-0.13*	2.720 *69.09*	-0.018 *-0.46*	0.078 *2.0*	0.188 *4.8*
3 *80*	3.500 *88.9*	+0.035 *+0.89*	-0.031 *-0.79*	0.562 *14.27*	+0.010 *0.25*	0.255 *6.48*	-0.005 *-0.13*	3.344 *84.94*	-0.018 *-0.46*	0.078 *2.0*	0.188 *4.8*
4 *100*	4.500 *114.3*	+0.045 *+1.14*	-0.031 *-0.79*	0.605 *15.37*	+0.015 *0.38*	0.305 *7.75*	-0.005 *-0.13*	4.334 *110.08*	-0.020 *-0.51*	0.083 *2.1*	0.203 *5.2*
5 *125*	5.563 *141.3*	+0.056 *+1.42*	-0.031 *-0.79*	0.605 *15.37*	+0.015 *0.38*	0.305 *7.75*	-0.005 *-0.13*	5.395 *137.03*	-0.022 *-0.56*	0.084 *2.1*	0.203 *5.2*
6 *150*	6.625 *168.3*	+0.063 *+1.60*	-0.031 *-0.79*	0.605 *15.37*	+0.015 *0.38*	0.305 *7.75*	-0.005 *-0.13*	6.455 *163.96*	-0.022 *-0.56*	0.085 *2.2*	0.219 *5.6*
8 *200*	8.625 *219.1*	+0.063 *+1.60*	-0.031 *-0.79*	0.714 *18.14*	+0.015 *0.38*	0.400 *10.16*	-0.010 *-0.254*	8.441 *214.40*	-0.025 *-0.64*	0.092 *2.3*	0.238 *6.1*
10 *250*	10.750 *273.1*	+0.063 *+1.60*	-0.031 *-0.79*	0.714 *18.14*	+0.015 *0.38*	0.400 *10.16*	-0.010 *-0.25*	10.562 *268.27*	-0.027 *-0.69*	0.094 *2.4*	0.250 *6.4*
12 *300*	12.750 *323.9*	+0.063 *+1.60*	-0.031 *-0.79*	0.714 *18.14*	+0.015 *0.38*	0.400 *10.16*	-0.010 *-0.25*	12.531 *318.29*	-0.030 *-0.76*	0.109 *2.8*	0.279 *7.1*

*Refer to additional notes on previous page.

ROLL GROOVE END GUARD® SPECIFICATION

End Guard (EG) roll groove is designed for lightwall pipe to be joined by HPR 7004 EG couplings.



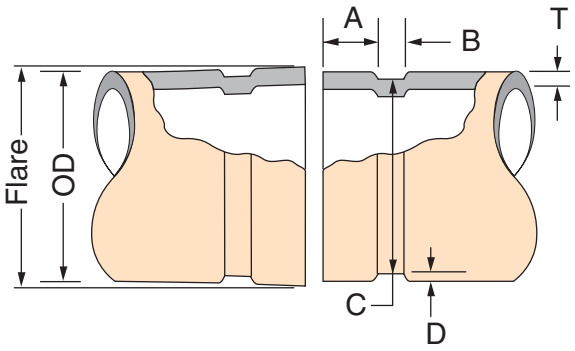
END GUARD (EG) ROLL GROOVE SPECIFICATIONS*

Nominal IPS Pipe Size	Pipe Outside Diameter			Gasket Seat "A"		Groove Width "B"		Groove Diameter "C"		Groove Depth (Ref. Only) "D"	Min. Allow Wall Thick. "T"
	Actual	Tolerance		Actual	Tol.+/-	Actual	Tol.(+0.010)	Actual	Tol.		
In./DN(mm)	*In./mm*	*+In./mm*	*-In./mm*	*In./mm*	*In./mm*	*In./mm*	*-In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*
2 *50*	2.375 *60.3*	+0.024 *+0.61*	-0.024 *-0.61*	0.572 *+14.53*	-0.020 *-0.51*	0.250 *6.35*	+0.015 *0.38*	2.250 *57.15*	-0.015 *-0.38*	0.062 *1.6*	0.065 *1.7*
2½ *65*	2.875 *73.0*	+0.029 *+0.74*	-0.029 *-0.74*	0.572 *+14.53*	-0.020 *-0.51*	0.250 *6.35*	+0.015 *0.38*	2.720 *69.09*	-0.018 *-0.46*	0.078 *2.0*	0.083 *2.1*
3 *80*	3.500 *88.9*	+0.035 *+0.89*	-0.031 *-0.79*	0.572 *+14.53*	-0.020 *-0.51*	0.250 *6.35*	+0.015 *0.38*	3.344 *84.94*	-0.018 *-0.46*	0.078 *2.0*	0.083 *2.1*
4 *100*	4.500 *114.3*	+0.045 *+1.14*	-0.031 *-0.79*	0.610 *+15.49*	-0.020 *-0.51*	0.300 *7.62*	+0.020 *0.51*	4.334 *110.08*	-0.020 *-0.51*	0.083 *2.1*	0.083 *2.1*
5 *125*	5.563 *141.3*	+0.056 *+1.42*	-0.031 *-0.79*	0.610 *+15.49*	-0.020 *-0.51*	0.300 *7.62*	+0.020 *0.51*	5.395 *137.03*	-0.022 *-0.56*	0.084 *2.1*	0.109 *2.8*
6 *150*	6.625 *168.3*	+0.063 *+1.60*	-0.031 *-0.79*	0.610 *+15.49*	-0.020 *-0.51*	0.300 *7.62*	+0.020 *0.51*	6.455 *163.96*	-0.022 *-0.56*	0.085 *2.2*	0.109 *2.8*
8 *200*	8.625 *219.1*	+0.063 *+1.60*	-0.031 *-0.79*	0.719 *+18.26*	-0.020 *-0.51*	0.390 *9.91*	+0.020 *0.51*	8.441 *214.40*	-0.025 *-0.64*	0.092 *2.3*	0.109 *2.8*
10 *250*	10.750 *273.1*	+0.063 *+1.60*	-0.031 *-0.79*	0.719 *+18.26*	-0.020 *-0.51*	0.390 *9.91*	+0.020 *0.51*	10.562 *268.27*	-0.027 *-0.69*	0.094 *2.4*	0.134 *3.4*
12 *300*	12.750 *323.9*	+0.063 *+1.60*	-0.031 *-0.79*	0.719 *+18.26*	-0.020 *-0.51*	0.390 *9.91*	+0.020 *0.51*	12.531 *318.29*	-0.030 *-0.76*	0.109 *2.8*	0.156 *4.0*

*Refer to additional notes on previous page.

GRUVLOK CTS COPPER SYSTEM

Roll Groove Specifications



GRUVLOK CTS COPPER SYSTEM – ROLL GROOVE SPECIFICATIONS

-1-	-2-			-3-	-4-	-5-		-6-	-7-	-8-
Nominal Size	Tubing Outside Diameter			Gasket Seat "A" +/– 0.03 in. +/– 0.76mm	Groove Width "B" +0.03/–0.00 in. +0.76/–0.00mm	Groove Diameter "C"		Nominal Groove Depth "D"	Min. Wall "T"	Max. Flare Diam.
	Actual	Tolerance				Actual	Tolerance +0.000			
In.	*In./mm*	*+ In./mm*	*– In./mm*	*In./mm*	*In./mm*	*In./mm*	*– In./mm*	*In./mm*	*In./mm*	*In./mm*
2	2.125 *54.0*	0.002 *0.05*	0.002 *0.05*	0.610 *15.5*	0.300 *7.6*	2.029 *51.54*	-0.020 *-0.51*	0.048 *1.2*	0.058 *1.6*	2.220 *56.4*
2½	2.625 *66.7*	0.002 *0.05*	0.002 *0.05*	0.610 *15.5*	0.300 *7.6*	2.525 *64.14*	-0.020 *-0.51*	0.050 *1.3*	0.065 *1.7*	2.720 *69.1*
3	3.125 *79.4*	0.002 *0.05*	0.002 *0.05*	0.610 *15.5*	0.300 *7.6*	3.025 *76.84*	-0.020 *-0.51*	0.050 *1.3*	DWV	3.220 *81.8*
4	4.125 *104.8*	0.002 *0.05*	0.002 *0.05*	0.610 *15.5*	0.300 *7.6*	4.019 *102.08*	-0.020 *-0.51*	0.053 *1.3*	DWV	4.220 *107.2*
5	5.125 *130.2*	0.002 *0.05*	0.002 *0.05*	0.610 *15.5*	0.300 *7.6*	4.999 *126.97*	-0.020 *-0.51*	0.053 *1.3*	DWV	5.220 *132.6*
6	6.125 *155.6*	0.002 *0.05*	0.002 *0.05*	0.610 *15.5*	0.300 *7.6*	5.999 *152.37*	-0.020 *-0.51*	0.063 *1.6*	DWV	6.220 *158.0*
8	8.125 *206.4*	0.002 *0.05*	0.004 *0.10*	0.610 *15.5*	0.300 *7.6*	7.959 *202.16*	-0.020 *-0.51*	0.083 *2.1*	DWV	8.220 *208.8*

COLUMN 1
Nominal tubing size ASTM B88

COLUMN 2
Outside diameter of copper tubing per ASTM B88. Allowable tolerance from square cut ends is 0.030"/0.76mm for sizes 2"-3"; 0.045"/1.14mm for sizes 4-8"

COLUMN 3
Gasket seat must be free from scores, roll marks, indentations, grease and dirt which may interfere with gasket sealing.

COLUMN 4
Groove width is to be free from chips, dirt, etc. which may interfere with proper coupling assembly.

COLUMN 5
Groove diameter must be of uniform depth for the entire circumference of the tubing. See column 6.

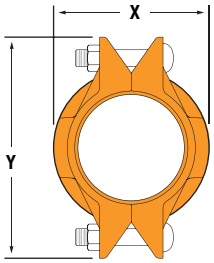
COLUMN 6
Groove depth is for reference only; the groove diameter must conform to column 5.

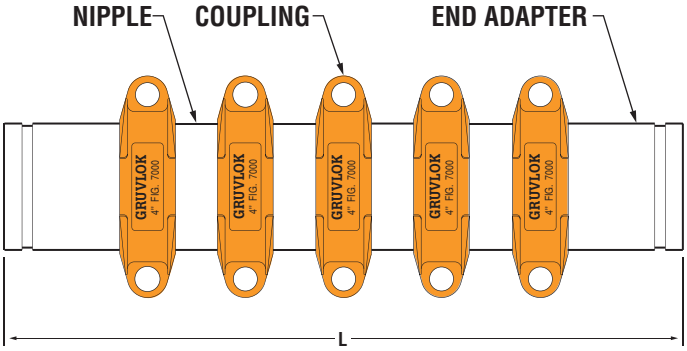
COLUMN 7
DWV (Drain, Waste and Vent Piping) per ASTM B306.

COLUMN 8
Maximum flare diameter is the OD at the most extreme tubing diameter.

FIG. 7240 ORDER FORM

Expansion Joints





PERFORMANCE DATA

Nominal Size	O.D.	Coupling Figure	Dimensions		Compressed Length L	Expanded Length L	Coupling Movement Capability	Number of Couplings	Total Movement Capability
			X	Y					
In./mm	*In./mm*		*In./mm*	*In./mm*	*In./mm*	*In./mm*	*In./mm*		*In./mm*
2 *50*	2.375 *60.3*	7000	3½ *88.9*	5½ *125*	30 *762*	31¼ *793.8*	⅛ *3.2*	10	1¼ *31.8*
2½ *65*	2.875 *73.0*	7000	4 *101.6*	5¾ *146.1*	30 *762*	31¼ *793.8*	⅛ *3.2*	10	1¼ *31.8*
3 *80*	3.500 *88.9*	7000	4⅝ *117.5*	6¾ *171.5*	30 *762*	31¼ *793.8*	⅛ *3.2*	10	1¼ *31.8*
4 *100*	4.500 *114.3*	7000	5⅞ *149.2*	8⅛ *206.4*	17½ *444.5*	18¾ *476.3*	¼ *6.4*	5	1¼ *31.8*
5 *125*	5.562 *141.3*	7000	7 *177.8*	9⅝ *244.5*	19 *482.6*	20¼ *514.4*	¼ *6.4*	5	1¼ *31.8*
6 *150*	6.625 *168.3*	7000	8 *203.2*	11 *279.4*	19 *482.6*	20¼ *514.4*	¼ *6.4*	5	1¼ *31.8*
8 *200*	8.625 *219.1*	7000	10⅜ *263.5*	13¼ *336.6*	22½ *571.5*	23¾ *603.3*	¼ *6.4*	5	1¼ *31.8*
10 *250*	10.750 *273.1*	7001	12⅞ *327.0*	17½ *444.5*	23½ *596.9*	24¾ *628.7*	¼ *6.4*	5	1¼ *31.8*
12 *300*	12.750 *323.9*	7001	15 *381.0*	19½ *495.3*	23½ *596.9*	24¾ *628.7*	¼ *6.4*	5	1¼ *31.8*

FIG. 7240 – ORDER FORM

When requesting a quotation or placing an order, please complete the following form and fax a copy to 717-684-2131 to the attention of Customer Service:

1) Size and material of pipe to which the Expansion Joint will be connected _____

2) Factory to preset the Expansion Joint to: _____ Full Expansion _____ Full Contraction _____ Intermediate

3) Total overall movement while in service: _____ inches

4) Pipe material for Expansion Joint (standard is sch. 40 steel): _____

5) Finish on pipe (standard is black): _____

6) Finish on couplings (standard is painted): _____

7) Gasket material (standard is Grade E EPDM): _____

8) Connecting pipe ends if different than standard roll or cut groove: _____

9) Are there any silicone restrictions for the application? _____ Yes _____ No

SECTION 15050

Basic Mechanical Methods and Materials

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping, couplings, fittings and valves for piped building systems.

1.2 RELATED SECTIONS

A. Section 15060 - Hangers and Supports.

B. Section 15300 - Pipes, Valves and Fittings for Fire Protection Systems.

C. Section 15400 - Pipes, Valves and Fittings for Plumbing Systems.

D. Section 15500 - Piping Specialties.

E. Section 15600 - Pipes Valves and Fittings for HVAC Heating and Cooling.

1.3 REFERENCES

A. American Society of Mechanical Engineers (ASME) B31.1 - Power Piping (SI Edition).

B. American Society of Mechanical Engineers (ASME) B31.3 - Chemical Plant and Petroleum Refinery Piping.

C. American Society of Mechanical Engineers (ASME) B31.9 - Building Services Piping.

D. ASTM International (ASTM) A36 - Standard Specification for Carbon Structural Steel.

E. ASTM International (ASTM) A47 - Standard Specification for Ferritic Malleable Iron Castings.

F. ASTM International (ASTM) A48 - Standard Specification for Gray Iron Castings.

G. ASTM International (ASTM) A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

H. ASTM International (ASTM) A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

I. ASTM International (ASTM) A153 - Specification for Zinc Coating (Hot Dip) on Iron & Steel Hardware.

J. ASTM International (ASTM) A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

K. ASTM International (ASTM) A387 - Standard Specification for Pressure Vessel Plates, Alloy Steel, Chromium-Molybdenum.

L. ASTM International (ASTM) A515 - Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate-and Higher-Temperature Service.

M. ASTM International (ASTM) A536 - Standard Specification for Ductile Iron Castings.

N. ASTM International (ASTM) A575 - Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.

O. ASTM International (ASTM) A668 - Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.

P. ASTM International (ASTM) A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

Q. ASTM International (ASTM) B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

R. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-58 Pipe Hangers and Supports - Materials, Design and Manufacture.

S. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-69 Pipe Hangers and Supports - Selection and Application.

T. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-77 Guidelines for Pipe Support Contractual Relationships.

U. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-89 Pipe Hangers and Supports - Fabrication and Installation Practices.

V. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-90 Guidelines on Terminology for Pipe Hangers and Supports.

W. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.

1.4 SYSTEM DESCRIPTION

A. Grooved Mechanical Products: Couplings, fittings, valves and grooved components shall be used as the piping method.
   1. Product: Gruvlok as manufactured by Anvil International.

B. System Design Requirements:
   1. Grooved products shall meet National and Local Piping and/or Building Codes. Mechanical commercial and industrial piping products shall have a minimum 300-psi (2.4 MPa) working pressure with 3 to 1 or greater safety working pressure with the exception of plain-end end fittings, which shall have a minimum of 175-psi (1.2MPa) working pressure.
   2. Fire Protection UL/ULC listed and FM approved products shall conform to NFPA working pressures.

SECTION 15050 (CONT.)

Basic Mechanical Methods and Materials

3. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies. Grooved piping installation shall meet ANSI B-31.1 - ANSI B-31.9 standards for horizontal and vertical pipe support design criteria.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Installation methods.

C. Certifications:
   1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

F. Closeout Submittals:
   1. Warranty: Warranty documents.
   2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Manufacturing facilities shall be registered to ISO 9001:2008 and assessed to ISO 9001:2008 standard. A copy of the current certificate shall be available upon request.

B. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, and establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights. Owner may have under Contract Documents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Anvil International, which is located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: gwieczerza@anvilintl.com; Web: www.anvilintl.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MANUFACTURERS

A. Steel Piping: Black Steel and/or galvanized pipe conforming to ASTM A-53, Grade A or B. Grooving shall conform to Gruvlok published grooving specifications.

B. Steel Piping: Black Steel and/or galvanized pipe conforming to ASTM A-135 or A-795. Grooving shall conform to Gruvlok published grooving specifications.

SECTION 15050 (CONT.)

Basic Mechanical Methods and Materials

C. Steel Piping: Black Steel and/or galvanized pipe conforming to ASTM A-53, Grade A or B. Standard schedule 40 pipe shall be roll or cut grooved. Grooving shall conform to Gruvlok published grooving specifications.

D. Steel Piping: Black Steel and/or galvanized pipe conforming to ASTM A-53, Grade A or B. Schedule 10 pipe and below shall be roll grooved. Grooving shall conform to Gruvlok published grooving specifications.

E. Copper Tubing: Copper tube to comply with ASTM B-88.
   1. Types K, L, M, and DWV shall be used in conjunction with the Gruvlok Copper roll grooved method.

2.3 FITTINGS

A. Material:
   1. Couplings and Grooved Flange Adapters shall conform to ASTM A-536 Ductile Grade 65-45-12 or to ASTM A-47 Malleable Grade 32510.
   2. Coupling Track Head Bolts shall conform to ASTM A-183 Grade 2.
   3. Hex nuts shall conform to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.
   4. Fittings shall conform to Cast Ductile ASTM A-536 or Cast Malleable ASTM A-47.
   5. Forged steel fittings shall conform to ASTM A-234 or A-106 Grade B.
   6. Segmental welded fittings shall conform to ASTM A-53.
   7. Coatings shall be (Orange) Alkyd-enamel rust inhibiting lead free paint.
   8. Coating shall be hot dipped galvanized fittings shall conform to ASTM A-153.
   9. Standard coupling gaskets for building services shall be Grade "EP" EPDM conforming to ASTM D-2000 with operating temperature range from -40 degrees F to +250 degrees F (-40 degrees C to 121 degrees C).

B. Gasket Lubricant: Coupling gaskets except where noted shall be lubricated with approved lubricant.
   1. Copper Systems: Gruvlok Xtreme Lubricant.
   2. Environments below -20 degrees F (-28 degrees C), and above 150 degrees F (66 degrees C) and systems subject to continuous cycle temperature changes: Gruvlok Xtreme Lubricant.
   3. Systems Subject to Thermal Cycling: Gruvlok Xtreme Lubricant.

C. Grooved Couplings for Steel Pipe Systems and other Approved Piping:
   1. Sizes 1 inch to 30 inches (25 mm to 762 mm): Gruvlok Style 7401 Rigidlok couplings shall be used including style 7012 flange adapters.
   2. Gruvlok Style 7001 (Flexible) couplings shall be used for vibration attenuation and noise suppression at equipment locations.
   3. Combination rigid, flexible, and outlet couplings shall be used for vibration, noise suppression and seismic tremor.
   4. Clamp type couplings shall be used for branch outlets.
   5. Grade "E" EPDM gaskets shall be used for water service applications with temperature ranges between - 40 degree F and +230 degree F (-40 degree C and 110 degree C).
   6. Use other gasket materials as recommended for petroleum service and other applications.
   7. Flexible or other style couplings designed for axial motion or other movements shall be supported in strict accordance with factory recommendations.

D. Grooved Couplings for Copper Tube Systems: Coupling working pressure not to exceed 300 psig (2.0 MPa).
   1. Gruvlok style 6400 rigid coupling and style 6084 flange adapter.
   2. Grade "EP" EPDM gasket
   3. Gruvlok Xtreme Lubricant

E. Grooved Flange Adapters: Flange adapters to transition from flange to groove with no nipple shall be Gruvlok Fig 7012 or Figure 7013:
   1. Flanges in Figures 7012 and 7013 are designed with internal anti-rotation tines and are designated as a rigid connection.
   2. Figures 7012 and 7013 flange adapters require sealing rings when used with certain flanged products.
   3. Figure 7012: Conforms to ANSI class 125 or 150 lb (57 or 68 kg).
      a. Sizes 2 inches through 20 inches (51 mm through 508 mm) are rated at 300 psig (2.0 MPa).
      b. Size 24 inches (610 mm) is rated at 250 psig (1.72 MPa).
   4. Figure 7013: 2 inches through 12 inches (51 mm through 305 mm) available for ANSI class 250 or 300 lb (113 kg or 136 kg) bolt pattern and is rated at 750 psig (5 MPa).

F. Grooved Fittings for Steel Piping Systems - Shall be Gruvlok cast ductile, malleable, forged steel, and/or segmental welded steel fittings.
   1. Sizes 1 inches to 30 inches (25 mm to 762 mm) diameter:
      a. Cast ductile conforms to ASTM A-536 or cast malleable iron conforms to ASTM A-47.
      b. Forged steel conforms to ASTM A-234.
      c. Segmental welded conforms to ASTM A-53.
   2. Fittings shall be coated with an Alkyd-enamel non-toxic paint.
   3. Zinc electroplated fittings conform to ASTM B-633.
   4. Hot Dip Galvanized fittings conform to ASTM A-153.
   5. Standard Fittings shall be schedule 40 or standard wall. Other fittings are schedule 80 or light wall as scheduled.

SECTION 15050 (CONT.)

Basic Mechanical Methods and Materials

G. Grooved Copper Fittings: Gruvlok Wrot Copper fittings per ASTM B-75 and ANSI B-16.22, alloy C12200.
   1. Wrought Copper fittings size 2 inches to 8 inches (51 mm to 203 mm) diameter shall be schedule 10 or standard wall 304 or 316 stainless steel. Copper fittings shall be 99.9 percent lead free.
   2. Couplings and Wrought Copper Fittings shall be NSF, Plumbing Code approved and UL/ULC listed.

H. Di-Electric Insulated Pipe Connections: Di-LOK Figure 7091 grooved by grooved insulating nipple.
   1. Shall inhibit the formation of a galvanic cell between dissimilar metals.
   2. Housing: Steel tube to comply with ASTM A513.
   3. Liner: Polypropylene to ASTM D4140. 300 psig (2 MPa).
   4. Operating Temperature -40 degrees F to +230 degrees F (-40 degrees C to 100 degrees C).
   5. Size range is 3/4 inch to 6 inches (19 mm to 152 mm) diameter.

I. Branch Outlets: Shall be Gruvlok Clamp-T Styles 7045 and 7046, and Clamp-T Cross Figure 7047, 7048 and 7049 with grooved or threaded outlets.
   1. Designated as a bolted-on positive pipe engagement branch outlet. Working pressure to 500 psi (3.5 KPa).
   2. Run Sizes 2 inches to 8 inches (51 mm to 203 mm).
   3. Branch outlets from 1/2 inch to 3 inches (13 mm to 76 mm) diameter.

J. Outlet Couplings: Shall be Gruvlok Figure 7042 with grooved or threaded outlets. Working pressure shall be 500-psig minimum.
   1. Run sizes 1-1/2 inches to 6 inches (38 mm to 152 mm).
   2. Branch outlets from 1/2 inch to 2 inches (13 mm to 51 mm) diameter.

K. Plain End Couplings and Fittings: Gruvlok Roughneck coupling Style 7005 and plain-end fittings to match.
   1. Size range is 2 inches to 16 inches (51 mm to 406 mm) diameter. Materials conform to ASTM A-536 and A-47. Fittings are cast or forged steel. Intended for working pressures 300 to 750 psig (2.0 KPa to 5.2 KPa) with bolts fully torque to factory recommend torque requirements on plain-end or beveled standard wall steel pipe and Gruvlok Plain-End fittings. Fittings match coupling working pressure.
   2. Size range is 1 inch to 2-1/2 inches (25 mm to 64 mm) diameter: Plain End "Sock-it" Method: Gruvlok Sock-it fitting series 7100 through 7107. Material conforms to ASTM A-126 Class A Cast Iron. Working pressures from 175 - 300 psi (1.2 KPa to 2.0 KPa) UL/ULC listed and FM approved.

L. Gaskets for Industrial and Other Piping Systems: Systems with different media products shall be provided with industrial grade gaskets as scheduled.

M. Track Head Bolts and Hex Nuts: Couplings shall be furnished with heat-treated; oval neck track head bolts conforming to ASTM A-183 Grade 2. Bolts shall meet minimum tensile strength of 110,000 psi (758 KPa). Hex nuts shall be carbon steel conforming to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.

2.4 GROOVED CONNECTION FLOW CONTROL VALVES

A. Gruvlok Tri-Service Valves - Model FTV-S.

B. Gruvlok Tri-Service Valves - Model FTV-A.
   1. Size: As indicated on drawings.
   2. Body and Yoke: Ductile iron; comply with ASTM A395 or ASTM A536.
   3. Disc: Cast iron, comply with ASTM A126.
   4. Stem: Bronze, comply with ASTM B21.
   5. Seat-Guide: Bronze, comply with ASTM B584.
   6. Disc Guide: Cast iron, comply with ASTM A126.
   7. Seat: Bronze.
   8. Flanged Gland: Cast iron, comply with ASTM A126.
   9. Packing: Graphited, non-asbestos packing.
   10. Spring: 302 stainless steel.
   11. Stem Guide: Ductile iron; comply with ASTM A395 or ASTM A536.

C. Gruvlok Balancing Valves - Model GBV-S (Soldered).

D. Gruvlok Balancing Valves - Model GBV-T (Threaded).
   1. Size: As indicated on drawings.
   2. Material: Cast bronze.
   3. Type and Description: Y-style globe valve with 4 full-turn adjustment, pressure differential ports on both sides of the valve, with positive shutoff and micrometer type handwheel adjustment. Provide tamperproof memory stop.

E. Gruvlok Balancing Valves - Model GBV-G (Grooved-End Straight).

F. Gruvlok Balancing Valves - Model GBV-A (Grooved-End Angle).
   1. Size: As indicated on drawings.
   2. Body: Ductile iron, comply with ASTM A536.
   3. Disc: Bronze, comply with ASTM B584.
   4. Seat: Ultra-high strength engineered resin.

SECTION 15050 (CONT.)
Basic Mechanical Methods and Materials

5. Trim: Brass C-37700.
6. O-ring: Nitrile.

G. Gruvlok Butterfly Valves - Series 7700:
1. Size: As indicated on drawings.
2. Body: Ductile iron; comply with ASTM A536, Grade 65-42-12.
3. Body Coating: Nylon.
4. Disc: Ductile iron; comply with ASTM A536, Grade 65-42-12.
5. Grade: Grade E - EPDM.
6. Grade: Grade T - Nitrile.
7. Upper and Lower Shaft: Type 416 stainless steel.

2.5 EQUIPMENT ANCHOR BOLTS AND TEMPLATES
A. Provide templates to ensure accurate location of anchor bolts.

PART 3 EXECUTION

3.1 EXAMINATION
A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION
A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION
A. General: Grooved piping installation shall meet ANSI B-31.1 - ANSI B-31.9 Codes for Pressure Piping.

B. Install in accordance with manufacturer's instructions.

C. Pipe ends shall be clean and free from indentations, burrs, rust or damage.

D. Field grooving or pipe cutting of galvanized pipe may require repair of possible damaged galvanized pipe ends. Two coats of spray-on "liquid-galvanize" are recommended.

E. Install rigid couplings that utilize a tongue-and-groove housing for precise coupling alignment and engagement. Tines in the housing key section engage to provide a rigid pipe connection.

F. Companion or mating flanges shall have a flat hard surface and shall be free from gouges, undulations or deformities. Use flange gasket sealing rings if mating surfaces are not uniform.

G. Plain-end coupling and fitting installation shall comply with specific torque and installation requirements. Consult current manufacturer's product installation data.

H. Gasket lubricant shall be used to assure proper coupling gasket seating, and conformance with gasket service usage.

3.4 VALVE INSTALLATION
A. Tri-Service Valves - Models FTV-S, FTV-A:
1. Mount valve to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 12 inches (305 mm) for pump sizes 2 inches by 2 inches (51 mm by 51 mm) to 6 inches by 6 inches (152 mm by 152 mm) and 24 inches (610 mm) for pump sizes 8 inches by 8 inches (203 mm by 203 mm) to 12 inches by 12 inches (305 x 305 mm).
2. Do not mount valve directly to pump to avoid causing undesirable noise in the system.
3. Leave sufficient clearance around valve for valve removal or repair.
4. Install valve in the direction of flow arrows on valve body.
5. Mount valve to flanged equipment using Gruvlok Flange Adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.
6. Valve body has been designed to handle the weight of the pump on vertical in-line installations. The valve body is not designed to support the piping weight. Support piping by hangers. Provide pipe supports under valve and strainer bodies.

B. Globe Valves - Model GBV-S (Soldered), GBV-T (Threaded), Balancing Valves - Model GBV-G (Grooved-End Straight), GBV-A (Grooved-End Angle):
1. To ensure accuracy of measurement of GBV-S, GBV-T, GBV-G and GBV-A valves, locate valves at least 5 pipe diameters downstream from any fitting and at least 10 pipe diameters downstream from a pump.
2. Install no fittings within 2 pipe diameters downstream of valve.

SECTION 15050 (CONT.)

Basic Mechanical Methods and Materials

3. Install valves with flow in the direction of the arrow on the valve body.
4. Provide easy access to probe metering ports (PMPs), drain ports and handwheel.
5. For solder applications, solder valve body in line using 95/5 solder.
6. Install valve-bonnet assembly into body, making sure non-asbestos gasket is in place.
7. Install valves in horizontal or vertical piping as indicated.
8. Do not install metering ports below the pipe (pointing down), as this will allow system sediment to accumulate in the ports.
9. Metering ports and body/drain plugs may be interchanged for improved accessibility.

END OF SECTION

SECTION 15300

Pipes, Valves and Fittings for Fire Protection Systems

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Scope of work:
   1. All areas as indicated on the drawings are to be protected by an automatic suppression system, of type as indicated.
   2. Wet pipe.
   3. Dry-pipe.
   4. Wet standpipe.
   5. Dry-standpipe.

B. Contractor shall be responsible for designing the distribution systems and sizing of the systems by hydraulic calculation; and shall provide the necessary engineering drawings and calculations to obtain acceptance of all authorities having jurisdiction.

1.2 SECTION INCLUDES

A. Section 07840 - Firestopping.

B. Section 08310 - Access Doors and Panels.

C. Section 15050 - Basic Mechanical Methods and Materials.

D. Section 15060 - Hangers and Supports.

E. Section 15500 - Piping Specialties.

1.3 REFERENCES

A. ASTM International (ASTM) A536 - Standard Specification for Ductile Iron Castings.

B. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.

C. NFPA 13 - Installation of sprinkler systems.

D. NFPA 72 - Installation, maintenance and use of protective signaling devices.

1.4 SYSTEM DESCRIPTION

A. System components to be UL listed/FM approved and labeled.

B. System components to be to be rated for minimum operating pressure of 175 psig.

C. Pipe, Valves, and Fittings - Grooved products for steel and copper fire protection systems shall be used. Refer to Section 15050 - Basic Materials and Methods and Section 15500 - Piping Specialties.

D. Products shall be UL/ULC listed and FM approved. Materials shall be installed in accordance with current NFPA Standards, local Rating Bureau and/or local Fire Marshall requirements.

E. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies. Refer to Section 15060 - Hangers and Supports.

SECTION 15300 (CONT.)

Pipes, Valves and Fittings for Fire Protection Systems

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Installation methods.

C. Certifications:
   1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.

D. Shop Drawings:
   1. Submit shop drawings and Product Data grouped to include complete submittals of related systems, products, and accessories in a single submittal.

E. Closeout Submittals:
   1. Warranty documents.
   2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Fire Protection Contractor shall be licensed by the State in which the project is located authorized to furnish and install fire protection systems.
   2. Contractor shall obtain all necessary permits and licenses pertaining to this Division (expense borne by the Contractor) and comply with Municipal and State Codes, Laws, Ordinances and Regulations, and the requirements of the National Fire protection Association, and pay all fees and sales taxes as required, and post all bonds incident thereto.

B. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, and establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DEFINITION

A. "Piping" includes all pipe, fittings, valves, hangers, and other supports and accessories related to such piping.

B. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, in crawl spaces or buried.

C. "Exposed" means not installed underground or "concealed" as defined above.

D. "Fire Protection Work" is all of the work Indicated or required by the Contract Documents.

E. "Or equivalent" means to possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity.

F. "Provide" means the Contractor shall "furnish and install" work and/or equipment.

G. "FPC" means the Fire Protection Contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

A. Contractor shall guarantee, in writing, that all work installed shall be free from any and all defects in workmanship and materials; that all apparatus shall develop capacities and characteristics specified; and that if, during the period of one year, or as otherwise specified, from the date of substantial completion, any defects in workmanship, material or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within a reasonable time as specified in notice from the Owner's Representative. In default thereof, the Owner's Representative shall have the work done and charge the cost of the work to the Contractor.

B. Furnish manufacturers written warranties for all equipment, stating effective date of Warranty, to the Owner's Representative.

SECTION 15300 (CONT.)

Pipes, Valves and Fittings for Fire Protection Systems

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Anvil International, which is located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: gwieczerza@anvilintl.com; Web: www.anvilintl.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MANUFACTURED UNITS

A. Grooved Butterfly Valve: Gruvlok Figure AE-7722-3A, 2 to 10 inches (51 mm to 254 mm). 300 PSI (2.1 MPa) rated UL/FM approved grooved-end with two (2) switches; one is a supervisory switch and the other is an auxiliary switch. Tamper resistant screws shall be provided to attach the cover of the actuator.

B. Check Valves: Gruvlok Figure 78FP, 2 to 12 inches (51 to 305 mm): 300 PSI (2.1 MPa) rated, UL/ULC listed and FM approved grooved-end.

C. Couplings for Fire Protections Systems - Gruvlok UL/ULC listed and/or FM approved. Figure 7000 (Flexible) and 7400 (Rigidlok) Grade "E" EPDM Type A, "C" Style Gaskets (DRI-SEAL), Type E EPDM, or Flush Gap Gasket.

D. Grooved Fittings for Fire Protection Piping Systems: Gruvlok Fire-Rite short pattern fittings, 90 degree elbows and tees in 2 to 8 inches (51 mm to 203 mm) or Gruvlok standard pattern fittings, 2 to 12 inches (51 to 305 mm). Cast ductile conforms to ASTM A-536 Ductile Iron to Grade 65-45-12. Fittings are painted to industry specification and are available galvanized. Fire-RiteSYMBOL 212 fittings are UL/ULC listed and FM approved.

E. Expansion Compensation Loop:

1. A flexible pipe loop that absorbs and compensates for multi-plane movements simultaneously while reduce piping stress.
2. Anvil Star Tri-Flex Loop as manufactured by Anvil International, or pre-approved equal.
   a. Model ANVL2 (+/-2 inches (51 mm) movement).
   b. Model ANVL4 (+/-4 inches (102 mm) movement).
   c. Model ANVL8 (+/-8 inches (203 mm) movement).
3. Construction shall be 3 equal length sections of annular corrugated stainless steel close-pitch hose (made in USA) with stainless steel over braid (made in USA) that will absorb or compensate for pipe movements in all 6 degrees of freedom (3 coordinate axes, plus rotation about those axes) simultaneously.
   a. The corrugated metal hose, braid(s), and a stainless steel ring-ferrule/band (material gauge not less than .048 inch (1.2 mm) shall be integrally seal-welded using a 100 percent circumferential, full penetration TIG welds. End fittings shall be selected per application.
   b. Design for pressure testing to 1.5 times their maximum rated working pressure and a minimum 4:1 (burst to working) safety factor.
   c. Individually leak tested by the manufacturer using air-under-water or hydrostatic pressure.
   d. In fire protection systems provide pipe loop that is Factory Mutual tested and approved for use in fire protection piping systems. Sizes 2 inches to 3 inches (51 mm to 76 mm) ID shall be FM Approved for 300 psi (2.1 MPa) working pressure at ambient temperature, and sizes 4 inches to 12 inches (102 mm to 305 mm) ID shall be FM Approved for 175 psi (1.2 MPa) working pressure at ambient temperature.
4. Warranty: Provide a 3-year product warranty when installed in accordance with all specifications and installation instructions as described in the Anvil Tri-Flex Loop Installation and Maintenance Instructions.

2.3 SPRINKLER HEADS

A. Manufacturer:

1. Viking, Central, Reliable or equal.
2. Type: Refer to schedule on drawings for head type required for different building areas.

2.4 PIPING

A. Steel Piping:

1. Refer to Section 15050 for fire protection piping material.

B. Copper Piping:

1. Refer to Section 15050 for fire protection piping material.

2.5 ACCESS PANELS

A. Provide access panels as required by Section 08310 - Access Doors and Panels.

2.6 FIRESTOPPING MATERIALS

A. Provide fire stopping assemblies as required by Section 07840 - Firestopping.

2.7 EQUIPMENT SUPPORTS

A. Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05120

SECTION 15300 (CONT.)

Pipes, Valves and Fittings for Fire Protection Systems

Structural Steel. Submit calculations with shop drawings.

2.8 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

A. Provide templates to ensure accurate location of anchor bolts.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Contractor shall verify and obtain fire flow test data required for design.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Provide openings as necessary to permit installation of piping or any other part of work under this Section.

D. Provide sleeves for piping penetrating floor and masonry walls.

E. This Contractor shall be responsible for establishing sizes and locations of all openings and lintels in new work and to transmit this information to the Contractor whose work is involved at such time as to avoid cutting and patching.

F. All patching shall match adjacent surfaces.

G. Contractor shall inspect and take note of existing conditions along with the Owner's Representative to avoid disputes regarding the condition of existing surface before work began.

H. Openings through existing concrete shall be core-drilled or saw cut.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide access panels for access to equipment, valves, or other specialties installed behind wall or above ceiling surfaces.

C. Lay-in acoustical tee bar ceilings and snap-in removable metal pan ceilings shall be considered adequate for access.

D. Fire Protection Contractor shall sublet installation work to subcontractors specifically skilled in the construction of the surfaces involved.

E. Contractor shall confer with the other Project Contractors with respect to access panel locations and shall, wherever practicable, group devices in such a manner so as to eliminate as many panels as possible.

F. Contractor shall remove all markings and labels from access panels.

G. Cutting or drilling thru structural beams or joists is not permitted.

H. Provide all openings and set all sleeves in cooperation with Contractors whose work is affected thereby.

I. Caulk opening between pipe and sleeve with fire barrier sealant.

J. In event holes must be provided through reinforced concrete, they shall be carefully drilled so as to avoid spalling and unnecessary damage of weakening of any structural member; chopping or breaking out will not be permitted.

K. Obtain Architect's approval before providing openings through concrete or masonry in place and then proceed as directed.

L. Contractor shall be responsible for damage to finished work resulting from cutting or drilling required because of neglect of Contractor to provide accurate and sufficient information.

M. Penetrations through fire and/or smoke rated construction shall be sealed to maintain the rating of the construction in which they occur.

N. Comply with the manufacturer's requirements for proper installation of fire stop materials to obtain the required fire and/or smoke rating.

3.4 COMPENSATION LOOPS

A. Compensation loops shall be prepared for shipment using a cut-to-length metal shipping bar, tacked securely between the elbows of the two parallel legs, to maintain the manufactured length during shipping. Shipping bar must be removed prior to system start-up.

B. Compensation loop hanger assembly kit shall be used to support and hang the loop. The FM Approved and UL Listed Seismic Wire/Cable assemblies conform to the requirements of the ASCE (American Society of Civil Engineers) guidelines for structural applications of wire rope, in that the cable is pre-stretched and the permanent end fittings maintain the break strength of the cable with a safety factor of two.

SECTION 15300 (CONT.)

Pipes, Valves and Fittings for Fire Protection Systems

3.5 SPRINKLER HEADS

A. Locate sprinkler heads, main piping and valves as indicated on the drawings.

B. Install sprinkler heads to coordinate with all lights, grilles and any other obstructions in ceiling.

C. Center sprinkler heads in ceiling tile and provide piping offsets as required.

D. Where ceiling is to be painted or sprayed, apply paper cover over sprinkler heads to ensure the head and escutcheons do not get coated. Remove protective paper cover after painting or spraying is completed.

E. Provide mountable metal box of spare heads with proper wrench for head replacement.

3.6 TESTS AND INSPECTIONS

A. Contractor shall be responsible for testing and certification of systems and ordering inspections as required by authorities having jurisdiction.

B. All tests shall be conducted in the presence of and to the satisfaction of the Owner or an authorized representative.

C. Inspections shall be made by the Owner's authorized representative and inspectors having jurisdiction.

3.7 PROTECTION

A. After all tests have been made and the systems pronounced to be satisfactory, the Contractor shall go over all work and clean equipment, fixtures, and related appurtenances and piping, and leave them clean and in complete working order at final completion of the project.

B. Protect installed products until completion of project.

C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 15400

Pipes, Valves and Fittings for Plumbing Systems

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Plumbing requirements.

1.2 RELATED SECTIONS

A. Section 07840 - Firestopping.

B. Section 08310 - Access Doors and Panels.

C. Section 15050 - Basic Mechanical Methods and Materials.

D. Section 15060 - Hangers and Supports.

E. Section 15500 - Piping Specialties.

1.3 RELATED SECTIONS

A. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.

1.4 SYSTEM DESCRIPTION

A. Grooved products for steel and copper plumbing systems shall be used. Refer to Section 15050 - Basic Materials and Methods and Section 15500 - Piping Specialties for related materials.

1. Galvanized fittings to be used with galvanized pipe.
2. Schedule 10 Type 304 or 316 grooved stainless steel pipe and grooved stainless steel fittings shall be used in conjunction with copper systems 8 inch (203 mm) diameter and above.
3. Couplings shall not be galvanized unless system is exposed to a corrosive environment.
4. Copper fittings shall be 99.9 percent lead free.

SECTION 15400 (CONT.)

Pipes, Valves and Fittings for Plumbing Systems

B. Contractor Design Requirements:
   1. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Installation methods.

C. Certifications:
   1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.

D. Shop Drawings:
   1. Submit shop drawings and [Product Data] grouped to include complete submittals of related systems, products, and accessories in a single submittal.

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

G. Closeout Submittals:
   1. Warranty: Warranty documents.
   2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Manufacturing facilities shall be registered to ISO 9001:2008 and assessed ISO 9001:2008 standard. A copy of the current certificate shall be available upon request.

B. Installer Qualifications:
   1. Contractor shall obtain all necessary permits and licenses pertaining to this Division (expense borne by the Contractor) and comply with Municipal and State Codes, Laws, Ordinances and Regulations, and the requirements of the National Fire protection Association, and pay all fees and sales taxes as required, and post all bonds incident thereto.

C. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, and establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DEFINITION

A. "Piping" includes all pipe, fittings, valves, hangers, and other supports and accessories related to such piping.

B. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, in crawl spaces or buried.

C. "Exposed" means not installed underground or "concealed" as defined above.

D. "Fire Protection Work" is all of the work Indicated or required by the Contract Documents.

E. "Or equivalent" means to possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity.

F. "Provide" means the Contractor shall "furnish and install" work and/or equipment.

G. "FPC" means the Fire Protection Contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

SECTION 15400 (CONT.)

Pipes, Valves and Fittings for Plumbing Systems

1.10 WARRANTY

A. Contractor shall guarantee, in writing, that all work installed shall be free from any and all defects in workmanship and materials; that all apparatus shall develop capacities and characteristics specified; and that if, during the period of one year, or as otherwise specified, from the date of substantial completion, any defects in workmanship, material or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within a reasonable time as specified in notice from the Owner's Representative. In default thereof, the Owner's Representative shall have the work done and charge the cost of the work to the Contractor.

B. Furnish manufacturers written warranties for all equipment, stating effective date of Warranty, to the Owner's Representative.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Anvil International, which is located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: gwieczerza@anvilintl.com; Web: www.anvilintl.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 FITTINGS

A. Material:
1. Couplings and Grooved Flange Adapters shall conform to ASTM A-536 Ductile Grade 65-45-12 or to ASTM A-47 Malleable Grade 32510.
2. Coupling Track Head Bolts shall conform to ASTM A-183 Grade 2.
3. Hex nuts shall confirm to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.
4. Fittings shall conform to Cast Ductile ASTM A-536 or Cast Malleable ASTM A-47.
5. Forged steel fittings shall conform to ASTM A-234 or A-106 Grade B.
6. Segmental welded fittings shall conform to ASTM A-53.
7. Coatings shall be Standard (Orange) Alkyd-enamel rust inhibiting lead free paint.
8. Hot dipped galvanized fittings shall conform to ASTM A-153.
9. Standard coupling gaskets for building services shall be Grade "EP" EPDM conforming to ASTM D-2000 with operating temperature range from -40 degrees F to +250 degrees F (-40 degrees C to 121 degrees C).

B. Gaskets: Gruvlok Product Grade "E" EPDM pressure responsive design for all water and oil free air service. EPDM gaskets are color coded green.
1. Material conformance to grooved industrial standards ASTM D-2000.
2. Temperature operating range is -40 degrees to +230 degrees F (-40 degrees C to 110 degrees C).
3. Gruvlok Xtreme lubricant shall be used to insure proper gasket installation.
4. Gruvlok Xtreme Lubricant shall be used for all copper system installations, installations below - 20 degrees F (-28 degrees C), installations above 150 degrees F (66 degrees C) and installations that are subject to temperature cycles.

C. Gasket Lubricant: Coupling gaskets except where noted shall be lubricated with approved lubricant.
1. Copper Systems: Gruvlok Xtreme Lubricant.
2. Environments below -20 degrees F (-28 degrees C), and above 150 degrees F (66 degrees C) and systems subject to continuous cycle temperature changes: Gruvlok Xtreme Lubricant.
3. DRI-SEAL Fire Protection Gaskets: Standard Gruvlok lubricants.

D. Grooved Couplings for Steel Pipe Systems and other Approved Piping:
1. Sizes 1 inch to 30 inches (25 mm to 762 mm): Gruvlok Style 7401 (Rigidlok) couplings shall be used including style 7012 flange adapters.
2. Gruvlok Style 7001 (Flexible) couplings shall be used for vibration attenuation and noise suppression at equipment locations.
3. Combination rigid, flexible, and outlet couplings shall be used for vibration, noise suppression and seismic tremor.
4. Clamp type couplings shall be used for branch outlets. Grade "E" EPDM gaskets are standard, but other gasket materials are available. Flexible or other style couplings designed for axial motion or other movements shall be supported in strict accordance with factory recommendations.

E. Grooved Couplings for Copper Tube Systems: Coupling working pressure not to exceed 300 psig (2.0 MPa).
1. Gruvlok style 6400 rigid coupling and style 6084 flange adapter.
2. Grade "EP" EPDM gasket.
3. Gruvlok Xtreme Lubricant.

F. Grooved Flange Adapters: Flange adapters to transition from flange to groove with no nipple shall be Gruvlok Fig 7012 or Figure 7013:
1. Flanges in Figures 7012 and 7013 are designed with internal anti-rotation "tines" and are designated as a rigid connection.
2. Figures 7012 and 7013 flange adapters require sealing rings when used with certain flanged products.
3. Figure 7012: Conforms to ANSI class 125 or 150 lb (57 or 68 kg).
   a. Sizes 2 inches through 20 inches (51 mm through 508 mm) are rated at 300 psig (2.0 MPa).

SECTION 15400 (CONT.)

Pipes, Valves and Fittings for Plumbing Systems

b. Size 24 inches (610 mm) is rated at 250 psig (1.72 MPa).

4. Figure 7013: 2 inches through 12 inches (51 mm through 305 mm) available for ANSI class 250 or 300 lb (113 kg or 136 kg) bolt pattern and is rated at 750 psig (5 MPa).

G. Grooved Fittings for Steel Piping Systems - Shall be Gruvlok cast ductile, malleable, forged steel, and/or segmental welded steel fittings.
1. Sizes 1 inches to 30 inches (25 mm to 762 mm) diameter:
   a. Cast ductile conforms to ASTM A-536 or cast malleable iron conforms to ASTM A-47.
   b. Forged steel conforms to ASTM A-234.
   c. Segmental welded conforms to ASTM A-53.
2. Fittings shall be coated with an Alkyd-enamel non-toxic paint.
3. Zinc electroplated fittings conform to ASTM B-633.
4. Hot Dip Galvanized fittings conform to ASTM A-153.
5. Standard Fittings shall be schedule 40 or standard wall. Other fittings are schedule 80 or lightwall as scheduled.

H. Grooved Copper Fittings: Gruvlok Wrot Copper fittings per ASTM B-75 and ANSI B-16.22, alloy C12200.
1. Copper fittings shall be 99.9 percent lead free.
2. Couplings and Wrought Copper Fittings shall be NSF, Plumbing Code approved and UL/ULC listed.

I. Di-Electric Insulated Pipe Connections: Di-LOK Figure 7091 grooved by grooved insulating nipple.
1. Shall inhibit the formation of a galvanic cell between dissimilar metals.
2. Housing: Steel tube to comply with ASTM A513.
3. Liner: Polypropylene to ASTM D4140. 300 psig (2 MPa).
4. Operating Temperature -40 degrees F to +230 degrees F (-40 degrees C to 100 degrees C).
5. Size range is 3/4 inch to 6 inches (19 mm to 152 mm) diameter.

J. Branch Outlets: Shall be Gruvlok Clamp-T Styles 7045 and 7046, and Clamp-T Cross Figure 7047, 7048 and 7049 with grooved or threaded outlets.
1. Designated as a bolted-on positive pipe engagement branch outlet. Working pressure to 500 psi (3.5 KPa).
2. Run Sizes 2 inches to 8 inches (51 mm to 203 mm).
3. Branch outlets from 1/2 inch to 3 inches (13 mm to 76 mm) diameter.

K. Outlet Couplings: Shall be Gruvlok Figure 7042 with grooved or threaded outlets. Working pressure shall be 500 psig minimum.
1. Run sizes 1-1/2 inches to 6 inches (38 mm to 152 mm).
2. Branch outlets from 1/2 inch to 2 inches (13 mm to 51 mm) diameter.

L. Plain End Couplings and Fittings: Gruvlok Roughneck coupling Style 7005 and plain-end fittings to match.
1. Size range is 2 inches to 16 inches (51 mm to 406 mm) diameter. Materials conform to ASTM A-536 and A-47. Fittings are cast or forged steel. Intended for working pressures 300 to 750 psig (2.0 KPa to 5.2 KPa) with bolts fully torque to factory recommend torque requirements on plain-end or beveled standard wall steel pipe and Gruvlok Plain-End fittings. Fittings match coupling working pressure.
2. Size range is 1 inch to 2-1/2 inches (25 mm to 64 mm) diameter: Plain End "Sock-it" Method: Gruvlok Sock-it fitting series 7100 through 7107. Material conforms to ASTM A-126 Class A Cast Iron. Working pressures from 175 - 300 psi (1.2 KPa to 2.0 KPa) UL/ULC listed and FM approved.

M. Gaskets for Industrial and Other Piping Systems: Gaskets with different media products shall be provided with industrial grade gaskets as scheduled.

N. Track Head Bolts and Hex Nuts: Couplings shall be furnished with heat treated, oval neck track head bolts conforming to ASTM A-183 Grade 2. Bolts shall meet minimum tensile strength of 110,000 psi (758 KPa). Hex nuts shall be carbon steel conforming to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.

2.3 GROOVED CONNECTION FLOW CONTROL VALVES

A. Gruvlok Tri-Service Valves - Model FTV-S.

B. Gruvlok Tri-Service Valves - Model FTV-A.
1. Size: As indicated on drawings.
2. Body and Yoke: Ductile iron, comply with ASTM A395 or ASTM A536.
3. Disc: Cast iron, comply with ASTM A126.
4. Stem: Bronze, comply with ASTM B21.
5. Seat-Guide: Bronze, comply with ASTM B584.
6. Disc Guide: Cast iron, comply with ASTM A126.
7. Seat: Bronze.
8. Flanged Gland: Cast iron, comply with ASTM A126.
9. Packing: Graphited, non-asbestos packing.
10. Spring: 302 stainless steel.
11. Stem Guide: Ductile iron, comply with ASTM A395 or ASTM A536.

C. Gruvlok Balancing Valves - Model GBV-S (Soldered).

SECTION 15400 (CONT.)

Pipes, Valves and Fittings for Plumbing Systems

D. Gruvlok Balancing Valves - Model GBV-T (Threaded).
   1. Size: As indicated on drawings.
   2. Material: Cast bronze.
   3. Type and Description: Y-style globe valve with 4 full-turn adjustment, pressure differential ports on both sides of the valve, with positive shutoff and micrometer type handwheel adjustment. Provide tamperproof memory stop.

E. Gruvlok Balancing Valves - Model GBV-G (Grooved-End Straight).

F. Gruvlok Balancing Valves - Model GBV-A (Grooved-End Angle).
   1. Size: As indicated on drawings.
   2. Body: Ductile iron, comply with ASTM A536, Grade 65-42-12.
   3. Body Coating: Epoxy.
   4. Body Coating: Nylon.
   5. Disc: Ductile iron, comply with ASTM A536, Grade 65-42-12.
   6. Grade: Grade E - EPDM.
   7. Grade: Grade T - Nitrile.
   8. Grade: Grade O - Fluoroelastomer.
   9. Upper and Lower Shaft: Type 416 stainless steel.

2.4 PIPING

A. Steel Piping:
   1. Refer to Section 15050 for piping material.

B. Copper Piping:
   1. Refer to Section 15050 for piping material.

C. Stainless Steel Piping:
   1. Refer to Section 15050 for piping material.

D. Aluminum Piping:
   1. Refer to Section 15050 for piping material.

E. Steel Piping:
   1. Refer to Section 15050 for piping material.

F. Plastic Piping:
   1. Refer to Section 15050 for piping material.

2.5 ACCESS PANELS

A. Provide access panels as required by Section 08310 - Access Doors and Panels.

2.6 FIRESTOPPING MATERIALS

A. Provide fire stopping assemblies as required by Section 07840 - Firestopping.

2.7 EQUIPMENT SUPPORTS

A. Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05120 Structural Steel. Submit calculations with shop drawings.

2.8 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

A. Provide templates to ensure accurate location of anchor bolts.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Provide openings as necessary to permit installation of piping or any other part of work under this Section.

D. Provide sleeves for piping penetrating floor and masonry walls.

SECTION 15400 (CONT.)

Pipes, Valves and Fittings for Plumbing Systems

E. This Contractor shall be responsible for establishing sizes and locations of all openings and lintels in new work and to transmit this information to the Contractor whose work is involved at such time as to avoid cutting and patching.

F. All patching shall match adjacent surfaces.

G. Contractor shall inspect and take note of existing conditions along with the Owner's Representative to avoid disputes regarding the condition of existing surface before work began.

H. Openings through existing concrete shall be core-drilled or saw cut.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.4 VALVE INSTALLATION

A. Tri-Service Valves - Models FTV-S, FTV-A:
   1. Mount valve to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 12 inches (305 mm) for pump sizes 2 inches by 2 inches (51 mm by 51 mm) to 6 inches by 6 inches (152 mm by 152 mm) and 24 inches (610 mm) for pump sizes 8 inches by 8 inches (203 mm by 203 mm) to 12 inches by 12 inches (305 by 305 mm).
   2. Do not mount valve directly to pump to avoid causing undesirable noise in the system.
   3. Leave sufficient clearance around valve for valve removal or repair.
   4. Install valve in the direction of flow arrows on valve body.
   5. Mount valve to flanged equipment using Gruvlok Flange Adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.
   6. Valve body has been designed to handle the weight of the pump on vertical in-line installations. The valve body is not designed to support the piping weight. Support piping by hangers. Provide pipe supports under valve and strainer bodies.

B. Globe Valves - Model GBV-S (Soldered), GBV-T (Threaded), Balancing Valves - Model GBV-G (Grooved-End Straight), GBV-A (Grooved-End Angle):
   1. To ensure accuracy of measurement of GBV-S, GBV-T, GBV-G and GBV-A valves, locate valves at least 5 pipe diameters downstream from any fitting and at least 10 pipe diameters downstream from a pump.
   2. Install no fittings within 2 pipe diameters downstream of valve.
   3. Install valves with flow in the direction of the arrow on the valve body.
   4. Provide easy access to probe metering ports (PMPs), drain ports and handwheel.
   5. For solder applications, solder valve body in line using 95/5 solder.
   6. Install valve-bonnet assembly into body, making sure non-asbestos gasket is in place.
   7. Install valves in horizontal or vertical piping as indicated.
   8. Do not install metering ports below the pipe (pointing down), as this will allow system sediment to accumulate in the ports.
   9. Metering ports and body/drain plugs may be interchanged for improved accessibility.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 15500

Piping Specialties

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Specialty piped systems.

1.2 RELATED SECTIONS

A. Section 07840 - Firestopping.

B. Section 08310 - Access Doors and Panels.

C. Section 15050 - Basic Mechanical Methods and Materials.

D. Section 15060 - Hangers and Supports.

SECTION 15500 (CONT.)
Piping Specialties

1.3 REFERENCES
A. American Society of Mechanical Engineers (ASME) B31.1 - Power Piping (SI Edition).

B. American Society of Mechanical Engineers (ASME) B31.3 - Chemical Plant and Petroleum Refinery Piping.

C. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.

1.4 SYSTEM DESCRIPTION
A. Grooved products for steel and copper piping specialty systems shall be used. Refer to Section 15050 - Basic Materials and Methods for related materials.
1. Galvanized fittings to be used with galvanized pipe.
2. Couplings shall not be galvanized unless system is exposed to a corrosive environment.
3. Copper fittings shall be 99.9 percent lead free.

B. Contractor Design Requirements:
1. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

1.5 SUBMITTALS
A. Submit under provisions of Section 01300.

B. [Product Data]: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Installation methods.

C. Certifications:
1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.

D. Shop Drawings:
1. Submit shop drawings and [Product Data] grouped to include complete submittals of related systems, products, and accessories in a single submittal.

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

G. Closeout Submittals:
1. Warranty: Warranty documents.
2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE
A. Manufacturer Qualifications:
1. Manufacturing facilities shall be registered to ISO 9001:2008 and assessed to ISO 9001:2008 standard. A copy of the current certificate shall be available upon request.

B. Installer Qualifications:
1. Contractor shall obtain all necessary permits and licenses pertaining to this Division (expense borne by the Contractor) and comply with Municipal and State Codes, Laws, Ordinances and Regulations, and the requirements of the National Fire protection Association, and pay all fees and sales taxes as required, and post all bonds incident thereto.

C. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DEFINITION
A. "Piping" includes all pipe, fittings, valves, hangers, and other supports and accessories related to such piping.

B. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, in crawl spaces or buried.

C. "Exposed" means not installed underground or "concealed" as defined above.

D. "Fire Protection Work" is all of the work Indicated or required by the Contract Documents.

E. "Or equivalent" means to possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in

SECTION 15500 (CONT.)
Piping Specialties

quality, durability or longevity.

F. "Provide" means the Contractor shall "furnish and install" work and/or equipment.

G. "FPC" means the Fire Protection Contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

A. Contractor shall guarantee, in writing, that all work installed shall be free from any and all defects in workmanship and materials; that all apparatus shall develop capacities and characteristics specified; and that if, during the period of one year, or as otherwise specified, from the date of substantial completion, any defects in workmanship, material or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within a reasonable time as specified in notice from the Owner's Representative. In default thereof, the Owner's Representative shall have the work done and charge the cost of the work to the Contractor.

B. Furnish manufacturers written warranties for all equipment, stating effective date of Warranty, to the Owner's Representative.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Anvil International, located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: gwieczerza@anvilintl.com; Web: www.anvilintl.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MANUFACTURED UNITS

A. Grooved Butterfly Valve: Gruvlok Series 7700 and Series 8000GR grooved butterfly valves. Service usage for Balancing and On/Off service.

1. Series 7700: Butterfly Valve - Sizes 2 inches to 12 inches (51 mm to 305 mm). Listed in accordance with MSS SP-67. Bubble tight at 300 psig (2.1 MPa). Body - Ductile Iron, available with standard nylon body coating or epoxy body coated. Disc- Ductile Iron with EPDM encapsulation. Operating temperature -40 degrees FSYMBOL 176 to + 230 degrees F (-40 degrees C to 110 degrees C). (Optional - Nitrile Disc encapsulation) Operating temperature up to +180 degrees F (82 degrees C) and Grade O Fluoroelastomer. Operating Temperature up to 230 degrees F (110 degrees C). Trim - 416 s/s. Bronze upper and lower shaft bearings conforming to ASTM B438, Grade 1 - type 1 for sizes 8 inches to 12 inches (203 mm to 305 mm) only. Low Torque. Rated for "Dead-end" service.
   a. Disc-to-stem attachment shall be made with splined stainless steel stems attached to disc by cold fusion process. Disc/stem seals shall be triple redundant as follows: 1. Disc-to-valve body; 2. EPDM seat-to-stem; 3. EPDM O-rings in upper and lower shaft.
2. Series 8000GR: Butterfly Valve - Size range 14 inches to 24 inches (356 mm to 610 mm). Bubble tight to 200-psig (1.4 MPa). Body: Cast Iron to ASTM A-126 CL.B. Disc- Nickel-Plated Ductile, Aluminum Bronze or Stainless Steel. Liner- Standard EPDM or Buna N. Operating temperature same as 7700 series. Bearings: Upper and lower bearings Teflon reinforced. Trim - 316 and 416 s/s. Low Torque. Rated for "Dead-end" service.
3. BFV Operators/Handles - Series 7700 and 8000GR available in 2 position, 10 position latch lock, Infinite position with memory stop for sizes 2 inches through 8 inches (51 mm through 203 mm), Double "D" with gear operators, chain wheel, and pneumatic or electric actuated for sizes 2 inches through 12 inches (51 mm through 305 mm).

B. Grooved Ball Valve - Shall be Gruvlok Series 7500. Sizes 2 inches to 6 inches. Standard port design rated for 740 psig (5.1 KPa) cwp. Meets MSS SP-72 body and 100 percent hydro pressure tested. The Series 7500 is compliant with NACE MR01-75 when stainless steel trim is specified. Bi-directional flow. Low torque operation. Body and End Caps - Ductile Iron ASTM 395 and Stainless Steel ASTM A351 CF8M. Ball and Stem- chrome plated carbon steel and 316 Stainless Steel. RPTFE and Nylon Seats and fluorocarbon stem and body seals. Two position handle standard.

1. Grooved Bronze Ball Valve- Shall be Gruvlok Series 7500B. Sizes 1-1/2 inches to 4 inches (38 mm to 102 mm) are rated 300 psi (1.9 KPa) WOG. Full port sizes 1-1/2 inches to 3 inches (38 mm to 76 mm) and standard port in the 4 inches (102 mm) version. Cast bonze body with stainless 316 ball and PTFE Seats and Seals. Valve shall comply with extraction requirements of NSF/ANSI 6.

C. Grooved (Non- Slam) Check Valve: Shall be Gruvlok Series 7800. Sizes 2 inches to- 12 inches (51 mm to 305 mm). 300-psig (1.9 KPa). Body-Ductile. Exterior body coated with rust Inhibiting paint. Clapper- sizes 2 inches to 5 inches (51 mm to 127 mm) -- Type 304 or 302 s/s to ASTM A-167.

SECTION 15500 (CONT.)
Piping Specialties

Clapper- sizes 6 inches to 12 inches (152 mm to 305 mm) - Ductile Iron. Clapper facing- EPDM or Nitrile. Seat ring, spring, and hinge pin: - Type 302 or 304 s/s. Bronze hinge pin bushings. Iron hinge pin plugs and drain. Service from 300 psi (1.9 KPa) to a low 1 psi (28 inch water head) (6895 Pa). Replaceable clapper. Horizontal or vertical service usage. MSS SP-71 & SP-80. 100 percent Shell Test & Hydro Seat test pressure 100 percent.

D. Grooved (Globe Type) Silent Check Valve: Shall be Gruvlok Series 400 G. Sizes 2 inches to 10 inches. Rated for 200-psi (1.3 KPa) maximum working pressure. Operating temperature to 200 degrees F (93 degrees C). Body- Ductile. Bronze Seat, Plug and Bushing. Durlon Gasket. Trim- Metal on Metal. Optional Trim- Bronze w/ Buna Seat, s/s and s/s w Buna Seat. Center-guided plug. (Positive noiseless opening and closing) Plug activated at 1/4 to 1/2 psi (1723 Pa to 3448 Pa).
   1. Di-Electric Insulated Pipe Connections: Shall be Di-Lok Figure 7091 grooved by grooved insulating nipple. Inhibits the formation of a galvanic cell between dissimilar metals. Housing- Steel Tube to ASTM A513. Liner- Polypropylene to ASTM D4140. 300 psig (1.9 KPa). Operating temperature -40 degrees F to +230 degrees F (-40 degrees C to 110 degrees C).

E. Grooved Strainers: Shall be Gruvlok Series 7260-T ("Tee" Type) or 758-G or 768-GF ("Wye" Type) strainers.
   1. Tee Strainer Series 7260: Sizes 2 inches to 24 inches (51 mm to 610 mm). Strainer in-line, twin-fold basket provides 100 percent of the projected pipe area for open flow. Body- Ductible 2 inches to 12 inches (51 mm to 305 mm) Malleable Iron ASTM A47 or Ductile Iron ASTM A536, Size 14 inches (356 mm) and larger: Carbon Steel Pipe ASTM A53. Basket- Stainless steel Type 304-basket standard #12 mesh (1/16 inch perf.) (1.6 mm perf.) Through 3 inches (76 mm). Sizes 4 inches and larger standard with #6 mesh (1/8 inch perf.) (3.2 mm perf.). Monel or other alloy baskets, magnets, and various mesh sizes optional. Horizontal or vertical service usage.
   2. Wye Strainers 758-G & 768GF: Size range 2 inches to 12 inches (305 mm). Body- Ductile iron. 300 psig (1.9 KPa). Baskets- Same as Tee Series.

F. Grooved Suction Diffusers: Shall be Gruvlok Series 7250. Sizes 2-1/2 inches to 16 inches (64 mm to 406 mm). Body- Carbon steel to ASTM A-53 body for all sizes. 300 psig (1.9 KPa). Strainer Basket- Stainless steel (3/16 inch perf.) (4.76 mm perf.) With start-up #16 mesh pre-filter removable screen. Blow-down and gage plug standard.

G. Flexible Connectors: Sizes 2 inches to 12 inches (51 mm to 305 mm). Stainless steel tube and braid design. Carbon steel grooved, threaded & flanged end. Rated working pressure 150 to 300 psi (1.0 to 2.0 KPa).

H. Triple Duty Combination Valves: Shall be Gruvlok "Tri-Service" (FTV-A/FTV-S) service valves. Sizes 2-1/2 inches to 12 inches (64 mm to 305 mm). Services- Combination shut-off, non-slam silent check and full throttling. Throttling flow indicator is standard. Horizontal or vertical service usage. Flow measurement ports on either side of valve body. Fixed or portable meters available for differential pressure measurement.

I. Calibrated Circuit (Setter) Balancing Valves: Shall be GBV-Gruvlok "Circuit Balancing" Valve. Sizes 1/2 inch to 12 inches (13 mm to 305 mm). Multi-turn adjustment. Positive shut-off. Tamper-proof memory stop. Pressure differential read-out ports. Differential Pressure Meter- Provide CBV differential pressure meter/transducer as required. Direct Flow readout. Proportional balancing.

J. Automatic Air Vents - Gruvlok Models GAV-15 rated 150 psig and GAV-30 rated 300 psig.

2.3 PIPING
A. Steel Piping:
   1. Refer to Section 15050 for piping material.

B. Copper Piping:
   1. Refer to Section 15050 for piping material.

C. Stainless Steel Piping:
   1. Refer to Section 15050 for piping material.

D. Aluminum Piping:
   1. Refer to Section 15050 for piping material.

E. Steel Piping:
   1. Refer to Section 15050 for piping material.

F. Plastic Piping:
   1. Refer to Section 15050 for piping material.

2.4 ACCESS PANELS
A. Provide access panels as required by Section 08310 - Access Doors and Panels.

2.5 FIRESTOPPING MATERIALS
A. Provide fire stopping assemblies as required by Section 07840 - Firestopping.

2.6 EQUIPMENT SUPPORTS
A. Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05120 Structural Steel. Submit calculations with shop drawings.

2.7 EQUIPMENT ANCHOR BOLTS AND TEMPLATES
A. Provide templates to ensure accurate location of anchor bolts.

SECTION 15500 (CONT.)

Piping Specialties

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Provide openings as necessary to permit installation of piping or any other part of work under this Section.

D. Provide sleeves for piping penetrating floor and masonry walls.

E. This Contractor shall be responsible for establishing sizes and locations of all openings and lintels in new work and to transmit this information to the Contractor whose work is involved at such time as to avoid cutting and patching.

F. All patching shall match adjacent surfaces.

G. Contractor shall inspect and take note of existing conditions along with the Owner's Representative to avoid disputes regarding the condition of existing surface before work began.

H. Openings through existing concrete shall be core-drilled or saw cut.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 15600

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

PART 1 GENERAL

1.1 SECTION INCLUDES

A. HVAC requirements.

1.2 RELATED SECTIONS

A. Section 07840 - Firestopping.

B. Section 08310 - Access Doors and Panels.

C. Section 15050 - Basic Mechanical Methods and Materials.

D. Section 15060 - Hangers and Supports.

E. Section 15500 - Piping Specialties.

1.3 REFERENCES

A. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) SP-127 Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, Application.

1.4 SYSTEM DESCRIPTION

A. Grooved products for steel and copper heating and cooling systems shall be used. Refer to Section 15050 - Basic Materials and Methods and Section 15500 - Piping Specialties for related materials.

1. Galvanized fittings shall be used with galvanized pipe.

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

2. Schedule 10 Type 304 or 316 grooved stainless steel pipe and grooved stainless steel fittings shall be used in conjunction with copper systems 8 inch (203 mm) diameter and above.
3. Couplings shall not be galvanized unless system is exposed to a corrosive environment.
4. Copper fittings shall be 99.9 percent lead free.

B. Contractor Design Requirements:
1. Incorporate in construction pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. [Product Data]: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Installation methods.

C. Certifications:
1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Certificates shall be furnished only as required by specific codes, upon request.

D. Shop Drawings:
1. Submit shop drawings and [Product Data] grouped to include complete submittals of related systems, products, and accessories in a single submittal.

E. Closeout Submittals:
1. Warranty: Warranty documents.
2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:
1. Manufacturing facilities shall be registered to ISO 9001:2008 and assessed to ISO 9001:2008 standard. A copy of the current certificate shall be available upon request.

B. Installer Qualifications:
1. Contractor shall obtain all necessary permits and licenses pertaining to this Division (expense borne by the Contractor) and comply with Municipal and State Codes, Laws, Ordinances and Regulations, and the requirements of the National Fire protection Association, and pay all fees and sales taxes as required, and post all bonds incident thereto.

C. Conduct pre-installation meeting to verify project requirements, coordinate with other trades, establish condition and completeness of substrate. Review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DEFINITION

A. "Piping" includes all pipe, fittings, valves, hangers, and other supports and accessories related to such piping.

B. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, in crawl spaces or buried.

C. "Exposed" means not installed underground or "concealed" as defined above.

D. "Fire Protection Work" is all of the work Indicated or required by the Contract Documents.

E. "Or equivalent" means to possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity.

F. "Provide" means the Contractor shall "furnish and install" work and/or equipment.

G. "FPC" means the Fire Protection Contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

1.10 WARRANTY

A. Contractor shall guarantee, in writing, that all work installed shall be free from any and all defects in workmanship and materials; that all apparatus shall develop capacities and characteristics specified; and that if, during the period of one year, or as otherwise specified, from the date of substantial completion, any defects in workmanship, material or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within a reasonable time as specified in notice from the Owner's Representative. In default thereof, the Owner's Representative shall have the work done and charge the cost of the work to the Contractor.

B. Furnish manufacturers written warranties for all equipment, stating effective date of Warranty, to the Owner's Representative.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Anvil International, located at: 110 Corporate Dr. Suite 10 ; Portsmouth, NH 03801; Tel: 603-422-8000; Fax: 603-422-8033; Email: gwieczerza@anvilintl.com; Web: www.anvilintl.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 FITTINGS

A. Material:
   1. Couplings and Grooved Flange Adapters shall conform to ASTM A-536 Ductile Grade 65-45-12 or to ASTM A-47 Malleable Grade 32510.
   2. Coupling Track Head Bolts shall conform to ASTM A-183 Grade 2.
   3. Hex nuts shall confirm to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.
   4. Fittings shall conform to Cast Ductile ASTM A-536 or Cast Malleable ASTM A-47.
   5. Forged steel fittings shall conform to ASTM A-234 or A-106 Grade B.
   6. Segmental welded fittings shall conform to ASTM A-53.
   7. Coatings shall be Standard (Orange) Alkyd-enamel rust inhibiting lead free paint.
   8. Hot dipped galvanized fittings shall conform to ASTM A-153.
   9. Standard coupling gaskets for building services shall be Grade "EP" EPDM conforming to ASTM D-2000 with operating temperature range from -40 degrees F to +250 degrees F (-40 degrees C to 121 degrees C).

B. Gaskets: Gruvlok Product Grade "EP" EPDM pressure responsive design for all water and oil free air service. EPDM gaskets are color coded green and red.
   1. Material conformance to grooved industrial standards ASTM D-2000.
   2. Temperature operating range is -40 degrees to +250 degrees F (-40 degrees C to 121 degrees C).
   3. Gruvlok Xtreme lubricant shall be used to insure proper gasket installation.
   4. Gruvlok Xtreme Lubricant shall be used for all copper system installations, installations below - 20 degrees F (-28 degrees C), installations above 150 degrees F (66 degrees C) and installations that are subject to temperature cycles.

C. Gasket Lubricant: Coupling gaskets except where noted shall be lubricated with approved lubricant.
   1. Copper Systems: Gruvlok Xtreme Lubricant.
   2. Environments below -20 degrees F (-28 degrees C), and above 150 degrees F (66 degrees C) and systems subject to continuous cycle temperature changes: Gruvlok Xtreme Lubricant.
   3. DRI-SEAL Fire Protection Gaskets: Standard Gruvlok lubricants.

D. Grooved Couplings for Steel Pipe Systems and other Approved Piping:
   1. Sizes 1 inch to 30 inches (25 mm to 762 mm): Gruvlok Style 7401 (Rigidlok) couplings shall be used including style 7012 flange adapters.
   2. Gruvlok Style 7001 (Flexible) couplings shall be used for vibration attenuation and noise suppression at equipment locations.
   3. Combination rigid, flexible, and outlet couplings shall be used for vibration, noise suppression and seismic tremor.
   4. Clamp type couplings shall be used for branch outlets. Grade "EP" EPDM gaskets are standard, but other gasket materials are available. Flexible or other style couplings designed for axial motion or other movements shall be supported in strict accordance with factory recommendations.

E. Grooved Couplings for Copper Tube Systems: Coupling working pressure not to exceed 300 psig (2.0 MPa).
   1. Gruvlok style 6400 rigid coupling and style 6084 flange adapter.
   2. Gruvlok Xtreme Lubricant.

F. Grooved Flange Adapters: Flange adapters to transition from flange to groove with no nipple shall be Gruvlok Fig 7012 or Figure 7013:
   1. Flanges in Figures 7012 and 7013 are designed with internal anti-rotation "tines" and are designated as a rigid connection.
   2. Figures 7012 and 7013 flange adapters require sealing rings when used with certain flanged products.
   3. Figure 7012: Conforms to ANSI class 125 or 150 lb (57 or 68 kg).

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

a. Sizes 2 inches through 20 inches (51 mm through 508 mm) are rated at 300 psig (2.0 MPa).
b. Size 24 inches (610 mm) is rated at 250 psig (1.72 MPa).

4. Figure 7013: 2 inches through 12 inches (51 mm through 305 mm) available for ANSI class 250 or 300 lb (113 kg or 136 kg) bolt pattern and is rated at 750 psig (5 MPa).

G. Grooved Fittings for Steel Piping Systems - Shall be Gruvlok cast ductile, malleable, forged steel, and/or segmental welded steel fittings.
1. Sizes 1 inches to 30 inches (25 mm to 762 mm) diameter:
a. Cast ductile conforms to ASTM A-536 or cast malleable iron conforms to ASTM A-47.
b. Forged steel conforms to ASTM A-234.
c. Segmental welded conforms to ASTM A-53.
2. Fittings shall be coated with an Alkyd-enamel non-toxic paint.
3. Zinc electroplated fittings conform to ASTM B-633.
4. Hot Dip Galvanized fittings conform to ASTM A-153.
5. Standard Fittings shall be schedule 40 or standard wall. Other fittings are schedule 80 or lightwall as scheduled.

H. Grooved Copper Fittings: Gruvlok Wrot Copper fittings per ASTM B-75 and ANSI B-16.22, alloy C12200.
1. Copper fittings shall be 99.9 percent lead free.
2. Couplings and Wrought Copper Fittings shall be NSF, Plumbing Code approved and UL/ULC listed.

I. Di-Electric Insulated Pipe Connections: Di-LOK Figure 7091 grooved by grooved insulating nipple.
1. Shall inhibit the formation of a galvanic cell between dissimilar metals.
2. Housing: Steel tube to comply with ASTM A513.
3. Liner: Polypropylene to ASTM D4140. 300 psig (2 MPa).
4. Operating Temperature -40 degrees F to +230 degrees F (-40 degrees C to 100 degrees C).
5. Size range is 3/4 inch to 6 inches (19 mm to 152 mm) diameter.

J. Branch Outlets: Shall be Gruvlok Clamp-T Styles 7045 and 7046, and Clamp-T Cross Figure 7047, 7048 and 7049 with grooved or threaded outlets.
1. Designated as a bolted-on positive pipe engagement branch outlet. Working pressure to 500 psi (3.5 KPa).
2. Run Sizes 2 inches to 8 inches (51 mm to 203 mm).
3. Branch outlets from 1/2 inch to 3 inches (13 mm to 76 mm) diameter.

K. Outlet Couplings: Shall be Gruvlok Figure 7042 with grooved or threaded outlets. Working pressure shall be 500-psig minimum.
1. Run sizes 1-1/2 inches to 6 inches (38 mm to 152 mm).
2. Branch outlets from 1/2 inch to 2 inches (13 mm to 51 mm) diameter.

L. Plain End Couplings and Fittings: Gruvlok Roughneck coupling Style 7005 and plain-end fittings to match.
1. Size range is 2 inches to 16 inches (51 mm to 406 mm) diameter. Materials conform to ASTM A-536, ASTM A-47 or ASTM A-234. Fittings are cast ductile iron, cast malleable iron or forged steel. Intended for working pressures 300 to 750 psig (2.0 KPa to 5.2 KPa) with bolts fully torque to factory recommend torque requirements on plain-end or beveled standard wall steel pipe and Gruvlok Plain-End fittings. Fittings match coupling working pressure.
2. Size range is 1 inch to 2-1/2 inches (25 mm to 64 mm) diameter: Plain End "Sock-it" Method: Gruvlok Sock-it fitting series 7100 through 7107. Material conforms to ASTM A-126 Class A Cast Iron. Working pressures from 175 - 300 psi (1.2 KPa to 2.0 KPa) UL/ULC listed and FM approved.

M. Gaskets for Industrial and Other Piping Systems: Gaskets with different media products shall be provided with industrial grade gaskets as scheduled.

N. Track Head Bolts and Hex Nuts: Couplings shall be furnished with heat-treated; oval neck track head bolts conforming to ASTM A-183 Grade 2. Bolts shall meet minimum tensile strength of 110,000 psi (758 KPa). Hex nuts shall be carbon steel conforming to ASTM A-563 Grade A. Bolts and nuts shall be zinc electroplated.

2.3 GROOVED CONNECTION FLOW CONTROL VALVES

A. Grooved Butterfly Valve: Gruvlok Series 7700 and Series 8000GR grooved butterfly valves. Service usage for Balancing and On/Off service.
1. Series 7700: Butterfly Valve - Sizes 2 inches to 12 inches (51 mm to 305 mm). Listed in accordance with MSS SP-67. Bubble tight at 300 psig (2.1 MPa). Body - Ductile Iron, available with standard nylon body coating or epoxy body coated. Disc- Ductile Iron with EPDM encapsulation. Operating temperature -40 degrees F to + 230 degrees F (-40 degrees C to 110 degrees C). (Optional - Nitrile Disc encapsulation) Operating temperature up to +180 degrees F (82 degrees C) and Grade O Fluoroelastomer. Operating Temperature up to 230 degrees F (110 degrees C). Trim - 416 s/s. Bronze upper and lower shaft bearings conforming to ASTM B438, Grade 1 - type 1 for sizes 8 inches to 12 inches (203 mm to 305 mm) only. Low Torque. Rated for "Dead-end" service.
2. Disc-to-stem attachment shall be made with splined stainless steel stems attached to disc by cold fusion process.
a. Disc/stem seals shall be triple redundant as follows: 1. Disc-to-valve body; 2. EPDM seat-to-stem; 3. EPDM O-rings in upper and lower shaft.
3. Series 8000GR: Butterfly Valve - Size range 14 inches to 24 inches (356 mm to 610 mm). Bubble tight to 200-psig (1.4 MPa). Body: Cast Iron to ASTM A-126 CL.B. Disc- Nickel-Plated Ductile, Aluminum Bronze or Stainless Steel. Liner- Standard EPDM or Nitrile. Operating temperature same as 7700 series. Bearings: Upper and lower bearings Teflon reinforced. Trim - 316 and 416 s/s. Low Torque. Rated for "Dead-end" service.

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

4. BFV Operators/Handles - Series 7700 and 8000GR available in 2 position, 10 position latch lock, Infinite position with memory stop for sizes 2 inches through 8 inches (51 mm through 203 mm), Double "D" with gear operators, chain wheel, and pneumatic or electric actuated for sizes 2 inches through 12 inches (51 mm through 305 mm).

B. Grooved Ball Valve - Shall be Gruvlok Series 7500. Sizes 2 inches to 6 inches. Standard port design rated for 740 psig (5.1 KPa) cwp. Meets MSS SP-72 body and 100 percent hydro pressure tested. The Series 7500 is compliant with NACE MR01-75 when stainless steel trim is specified. Bi-directional flow. Low torque operation. Body and End Caps - Ductile Iron ASTM 395 and Stainless Steel ASTM A351 CF8M. Ball and Stem - chrome plated carbon steel and 316 Stainless Steel. RPTFE and Nylon Seats and fluorocarbon stem and body seals. Two position handle standard.
   1. Grooved Three Way Diverter Valve - Shall be Gruvlok Series FS7500 Stainless Steel body or FC7500 Carbon Steel Body 3-Way Diverter Valve. Full port design rated for 600 psig (4.1 KPa) cwp. Meets MSS SP-72 body and 100 percent hydrostatic pressure tested.
   2. Grooved Bronze Ball Valve- Shall be Gruvlok Series 7500B. Sizes 1-1/2 inches to 4 inches (38 mm to 102 mm) are rated 300 psi (1.9 KPa) WOG. Full port sizes 1-1/2 inches to 3 inches (38 mm to 76 mm) and standard port in the 4 inches (102 mm) version. Cast bonze body with stainless 316 ball and PTFE Seats and Seals. Valve shall comply with extraction requirements of NSF/ANSI 6.

C. Gruvlok Tri-Service Valves - Model FTV-S.

D. Gruvlok Tri-Service Valves - Model FTV-A.
   1. Size: As indicated on drawings.
   2. Body and Yoke: Ductile iron; comply with ASTM A395 or ASTM A536.
   3. Disc: Cast iron, comply with ASTM A126.
   4. Stem: Bronze, comply with ASTM B21.
   5. Seat-Guide: Bronze, comply with ASTM B584.
   6. Disc Guide: Cast iron, comply with ASTM A126.
   7. Seat: Bronze.
   8. Flanged Gland: Cast iron, comply with ASTM A126.
   9. Packing: Graphited, non-asbestos packing.
   10. Spring: 302 stainless steel.
   11. Stem Guide: Ductile iron; comply with ASTM A395 or ASTM A536.

E. Gruvlok Balancing Valves - Model GBV-S (Soldered).

F. Gruvlok Balancing Valves - Model GBV-T (Threaded).
   1. Size: As indicated on drawings.
   2. Material: Cast bronze.
   3. Type and Description: Y-style globe valve with 4 full-turn adjustment, pressure differential ports on both sides of the valve, with positive shutoff and micrometer type hand wheel adjustment. Provide tamperproof memory stop.

G. Gruvlok Balancing Valves - Model GBV-G (Grooved-End Straight).

H. Gruvlok Balancing Valves - Model GBV-A (Grooved-End Angle).
   1. Size: As indicated on drawings.
   2. Body: Ductile iron, comply with ASTM A536.
   3. Disc: Bronze, comply with ASTM B584.
   4. Seat: Ultra-high strength engineered resin.
   5. Trim: Brass C-37700.
   6. O-ring: Nitrile.

2.4 MANUFACTURED UNITS

A. Grooved (Non- Slam) Check Valve: Shall be Gruvlok Series 7800. Sizes 2 inches to- 12 inches (51 mm to 305 mm). 300-psig (1.9 KPa). Body- Ductile. Exterior body coated with rust Inhibiting paint. Clapper- sizes 2 inches to 5 inches (51 mm to 127 mm) -- Type 304 or 302 s/s to ASTM A-167. Clapper- sizes 6 inches to 12 inches (152 mm to 305 mm). - Ductile Iron. Clapper facing- EPDM or Nitrile. Seat ring, spring, and hinge pin: - Type 302 or 304 s/s. Bronze hinge pin bushings. Iron hinge pin plugs and drain. Service from 300 psi (1.9 KPa) to a low 1 psi (28 inch water head) (6895 Pa). Replaceable clapper. Horizontal or vertical service usage. MSS SP-71 & SP-80. 100 percent Shell Test & Hydro Seat test pressure 100 percent.

B. Grooved (Globe Type) Silent Check Valve: Shall be Gruvlok Series 400 G. Sizes 2 inches to 10 inches. Rated for 200-psi (1.3 KPa) maximum working pressure. Operating temperature to 200 degrees F (93 degrees C). Body- Ductile. Bronze Seat, Plug and Bushing. Durlon Gasket. Trim- Metal on Metal. Optional Trim- Bronze w/ Nitrile Seat, s/s and s/s w Nitrile Seat. Center-guided plug. (Positive noiseless opening and closing) Plug activated at 1/4 to 1/2 psi (1723 Pa to 3448 Pa).
   1. Di-Electric Insulated Pipe Connections: Shall be Di-Lok Figure 7091 grooved by grooved insulating nipples. Inhibits the formation of a galvanic cell between dissimilar metals. Housing- Steel Tube to ASTM A513. Liner- Polypropylene to ASTM D4140. 300 psig (1.9 KPa). Operating temperature -40 degrees F to +230 degrees F (-40 degrees C to 110 degrees C).

C. Grooved Strainers: Shall be Gruvlok Series 7260-T ("Tee" Type) or 758-G or 768-GF ("Wye" Type) strainers.

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

1. Tee Strainer Series 7260: Sizes 2 inches to 24 inches (51 mm to 610 mm). Strainer in-line, twin-fold basket provides 100 percent of the projected pipe area for open flow. Body- Ductible 2 inches to 12 inches (51 mm to 305 mm) Malleable Iron ASTM A47 or Ductile Iron ASTM A536, Size 14 inches (356 mm) and larger: Carbon Steel Pipe ASTM A53. Basket- Stainless steel Type 304-basket standard #12 mesh (1/16 inch perf.) (1.6 mm perf.) through 3 inches (76 mm). Sizes 4 inches and larger standard with #6 mesh (1/8 inch perf.) (3.2 mm perf.). Monel or other alloy baskets, magnets, and various mesh sizes optional. Horizontal or vertical service usage.
2. Wye Strainers 758-G & 768GF: Size range 2 inches to 12 inches (305 mm). Body- Ductile iron. 300 psig (1.9 KPa). Baskets- Same as Tee Series.

D. Grooved Suction Diffusers: Shall be Gruvlok Series 7250. Sizes 2-1/2 inches to 16 inches (64 mm to 406 mm). Body- Carbon steel to ASTM A-53 body for all sizes. 300 psig (1.9 KPa). Strainer Basket- Stainless steel (3/16 inch perf.) (4.76 mm perf.) With start-up #16 mesh pre-filter removable screen. Blow-down and gage plug standard.

E. Flexible Connectors: Sizes 2 inches to 12 inches (51 mm to 305 mm). Stainless steel tube and braid design. Carbon steel grooved, threaded & flanged end. Rated working pressure 150 to 300 psi (1.0 to 2.0 KPa).

F. Triple Duty Combination Valves: Shall be Gruvlok "Tri-Service" (FTV-A/FTV-S) service valves. Sizes 2-1/2 inches to 12 inches (64 mm to 305 mm). Services- Combination shut-off, non-slam silent check and full throttling. Throttling flow indicator is standard. Horizontal or vertical service usage. Flow measurement ports on either side of valve body. Fixed or portable meters available for differential pressure measurement.

G. Calibrated Circuit (Setter) Balancing Valves: Shall be GBV-Gruvlok "Circuit Balancing" Valve. Sizes 1/2 inch to 12 inches (13 mm to 305 mm). Multi-turn adjustment. Positive shut-off. Tamper-proof memory stop. Pressure differential read-out ports. Differential Pressure Meter- Provide CBV differential pressure meter/transducer as required. Direct Flow readout. Proportional balancing.

H. Automatic Air Vents - Gruvlok Models GAV-15 rated 150 psig and GAV-30 rated 300 psig.

2.5 PIPING

A. Steel Piping:
   1. Refer to Section 15050 for piping material.

B. Copper Piping:
   1. Refer to Section 15050 for piping material.

C. Stainless Steel Piping:
   1. Refer to Section 15050 for piping material.

D. Aluminum Piping:
   1. Refer to Section 15050 for piping material.

E. Steel Piping:
   1. Refer to Section 15050 for piping material.

F. Plastic Piping:
   1. Refer to Section 15050 for piping material.

2.6 ACCESS PANELS

A. Provide access panels as required by Section 08310 - Access Doors and Panels.

2.7 FIRESTOPPING MATERIALS

A. Provide fire stopping assemblies as required by Section 07840 - Firestopping.

2.8 EQUIPMENT SUPPORTS

A. Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05120 Structural Steel. Submit calculations with shop drawings.

2.9 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

A. Provide templates to ensure accurate location of anchor bolts.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
C. Provide openings as necessary to permit installation of piping or any other part of work under this Section.

SECTION 15600 (CONT.)

Pipes, Valves and Fittings for HVAC Heating and Cooling Systems

D. Provide sleeves for piping penetrating floor and masonry walls.

E. This Contractor shall be responsible for establishing sizes and locations of all openings and lintels in new work and to transmit this information to the Contractor whose work is involved at such time as to avoid cutting and patching.

F. All patching shall match adjacent surfaces.

G. Contractor shall inspect and take note of existing conditions along with the Owner's Representative to avoid disputes regarding the condition of existing surface before work began.

H. Openings through existing concrete shall be core-drilled or saw cut.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.4 VALVE INSTALLATION

A. Tri-Service Valves - Models FTV-S, FTV-A:
   1. Mount valve to a spool piece on the discharge side of the pump. Spool piece required is based on a minimum recommended space of 12 inches (305 mm) for pump sizes 2 inches by 2 inches (51 mm by 51 mm) to 6 inches by 6 inches (152 mm by 152 mm) and 24 inches (610 mm) for pump sizes 8 inches by 8 inches (203 mm by 203 mm) to 12 inches by 12 inches (305 x 305 mm).
   2. Do not mount valve directly to pump to avoid causing undesirable noise in the system.
   3. Leave sufficient clearance around valve for valve removal or repair.
   4. Install valve in the direction of flow arrows on valve body.
   5. Mount valve to flanged equipment using Gruvlok Flange Adapter or industry standard grooved coupling, suitable for system pressure and temperatures encountered.
   6. Valve body has been designed to handle the weight of the pump on vertical in-line installations. The valve body is not designed to support the piping weight. Support piping by hangers. Provide pipe supports under valve and strainer bodies.

B. Globe Valves - Model GBV-S (Soldered), GBV-T (Threaded), Balancing Valves - Model GBV-G (Grooved-End Straight), GBV-A (Grooved-End Angle):
   1. To ensure accuracy of measurement of GBV-S, GBV-T, GBV-G and GBV-A valves, locate valves at least 5 pipe diameters downstream from any fitting and at least 10 pipe diameters downstream from a pump.
   2. Install no fittings within 2 pipe diameters downstream of valve.
   3. Install valves with flow in the direction of the arrow on the valve body.
   4. Provide easy access to probe metering ports (PMPs), drain ports and hand wheel.
   5. For solder applications, solder valve body in line using 95/5 solder.
   6. Install valve-bonnet assembly into body, making sure non-asbestos gasket is in place.
   7. Install valves in horizontal or vertical piping as indicated.
   8. Do not install metering ports below the pipe (pointing down), as this will allow system sediment to accumulate in the ports.
   9. Metering ports and body/drain plugs may be interchanged for improved accessibility.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PIPE FITTINGS

MALLEABLE IRON FITTINGS

Malleable Iron Threaded Fittings – Class 150 (Standard)

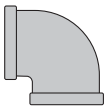


Fig. 1101 – 90˚ Elbow
Size Range: 1/8" - 6" NPS

Fig. 1102 – 45˚ Elbow
Size Range: 1/8" - 6" NPS

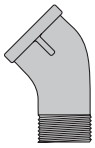


Fig. 1104 – 45˚ Street Elbow
Size Range: 1/8" - 2" NPS

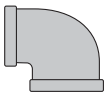


Fig. 1101R – Reducing Elbow
Size Range: 1/4" x 1/8" thru 4" x 3" NPS

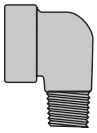


Fig. 1103 – Straight
Fig. 1003R – Reducing
90˚ Street Elbow
Size Range
Fig. 1103: 1/8" - 4"
Fig. 1103R: 1/2" x 3/8" thru 2" x 1 1/2"

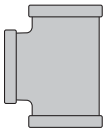


Fig. 1105 – Straight
Fig. 1105R – Reducing
Size Range
Fig. 1105: 1/8" - 6" NPS
Fig. 1105R: 1/8" x 1/8" x 1/4" thru 4" x 4" x 3" NPS

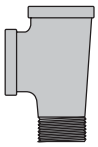


Fig. 1106 – Straight
Fig. 1106R – Reducing
Street or Service Tee
Size Range
Fig. 1106: 1/4" - 2" NPS
Fig. 1106R: 1 1/4" x 1" x 1 1/4"

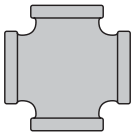


Fig. 1107 – Cross
Size Range: 1/8" - 4" NPS

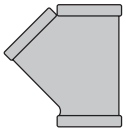


Fig. 1108
45˚ Y-Branch or Lateral
Size Range: 3/8" - 4" NPS

Fig. 1121
Coupling - Right Hand
Size Range: 1/8" - 4" NPS

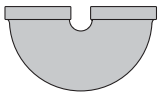


Fig. 1119
Return Bends
Open Pattern – Right Hand
Size Range: 1/2" - 2" NPS

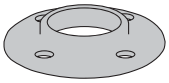


Fig. 1190 – Floor Flange
(Ductile Iron)
Size Range: 1/4" - 2" NPS

Fig. 1125 – Reducer
Size Range: 1/4" x 1/8" thru 6" x 4" NPS

Fig. 1124 – Cap
Size Range: 1/2" - 6" NPS

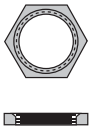


Fig. 1134 – Hex Locknut
Size Range: 1/8" - 2" NPS

Malleable Iron Plain Fittings

NOTE: Not to be used for pressure service.

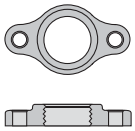


Fig. 1133 – Waste Nut
Sizes: 1/2" & 3/4" NPS

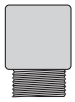


Fig. 1138 – Extension Piece
Size Range: 1/2" - 1" NPS

Malleable Iron Threaded Fittings – Class 300 (XS/XH)

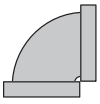


Fig. 1161 – Straight
Fig. 1161R – Reducing
90˚ Elbow
Size Range
Fig. 1161: 1/4" - 4" NPS
Fig. 1161R: 3/8" x 1/4" thru 2" x 1 1/2" NPS

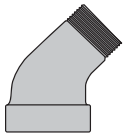


Fig. 1160
45˚ Street Elbow
Size Range: 1/2" - 2" NPS

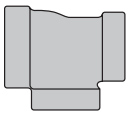


Fig. 1164R
Reducing Tee
Size Range: 3/8" x 3/8" x 1/4" thru 3" x 3" x 2" NPS

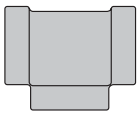


Fig. 1164
Straight Tee
Size Range: 1/4" - 4" NPS

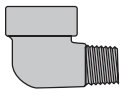


Fig. 1170
90˚ Street Elbow
Size Range: 1/4" - 3" NPS

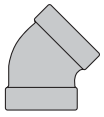


Fig. 1162
45˚ Elbow
Size Range: 1/4" - 4" NPS

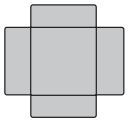


Fig. 1165 – Cross
Size Range: 1/4" - 2" NPS

Fig. 1167 – Reducer
Size Range: 3/8" x 1/4" thru 4" x 3" NPS

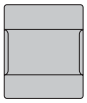


Fig. 1166 – Coupling
Size Range: 1/4" - 3" NPS

Fig. 1163 – Cap
Size Range: 1/4" - 3" NPS

Fig. 390
Countersunk Plugs
Size Range: 1/2" - 3/4" NPS

PIPE FITTINGS (Continued)

MALLEABLE IRON UNIONS – Class 150; 250; 300

Copper or Copper Alloy to Iron

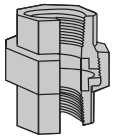


Fig. 463 – Class 150 Union
150 Lb. WSP; 300 Lb. WOG, Non-Shock
Size Range: 1/8" - 3" NPS

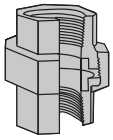


Fig. 554 – Class 250 Union
250 Lb. WSP; 500 Lb. WOG, Non-Shock
Size Range: 1/8" - 4" NPS

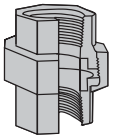


Fig. 459 – Class 300 Union
300 Lb. WSP; 600 Lb. WOG, Non-Shock
Size Range: 1/8" - 4" NPS

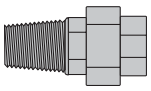


Fig. 551 – Class 300 Union (Male/Female)
300 Lb. WSP; 600 Lb. WOG, Non-Shock
Size Range: 1/2" - 2" NPS

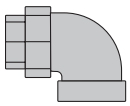


Fig. 552 – Class 300 90˚ Elbow Female Union
300 Lb. WSP
Size Range: 3/8" - 1" NPS

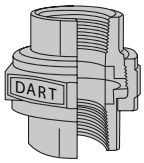


Fig. 832 – Dart Union
Bronze to Bronze Seat Union
Size Range: 3/8" - 2" NPS

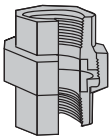


Fig. J-3300 – Class 300 All Iron Union
Size Range: 1/4" - 3" NPS

CAST IRON FITTINGS

Cast Iron Threaded Fittings – Class 125 (Standard)

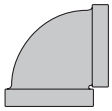


Fig. 351 – 90˚ Elbow
Size Range: 1/4" - 8" NPS

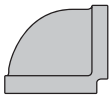


Fig. 352
90˚ Reducing Elbow
Size Range: 1/2" x 1/4" thru 6" x 5"

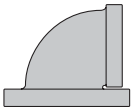


Fig. 371 – 90˚ Elbow Flange & Screw
Size Range: 2 1/2" - 6" NPS

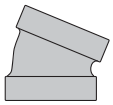


Fig. 356A – 22 1/2˚ Elbow
Size Range: 3/4" - 2 1/2" NPS

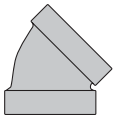


Fig. 356 – 45˚ Elbow
Size Range: 1/4" - 8" NPS

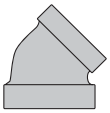


Fig. 356R
45˚ Reducing Elbow
Size: 1" x 1/2" NPS

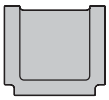


Fig. 358
Straight Tee
Size Range: 1/4" - 8" NPS

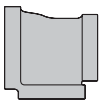


Fig. 359
Reducing Tee
Size Range: 1/2" x 1/2" x 1/4" thru 6" x 6" x 5" NPS

Fig. 360
Straight Cross
Size Range: 1/2" - 6" NPS

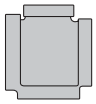


Fig. 361
Reducing Cross
Size Range
1" x 1" x 3/4" x 3/4" thru 4" x 4" x 2" x 2" NPS

Fig. 366
Screwed Hex Coupling
Size: 1" NPS

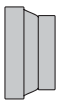


Fig. 367
Concentric Reducer
Size Range: 3/4" x 1/2" thru 8" x 6" NPS

Fig. 368
Eccentric Reducer
Size Range: 3/4" x 1/2" thru 6" x 4" NPS

Fig. 383 – Hex Bushing
Size Range: 1 1/2" x 1/4" thru 10" x 8" NPS

Fig. 385 – Face Bushing
Size Range: 3" x 2" thru 4" x 3" NPS

Fig. 387 – Square Head Plug (Cored)
Size Range: 3/4" - 4" NPS

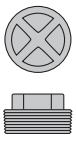


Fig. 380 – Solid
Fig. 389 – Cored
Bar Plugs
Size Range: 4" - 8" NPS

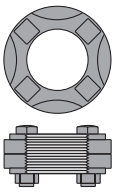


Fig. 487 – Flange Union Gasket Type
(Assembled with Gaskets)
Size Range: 1/2" - 8" NPS

Fig. 388 – Square Head Plug (Solid)
Size Range: 1/2" - 3 1/2" NPS

Fig. 390
Countersunk Plugs
Size Range: 1" - 4" NPS

Fig. 381 – Cap
Size Range: 2 1/2" - 8" NPS

Fig. 370 – Locknut
Size Range: 2 1/2" - 4" NPS

PIPE FITTINGS (Continued)

CAST IRON FITTINGS (Continued)

Cast Iron Threaded Fittings – Class 250 (Extra Heavy)

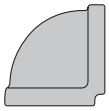


Fig. 421 – 90˚ Elbow
Size Range: 1/4" - 3" NPS

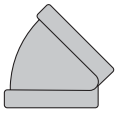


Fig. 424 – 45˚ Elbow
Size Range: 1/2" - 2 1/2" NPS

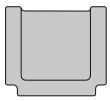


Fig. 425 – Tee
Size Range: 1/4" - 4" NPS

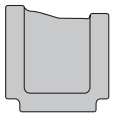


Fig. 426 – Reducing Tee
Size Range: 3/4" x 3/4" x 1/2" thru 2" x 2" x 1 1/2"

Cast Iron Threaded – Safety Valve Discharge Elbow

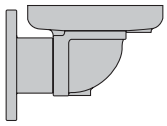


Fig. 1538 – Screwed Cast Iron
Size Range: 2 1/2" - 4" NPS

Cast Iron Drainage Fittings

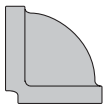


Fig. 701
90˚ Short Turn Elbow
Size Range: 1 1/2" - 4" NPS

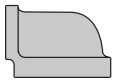


Fig. 701R – 90˚ Reducing Short Turn Elbow
Sizes: 1 1/2" x 1 1/4" & 2" x 1 1/2" NPS

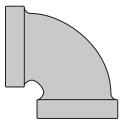


Fig. 702
90˚ Long Turn Elbow
Size Range: 1 1/2" - 4" NPS

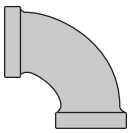


Fig. 702A
90˚ Extra Long Turn Elbow
Sizes: 1 1/2" & 2" NPS

Fig. 703
60˚ Short Turn Elbow
Size: 1 1/2" NPS

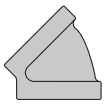


Fig. 705
45˚ Short Turn Elbow
Size Range: 1 1/2" - 4" NPS

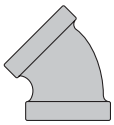


Fig. 706
45˚ Long Turn Elbow
Size: 1 1/2" NPS

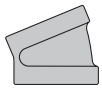


Fig. 707 – 22 1/2˚ Elbow
Sizes: 1 1/2" & 2" NPS

Fig. 708 – 11 1/4˚ Elbow
Sizes: 1 1/2" & 2" NPS

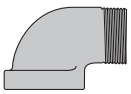


Fig. 718 – 90˚ Street Elbow
Sizes: 1 1/2" & 2" NPS

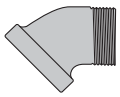


Fig. 719 – 45˚ Street Elbow
Sizes: 1 1/2" & 2" NPS

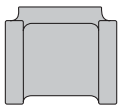


Fig. 722 – Tee
Sizes: 1 1/2" & 2" NPS

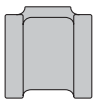


Fig. 723 – Reducing Tee
Size: 2" x 2" x 1 1/2" NPS

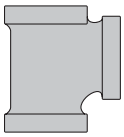


Fig. 726 – Sanitary Tee
90˚ Short Turn
Size Range: 1 1/2" - 4" NPS

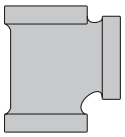


Fig. 727 – Sanitary Tee
90˚ Reducing Short Turn
Sizes:
2" x 2" x 1 1/2" & 2" x 1 1/2" x 1 1/2"

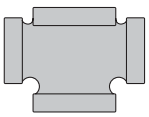


Fig. 729 – Sanitary Tee
90˚ Reducing Double Short Turn
Size: 2" x 1 1/2" NPS

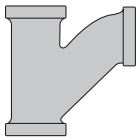


Fig. 730 – Y-Branch
90˚ Long Turn
Sizes: 1 1/2" & 2" NPS

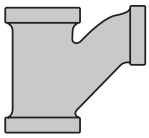


Fig. 731 – Y-Branch
90˚ Reducing Long Turn
Size: 2" x 2" x 1 1/2" NPS

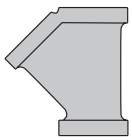


Fig. 734 – 45˚ Y-Branch
Sizes: 1 1/2" - 4" NPS

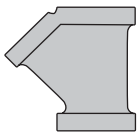


Fig. 735 – 45˚ Reducing Y-Branch
Sizes: 2" x 2" x 1 1/2" & 4" x 4" x 3"

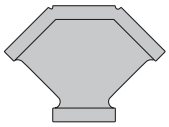


Fig. 736 – 45˚ Double Y-Branch
Size: 1 1/2" NPS

Fig. 744 – Tucker Connection
Size Range: 1 1/2" - 4" NPS

Fig. 753 – Coupling
Size: 1 1/2" NPS

Fig. 752 – P-Trap
Size Range: 1 1/2" - 3" NPS

Fig. 754 – Bath P-Trap
Sizes: 1 1/2" & 2" NPS

PIPE FITTINGS (Continued)

CAST IRON FITTINGS (Continued)

Cast Iron Flanged Fittings – Class 125 (Standard)

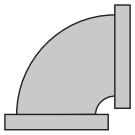


Fig. 801
90˚ Straight Elbow
Size Range: 1½" - 12" NPS

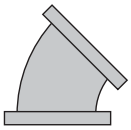


Fig. 802
45˚ Straight Elbow
Size Range: 1½" - 12" NPS

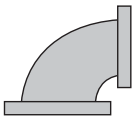


Fig. 803
90˚ Taper Reducing Elbow
Size Range:
2½" x 2" thru 12" x 10" NPS

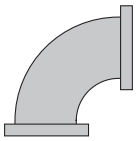


Fig. 804 – Straight
Fig. 804R – Reducing
Long Radius Elbow
Size Range:
Fig. 804: 2" - 12" NPS
Fig. 804R: 4" x 3" thru 10" x 8"

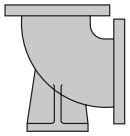


Fig. 805 – Base Elbow
Size Range: 3" - 12" NPS

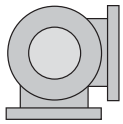


Fig. 808 – Side Outlet Elbow
Size Range: 4" - 8" NPS

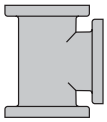


Fig. 811 – Straight Tee
Size Range: 1½" - 12" NPS

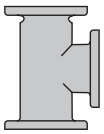


Fig. 812 – Reducing Tee
Size Range:
3" x 2" x 3" thru 12" x 12" x 10"

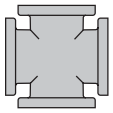


Fig. 821 – Cross
Size Range: 2" - 10" NPS

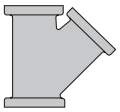


Fig. 823 – Lateral
Size Range: 2" - 8" NPS

Fig. 825
Concentric Reducer
Size Range: 2" x 1½" thru
12" x 10" NPS

Fig. 826
Eccentric Reducer
Size Range: 3" x 2" thru
12" x 10" NPS

Iron Flanges – Class 125 (Standard)

Fig. 1010T – Cast Iron
Flange Threaded
Size Range: 3" x 7½" thru
12" x 19" NPS

Fig. 1011 – Cast Iron
Companion Flange
Size Range:
Fig: 1011: ¾" x 3⅞" thru
12" x 19" NPS

Fig. 1016 – Reducing
Companion Flange
Size Range:
1" x 5" thru 8" x 19" NPS

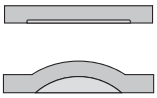


Fig. 1018 – Cast Iron
Blind Flange
Size Range:
1" x 4¼" thru 12" x 19" NPS

Cast Iron Flanged Fittings – Class 250 (Extra Heavy)

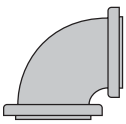


Fig. 831
90˚ Straight Elbow
Size Range: 2" - 8" NPS

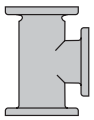


Fig. 841 – Straight Tee
Size Range: 2½" - 8" NPS

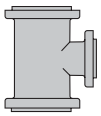


Fig. 842 – Reducing Tee
Sizes: 6" x 6" x 4" and
8" x 8" x 6" NPS

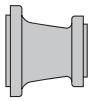


Fig. 855
Concentric Reducer
Size Range:
3" x 2" thru 10" x 8" NPS

Iron Flanges – Class 250 (Extra Heavy)

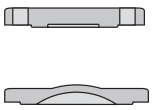


Fig. 1021 – Cast Iron
Blind Flange
Size Range:
1½" x 6⅛" thru 8" x 15" NPS

Fig. 1025 – Cast Iron
Companion Flange
Size Range:
1¼" x 5¼" thru 8" x 15" NPS

Fig. 1030 – Cast Iron
Companion Flange
Size Range:
2" x 8¼" thru 4" x 11" NPS

PIPE FITTINGS (Continued)

PIPE NIPPLES

Seamless/Welded – Black & Galvanized

Seamless Pipe Nipples
Std. Sch. 40, XH Sch. 80, Sch. 160, XXH
Size Range: 1/8" thru 6"

Welded Pipe Nipples
Std. Sch. 40, XH Sch. 80
Size Range: 1/8" thru 6"

STEEL FITTINGS

Steel Pipe Couplings

Fig. 336
Standard, Full & Half
Size Range: 1/8" - 6" NPS

Fig. 337
Extra Strong (XS), Full & Half
Size Range: 1/8" - 6" NPS

Fig. 346
Standard, Right & Left
Size Range: 1/2" - 2" NPS

Fig. 347
Extra Strong (XS), Right & Left
Size Range: 1/2" - 2" NPS

Fig. 348
API Line Pipe Coupling
Size Range: 1/8" - 12" NPS

Fig. 379
Shallow Well Coupling
Size Range: 1 1/4" - 2" NPS

Fig. 380
Water Well Reamed and Drifted Coupling
Size Range: 1 1/4" - 2" NPS

Fig. 381
#9 Drive Coupling
Size Range: 1 1/4" - 12" NPS

Merchant Steel Bushings, Caps & Plugs

Hex Bushing
Size Range: 1/4" x 1/8" thru 1" x 3/4" NPS

Countersunk Plug (Square & Hex Socket)
Size Range: 1/8" - 2" NPS

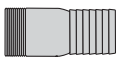
Flush Bushing
Size Range: 1/4" x 1/8" thru 1/2" x 3/8" NPS

Cap
Size Range: 1/8" - 3/4" NPS

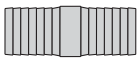
Solid Square Head Plug
Size Range: 1/8" - 2" NPS

Steel Hose Fittings

For fast, economical hose connections & repairs
Combination Nipples



Combination Nipples
Nominal Pipe Sizes: 1/2" - 6"
Size Range: 1/2" - 2"



Hose Menders
Nominal Pipe Sizes: 1/2" - 6"
Size Range: 1/2" - 2"

PIPE FITTINGS (Continued)

FORGED STEEL FITTINGS

Class 2000 Threaded

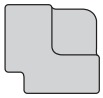


Fig. 2101 – 90˚ Elbow
Size Range: 1/4" - 4" NPS


Fig. 2102 – 45˚ Elbow
Size Range: 1/4" - 3" NPS

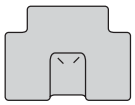


Fig. 2103 – Tee
Size Range: 1/4" - 4" NPS

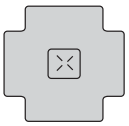


Fig. 2104 – Cross
Size Range: 1/4" - 3" NPS

Class 3000 Threaded

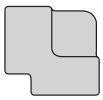


Fig. 2111 – 90˚ Elbow
Size Range: 1/8" - 4" NPS


Fig. 2112 – 45˚ Elbow
Size Range: 1/8" - 4" NPS

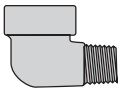


Fig. 2113 – 90˚ Street Elbow
Size Range: 1/8" - 2" NPS

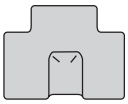


Fig. 2114 – Tee
Size Range: 1/8" - 4" NPS

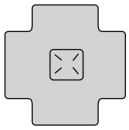


Fig. 2115 – Cross
Size Range: 1/8" - 4" NPS

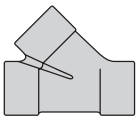


Fig. 2116 – Lateral
Size Range: 1/2" - 2" NPS

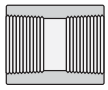


Fig. 2117 – Coupling
Size Range: 1/8" - 4" NPS

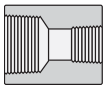


Fig. 2118 – Reducing Coupling
Size Range: 1/4" x 1/8"- 4" x 1 1/2" NPS


Fig. 2119 – Half Coupling
Size Range: 1/8" - 4" NPS


Fig. 2120 – Pipe Cap
Size Range: 1/8" - 4" NPS

Class 6000 Threaded

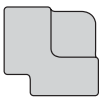


Fig. 2131 – 90˚ Elbow
Size Range: 1/8" - 4" NPS


Fig. 2132 – 45˚ Elbow
Size Range: 1/8" - 4" NPS

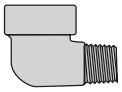


Fig. 2133 – 90˚ Street Elbow
Size Range: 1/8" - 1 1/2" NPS

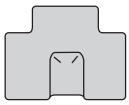


Fig. 2134 – Tee
Size Range: 1/8" - 4" NPS

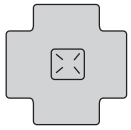


Fig. 2135 – Cross
Size Range: 1/8" - 4" NPS

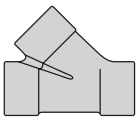


Fig. 2136 – Lateral
Size Range: 1/2" - 1 1/2" NPS

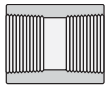


Fig. 2137 – Coupling
Size Range: 1/8" - 4" NPS

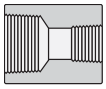


Fig. 2138 – Reducing Coupling
Size Range: 1/4" x 1/8"- 4" x 2" NPS


Fig. 2141 – Half Coupling
Size Range: 1/8" - 4" NPS


Fig. 2143 – Pipe Cap
Size Range: 1/8" - 4" NPS

Class 3000 Socket-Weld

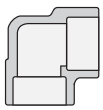


Fig. 2150 – 90˚ Elbow
Size Range: 1/8" - 4" NPS

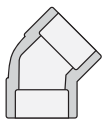


Fig. 2151 – 45˚ Elbow
Size Range: 1/8" - 4" NPS

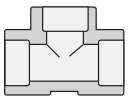


Fig. 2152 – Tee
Size Range: 1/8" - 4" NPS

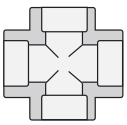


Fig. 2153 – Cross
Size Range: 1/8" - 4" NPS

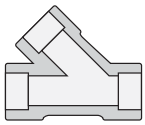


Fig. 2158 – Lateral
Size Range: 1/2" - 2" NPS


Fig. 2154 – Couplings
Size Range: 1/8" - 4" NPS


Fig. 2156 – Reducing Coupling
Size Range: 1/4" x 1/8"- 4" x 2" NPS


Fig. 2155 – Half Coupling
Size Range: 1/8" - 4" NPS


Fig. 2157 – Pipe Cap
Size Range: 1/8" - 4" NPS

PIPE FITTINGS (Continued)

FORGED STEEL FITTINGS (Continued)

Class 6000 Socket-Weld

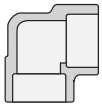


Fig. 2170 – 90˚ Elbow
Size Range: 1/2" - 4" NPS

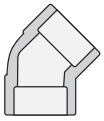


Fig. 2171 – 45˚ Elbow
Size Range: 1/2" - 4" NPS

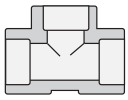


Fig. 2172 – Tee
Size Range: 1/2" - 4" NPS

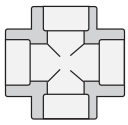


Fig. 2173 – Cross
Size Range: 1/2" - 2" NPS

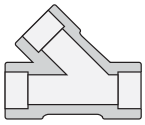


Fig. 2178 – Lateral
Size Range: 1/2" - 1 1/2" NPS


Fig. 2174 – Couplings
Size Range: 1/2" - 4" NPS


Fig. 2176 – Reducing Coupling
Size Range: 1/2" x 1/4" - 4" x 2" NPS


Fig. 2175 – Half Couplings
Size Range: 1/2" - 4" NPS


Fig. 2177 – Pipe Caps
Size Range: 1/2" - 4" NPS

High Pressure Plugs & Bushings

Anvil High Pressure Plugs and Bushings satisfy the requiement of ASME B16.11 Class 2000, 3000, and 6000.

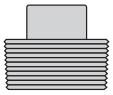


Fig. 2122 – Plugs
Square Head
Size Range: 1/8" - 4" NPS

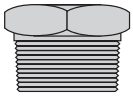


Fig. 2142 – Plugs
Hex Head
Size Range: 1/8" - 4" NPS

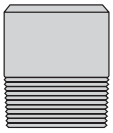


Fig. 2121 – Plugs
Round Head
Size Range: 1/8" - 4" NPS

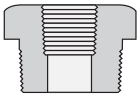


Fig. 2139 – Bushings
Hex Head
Size Range: 1/4" x 1/8" - 4" x 1 1/2" NPS


Fig. 2140 – Bushings
Flush
Size Range: 1/4" x 1/8" - 2" x 1/4" NPS

Socket-Weld Reducer Inserts

Reducer inserts comply with MSS Standard SP-79. They enable standard socket-weld fittings to be used for making any combination of pipe line reductions quickly and economically. Socket-weld reducer inserts serve the same purpose as threaded reducing bushings with threaded fittings.

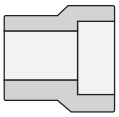


Fig. 2159 (Type 1)

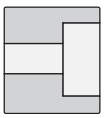


Fig. 2179 (Type 2)

CLASS 3000

For use with Schedule 40 & 80 Pipe

Type 1 – Reducer Insert
Size Range: 3/8" x 1/4" thru 3" x 1" NPS

Type 2 – Reducer Insert
Size Range: 3/8" x 1/4" thru 3" x 1" NPS

CLASS 6000

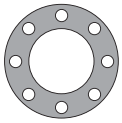
For use with Schedule 160 Pipe

Type 1 – Reducer Insert
Size Range: 3/8" x 1/4" thru 3" x 2 1/2" NPS

Type 2 – Reducer Insert
Size Range: 3/8" x 1/4" thru 3" x 2 1/2" NPS

MISCELLANEOUS

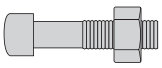
All Purpose Asbestos Gaskets


Full Face


Ring

Compressed Sheet Packing is a single-formula material suitable for a wide range of temperature-pressure combinations. It is used for sealing water, steam, all oils, gases, alkalies, acids, refigerants & hydrocarbons.

Available in Eight Gauges: 1/100", 1/64", 1/32", 1/16", 3/32", 1/8", 3/16", & 1/4" (.2, .4, .8, 1.6, 3.1, 4.7 and 6.3 mm)



When ordering, specify bolt size & length required.
Bolts are furnished in sizes:
1/4", 5/16", 3/8", 7/16", 1", 1 1/8", 1 1/4" (6.3, 7.9, 9.5, 11, 25, 29 and 32 mm) in varying lengths.
Length of bolts are measured from under head to extreme point.

Floor & Ceiling Plates

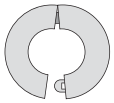


Fig. 1 – with Springs
Fig. 2 – with Set Screw
Stamped Steel for Copper Tube
Size Range: 1/4" - 6" NPS

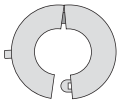


Fig. 10 – with Springs
Fig. 13 – with Set Screw
Stamped Steel for Pipe
Size Range: 1/4" - 6" NPS

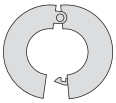


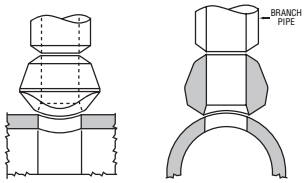
Fig. 20 – with Springs &
exposed Rivet Hinge
Stamped Steel for Pipe
Size Range: 1/4" - 6" NPS

PIPE FITTINGS (Continued)

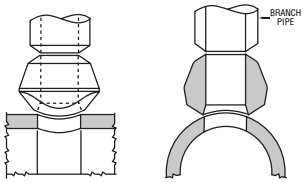
ANVIL UNIVERSAL ANVILETS

Universal Buttweld Anvilets

Full & Reducing Sizes Class 3000 & 6000

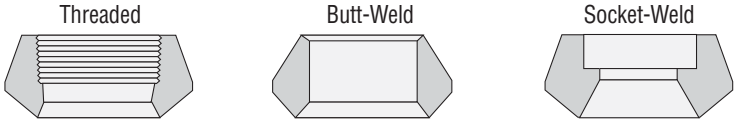


Schedule 160 & XXS
Size Range: 1/2" - 4" NPS



Standard Weight
XS/XH
For Oultet Sizes: 1/8" - 24" NPS
Size Range: 1/8" - 24" NPS

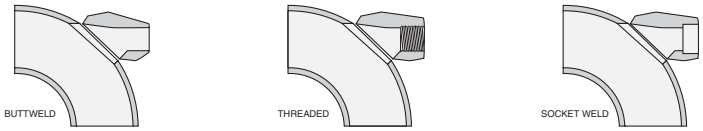
Universal Flat Anvilets



Class 3000 Threaded, Buttweld & Socket-Weld
Size Range: 1/4" - 3" NPS

Universal Elbow Anvilets

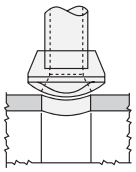
Class 3000 & 6000 Butt-Weld, Threaded, and Socket-Weld



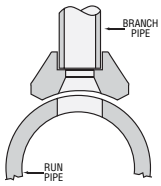
Class 3000
Threaded & Socket-Weld/Standard & XS/XH Buttweld
Size Range: 1/2" - 2" NPS

Class 6000
Threaded & Socket-Weld
Size Range: 1/2" - 1 1/2" NPS

Universal Socket-Weld Anvilets



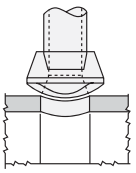
Class 3000
For Oultet Sizes: 1/8" - 4" NPS



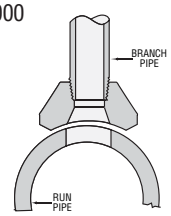
Class 6000
For Oultet Sizes: 1/2" - 2" NPS

Universal Threaded Anvilets

Full & Reducing Sizes Class 3000 & 6000



Class 3000
For Oultet Sizes: 1/8" - 4" NPS

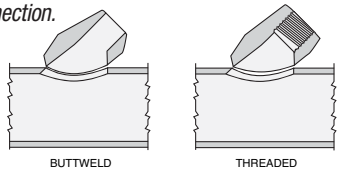


Class 6000
For Oultet Sizes: 1/2" - 2" NPS

Universal Lateral Anvilets

Class 3000 & 6000 Buttweld and Threaded

Lateral Anvilets provide a strong, readily attached 45˚ lateral outlet connection.



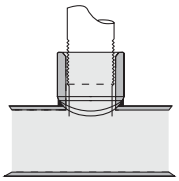
Class 3000
Standard/XS Buttweld
Size Range: 1/2" - 2" NPS

Class 3000
Threaded/Standard
Size Range: 1/2" - 2" NPS

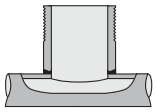
MERIT® OUTLET FITTINGS

Weld-Miser™ Tee-Let®

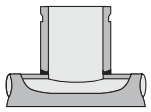
Welding Outlet Fittings



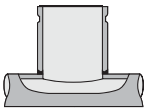
Type A – Female Thread
Size Range: 1/2" - 4"



Type B – Male Thread
Standard Weight
Size Range: 1" - 8"



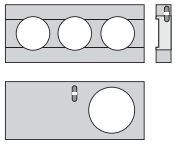
Type C – Cut Groove
Standard Weight
Size Range: 1 1/4" - 8"



Type C/R – Roll
Groove Schedule 10
Size Range: 1 1/4" - 6"

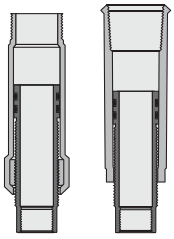
Hole Templates

Hand Held Hole Templates
Size Range: 1 1/2" - 2 1/2"



Eliminator

Adjustable Drop Nipples
Size Range: 1"x 1/2" thru 1"x 3/4"



Type M Type F

PIPE FITTINGS (Continued)

JB SMITH OIL COUNTRY

Carbon Steel – Swage Nipples

Concentric Swage Nipples
Size Range:
1/4" x 1/8" thru 1" x 3/4"
1 1/4" x 1/4" thru 8" x 6"

Eccentric Swage Nipples
Size Range: 1/4" x 1/8" thru 4" x 3 1/2"

Stainless Steel – Swage Nipples

Stainless & Alloy Steel Swage Nipples
Size Range: 1/4" x 1/8" thru 4" x 3 1/2"

Carbon Steel – Bull Plugs

Carbon Steel Bull Plugs
Size Range: 1/8" - 8"

Solid Refinery Plugs
Black (Non-Plated)
Carbon Steel
Size Range: 1/8" - 2"

Oil Country Fittings – Tubing Swages & Casing Swages

Large End Upset
Reduced to Regular or Upset
Size Range: 1" x 3/4" thru 4" x 3 1/2"

Large End Non-Upset
Reduced to Upset
Size Range: 1" x 3/4" thru 4" x 3"

Swage Nipples Oil Country
Tubing & Casing Non EUE Ends
Size Range: 1" - 4"

Oil Country Fittings – Adapter Nipples

Tubing Nipples
Standard Weight
Size Range: 1" - 4"

Tubing Nipples
Extra Heavy Weight
Size Range: 1" - 4"

Oil Country Couplings – Casing Couplings

API Casing Couplings
Short Thread
Size Range: 4 1/2" - 20"

API Casing Couplings
Long Thread
Size Range: 4 1/2" - 13 3/8"

Combination Couplings J-55
Size Range: 2" - 4"

Bell Nipple
Size Range: 4 1/2" - 8 5/8"

Adapter Nipples
Seamless Sch. 40
Size Range: 3/4" - 12"

Oil Country Couplings – Tubing Couplings

API Tubing Couplings
Size Range: 2" - 4"

Special Clearance
Tubing Couplings
Size Range: 2" - 3"

Sub Tubing Couplings J-55
Size Range: 2" EUE x 2" Reg thru
4" EUE x 4" Reg

Oil Country Fittings – Casing Nipples

Oil Country Casing Nipples
Size Range: 4 1/2" - 16"

Oil Country Fittings – Chamber Vessels

Chambers/Pressure Vessels
Size Range: 2" - 8"

Oil Country Fittings – Bull Plugs

Tubing Bull Plugs
Size Range: 3/4" EUE - 3" EUE

Casing Bull Plugs
Size Range: 4 1/2" - 10 3/4" API

API Bull Plug Female
Size Range: 3/4" EUE - 4" EUE

PIPE FITTINGS (Continued)

CATAWISSA UNIONS

Wing Unions

Fig. 100
Threaded Ends
1,000 psi cwp - 1,500 psi test
Size Range: 2" - 8"

Fig. 100C
Threaded Ends - Lug Union
1,000 psi cwp - 1,500 psi test
Size: 2"

Fig. 200
Threaded Ends
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 6"

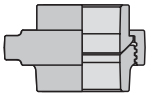


Fig. 200
Buttweld Ends - Sch. 40
2,000 psi cwp - 3,000 psi test
Size Range: 1"- 6"

Fig. 200C
Threaded Ends - Lug Union
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 2"

Fig. 206
Threaded Ends
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 6"

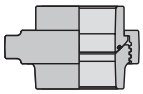


Fig. 206
Buttweld Ends - Sch. 40
2,000 psi cwp - 3,000 psi test
Size Range: 2" - 6"

Fig. 211
Threaded Ends
Insulating Union
2,000 psi cwp - 3,000 psi test
Sizes: 1" & 2"

Fig. 300
Flat-Face Union
2,000 psi cwp - 3,000 psi test
Size Range: 1" - 4"

Fig. 301
Steam Service Union
3,000 psi cwp - 4,500 psi test
Size Range: 1" - 3"

Fig. 400
Threaded Ends
4,000 psi cwp - 6,000 psi test
Size Range: 2" - 4"

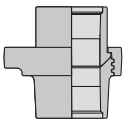


Fig. 400
Buttweld Ends - Sch. 80
4,000 psi cwp - 6,000 psi test
Size: 2"

Fig. 600
Threaded Ends
6,000 psi cwp - 9,000 psi test
Size Range: 1" thru 4"

Fig. 602
Threaded Ends
6,000 psi cwp - 9,000 psi test
Size Range: 1" thru 4"

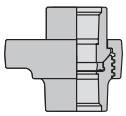


Fig. 602
Buttweld Ends - Sch. 80
6,000 psi cwp - 9,000 psi test
Size Range: 2" thru 4"

Fig. 607
Threaded Ends
Well Service Union
2,000 psi cwp - 3,000 psi test
Sizes: 1½" & 2"

Fig. 1002
Threaded Ends
10,000 psi cwp - 15,000 psi test
Size Range: 1" - 4"

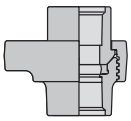


Fig. 1002
Buttweld Ends - Sch. 160
10,000 psi cwp - 15,000 psi test
Size Range: 2" - 4"

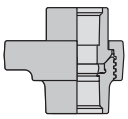


Fig. 1002
Buttweld Ends - Sch. XXH
10,000 psi cwp - 15,000 psi test
Size Range: 2" - 4"

Fig. 1502
Threaded Ends
15,000 psi cwp - 22,500 psi test
Sizes: 2" & 3"

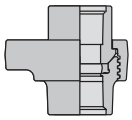


Fig. 1502
Buttweld Ends - Sch. XXH
15,000 psi cwp - 22,500 psi test
Sizes: 2" & 3"

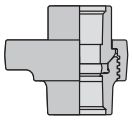


Fig. 1502
Buttweld Ends - Sch. 160
15,000 psi cwp - 22,500 psi test
Sizes: 2" & 3"

Fig. 202
Blanking Cap Only
with O-Ring
Size: 4"

Fig. S1A
High Speed Union
3,000 psi cwp - 4,500 psi test
Size Range: 1" - 3"

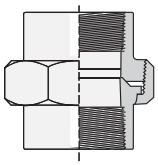
Fig. 3L S1A
Tri-Lug High Speed Union
3,000 psi cwp - 4,500 psi test
Size Range: 1" - 2"

Forged Steel Unions

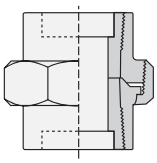
Manufactured to MSS Standard Practice SP83 (Class 6000 by method of MSS SP83).

CLASS 3000
Fig. 2125 – Threaded
Fig. 2126 – Socket-Weld
Size Range: ¼" - 3" NPS

CLASS 6000
Fig. 2127 – Threaded
Fig. 2128 – Socket-Weld
Size Range: ¼" - 2" NPS



THREADED



SOCKET WELD

PIPE HANGERS

Copper Tubing Hangers


Fig. CT-69
Adjustable Swivel Ring
Size Range: 1/2" - 4"


Fig. CT-65
Light Weight
Adjustable Clevis
Size Range: 1/2" - 4"


Fig. 69F
Adjustable Swivel Ring
Felt Lined
Size Range: 1/2" - 6"


Fig. 67F
Copper Tube Felt Lined
Hanger
Size Range: 1/2" - 6"


Fig. CT-121
Copper Tubing
Riser Clamp
Size Range: 1/2" - 4"


Fig. CT-128R
Rod Threaded
Ceiling Flange
Sizes: 3/8" thru 1/2"


Fig. CT-138R
Extensions Split
Tubing Clamp
Size Range: 1/2" - 2"


Fig. CT-255
Copper Tubing
Alignment Guide
Size Range: 1" - 4"

CPVC Pipe Hangers


Fig. 185
One Hole Pipe Strap
Size Range: 3/4" - 2"


Fig. 186
Two Hole Pipe Strap
Size Range: 3/4" - 2"


Fig. 187
Two Hole 90° Side
Mount Strap
Size Range: 3/4" - 2"


Fig. 188
Two Hole Stand Off
Strap
Size Range: 3/4" - 2"

Steel Pipe Clamps


Fig. 261
Extension Pipe or
Riser Clamp
Size Range: 3/4" - 24"


Fig. 40
Riser Clamp Standard
Size Range: 2" - 24"


Fig. 103
Offset Pipe Clamp
Size Range: 3/4" - 8"


Fig. 100
Extended Pipe Clamp
Size Range: 1/2" - 8"


Fig. 212
Medium Pipe Clamp
Size Range: 1/2" - 30"


Fig. 212FP
Earthquake
Bracing Clamp
Size Range: 2 1/2" - 12"


Fig. 216
Heavy Pipe Clamp
Size Range: 3" - 42"


Fig. 295
Double Bolt
Pipe Clamp
Size Range: 3/4" - 36"


Fig. 295A
Alloy Double Bolt
Pipe Clamp
Size Range: 1 1/2" - 24"


Fig. 295H
Heavy Duty Double
Bolt Pipe Clamp
Size Range: 6" - 36"


Fig. 224
Alloy Steel Pipe Clamp
Size Range: 4" - 16"


Fig. 246
Heavy Duty Alloy Steel
Pipe Clamp
Size Range: 10" - 24"

Clevis


Fig. 67
Pipe or Conduit
Hanger
Size Range: 1/2" - 6"


Fig. 65
Light Duty
Adjustable Clevis
Size Range: 3/8" - 4"


Fig. 260
Adjustable Clevis
Hanger
Size Range: 1/2" - 30"


Fig. 260 ISS
Clevis Hanger with
Insulation Saddle
System
Size Range: 2" - 16"


Fig. 300
Adjustable Clevis for
Insulated Lines
Size Range: 3/4" - 12"


Fig. 590
Adjustable Clevis for
Ductile or Cast Iron
Size Range: 3" - 24"

Pipe Shields & Saddles


Fig. 167
Insulation
Protection Shield
Size Range: 1/2" thru 24" pipe
with up to 2" thick insulation.


Fig. 168
Rib-Lok Shield
Size Range: 1/2" thru 8" pipe
or copper tube with up to
2" thick insulation.


Fig. 160 to 166A
Pipe Covering Protection Saddle
Size Range: 3/4" thru 36"

Socket Clamps


Fig. 595 & Fig. 594
Socket Clamp
For Ductile Iron or
Cast Iron Pipe
& Socket Clamp Washer
Size Range: 4" - 24" pipe


Fig. 600 & Fig. 599
Socket Clamp
For Ductile Iron or
Cast Iron Pipe
& Socket Clamp Washer
Size Range: 3" - 24" pipe

PIPE HANGERS (Continued)

Beam Clamps


Fig. 86 & 88
C-Clamp with Set Screw and Lock Nut
Size Range: 3/8" - 3/4"


Fig. 95
C-Clamp with Lock Nut
Sizes: 3/8" and 1/2"


Fig. 89
Retaining Clip
Size Range: 3/8" - 1/2"


Fig. 89X
Retaining Clip
Size Range: 3/8" - 3/4"


Fig. 92
Universal C-Type Clamp
Standard Throat
Sizes: 3/8" and 1/2"


Fig. 93
Universal C-Type Clamp
Wide Throat
Sizes: 3/8" and 1/2"


Fig. 94
Wide Throat Top Beam C-Clamp
Sizes: 5/8" and 3/4"


Fig. 227
Top Beam Clamp


Fig. 217
Adjustable Side Beam Clamp
Size Range: 3" - 7 5/8"


Fig. 14
Adjustable Side Beam Clamp
Sizes: 3/8" - 5/8"


Fig. 133
Standard Duty Beam Clamp
Size Range: 4" - 12"


Fig. 134
Heavy Duty Beam Clamp
Size Range: 4" - 12"


Fig. 218
Malleable Beam Clamp without Extension Piece


Fig. 228
Universal Forged Steel Beam Clamp


Fig. 292 & 292L
Beam Clamp with Weldless Eye Nut

Trapeze


Fig. 46
Universal Trapeze Assembly


Fig. 45
Channel Assembly


Fig. 50
Equal Leg Angle for Trapeze Assembly

Brackets


Fig. 202
Iron Side Beam Bracket
Size Range: 3/8" - 5/8"


Fig. 206
Steel Side Beam Bracket
Size Range: 3/8" - 5/8"


Fig. 207
Threaded Steel Side Beam Bracket
Sizes: 3/8" and 1/2"


Fig. 189
Staight Eye Socket
Size: 3/8"


Fig. 190
Off-Set Eye Socket
Size: 3/8"


Fig. 194
Light Welded Steel Bracket


Fig. 195
Medium Welded Steel Bracket


Fig. 199
Heavy Welded Steel Bracket

Ceiling Plates & Flanges


Fig. 395
Cast Iron Ceiling Plate
Size Range: 1/2" - 8"


Fig. 127
Plastic Ceiling Plate
Sizes: 3/8" and 1/2"


Fig. 128R
Rod Threaded, Ceiling Flange
Sizes: 3/8" & 1/2"


Fig. 153
Pipe Hanger Flange
Size Range: 3/8" - 3/4"

U-Bolts


Fig. 137 & 137S
Standard U-Bolt
Size Range: 1/2" - 36"


Fig. 137C
Plastic Coated U-Bolt
Size Range: 1/2" - 8"


Fig. 120
Light Weight U-Bolt
Size Range: 1/2" - 10"

Structural Attachments


Fig. 55 & Fig. 55L
Structural Welding Lug
Size Range:
Fig. 55: 1/2" - 3 3/4"
Fig. 55L: 1/2" - 2"


Fig. 54
Two Hole Welding Beam Lug
Size Range: 1/2" - 2 1/4"

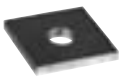


Fig. 60
Steel Washer Plate
Size Range: 3/8" - 3 3/4"


Fig. 66
Welded Beam Attachment
Size Range: 3/8" - 3 1/2"


Fig. 112 & 113
Brace Fitting Compete
Sizes: 1" and 1 1/4"

PIPE HANGERS (Continued)

Concrete Inserts & Attachments

Fig. 152
Screw Concrete Insert
Size Range: 3/8" - 7/8"

Fig. 282
Universal
Concrete Insert
Size Range: 3/8" - 7/8"

Fig. 281
Wedge Type
Concrete Insert
Size Range: 1/4" - 7/8"

Fig. 285
Light Weight Concrete
Insert
Size Range: 1/4" - 5/8"

Fig. 286
Iron Cross Design
Size Range: 3/4" - 1 1/2"

Fig. 284
Metal Deck Hanger
Size Range: 3/8" - 3/4"

Fig. 52
Concrete Rod
Attachment Plate
Size Range: 3/8" - 1 1/4"

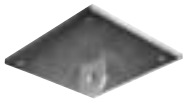


Fig. 47
Concrete Single Lug
Plate
Size Range: 1/2" - 2"

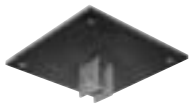


Fig. 49
Concrete Clevis Plate
Size Range: 3/8" - 1 3/4"

Pipe Supports

Fig. 62
Type A, B & C
Pipe Stanchion
Size Range: 2" - 18"

Fig. 63
Type A, B & C
Pipe Stanchion
Size Range: 2 1/2" - 42"

Fig. 192
Adjustable Pipe
Saddle Support
Size Range: 2" - 12"

Fig. 191
Adjustable Pipe
Saddle with U-Bolt
Size Range: 2" - 12"

Fig. 264
Adjustable Pipe
Saddle Support
Size Range: 2 1/2" - 36"

Fig. 265
Adjustable Pipe
Saddle Support
Size Range: 4" - 36"

Fig. 258
Stanchion Pipe
Saddle Support
Size Range: 4" - 36"

Fig. 259
Adjustable Pipe
Saddle Support
Size Range: 4" - 36"

Hanger Rods & Accessories

Fig. 142
Coach Screw Rods
Machine Threaded on
Opposite End
Sizes: 3/8" and 1/2"

Fig. 146
Continuous Thread
Sizes: 1/4" - 1 1/2"
Stocked in six, ten & twelve foot lengths. Other even foot lengths can be furnished to order.

Fig. 140 & 253
Machine Threaded Rods
Threaded Both Ends
Sizes: 3/8" - 5"

Fig. 248 & 248L
Eye Rod Not Welded
Size Range: 3/8" - 2 1/2"

Fig. 278 & 278L
Eye Rod Welded
Size Range: 3/8" - 2 1/2"

Fig. 248X
Linked Eye Rods
Size Range: 3/8" - 2 1/2"

Fig. 278X
Linked Eye Rods
Welded
Size Range: 3/8" - 2 1/2"

Fig. 148
Rod with Eye End
Size Range: 2 3/4" - 5"

Fig. 135, 135E & 135R
Rod Coupling
Size Range:
Fig. 135: 3/8" - 1"
Fig. 135E: 1/4" - 1"
Fig. 135R: 3/8" x 1/4" - 7/8" x 3/4"

Fig. 136:
Fig. 136R:
Fig. 136 & 136R
Straight Rod Coupling
Size Range: 1/4" - 1"

Fig. 114
Turnbuckle Adjuster
Size Range: 1/4" - 3/4"

Fig. 110R
Socket, Rod Threaded
Size Range: 1/4" - 7/8"

Fig. 157
Extension Piece
Size Range: 3/8" - 7/8"

Fig. 299
Forged Steel Clevis
Size Range: 3/8" - 4"

Fig. 233
Turnbuckle
Size Range: 1 1/4" - 5"

Fig. 230
Turnbuckle
Size Range: 3/8" - 2 1/2"

Fig. 290 & 290L
Weldless Eye Nut
Size Range: 3/8" - 2 1/2"

Fig. 291
Clevis Pin with Cotters
Size Range: 1/2" - 4"

Pipe Rings

Fig. 108
Split Pipe Ring
Size Range: 3/8" - 8"

Fig. 138R
Extension Split Pipe Clamp
Size Range: 3/8" - 3"

Fig. 104
Adjustable Swivel Ring, Split Ring Type
Size Range: 3/8" - 8"

Fig. 69
Adjustable Swivel Ring
Size Range: 1/2" - 8"

PIPE HANGERS (Continued)

Straps

Fig. 126
One-Hole Clamp
Size Range: 3/8" - 4"

Fig. 262
Strap Short
Size Range: 1/2" - 4"

Fig. 243
Pipe Strap
Size Range: 1/2" - 6" pipe

Fig. 244
Pipe Strap
Size Range: 1/2" - 6" pipe

Pipe Rolls

Fig. 177
Adjustable Pipe Roll Support
Size Range: 1" - 30"

Fig. 171
Single Pipe Roll
Size Range: 1" - 30"

Fig. 178
Spring Cushion Hanger

Fig. 181
Adjustable Steel Yoke Pipe Roll
Size Range: 2 1/2" - 24"

Fig. 175
Roller Chair
Size Range: 2" - 30" pipe

Fig. 277
Pipe Roll & Base Plate
Size Range: 2" - 24"

Fig. 271
Pipe Roll Stand
Size Range: 2" - 42"

Fig. 274, 274P & 275
Adjustable Pipe Roll Stand
Size Range: 2" - 42"

Pipe Guides & Slides

Fig. 255
Pipe Alignment Guide
Size Range: 1" - 24" and Insulation Thickness of 1" thru 4" (Also available in copper tube sizes)

Fig. 256
Pipe Alignment Guide
Size Range: 1" - 24" Pipe and Insulation Thickness of 1" thru 4"

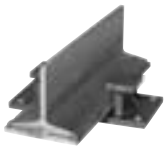


Fig. 257 & 257A
Structural Tee Slide Assembly
Size Range: All Sizes within Maximum Load Rating

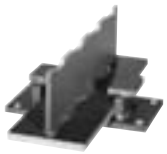


Fig. 436 & 436A
Fabricated Tee Slide Assembly
Size Range: All Sizes within Maximum Load Rating

Fig. 439 & 439A
Structural "H" Slide Assembly
Size Range: 6" - 36"

Fig. 432
Special Clamp
Size Range: 2" - 24"

Fig. 212
Medium Pipe Clamp
Size Range: 2" - 30"

Snubbers

Fig. 3306 & 3307
Hydraulic Shock & Sway Suppressor (Snubber)
Size Range: Six Standard Sizes with Load Ratings from 350 to 50,000 (LBS).

Fig. 312
Tapered Pin
Size Range: 3/8" - 2 1/2"

Fig. 200 & C-200 / Fig. 201 & C-201
Hydraulic Shock & Sway Suppresor (Snubber)
Size Range: Nine standard sizes with load ratings from 350 (LBS) to 120,000 (LBS).

Sway Strut Assembly

Fig. 211, C-211, 640, C-640
Sway Strut Assembly

Fig. 222 & C-222
Mini-Sway Strut Assembly

Spring Hangers

Fig. 82 & C-82
Short Spring

Fig. B-268 & C-268
Standard Spring

Triple Spring,
Triple Spring-CR

Fig. 98 & C-98
Double Spring

Quadruple Spring,
Quadruple Spring-CR

Constant Supports

Model R 80-V
Vertical Constant Support

Model R 81-H
Horizontal Constant Support

Size Range: Anvil Model R constant support hangers are made in two basic designs, 80-V & 81-H constant supports are made in nine different frame sizes & 110 spring sizes to accomodate travels from 1 1/2" to 20" & loads from 27 lbs to 87,500 lbs.

Horizontal Traveler & Sway Brace

Fig. 170
Horizontal Traveler
Size Range: Available in Four Sizes to Take Loads to 20,700 (LBS). All sizes provide for 12" of Horizontal Travel.

Fig. 296, 297, 298, 301, 302 & 303
Sway Brace
Size Range: Pre Loads from 50 to 1,800 Pounds & maximum forces from 200 to 7,200 Pounds.

PIPE HANGERS • SWAY BRACE - SEISMIC

Pipe Brace Clamps

Fig. 770
Q Brace Clamp
Size Range: 1" - 6"
Service Pipe

Fig. 776
Brace Clamp
Size Range: 2½" - 8"
Service Pipe

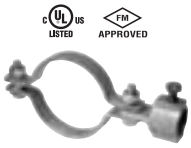


Fig. 775
Lateral/Longitudinal
Brace Clamp
Size Range: 2½" - 8"
Service Pipe

Structural Attachments

Fig. 778
Bar Joist and Beam
Attachment (WF)
Size Range: Flange
Thickness ⅛" thru ¾"

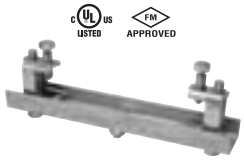


Fig. 772
Adjustable Steel Beam
Attachment
Size Range: Flange Widths
4" thru 15"

Fig. 779
Multi-Connector
Adapter
Size Range: 1" - 8"
Service Pipe

Restraints

Fig. 773
Surge Restrainer
Size Range: ¾" - 2"
Swivel Ring Hanger

Fig. 777
Swivel Joint
Connector Rod Tap
Size Range: ⅜" Rod
Diameter

Sway Brace Attachment

Fig. 771
Sway Brace Swivel Attachment
Size Range: 1" and 1¼" Brace Pipe

ANVIL-STRUT™
A BRAND OF ANVIL INTERNATIONAL

Channels

AS 100
Channel
Size: 1⅝" x 3¼" x 12 GA.

AS 100EH
Channel with Elongated Holes
Size: 1⅝" x 3¼" x 12 GA.
9/16" x 1⅛" Elongated Holes on 2" Centers.

AS 100KO
Channel with Knock Outs
Size: 1⅝" x 3¼" x 12 GA.
⅞" Knock Outs on 6" Centers.

AS 100H
Channel with Holes
Size: 1⅝" x 3¼" x 12 GA.
9/16" Holes on 1⅞" Centers.

AS 100S
Channel with Long Slots
Size: 1⅝" x 3¼" x 12 GA.
13/32" x 3" Slots on 4" Centers

AS 100BTB
Welded Channel
Size: 1⅝" x 6½" x 12 GA.
Two Pcs. AS 100 Welded Back-to-Back.

AS 150
Channel
Size: 1⅝" x 2⅞" x 12 GA.

AS 150EH
Channel with Elongated Holes
Size: 1⅝" x 2⅞" x 12 GA.
9/16" x 1⅛" Elongated Holes on 2" Centers.

AS 150KO
Channel with Knock Outs
Size: 1⅝" x 2⅞" x 12 GA.
⅞" Knock Outs on 6" Centers.

AS 150H
Channel with Holes
Size: 1⅝" x 2⅞" x 12 GA.
9/16" Holes on 1⅞" Centers.

AS 150S
Channel with Long Slots
Size: 1⅝" x 2⅞" x 12 GA.
13/32" x 3" Slots on 4" Centers.

AS 150BTB
Welded Channel
Size: 1⅝" x 4⅞" x 12 GA.
Two Pcs. AS 150 Welded Back-to-Back.

AS 200
Channel
Size: 1⅝" x 1⅝" x 12 GA.

AS 200EH
Channel with Elongated Holes
Size: 1⅝" x 1⅝" x 12 GA.
9/16" x 1⅛" Elongated Holes on 2" Centers.

AS 200KO
Channel with Knock Outs
Size: 1⅝" x 1⅝" x 12 GA.
⅞" Knock Outs on 6" Centers.

AS 200H
Channel with Holes
Size: 1⅝" x 1⅝" x 12 GA.
9/16" Holes on 1⅞" Centers.

AS 200S
Channel with Long Slots
Size: 1⅝" x 1⅝" x 12 GA.
13/32" x 3" Slots on 4" Centers.

AS 200H3
Channel with Holes on all Three Sides
Size: 1⅝" x 1⅝" x 12 GA.
9/16" Holes on all three sides are on 1⅞" Centers.

AS 200BTB
Welded Channel
Size: 1⅝" x 3¼" x 12 GA.
Two Pcs. AS 200 Welded Back-to-Back.

AS 200EH BTB
Welded Channel
Size: 1⅝" x 3¼" x 12 GA.
Two Pcs. AS 200EH Welded Back-to-Back.
9/16" x 1⅛" Elongated Holes on 2" Centers.

AS 200STS
Welded Channel
Size: 1⅝" x 3¼" x 12 GA.
Two Pcs. AS 200 Welded Back-to-Back.

AS 200BTS
Welded Channel
Size: 1⅝" x 3¼" x 12 GA.
Two Pcs. AS 200 Welded Side-to-Back.

AS 200STSR
Welded Channel
Size: 1⅝" x 3¼" x 12 GA.
Two Pcs. AS 200 Welded Side-to-Opposite Side.

AS 210
Channel
Size: 1⅝" x 1⅝" x 14 GA.

AS 210EH
Channel with Elongated Holes
Size: 1⅝" x 1⅝" x 14 GA.
9/16" x 1⅛" Elongated Holes on 2" Centers.

AS 210KO
Channel with Knock Outs
Size: 1⅝" x 1⅝" x 14 GA.
⅞" Knock Outs on 6" Centers.

AS 210H
Channel with Holes
Size: 1⅝" x 1⅝" x 14 GA.
9/16" Holes on 1⅞" Centers.

AS 210S
Channel with Long Slots
Size: 1⅝" x 1⅝" x 14 GA.
13/32" x 3" Slots on 4" Centers.

AS 210BTB
Welded Channel
Size: 1⅝" x 3¼" x 14 GA.
Two Pcs. AS 210 Welded Back-to-Back.

AS 300
Channel
Size: 1⅝" x 1⅜" x 12 GA.

AS 300EH
Channel with Elongated Holes
Size: 1⅝" x 1⅜" x 12 GA.
9/16" x 1⅛" Elongated Holes on 2" Centers.

AS 300KO
Channel with Knock Outs
Size: 1⅝" x 1⅜" x 12 GA.
⅞" Knock Outs on 6" Centers.

AS 300H
Channel with Holes
Size: 1⅝" x 1⅜" x 12 GA.
9/16" Holes on 1⅞" Centers.

AS 300S
Channel with Long Slots
Size: 1⅝" x 1⅜" x 12 GA.
13/32" x 3" Slots on 4" Centers.

AS 300BTB
Welded Channel
Size: 1⅝" x 2¾" x 12 GA.
Two Pcs. AS 300 Welded Back-to-Back.

ANVIL-STRUT™ (Continued)

Channels *(continued)*

AS 400
Channel
Size: 1 5/8" x 1" x 12 GA.

AS 400EH
Channel with Elongated Holes
Size: 1 5/8" x 1" x 12 GA.
9/16" x 1 1/8" Elongated Holes on 2" Centers.

AS 400KO
Channel with Knock Outs
Size: 1 5/8" x 1" x 12 GA.
7/8" Knock Outs on 6" Centers.

AS 400H
Channel with Holes
Size: 1 5/8" x 1" x 12 GA.
9/16" Holes on 1 7/8" Centers.

AS 400S
Channel with Long Slots
Size: 1 5/8" x 1" x 12 GA.
13/32" x 3" Slots on 4" Centers.

AS 400BTB
Welded Channel
Size: 1 5/8" x 2" x 12 GA.
Two Pcs. AS 400 Welded Back-to-Back.

AS 500
Channel
Size: 1 5/8" x 13/16" x 14 GA.

AS 500EH
Channel with Elongated Holes
Size: 1 5/8" x 13/16" x 14 GA.
9/16" x 1 1/8" Elongated Holes on 2" Centers.

AS 500H
Channel with Holes
Size: 1 5/8" x 13/16" x 14 GA.
9/16" Holes on 1 7/8" Centers.

AS 500S
Channel with Long Slots
Size: 1 5/8" x 13/16" x 14 GA.
13/32" x 3" Slots on 4" Centers.

AS 500BTB
Welded Channel
Size: 1 5/8" x 1 5/8" x 14 GA.
Two Pcs. AS 500 Welded Back-to-Back.

AS 520
Channel
Size: 1 5/8" x 13/16" x 12 GA.

AS 520EH
Channel with Elongated Holes
Size: 1 5/8" x 13/16" x 12 GA.
9/16" x 1 1/8" Elongated Holes on 2" Centers.

AS 520H
Channel with Holes
Size: 1 5/8" x 13/16" x 12 GA.
9/16" Holes on 1 7/8" Centers.

AS 520S
Channel with Long Slots
Size: 1 5/8" x 13/16" x 12 GA.
13/32" x 3" Slots on 4" Centers.

AS 520BTB
Welded Channel
Size: 1 5/8" x 1 5/8" x 12 GA.
Two Pcs. AS 520 Welded Back-to-Back.

AS 560
Channel
Size: 1 5/8" x 13/16" x 16 GA.

AS 560EH
Channel with Elongated Holes
Size: 1 5/8" x 13/16" x 16 GA.
9/16" x 1 1/8" Elongated Holes on 2" Centers.

AS 707
Metal Raceway Closure Strip
For All 1 5/8" Width Channels.
(10' Length)

AS 707P
Metal Painted Closure Strip
For All 1 5/8" Width Channels.
(10' Length)

Channel Hardware

AS 3281
Double Conveyer Adjusting Nut
Use with all 1 5/8" wide channel

AS 83
Hexagon Nut

Fig. 135
Rod Coupling

Fig. 146
Continuous Threaded Rod

AS 209
Flat Washer

AS 203
Linked Eyelet with Stud

AS 211
Lock Washer

AS 230
Fender Washer

AS 6075
Slotted Hex Head Machine Screw

AS 6108
Square Nut

AS 3500
Seismic Rod Stiffener

AS 6024
Hex Head Cap Screw

Channel Nuts

AS NS - Clamping Nut without Spring
Use with all 1 5/8" wide channel

AS SS - Clamping Nut with Short Spring
Use with AS 400 and AS 500

AS RS - Clamping Nut with Regular Spring
Use with AS 200, AS 210 and AS 300

AS LS - Clamping Nut with Long Spring
Use with AS 100 & AS 150

AS TG - Top Grip Nut with Spring on Top
Use with all 1 5/8" wide channel

AS 517
Stud Nut with RS Spring

ANVIL-STRUT™ (Continued)

Clamps & Accessories

AS 85
Rod or Insulator Support

Fig. 86
Clamp with Lock Nut

Fig. 93
Top Beam "C" Clamp
Size Range: 3/8" - 1/2"

Fig. 94
Top Beam "C" Clamp
Size Range: 5/8" - 3/4"

Fig. 95
Clamp with Lock Nut

AS 135X
Light Duty Beam Clamp

AS 684
Beam Clamp

AS 685
Beam Clamp

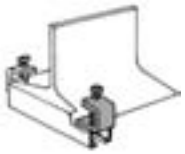
AS 686
Beam Clamp

AS 855
Angular "C" Beam Clamp
AS 855 1 - Use with AS 200 and AS 210.
AS 855 2 - Use with AS 500.

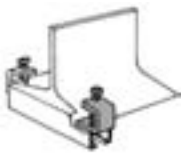
AS 858
Heavy Duty Suspension Rod Beam Clamp
Safety Anchor Strap AS 871 sold separately.

AS 865
Wide Throat Heavy Duty Beam Clamp
Safety Anchor Strap AS 871 sold separately.

AS 871
Safety Anchor Strap
(For Heavy Duty Beam Clamps)



AS 907
"I" Beam Clamp
Includes Cup Point Set Screw.

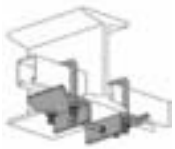


AS 998
"I" Beam Clamp
Includes Set Screw.

AS 2623
Swivel Adapter
Use with AS 2622 Beam Clamp.

AS 2651
Beam Clamp

AS 2656
"U" Bolt Beam Clamp with Hook



AS 2657
Double "U" Bolt Beam Clamp

Splice Clevis

AS 631
Two Hole Splice Clevis
Use with AS 200 & AS 210.

AS 644
Two Hole Splice Clevis
Use with AS 500 & AS 520.

AS 629
Three Hole Splice Clevis
Use with AS 200 & AS 210.

AS 645
Three Hole Splice Clevis
Use with AS 500 & AS 520.

AS 616
Four Hole Splice Clevis
Use with AS 200 & AS 210.

AS 646
Four Hole Splice Clevis
Use with AS 500.

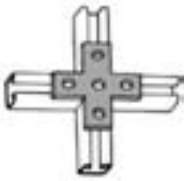
Plates

AS 601
Two Hole Splice Plate

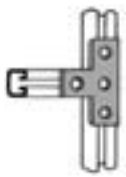
AS 602
Three Hole Splice Plate

AS 617
Three Hole Swivel Plate

AS 620
Two Hole Connecting Plate



AS 712
Cross Plate



AS 714
"T" Plate

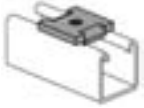
AS 715
"T" Plate - 90°

AS 718
Flat Angle Plate

AS 719
Four Hole Corner Plate

AS 888
Four Hole Splice Plate

AS 619
Square Washer



AS 2504
Square Washer with Channel Guide

ANVIL-STRUT™ (Continued)

"U" Supports

AS 613
"U" Support
Use with AS 200, AS 210 and AS 500BTB.

AS 679
"U" Support
Use with AS 100, AS 200BTB and AS 210BTB.

AS 710
"U" Support
Use with AS 300.

AS 929
"U" Support
Use with AS 500 & AS 520.

AS 978
"U" Support
Use with AS 400.

AS 2119
"U" Connector

AS 2648
"U" Support
Use with AS 150.

AS 687
Slotted "U" Support
Use with AS 200 & AS 210.

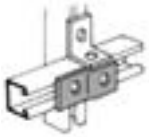
AS 721
"U" Support
Use with AS 100, AS 200BTB and AS 210BTB.

AS 678
Three Hole "U" Support
Use with AS 150BTB.

AS 733
Six Hole "U" Support
Use with AS 200 & AS 210.

AS 735
Eight Hole "U" Support
Use with AS 200BTB.

"Z" Supports

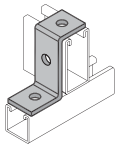


AS 609
Two Hole Offset "Z" Support

AS 611
"Z" Support
Use with AS 200, AS 210 and AS 500BTB.

AS 612
"Z" Support
Use with AS 400.

AS 711
"Z" Support
Use with AS 300.



AS 756
"Z" Support
Use with AS 100, AS 200BTB & AS 210BTB.

AS 928
"Z" Support
Use with AS 500 & AS 520.

AS 2601
"Z" Support
Use with AS 150.

Angle Fittings and Connectors

AS 603
Two Hole End Angle

AS 604
Two Hole Corner Angle

AS 624
Two Hole Closed Angle Connector

AS 633
Two Hole Open Angle Connector

AS 763, AS 764
Slotted Adjustment Corner Angle

AS 806
Two Hole Angle with Impressions on Both Legs

AS 921
One Hole Angle

AS 2144
Corner Angle

AS 2520
Two Hole Adjustment Angle

AS 2545
Slotted 90° Angle

AS 605
Three Hole Corner Angle

AS 606
Three Hole Corner Angle

AS 745
Three Hole Corner Angle

AS 3049
Two Hole Slotted 90° Corner Connector

AS 607
Four Hole Corner Angle

AS 781
Four Hole Open Angle Connector

AS 793
Four Hole Closed Angle Connector

AS 614
Four Hole Joint Corner Connector

AS 615
Four Hole Shelf Joint Angle Connector

AS 689
Adjustable Double Slotted Corner Connector

AS 748
Four Hole Corner Joint Connector

AS 927
Five Hole Corner Connector

AS 744
Flat Corner Connector

AS 750
Four Hole Corner Connector

ANVIL-STRUT™ (Continued)

Angle Fittings and Connectors *(continued)*

AS 2190
Flat Corner Connector

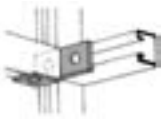
AS 747
Symmetrical Four Hole Connector

AS 854
Flat Connector

AS 925
Symmetrical Three Hole Joint Connector

AS 2112
Cross Connector

AS 665
Four Hole Double Corner Connector

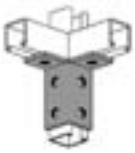


AS 720
RH & LH Angle Plate Connector

AS 922 RH & LH
Two Hole Single Corner Angle Connector

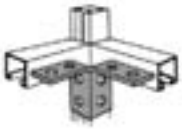
AS 923
Five Hole Two Angle Connector

AS 2128 RH & LH
Six Hole Corner Connector



AS 666
Six Hole Double Corner Connector

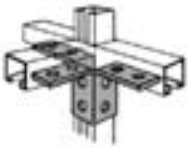
AS 821
Eight Hole Double Angle Connector



AS 667
Eight Hole Double Corner Connector

AS 913
Ten Hole Two Angle Clevis Connector

AS 668
Six Hole Three Angle Connector



AS 669
Twelve Hole Three Angle Clevis Connector

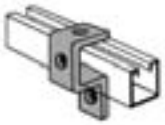
AS 2560 & AS 2561
Conduit Connector Fitting Assembly

AS 3060
Offset Connector

AS 9402
Two Hole Hinge Connector

AS 9403
Three Hole Hinge Connector

AS 9404
Four Hole Hinge Connector



AS 677
Cup Support for Standard Single Strut
Use with AS 200 and AS 210.

AS 993
Inside Clevis

AS 2401 thru AS 2403
Ladder Rung

Post Bases

AS 2064
Double Column Post Base
Use with AS 100, AS 200BTB, AS 200STS, AS 200BTS and AS 200STR Channel

AS 3013
Single Column Post Base
Use with AS 200 and AS 210 Channel.

AS 3013 SQ
Single Column Post Base
Use with AS 200 and AS 210 Channel.

AS 3013 FL
Single Column Post Base
Use with AS 200 and AS 210 Channel.

AS 3025
Post Base
Use with AS 200 and AS 210 Channel.

AS 3025 FL
Post Base
Use with AS 200 and AS 210 Channel.

AS 3029
Double Column Post Base
Use with all 3¼" Channels.

AS 3033
Post Base
Use with AS 200 and AS 210 Channel.

AS 3040
Post Base
Use with AS 200 and AS 210 Channel.

AS 3064
Double Column Post Base
Use with all 3¼" Channels.

AS 3064 SQ
Double Column Post Base
Use with all 3¼" Channels.

AS 9400
Adjustable Base

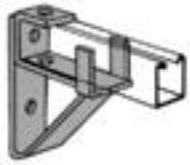
ANVIL-STRUT™ (Continued)

Brackets

AS 651
Reversible Strut Bracket

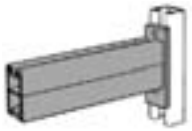
AS 661 T1
Strut Bracket (Slot Up)

AS 661 T2
Strut Bracket (Slot Down)



AS 708
Single Channel Bracket Support
Use with AS 200, AS 210 and AS 500BTB.

AS 732
Shelf Bracket



AS 809
Double Channel Bracket

AS 825 RH/LH
Pipe Axle Support

AS 838 RH/LH
6" thru 30" Shelf Bracket

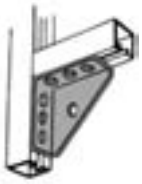
AS 926
Strut Brace

AS 2404 thru AS 2408
Wall Ladder Bracket

AS 2421
45˚ Stair Tread Support

AS 2422
34½˚ Stair Tread Support

AS 3164
Double Channel Bracket Support
Use with all 3¼" Channels.

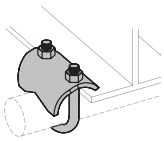


AS 3373
Universal Angle Bracket

AS 2627
Spacer Clevis

AS 2654 & AS 2654A
Column Attachment

Pipe and Conduit Supports



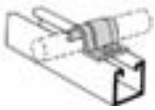
AS 51
Right Angle Pipe or Conduit Clamp

Fig. 67
Pipe or Conduit Hanger

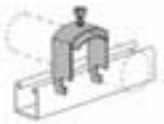
Fig. 69
Swivel Ring Hanger

Fig. 137
"U" Bolt with Nuts Long Tangent

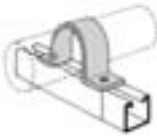
AS 270
Conduit Clamp



AS 1450
One Hole Clamp for O.D. Tubing



AS 3101 thru AS 3115
One Piece Cable and Conduit Clamp



AS 3126
Hold Down Clamp

AS 1000
EMT Conduit Clamps
Offered in Pre-Assembled only.

AS 1100
Rigid Steel Conduit Clamps
Offered in Pre-Assembled only.

AS 1200
O.D. Tubing Clamp
Offered in Pre-Assembled only.

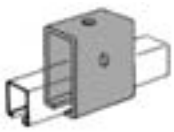
AS 1300
Universal Pipe Clamp
Offered in Pre-Assembled only.

Trolleys & Accessories

AS 2521
Two Wheel Trolley
Use with AS 200 Channel.

AS 2522
Four Wheel Trolley
Use with AS 200 Channel.

AS 2528
Trolley Beam Standard Support
Use with AS 200 and AS 210 Channel.



AS 2528-1
Trolley Beam Joint Support
Use with AS 200 and AS 210 Channel.

ANVIL-STRUT™ (Continued)

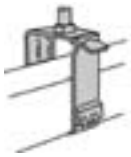
Pipe and Conduit Supports *(continued)*

AS 815
(6" to 18" Pipe)
Double Roller Pipe Support

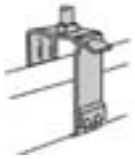
AS 1901
(1" to 8" Pipe)
Pipe Roller Support

AS 1902
(1" to 8" Pipe)
Pipe Roller Support

AS 1911
(2" to 14" Pipe)
Pipe Roller Support



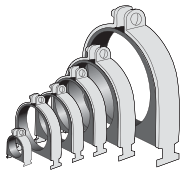
AS 2631
Swing Gate Fixture Hanger
Use with AS 200, AS 210, AS 300, AS 400 and AS 500 Channels.



AS 2631D
Swing Gate Fixture Hanger
Use with AS 100, AS 150, AS 200BTB and AS 210BTB Channels.

AS 3138
Parallel Pipe Clamp

AS 3792
Cushion Strip



AS 0040D thru AS 106P
Cushion Clamp Assembly

Klo-Shure® Strut-Mounted
Insulation Couplings with Strut Clamp

Klo-Shure® Strut-Mounted
Insulation Couplings with Non Metallic Strut Clamp

Klo-Shure® Strut-Mounted
Insulation Couplings for Fiberglass Insulation

Concrete Inserts

Fig. 152
Screw Concrete Insert

Fig. 285
Light Weight Concrete Insert

AS 349
Continuous Concrete Insert
with or without Closure Strip and End Cap Installed.

AS 449
Continuous Concrete Insert
with or without Closure Strip and End Cap Installed.

AS 6151
Plastic Closure Strip

End Caps

AS 653
Type "B" End Cap Anchor
Use with AS 349 Insert.

AS 654
Type "B" End Cap Anchor
Use with AS 449 Insert.

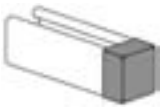
AS 655 & AS 656
Type "A" End Cap
Use with AS 200 Channel. Use with AS 300 Channel and AS 349 Insert.

AS 901 & AS 902
Type "A" End Cap
Use with AS 100 and AS 400 Channel.

AS 930
Type "A" End Cap
Use with AS 500 Channel.

AS 2580
Type "A" End Cap
Use with AS 150 Channel.

AS 2511
End Cap with Knockout
AS 2511 1 – Use with AS 100.
AS 2511 2 – Use with AS 200 and AS 210.
AS 2511 3 – Use with AS 300.



AS 6153
Safety End Cap
AS 6153 1 – Use with AS 100.
AS 6153 2 – Use with AS 200 and AS 210.
AS 6153 3 – Use with AS 300.
AS 6153 5 – Use with AS 500.

1. CONTROLLING PROVISIONS:
These terms and conditions shall control with respect to any purchase order or sale of Seller's products. No waiver, alteration or modification of these terms and conditions whether on Buyer's purchase order or otherwise shall be valid unless the waiver, alteration or modification is specifically accepted in writing and signed by an authorized representative of Seller.

2. DELIVERY:
Seller will make every effort to complete delivery of products as indicated on Seller's acceptance of an order, but Seller assumes no responsibility or liability, and will accept no backcharge, for loss or damage due to delay or inability to deliver caused by acts of God, war, labor difficulties, accident, delays of carriers, by contractors or suppliers, inability to obtain materials, shortages of fuel and energy, or any other causes of any kind whatever beyond the control of Seller. Seller may terminate any contract of sale of its products without liability of any nature, by written notice to Buyer, in the event that the delay in delivery or performance resulting from any of the aforesaid causes shall continue for a period of sixty (60) days. Under no circumstances shall Seller be liable for any special or consequential damages or for loss, damage, or expense (whether or not based on negligence) directly or indirectly arising from delays or failure to give notice of delay.

3. WARRANTY:
Seller warrants for one year from the date of shipment Seller's manufactured products to the extent that Seller will replace those having defects in material or workmanship when used for the purpose and in the manner which Seller recommends. If Seller examination shall disclose to its satisfaction that the products are defective, and an adjustment is required, the amount of such adjustment shall not exceed the net sales price of the defective products only and no allowance will be made for labor or expense of repairing or replacing defective products or workmanship of damage resulting from the same. Seller warrants the products which it sells of other manufacturers to the extent of the warranties of their respective makers. Where engineering design or fabrication work is supplied. Buyer's acceptance of Seller's design or of delivery of work shall relieve Seller of all further obligation, other than expressed in Seller's product warranty. THIS IS SELLER'S SOLE WARRANTY. SELLER MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FOR A PARTICULAR PURPOSE WHICH EXCEED SELLER'S AFORESTATED OBLIGATION ARE HEREBY DISCLAIMED BY SELLER AND EXCLUDED FROM THIS WARRANTY. Seller neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of its engineering designs or products. This warranty shall not apply to any products or parts of products which (a) have been repaired or altered outside of Seller's factory, in any manner: (b) have been subjected to misuse, negligence or accidents; (c) have been used in a manner contrary to Seller's instructions or recommendations. Seller shall not be responsible for design errors due to inaccurate or incomplete information supplied by Buyer or its representatives.

4. SELLER'S LIABILITY:
Seller will not be liable for any loss, damage, cost of repairs, incidental or consequential damages of any kind, whether based upon warranty (except for the obligation accepted by Seller under "Warranty" above), contract or negligence, arising in connection with the design, manufacture, sale, use or repair of the products or of the engineering designs supplied to Buyer.

5. RETURNS:
Seller cannot accept return of any products unless its written permission has been first obtained, in which case same will be credited subject to the following (a) All material returned must, on its arrival at Seller's Plant, be found to be in first-class condition; if not, cost of putting in saleable condition will be deducted from credit memoranda; (b) A handling charge deduction of twenty percent (20%) will be made from all credit memoranda issued for material returned; (c) Transportation charges, if not prepaid will be deducted from credit memoranda.

6. SHIPMENTS:
All products sent out will be carefully examined, counted and packed. The cost of any special packing or special handling caused by Buyer's requirements or requests shall be added to the amount of the order. No claim for shortages will be allowed unless made in writing within ten (10) days of receipt of a shipment.

Claims for products damaged or lost in transit should be made on the carrier, as Seller's responsibility ceases, and title passes, on delivery to the carrier.

7. SPECIAL PRODUCTS:
Orders covering special or nonstandard products are not subject to cancellation except on such terms as Seller may specify on application.

8. PRICES AND DESIGNS:
Prices and designs are subject to change without notice. All prices are F.O.B. Point of shipment, unless otherwise stated.

9. TAXES:
The amount of any sales, excise or other taxes, if any, applicable to the products covered by this order, shall be paid by Buyer unless Buyer provides Seller with an exemption certificate acceptance to the taxing authorities.

10. NUCLEAR PLANTS:
Where the products, engineering design or fabrication is for nuclear plant applications. Buyer agrees (a) to take all necessary steps to add Seller as an insured under the American Nuclear Insurers' (ANI) pool and under the Mutual Atomic Energy Reinsurance Pool (MAERP) for property damage and liability insurance and if necessary steps could have been taken, but are not taken, Buyer shall hold Seller harmless against all such losses which could have been thus covered (b) Buyer agrees to hold Seller harmless with respect to any personal injury (or death), property damage or other loss in a nuclear incident which is caused directly or indirectly by defective design, material, workmanship furnished by Buyer (or which could be so covered but with respect to which Buyer has elected to self-insure), and further agrees to waive subrogation by its carriers of such insurance against Seller, and (c) as to nuclear hazards for which Buyer cannot obtain insurance coverage, the liability of Seller for any personal injury (or death), property damage or other loss directly caused by defective design, material, or workmanship furnished by Seller shall not exceed the value at the time of the loss occurrence.

11. MINIMUM INVOICE:
Domestic: $100 plus transportation.
International: $500 plus transportation.

12. TERMS:
Cash, net 30 days unless otherwise specified.

NOTE: All orders are accepted on the basis of prices in effect at the time of shipment.

NOTICE: The prices and terms quoted, there will be added any manufacturers or sales tax payable on the transaction under any effective statute.

FREIGHT ALLOWANCE: All prices are F.O.B. point of shipment. On shipments weighing 2,500 pounds or more, rail freight or motor freight at the lowest published rate, is allowed to all continental U.S. rail points or all U.S. highway points listed in published tariffs (Alaska and Hawaii excluded). In no case will more than actual freight be allowed. Shipments (weighing less than 2,500 pounds) will be shipped prepaid. The buyer will be invoiced for freight costs at the applicable published class, exception or commodity rate(s) or charge(s). Anvil reserves the right to select the carrier for all shipments.

Victaulic®	Gruvlok®	Couplings & Gaskets
07/107	7400	Rigidlite® Coupling
07/107	7401	Rigidlok® Coupling
45/46	7084/7085	Flg x Grv Adapter-150/300#
72	7042FF	Outlet Coupling fnpt
75	7000	Lt. Wt. Flexible Coupling
77	7001	Flexible Coupling
78	7003	Hinge Coupling
99	7005	Rough Neck Coupling
741/743	7012/7013	Grooved Flange-150/300#
995/997	7305/7307	HDPE Coupling
ES	EG	End Guard Gasket
FS	FG	Flush Gap Gasket
Grade E	Grade E	Gasket EPDM
Grade L	Grade L	Gasket Silicone
Grade O	Grade O	Gasket Viton
Grade T	Grade T	Gasket Nitrile
HP-70	7004HPR	HPR Coupling
HP-70ES	7004EG	End Guard Coupling
NA	7400	300 p.s.i. Rigid Coupling

Victaulic®	Gruvlok®	Mechanical
47	7088/7089	Di-Electric Nipple
155	7240	Expansion Joint
300	7700	Butterfly Valves
416	400G	Large Silent Check Valve
700	7600	Butterfly Valve
709	8000	Large Butterfly Valve
716	7811	Check Valve
721	7500	Ball Valve
730	7260	Tee Strainer
731	7250	Suction Diffuser
732	758, 768	Wye Strainer
733	Available	Venturi - Grooved
789	GBV-G	Balancing Valve
NA	722	Triple Service Valve
NA	SF21-GF	Flex Connector, F x G
R-10F	7050RF	Base Ell Reducing, F x G
VE272	3006/C	Grooving Tools
VE416	3007	Grooving Tools

Copper Victaulic®	Gruvlok®	CTS Copper Product
606/607	6400	Rigid Coupling - Copper
608	6721	Copper Butterfly Valve
610	6050	Copper 90° Ell
611	6051	Copper 45° Ell
620	6060	Copper Tee
625	6061	Copper Reducing Tee, G x G
626	6064	Copper Reducing Tee, G x C
641	6084	Flange - Copper
650	6072	Copper Conc. Reducer, G x G
652	6075	Copper Conc. Reducer, G x C
660	6074	Copper Cap
NA	7500B	Copper Ball Valve

Victaulic®	Gruvlok®	Fittings
10	7050	90° Ell
10-P	7050P	Plain-End 90° Ell
11	7051	45° Ell
12	7052	22 1/2° Ell
13	7053	11 1/4° Ell
20	7060	Tee
25	7061	Reducing Tee
29M	7063	Tee with Threaded Branch
29T	7064	Reducing Tee with Threaded Branch
30	7069	Lateral 45°
30R	7070	Reducing Lateral 45°
32	7066	True Wye
32R	7067	Reducing Tee Wye
33	7071	True Wye
43/40	7080/7081	Nipples, G x G/G x T
50	7072	Concentric Reducer
51	7073	Eccentric Reducer
52	7076	Reducer Groove x Thread
53	7077	Swaged Reducer Nipple
60	7074	Cap
80	7087	Female Threaded Adapter
100	7050LR	Long Radius 90° Ell
110	7051LR	Long Radius 45° Ell

Victaulic®	Gruvlok®	Fire Protection
001	7450	90° Ell (Short Pattern)
002	7460	Tee (Short Pattern)
75	7000A	Lt. Wt. Flexible Coupling
005	7400A	Lt. Wt. Rigid Sprinkler Coupling
27	7065	Standpipe Tee
61	7075	Bull Plug
96	7105	Sock-It® Reducing Tee
705W	7722-3D	UL/FM Butterfly Valve w/s
717	78FP	UL/FM Valve
750	7010	Reducing Coupling
920	7045	Clamp Tee Fnpt Outlet
920	7046	Clamp Tee Grooved Outlet
920	7048	Clamp Cross
925	7044	Econ. Clamp Tee Fnpt
961	7100	Sock-It® 90° Ell

Victaulic®	Gruvlok®	Stainless Steel
489	7400SS	Rigid Coupling - 316SS
89	7401	Rigid Coupling - Ductile Iron
20-SS	7060-SS04	Sch. 10 Tee 304L
20-SS-SW	7061-SS04	Sch. 10 Reducing Tee 304L
50-SSLT	7072-SS04	Sch. 10 Conc. Reducer 304L
51-SSLT	7073-SS04	Sch. 10 Ecc. Reducer 304L
60-SS	7074-SS04	Sch. 10 Cap 304L
100-SS	7050-SS04	Sch. 10 90° Ell 304L
110-SS	7051-SS04	Sch. 10 45° Ell 304L
721S	7500SS	SS Ball Valve

Today Anvil® International is the largest and most complete fitting and hanger manufacturer in the world.

2004 Anvil® International acquires Star Pipe Products, Building and Construction Divisions (SPF) and forms AnvilStar™ Fire Products Division.

2001 Anvil® International acquires Merit® Manufacturing and Beck Manufacturing.

2000 The industry's trusted manufacturer of pipe fittings, hangers and grooved fittings is renamed Anvil® International, Inc.

1999 Tyco sells the distribution and manufacturing operations known up to this point as "Grinnell Supply Sales", but keeps the Grinnell® trademark.

1994 J.B. Smith™ and Catawissa™ join the Grinnell Supply Sales and Manufacturing division.

1969 Grinnell Co. acquired by International Telephone and Telegraph. Two years later, ITT divests the Fire Protection Division, but keeps the manufacturing and sales divisions that will become known as Anvil® International.

1960 Gruvlok® line of grooved fittings is introduced.

1919 General Fire Extinguisher Co. becomes Grinnell Co.

1909 Frederick Grinnell opens a foundry in Cranston, RI. Companies express interest in buying its piping products, laying the groundwork for what would become the Grinnell Supply Sales Division. It would be these manufacturing and sales operations that eventually become Anvil® International.

1850 Providence Steam & Gas Pipe Co. is formed, and Frederick Grinnell purchases a controlling interest.

TRUSTED FOR 150 YEARS

We built our reputation from the ground up.

Anvil's history stretches back to the mid 1800s, when a company named Grinnell® began providing its customers with the finest quality pipe products. Since 2000, those quality products and services—and the people who provide them—have been known as Anvil® International. Anvil® customers receive the quality and integrity that have been building strong connections in both products and business relationships for over 150 years.

Focused Product Line:

Anvil® Malleable and Cast Iron Fittings

Anvil® Hangers, Supports and Struts

Beck Welded Pipe Nipples

Anvil® Seamless Pipe Nipples

Anvil® Steel Pipe Couplings and Small Steel Fittings

Merit® Tee-Lets and Drop Nipples

Gruvlok® Couplings, Fittings and Valves

SPF™ Malleable and Cast and Ductile Iron Fittings

SPF™ Grooved Fittings and O'Lets

J.B. Smith Swage Nipples and Bull Plugs

Catawissa® Wing Unions and Check Valves

BUILDING CONNECTIONS THAT LAST

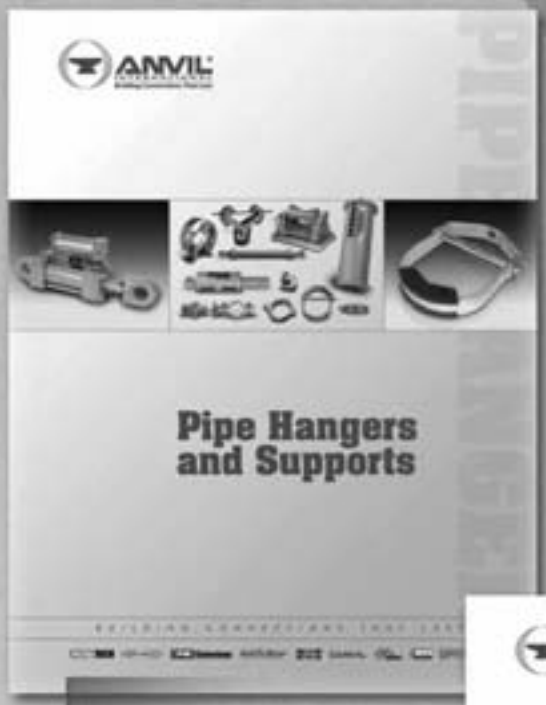
ANVIL® INTERNATIONAL

ANVIL BRANDS: GRUVLOK · SPF/ANVIL · Catawissa · ANVIL EPS · JBS · CANVIL · MERIT · BECK · ANVIL-STRUT · SEMINOLE Tubular Products

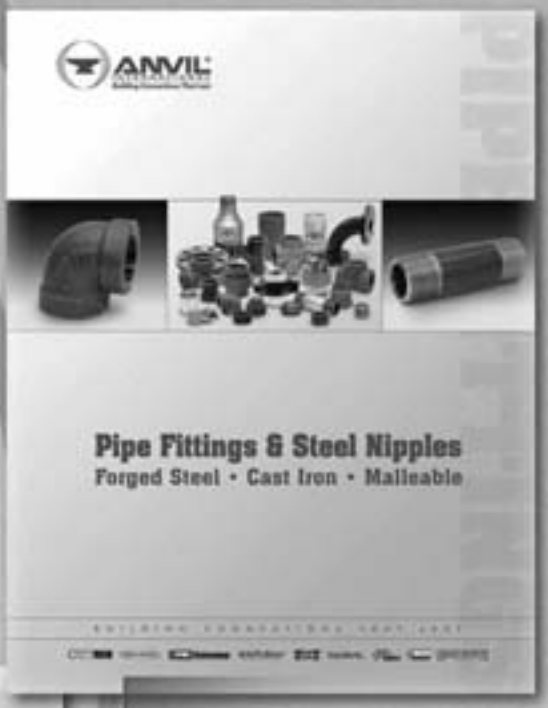
ANVIL INTERNATIONAL

Building Connections That Last

www.anvilintl.com



Pipe Hangers & Support Catalog
Order Document #165



Pipe Fittings Catalog
Order Document #010

Anvil-Strut Metal Framing Product & Engineering Catalog
Order Document #125

Pipe Fitters Handbook
Order Document #030

Gruvlok Mechanical Piping Products Catalog
Order Document #040

BRANDS OF ANVIL INTERNATIONAL

Anvil® product lines include malleable and cast iron fittings, unions and flanges; seamless and welded steel pipe nipples; steel pipe couplings; universal anvilets; forged steel fittings and unions; pipe hangers and supports; threaded rod; and engineered hangers.

The Gruvlok® product line consists of couplings for grooved and plain-end fittings, butterfly valves and check valves; flanges; pump protection components; pipe grooving tools; as well as copper and stainless steel system components.

Anvil-Strut™ products include a complete line of channel in stock lengths of 10 and 20 feet, with custom lengths available upon request. A variety of fittings and accessories are also offered. All products can be ordered in an assortment of finishes and material choices including SupR-Green™, Zinc Trivalent Chromium, pre-galvanized, hot-dip galvanized, electro-galvanized, aluminum, plain, and stainless steel.

JB Smith™ is the leading manufacturer of oil country tubular fittings, swages and bull plugs – all meeting API specifications. Offering tubing nipples, casing nipples as well as a full line of traditional line pipe and oil country threads in every schedule, JB Smith is the resource for all your oilfield needs.

Catawissa™ NACE and API approved wing unions for Standard Service are offered in non-pressure seal ends as well as threaded and butt weld, and are interchangeable with most leading union manufacturers. Fully traceable and available with complete mill certifications, Catawissa's oilfield wing union product line includes the standard ball-and-cone design plus our unique Figure 300 Flat Face design, where space and pipe line separation are a consideration.

The SPF/Anvil™ product line includes a variety of internationally sourced products such as grooved couplings, fittings and flanges, cast iron, malleable iron and ductile iron threaded fittings, steel pipe nipples, as well as o'lets.

The Merit® product line includes a variety of tee-lets, drop nipples, and steel welding flanges for fire protection applications. Most Merit products are UL/ULC Listed, FM Approved, and rated from 175 to 300 psi.

Steel pipe nipples and steel pipe couplings are manufactured in accordance with the ASTM A733 Standard Specification for Welded and Seamless Carbon Steel and Stainless Steel Pipe Nipples. Steel pipe couplings are manufactured in accordance with the ASTM A865 Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints. API couplings are manufactured in accordance with the API Specification for line pipe.

Canvil® manufactures low pressure hexagon reducer bushings, as well as plugs and hex caps up to 1" in diameter in various finishes including Oil Treat, Phosphate and Electro Galvanized. In addition, Canvil manufactures A105 hex or round material in class 3000 and 6000 pound, forged steel couplings and bar stock products offered as either as normalized (A105N) or non-normalized (A105) that are fully traceable for mechanicals and chemistry through our MTR program.

Anvil EPS-Engineered Pipe Supports are products used to support piping systems under thermal, seismic, and other dynamic loading conditions. The product line encompasses variable spring hangers, constant supports, sway struts and snubbers as well as standard and special design clamps. Anvil EPS brings the highest quality products and innovative engineering solutions to common and uncommon piping system problems.

ANVIL® INTERNATIONAL
Building Connections That Last

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E-mail: sales@anvilintl.com

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Toll Free: 1-800-451-4414

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International Customer Service
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U.S. REGIONAL DISTRIBUTION CENTERS

UNIVERSITY PARK

750 Central Avenue
University Park, IL 60484

COLUMBIA

800 Malleable Road
Columbia, PA 17512

IRVING

1401 Valley View Lane, Suite 150
Irving, TX 75061

ONTARIO

1470 S. Vintage Avenue
Ontario, CA 91761

ANVIL EPS

Engineered Pipe Supports
Customer Service Center

160 Frenchtown Road
North Kingstown, RI 02852

Tel: 401-886-3000
Fax: 401-886-3010
Toll Free: 1-877-406-3108

additional INVENTORY LOCATIONS*

UNITED STATES: Arizona, Colorado, Georgia, Indiana, Massachusetts, Minnesota, Missouri, New York, Tennessee, Texas, Washington and Wisconsin

INTERNATIONAL: Ontario, Canada

*Inventory varies at locations

BUILDING CONNECTIONS THAT LAST

GRUVLOK · SPF/ANVIL · Catawissa · ANVIL EPS · JBS · CANVIL · MERIT · BECK · ANVIL-STRUT · SEMINOLE Tubular Products · North Alabama Pipe

www.anvilintl.com

Revision Date: 10.24.12