

HS5050-W Reference Guide

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TNT Stored Energy Equivalents

multiply by to obtain	Joules	Mega Joules	Ft. Lbs.	Grams TNT	KGrams TNT	Lbs. TNT
Joules		1.0E+6	1.35	4638	4.64E+6	2.11E+6
Mega Joules	1.0E-6		1.36E-6	4.64E-3	4.64	8.11
Ft. Lbs.	0.738	7.38E+5		3420	3.42E+6	1.55E+6
Gram TNT	2.16E-4	216	2.92E-4		1000	454
KGrams TNT	2.16E-7	0.216	2.92E-7	0.001		0.454
Lbs. TNT	4.75E-7	0.475	6.45E-7	2.2E-3	2.2	

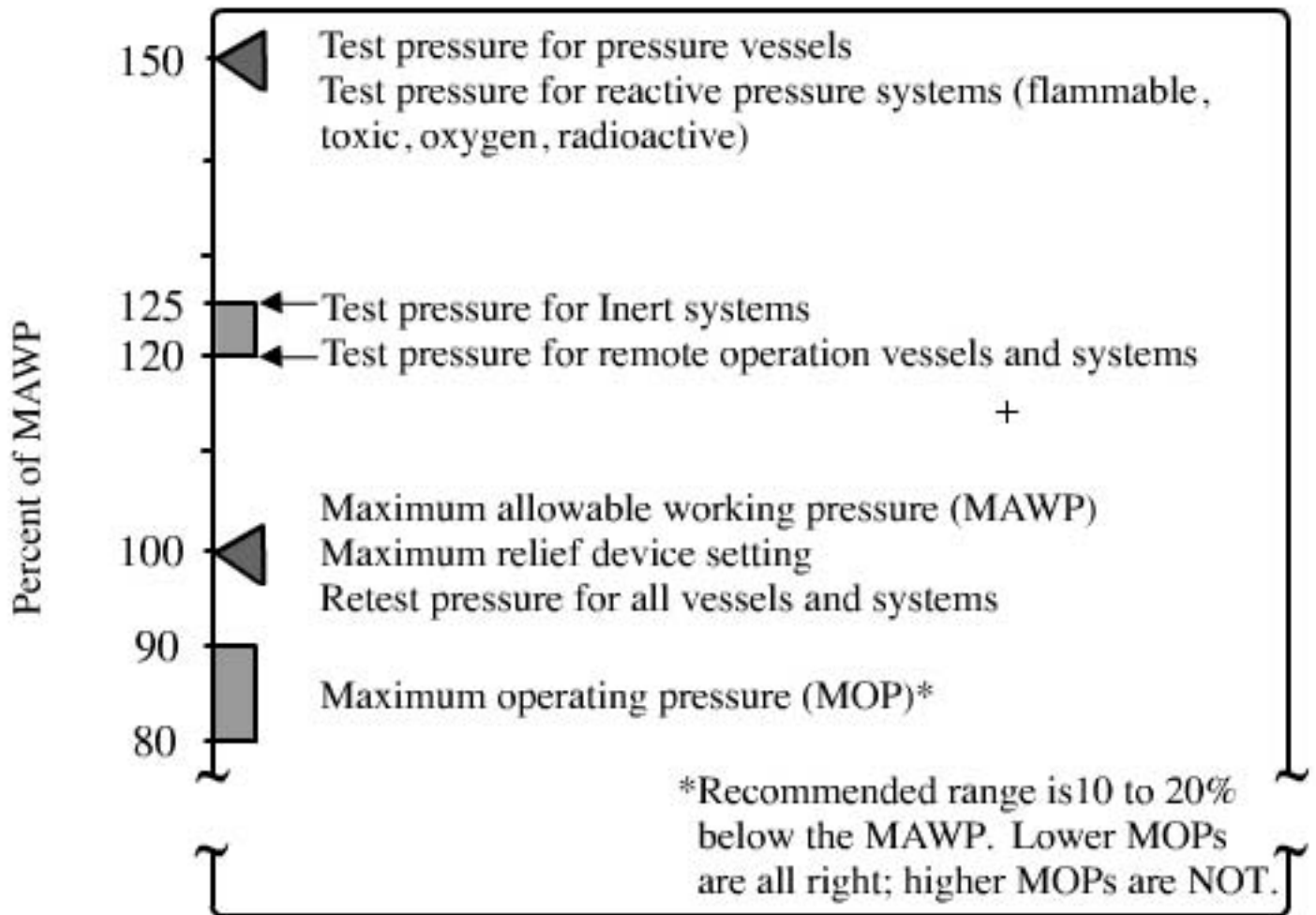
Fahrenheit to Centigrade

Deg F	0	1	2	3	4	5	6	7	8	9
0	-17.8	-17.2	-16.7	-16.1	-15.6	-15.0	-14.4	-13.9	-13.3	-12.8
10	-12.2	-11.7	-11.1	-10.6	-10.0	-9.4	-8.9	-8.3	-7.8	-7.2
20	-6.7	-6.1	-5.6	-5.0	-4.4	-3.9	-3.3	-2.8	-2.2	-1.7
30	-1.1	-0.6	0.0	0.6	1.1	1.7	2.2	2.8	3.3	3.9
40	4.4	5.0	5.6	6.1	6.7	7.2	7.8	8.3	8.9	9.4
50	10.0	10.6	11.1	11.7	12.2	12.8	13.3	13.9	14.4	15.0
60	15.6	16.1	16.7	17.2	17.8	18.3	18.9	19.4	20.0	20.6
70	21.1	21.7	22.2	22.8	23.3	23.9	24.4	25.0	25.6	26.1
80	26.7	27.2	27.8	28.3	28.9	29.4	30.0	30.6	31.1	31.7
90	32.2	32.8	33.3	33.9	34.4	35.0	35.6	36.1	36.7	37.2
100	37.8	38.3	38.9	39.4	40.0	40.6	41.1	41.7	42.2	42.8
110	43.3	43.9	44.4	45.0	45.6	46.1	46.7	47.2	47.8	48.3
120	48.9	49.4	50.0	50.6	51.1	51.7	52.2	52.8	53.3	53.9
130	54.4	55.0	55.6	56.1	56.7	57.2	57.8	58.3	58.9	59.4
140	60.0	60.6	61.1	61.7	62.2	62.8	63.3	63.9	64.4	65.0
150	65.6	66.1	66.7	67.2	67.8	68.3	68.9	69.4	70.0	70.6
160	71.1	71.7	72.2	72.8	73.3	73.9	74.4	75.0	75.6	76.1
170	76.7	77.2	77.8	78.3	78.9	79.4	80.0	80.6	81.1	81.7
180	82.2	82.8	83.3	83.9	84.4	85.0	85.6	86.1	86.7	87.2
190	87.8	88.3	88.9	89.4	90.0	90.6	91.1	91.7	92.2	92.8
200	93.3	93.9	94.4	95.0	95.6	96.1	96.7	97.2	97.8	98.3
210	98.9	99.4	100.0	100.6	101.1	101.7	102.2	102.8	103.3	103.9
220	104.4	105.0	105.6	106.1	106.7	107.2	107.8	108.3	108.9	109.4
230	110.0	110.6	111.1	111.7	112.2	112.8	113.3	113.9	114.4	115.0
240	115.6	116.1	116.7	117.2	117.8	118.3	118.9	119.4	120.0	120.6
250	121.1	121.7	122.2	122.8	123.3	123.9	124.4	125.0	125.6	126.1
Deg F	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Deg C	0.0	0.06	0.11	0.17	0.22	0.28	0.33	0.39	0.44	0.50

Centigrade to Fahrenheit

Deg F	0	1	2	3	4	5	6	7	8	9
0	32.0	33.8	35.6	37.4	39.2	41.0	42.8	44.6	46.4	48.2
10	50.0	51.8	53.6	55.4	57.2	59.0	60.8	62.6	64.4	66.2
20	68.0	69.8	71.6	73.4	75.2	77.0	78.8	80.6	82.4	84.2
30	86.0	87.8	89.6	91.4	93.2	95.0	96.8	98.6	100.4	102.2
40	104.0	105.8	107.6	109.4	111.2	113.0	114.8	116.6	118.4	120.2
50	122.0	123.8	125.6	127.4	129.2	131.0	132.8	134.6	136.4	138.2
60	140.0	141.8	143.6	145.4	147.2	149.0	150.8	152.6	154.4	156.2
70	158.0	159.8	161.6	163.4	165.2	167.0	168.8	170.6	172.4	174.2
80	176.0	177.8	179.6	181.4	183.2	185.0	186.8	188.6	190.4	192.2
90	194.0	195.8	197.6	199.4	201.2	203.0	204.8	206.6	208.4	210.2
100	212.0	213.8	215.6	217.4	219.2	221.0	222.8	224.6	226.4	228.2
110	230.0	231.8	233.6	235.4	237.2	239.0	240.8	242.6	244.4	246.2
120	248.0	249.8	251.6	253.4	255.2	257.0	258.8	260.6	262.4	264.2
130	266.0	267.8	269.6	271.4	273.2	275.0	276.8	278.6	280.4	282.2
140	284.0	285.8	287.6	289.4	291.2	293.0	294.8	296.6	298.4	300.2
150	302.0	303.8	305.6	307.4	309.2	311.0	312.8	314.6	316.4	318.2
160	320.0	321.8	323.6	325.4	327.2	329.0	330.8	332.6	334.4	336.2
170	338.0	339.8	341.6	343.4	345.2	347.0	348.8	350.6	352.4	354.2
180	356.0	357.8	359.6	361.4	363.2	365.0	366.8	368.6	370.4	372.2
190	374.0	375.8	377.6	379.4	381.2	383.0	384.8	386.6	388.4	390.2
200	392.0	393.8	395.6	397.4	399.2	401.0	402.8	404.6	406.4	408.2
210	410.0	411.8	413.6	415.4	417.2	419.0	420.8	422.6	424.4	426.2
220	428.0	429.8	431.6	433.4	435.2	437.0	438.8	440.6	442.4	444.2
230	446.0	447.8	449.6	451.4	453.2	455.0	456.8	458.6	460.4	462.2
240	464.0	465.8	467.6	469.4	471.2	473.0	474.8	476.6	478.4	480.2
250	482.0	483.8	485.6	487.4	489.2	491.0	492.8	494.6	496.4	498.2
Deg C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Deg F	0.0	0.18	0.36	0.54	0.72	0.9	1.08	1.26	1.44	1.62

MAWP, MOP, & Test Pressure Relationships



Disassembly, Inspection, Cleaning and Assembly of Autoclave 30VM Valves

Disassembly

1. Make sure the valve stem is backed off the seat (to prevent possible damage to the stem or seat).
2. Remove locking device screw (11).
3. Unscrew packing gland and remove valve stem assembly. The packing washer (4) will usually come out with the stem assembly and, rarely, the packing (3) and bottom washer (2). Any of these items which are left in the valve body are removed in the next step.
4. Using the Carr Lane 4-ball locking pin (-3 size) as a packing puller remove the packing and washer(s) from the valve body.
5. Discard the packing (3) and replace with a new one. If this is not possible, trim off the extruded packing material.
6. Remove the handle (13).
7. Disassemble the stem by removing the two lock nuts (9).

Note: Item numbers appearing in parentheses refer to the following drawing of the Autoclave 30VM valve.

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Disassembly, Inspection, Cleaning and Assembly, continued

Inspection and Cleaning

8. Inspect the stem (6). If the seating area is badly deformed, replace the stem. If the packing seal area is scratched, polish the stem. If the scratches cannot be polished out, replace the stem.
9. Inspect the I.D. of the bottom washer (2). There is often a small burr at each end of the hole (possibly causing spiral scratches on the stem). These burrs can be removed by sliding the washer back and forth on a narrow strip of 600 grit sandpaper or comparable emery cloth passed through the hole.
10. Inspect the passages in the valve body and remove any chips or other foreign material.
11. Inspect the valve seat for excessive wear, scratches, cracks or burrs. Burrs can be removed with a small file or drill. If the seat is cracked, excessively worn or badly scratched, replace the valve body.
12. Wash all parts with acetone. If a very high cleanliness is required follow the acetone with several minutes in an ultrasound cleaner filled with Freon TF.

Disassembly, Inspection, Cleaning and Assembly, continued

Assembly

13. Apply a thin film of KOPR-KOTE thread lubricant to the following during assembly:
 - Both sides of both thrust washers (7)
 - The top section of the stem (6) where it fits inside the sleeve (8)
 - The threads on the bottom of the sleeve (8)
 - The packing gland (5), coating the threads and the bottom surface where it will contact the packing washer (4).
14. Assemble stem assembly (6), (7), (8), (9); lock nuts (9) need only be finger tight at this time. Screw the packing gland (5) all the way onto the sleeve (8). Slide the packing and washers (2), (3), (4) onto the stem.
15. Insert the stem assembly into the body and, ensuring that the stem is fully backed out, torque the packing gland to between 45 and 50 ft-lbs. Wait 5 minutes and, without breaking the packing gland loose, reseal it to the same torque.
16. Install the locking device (10).

Disassembly, Inspection, Cleaning and Assembly, continued

Assembly, continued

17. Install the handle (13), taking care that it does not bind on the thrust washer (7) or the lock nuts (9).
18. Using the lock nuts (9), adjust the torque on the floating stem. Torque should be set such that the floating stem will not turn at the same rate as the handle. An ideal setting to minimize backlash is 1/2 turn of the stem for each full turn of the handle.
19. Work the stem into the seat gradually. Close and open the valve 5 or 6 times, gently at first and building up to normal closing force (generally about 3 to 4 ft-lbs).
20. Recheck the torque adjustment of the floating stem, as in step 18.

Disassembly, Inspection, Cleaning, and Assembly, continued

