

## **The SNS-FE LEBT Drawing Package**

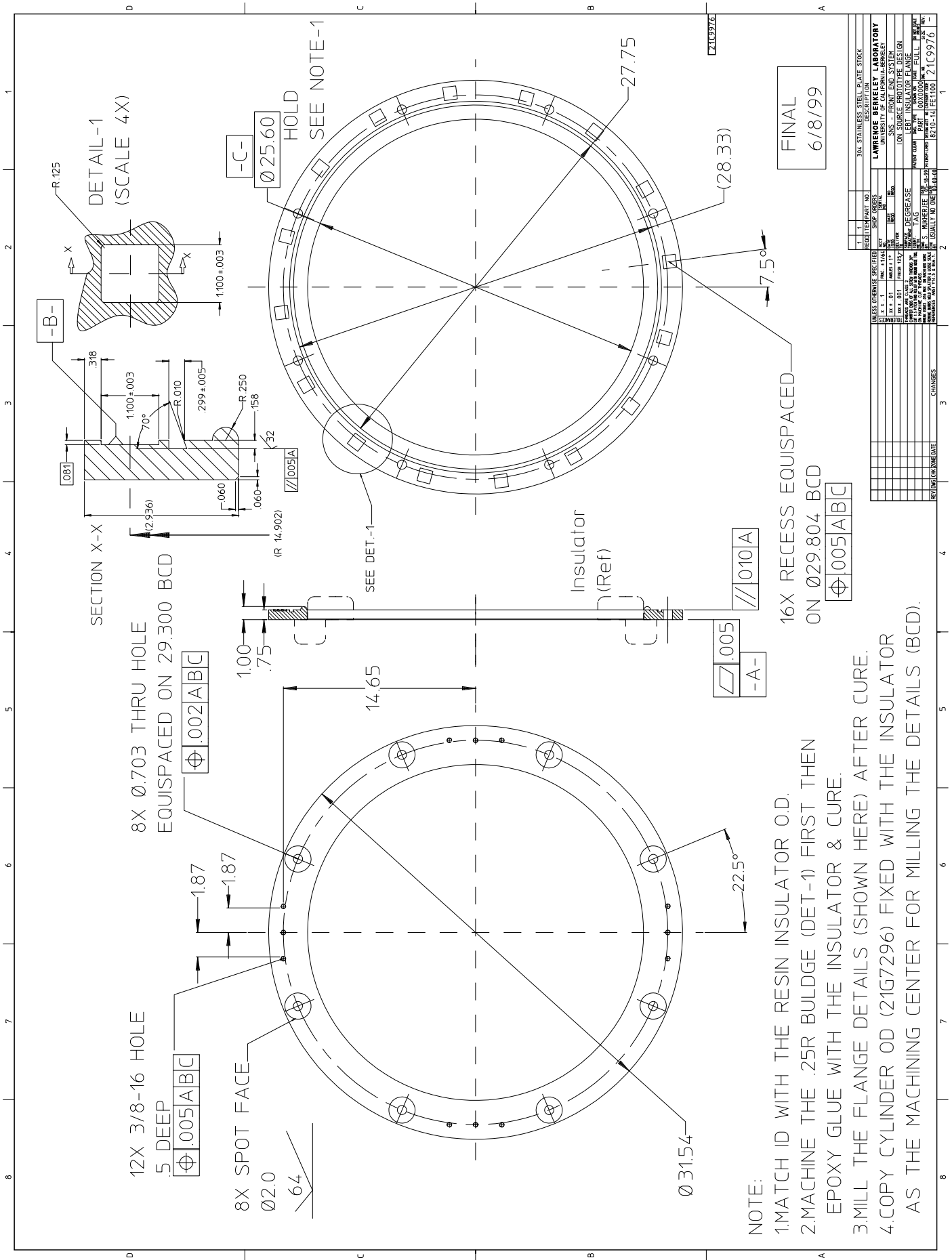
This technical note is intended exclusively for internal use inside the SNS Front End Systems group. The primary purpose of the technical note series is to promote rapid dissemination of results for work in progress. No formal review has taken place to ascertain the accuracy of its contents, or the consistency/compatibility of the information with other SNS work.

## The Complete SNS-FE LEBT Drawing Package

Daniel Cheng

This report contains the complete, final LEBT design for the SNS Front-End Systems. The Final Design review was held March 22, 1999. The drawings were completed June 30, 1999. Discussions on the design can be found in the PAC '99 proceedings, and the report on the final assembly of the LEBT will follow in a future report. Below is the complete list of the LEBT drawings included.

25B069 6	Vacuum Chamber
25B071 6	Primary Reentrant Cylinder
25B077 6	Flat Flange, LEBT Test Stand Vacuum Chamber
25B078 6	Vacuum Chamber-LEBT Test Stand
25B087 6	Stand Face, Vacuum Chamber
25B088 6	Stand Foot, Vacuum Chamber
21C997 6	LEBT Insulator Flange
21G700 4	Extractor Electrode Assembly
21G701 4	Extractor Electrode Body
21G702 3	Extractor Electrode Clamp Ring
21G703 3	Extractor Electrode Aperture Insert
21G704 4	G3 Electrode Assembly
21G705 4	G3 Electrode Body
21G706 3	G3 Electrode Clamp Ring
21G707 3	G3 Electrode Aperture Insert
21G708 6	Ground Electrode
21G709 6	Chopper Electrode First Machining
21G710 6	Chopper Electrode Second Machining
21G711 4	Chopper Electrode Assembly
21G712 3	Ground-Chopper Insulator Shield, Outer
21G713 2	Ground-Chopper Insulator
21G714 2	Ground-Chopper Insulator Shield, Inner
21G715 3	Main Ground Insulator Shield, Outer
21G716 3	Main Ground Insulator Shield, Clamp
21G717 2	Main Ground Insulator
21G718 2	Main Ground Insulator Shield, Inner
21G719 3	G3 Insulator Shield, Outer
21G720 2	G3 Insulator Standoff
21G721 2	G3 Insulator Shield, Inner
21G722 3	Extractor Insulator Shield, Outer
21G723 1	Extractor Insulator Standoff
21G724 2	Extractor Insulator Shield, Inner
21G725 2	Ground-Chopper Insulator Assembly
21G726 2	Main Ground Insulator Assembly
21G727 2	G3 Insulator Assembly
21G728 2	Extractor Insulator Assembly
21G729 6	Reentrant Cylinder Finish Machining
21G730 1	Main Support Ceramic Holdoff Washer
21G731 3	Electrode High-Voltage Connect
21G732 2	Chopper Hi voltage Feed-thru Electrical Connect
21G733 2	Hi voltage Feed-thru Electrical Connect
21G735 6	LEBT Assembly
21G736 2	Ceramic Standoff Key, round
21G737 2	Ceramic Standoff Key, rectangular
21G896 4	LEBT Insulator Flange Assembly
21G899 4	Spacer for LEBT Reentrant Cylinder

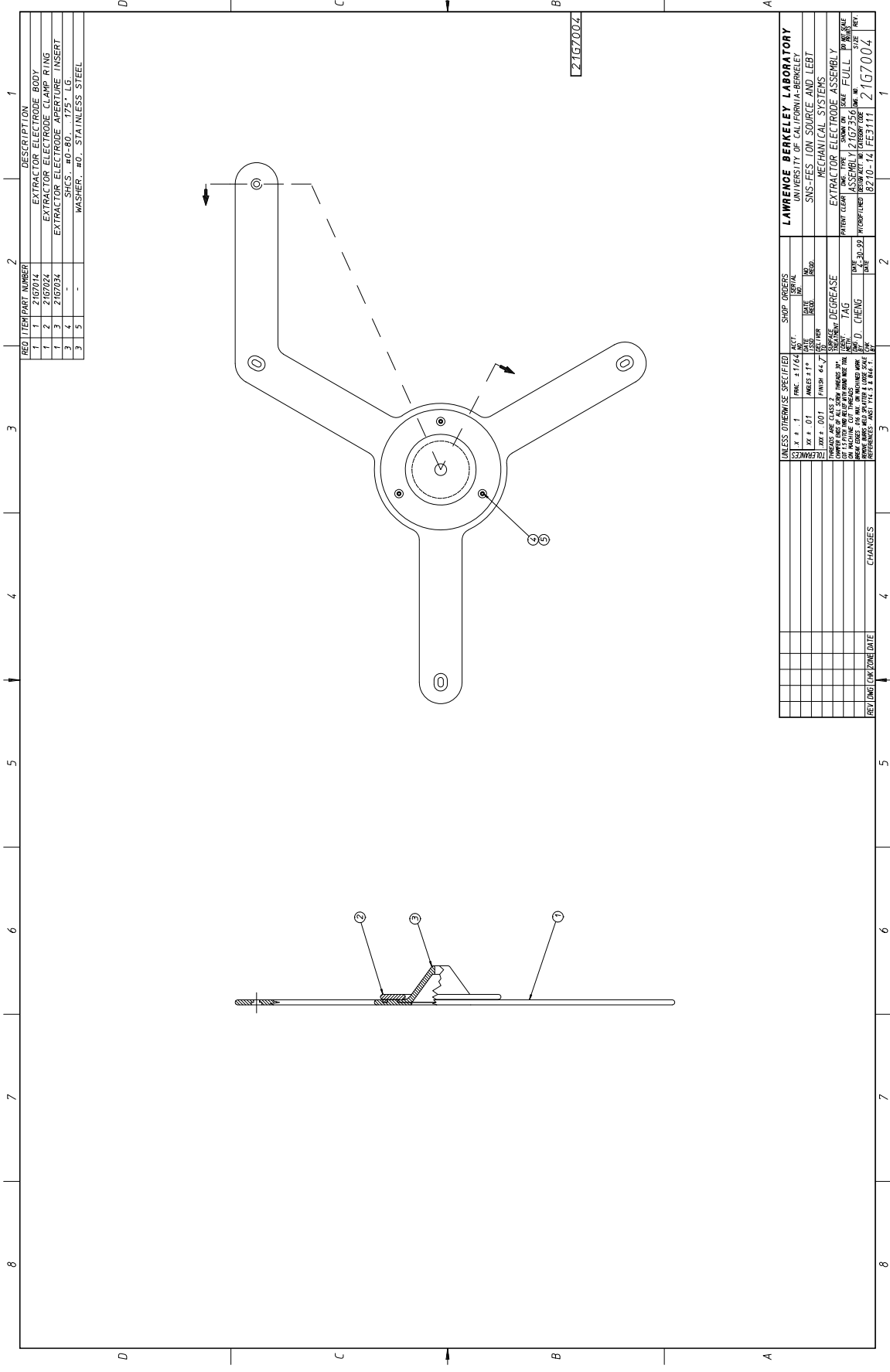


NOTE:

1. MATCH ID WITH THE RESIN INSULATOR O.D.
2. MACHINE THE .25R BULGGE (DET-1) FIRST THEN EPOXY GLUE WITH THE INSULATOR & CURE.
3. MILL THE FLANGE DETAILS (SHOWN HERE) AFTER CURE.
4. COPY CYLINDER OD (21G7296) FIXED WITH THE INSULATOR AS THE MACHING CENTER FOR MILLING THE DETAILS (BCD).

FINAL  
6/8/99

UNLESS OTHERWISE SPECIFIED	304 STAINLESS STEEL PLATE STOCK
FINISH	AS SHOWN
DATE	6/8/99
DESIGNED BY	W. BERRY
CHECKED BY	J. BERRY
APPROVED BY	J. BERRY
DATE	6/8/99
PROJECT	INSULATOR FLANGE
DRAWING NO.	21C976
REV.	
1	ISSUE FOR MILLING
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3	ISSUE FOR MILLING
4	ISSUE FOR MILLING
5	ISSUE FOR MILLING
6	ISSUE FOR MILLING
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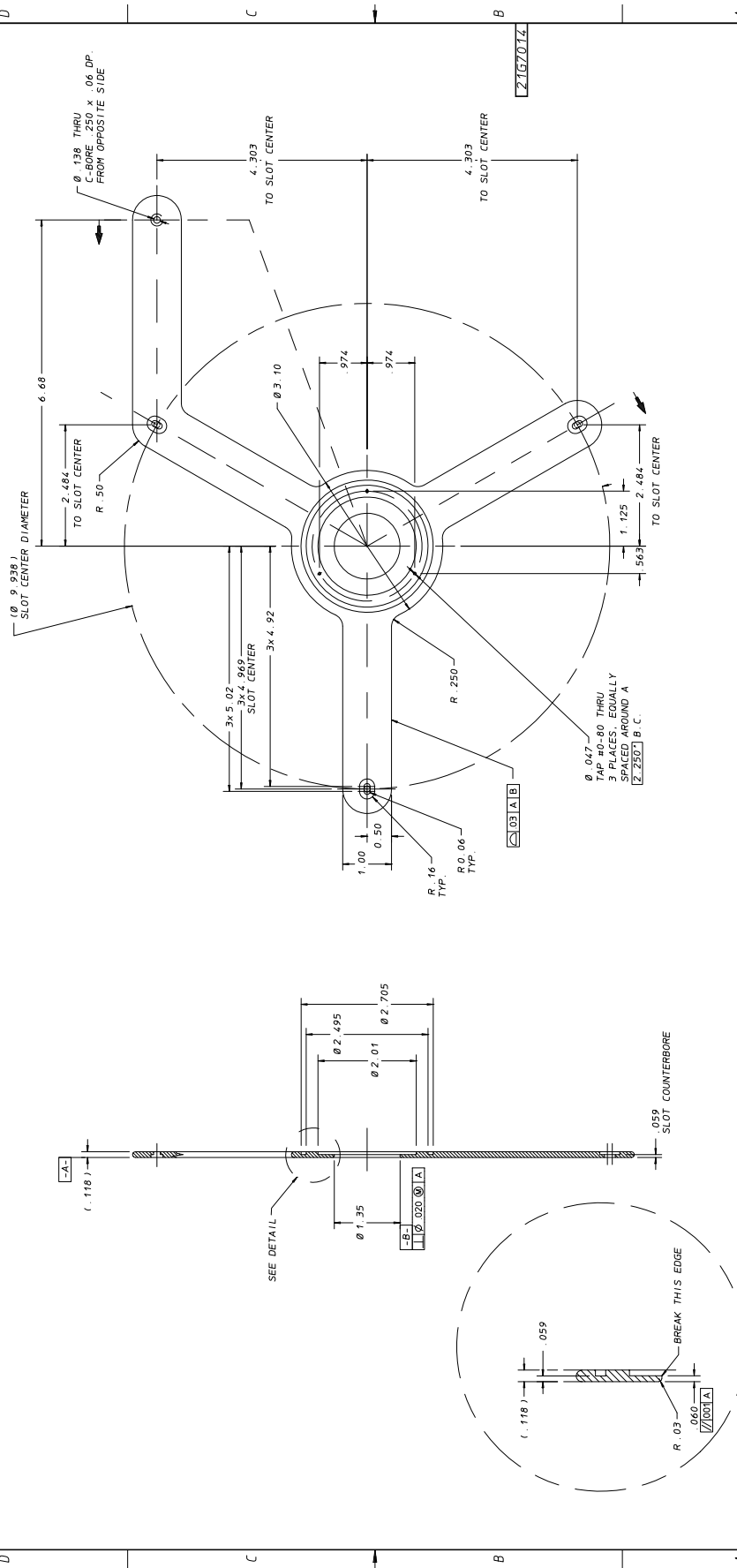
REQ	ITEM	PART NUMBER	DESCRIPTION
1	1	2167014	EXTRACTOR ELECTRODE BODY
1	2	2167024	EXTRACTOR ELECTRODE CLAMP RING
1	3	2167034	EXTRACTOR ELECTRODE APERTURE INSERT
3	4	-	SHCS. #0-80 x .175" LG.
3	5	-	WASHER. #0. STAINLESS STEEL

REV	DATE	BY	CHK	APP	DESCRIPTION
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3					REVISIONS AND THE 3 & 4 B.A.T. 17
4					REVISIONS AND THE 3 & 4 B.A.T. 17
5					REVISIONS AND THE 3 & 4 B.A.T. 17
6					REVISIONS AND THE 3 & 4 B.A.T. 17
7					REVISIONS AND THE 3 & 4 B.A.T. 17
8					REVISIONS AND THE 3 & 4 B.A.T. 17

UNLESS OTHERWISE SPECIFIED	SHOP DIMENSIONS
1. FINISH: 17544 ACET	1. FINISH: 17544 ACET
2. TOLERANCES: .015	2. TOLERANCES: .015
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99. DIMENSIONS: .015	99. DIMENSIONS: .015
100. DIMENSIONS: .015	100. DIMENSIONS: .015

LAWRENCE BERKELEY LABORATORY  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SNS-FEES ION SOURCE AND LEET  
 MECHANICAL SYSTEMS  
 EXTRACTOR ELECTRODE ASSEMBLY  
 PART NUMBER ASSEMBLY 2167356  
 PART NUMBER DRAWING 2167004  
 10/10-14 PEB3111 2167004

REV	ITEM/PART NUMBER	DESCRIPTION
A/R	1	STAINLESS STEEL SHEET, .125" THICK, TYPE 304



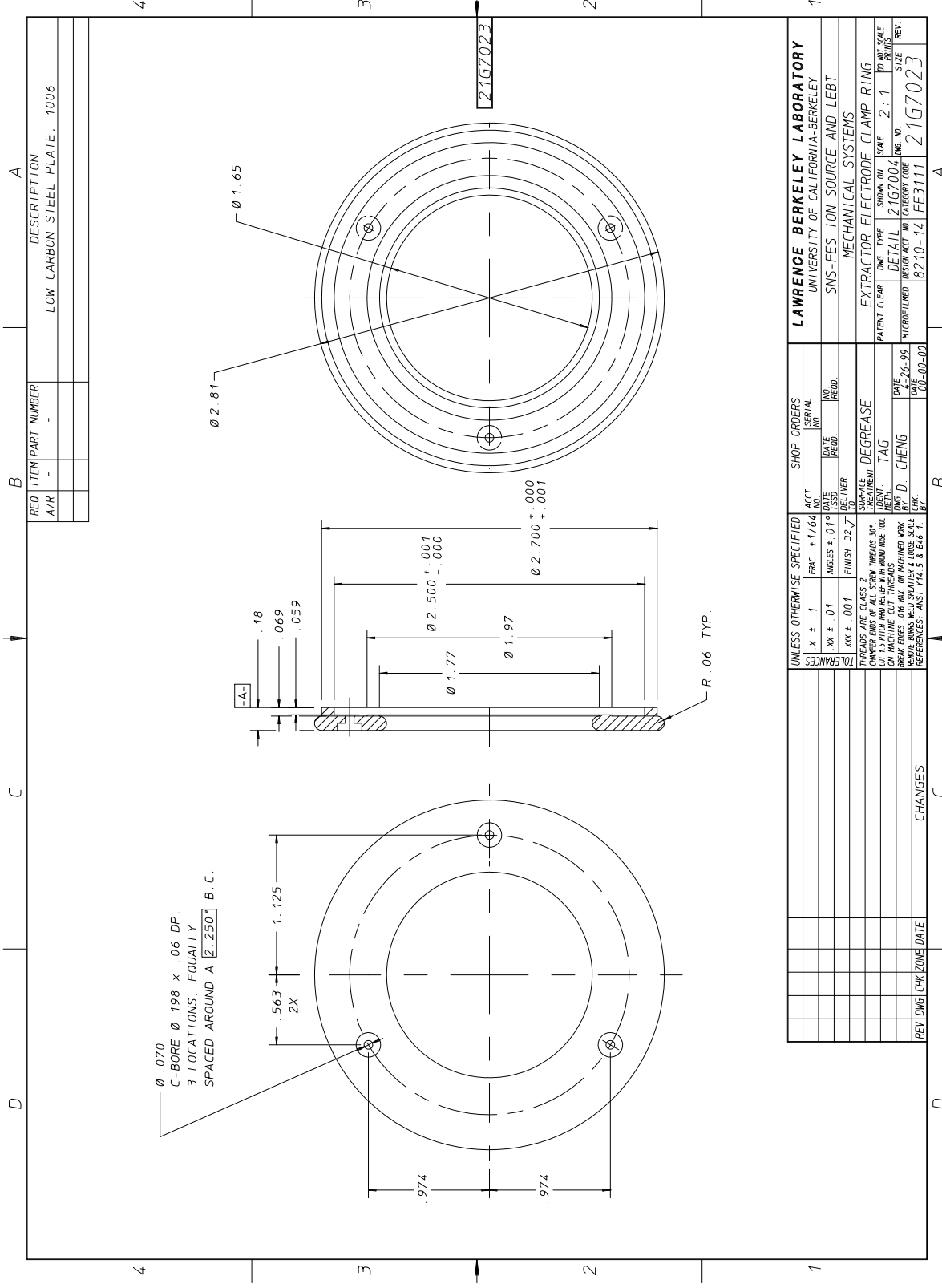
UNLESS OTHERWISE SPECIFIED	SHOP DIMENSIONS
FINISH	AS SHOWN
TOLERANCES	AS SHOWN
WELDING	AS SHOWN
THREADS	AS SHOWN
KEYS	AS SHOWN
KEYWAYS	AS SHOWN
SPACERS	AS SHOWN
DRILLING	AS SHOWN
REWORK	AS SHOWN
REFERENCES	AS SHOWN

LAWRENCE BERKELEY LABORATORY  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SNS-FEES ION SOURCE AND LEET  
 MECHANICAL SYSTEMS  
 EXTRACORREL ELECTRODE BODY  
 PATENT CLEARANCE  
 DETAIL 2167014  
 18710-14 FE3111 2167014

SCALE 2x

REVISION (REV) DATE

CHANGES



REV	ITEM	PART NUMBER	DESCRIPTION
A/R	-	-	LOW CARBON STEEL PLATE, 1006

UNLESS OTHERWISE SPECIFIED		SHOP ORDERS	
XX ± .1	PRAC. ± 1/64	ACCT. NO.	SERIAL NO.
XX ± .01	ANGLES ± .01°	ISSD	DATE
XX ± .001	FINISH 32	DELIVER	BY
TOLERANCES ARE GILLES 2		SURFACE DECREASE TAG	
LOWER ENDS OF ALL SCREW THREADS 3P.		TREATMENT	
ON MACHINING CUT THREADS: FINISH MARK		DATE	
REMOVE BURRS, WELD SPATTER & LOOSE SCALE		BY	
REFERENCES: ANSI Y14.5 & B46.1		DATE	
REV		DATE	
1		2-26-99	
2		9-00-00-00	

**LAWRENCE BERKELEY LABORATORY**  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SNS-FES ION SOURCE AND LEBT  
 MECHANICAL SYSTEMS  
 EXTRACTOR ELECTRODE CLAMP RING  
 DWG. TYPE SHOW ON SCALE 2:1  
 DETAIL 21G700.4  
 DWG. NO. 21G700.4  
 REVISION NO. 8210-14 FE3111  
 CATEGORY CODE 21G7023

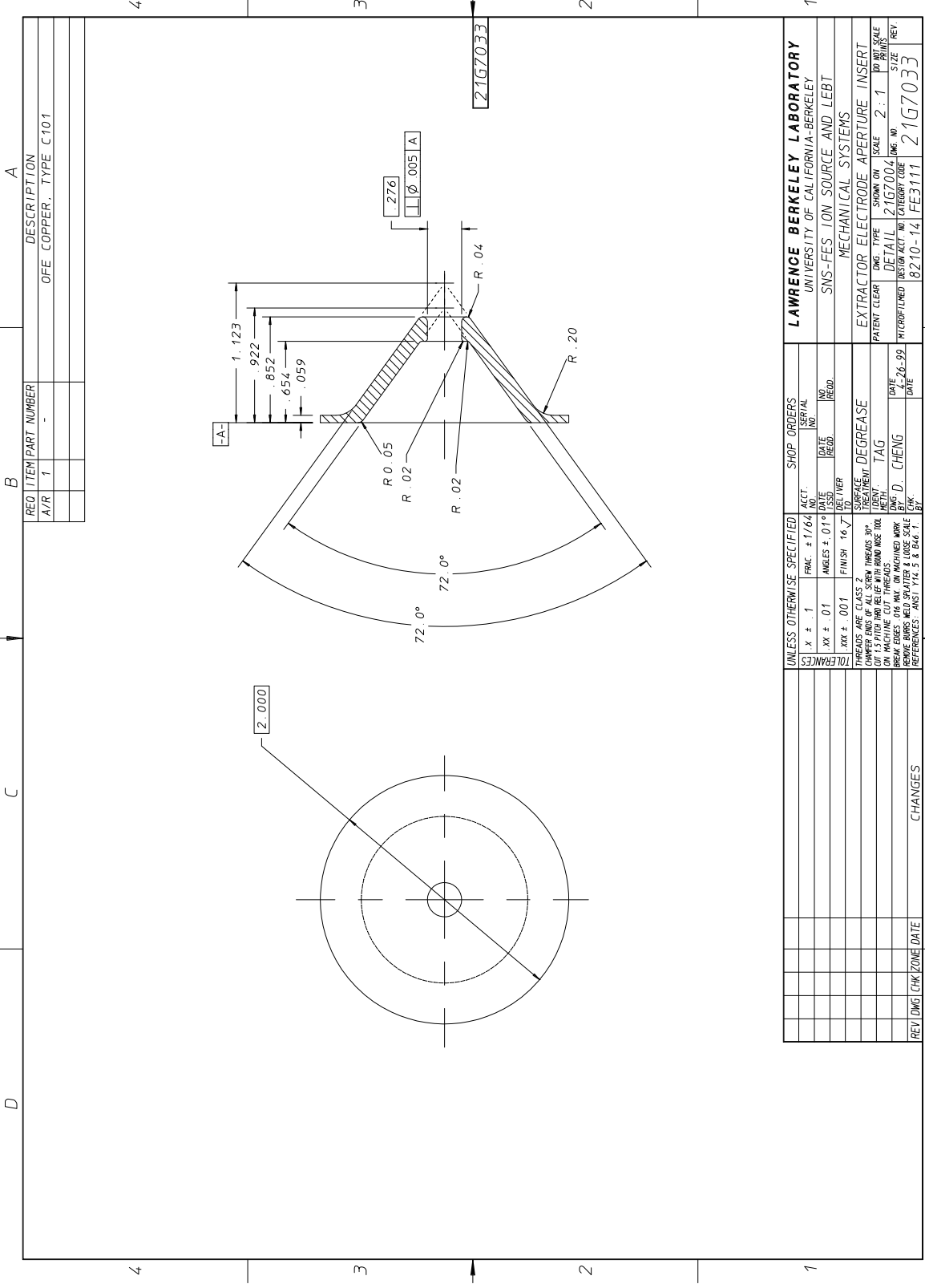
Ø .070  
 C-BORE Ø. 198 x .06 DF.  
 3 LOCATIONS, EQUALLY  
 SPACED AROUND A Ø. 2.50 B.C.

Ø 2.81  
 Ø 1.65  
 Ø 2.500 ± .001  
 Ø 1.77  
 Ø 1.97  
 Ø 2.700 ± .001  
 R.06 TYP.

.18  
 .069  
 .059  
 2X  
 1.125  
 .974  
 .974

21G7023

1  
 2  
 3  
 4  
 A  
 B  
 C  
 D



REV		ITEM PART NUMBER		DESCRIPTION	
A/R	1	-	-	OFE COPPER, TYPE C101	

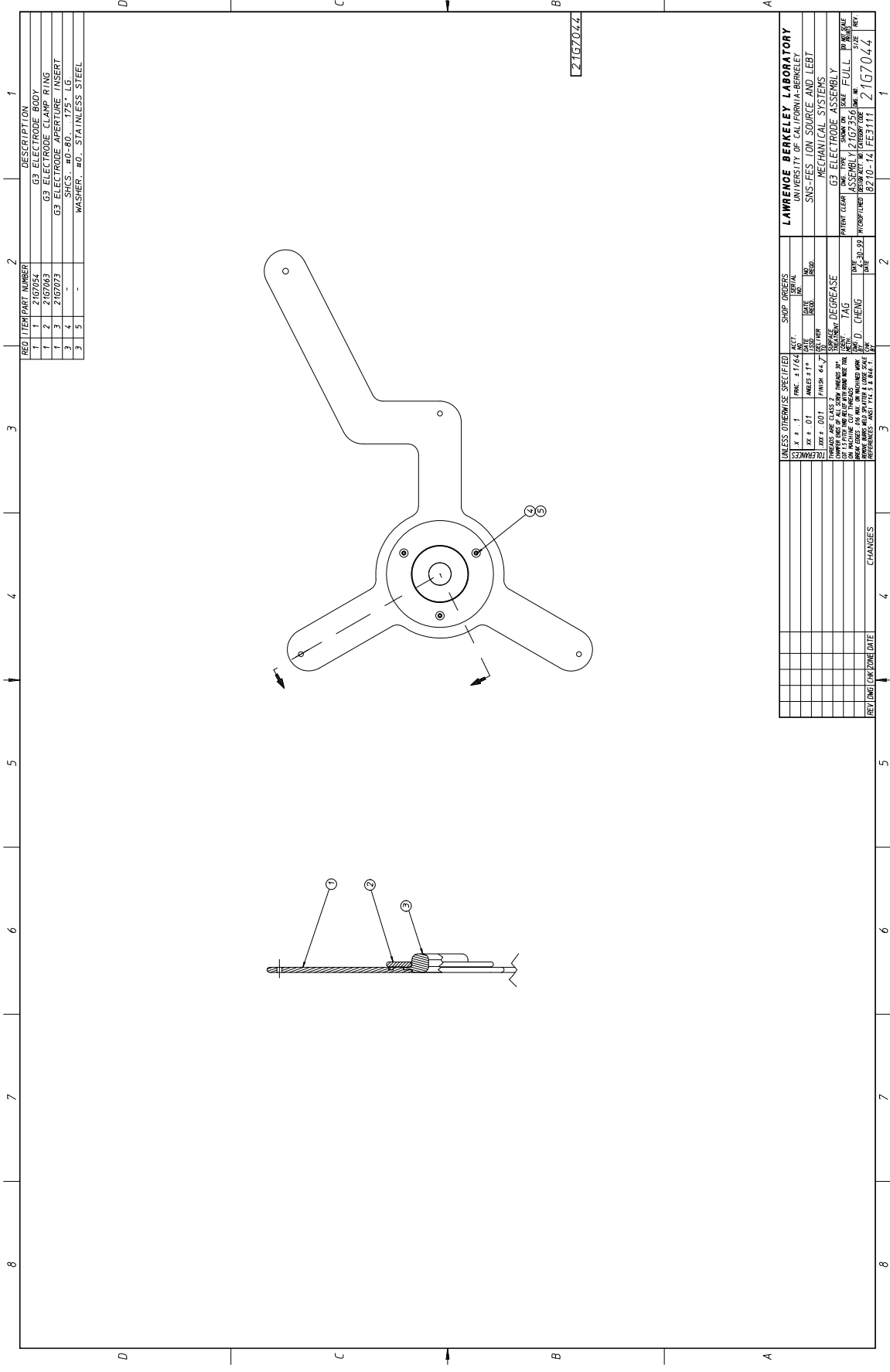
2.000

21G7033

UNLESS OTHERWISE SPECIFIED		SHOP ORDERS		LAWRENCE BERKELEY LABORATORY	
X ± .1	PREC. ± 1/64	ACCT. NO.	SERIAL	UNIVERSITY OF CALIFORNIA-BERKELEY	
XX ± .01	ANGLES ± .01°	WSSD	DATE	SNS-FES ION SOURCE AND LEBT	
XXX ± .001	FINISH 16.7	DELIVER	BY	MECHANICAL SYSTEMS	
TOLERANCES ARE CLASSES 2		SURFACE DECREASE		EXTRACTOR ELECTRODE APERTURE INSERT	
LOWER ENDS OF ALL SCREW THREADS 30°		TAG		PATENT CLEAR	
ON MACHINING CUT THREADS		IDENT.		Dwg. TYPE	
REMOVE BURRS MILD SWARTER & LOOSE SCALE BY		DATE		SHOW ON SCALE	
REFERENCES: ANSI Y14.5 & B46.1		DATE		2:1	
		BY		DWG. NO.	
				21G700.4	
				REV	
				8210-14 FE3111	
				21G7033	
				A	

CHANGES

REV	DWG	CHK	ZONE	DATE



REQ	ITEM	PART NUMBER	DESCRIPTION
1	1	2167064	G3 ELECTRODE BODY
1	2	2167063	G3 ELECTRODE CLAMP RING
1	3	2167073	G3 ELECTRODE APERTURE INSERT
3	4	-	SHCS. #0-80 x .175" LG.
3	5	-	WASHER. #0. STAINLESS STEEL

REV	DATE	BY	CHK	APP	DESCRIPTION
1					
2					
3					
4					

UNLESS OTHERWISE SPECIFIED:

1. FINISH: MILL

2. DIMENSIONS: AS SHOWN

3. TOLERANCES: FRACTIONS TO NEAREST 1/1000, DECIMALS TO NEAREST 0.0005

4. SURFACE FINISH: RA 32

5. THREADS: PER ANSI B1.1

6. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE TAKEN FROM THE UNMACHINED SURFACE

7. DIMENSIONS TO BE TAKEN FROM THE UNMACHINED SURFACE

8. DIMENSIONS TO BE TAKEN FROM THE MACHINED SURFACE

9. DIMENSIONS TO BE TAKEN FROM THE CENTERLINE

10. DIMENSIONS TO BE TAKEN FROM THE END FACE

11. DIMENSIONS TO BE TAKEN FROM THE SIDE FACE

12. DIMENSIONS TO BE TAKEN FROM THE TOP FACE

13. DIMENSIONS TO BE TAKEN FROM THE BOTTOM FACE

14. DIMENSIONS TO BE TAKEN FROM THE INSIDE SURFACE

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98. DIMENSIONS TO BE TAKEN FROM THE INSIDE SURFACE

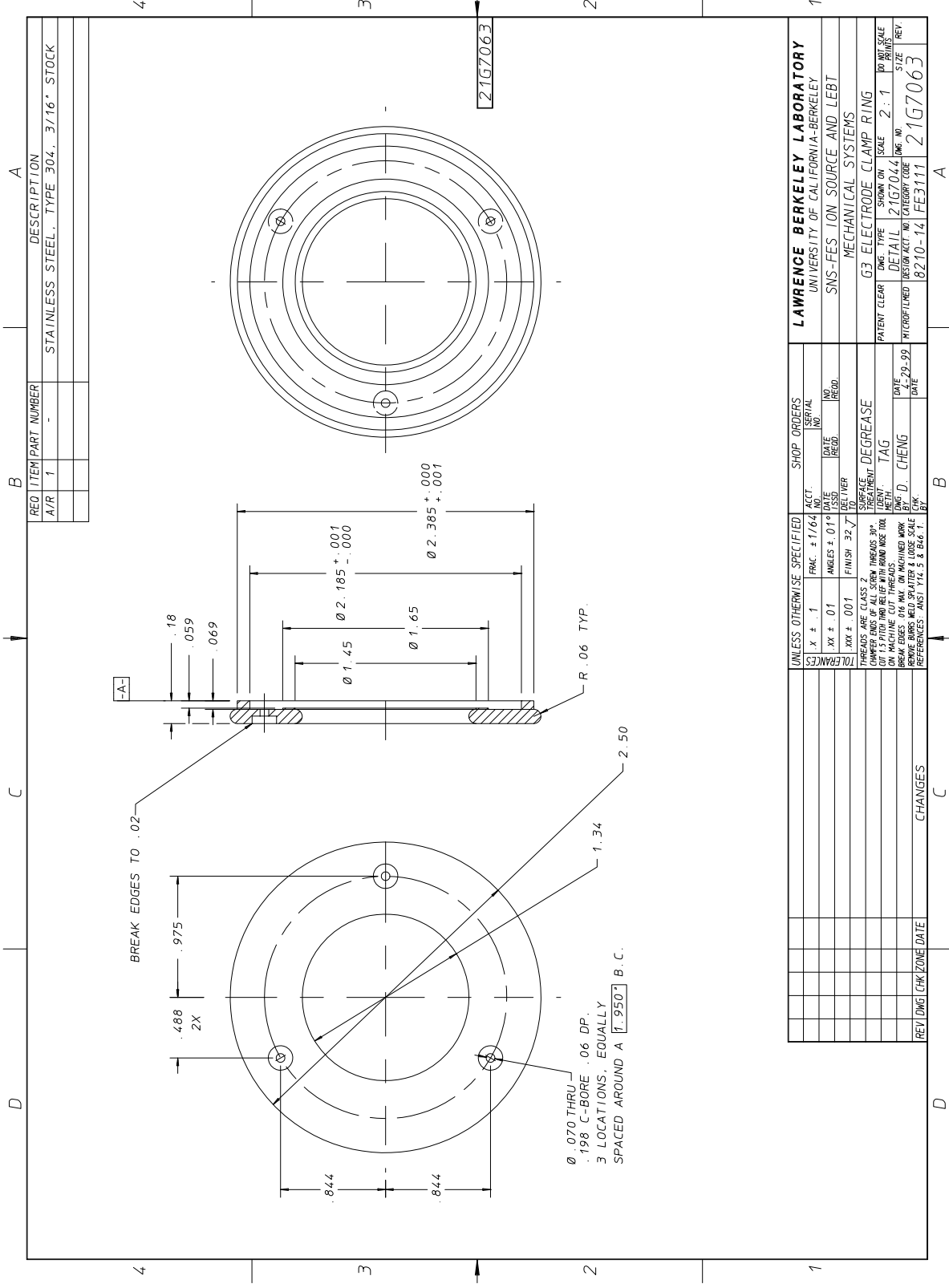
99. DIMENSIONS TO BE TAKEN FROM THE OUTSIDE SURFACE

100. DIMENSIONS TO BE TAKEN FROM THE CENTERLINE

LAWRENCE BERKELEY LABORATORY  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SWS-FES ION SOURCE AND LEET  
 MECHANICAL SYSTEMS  
 G3 ELECTRODE ASSEMBLY  
 PART CLEAR ASSEMBLY  
 ASSEMBLY 2167066  
 MICROFILMED DOCUMENT NUMBER 18710-14 PEB3111 2167044







REV	ITEM	PART NUMBER	DESCRIPTION
A/R	1	-	STAINLESS STEEL, TYPE 304, 3/16" STOCK

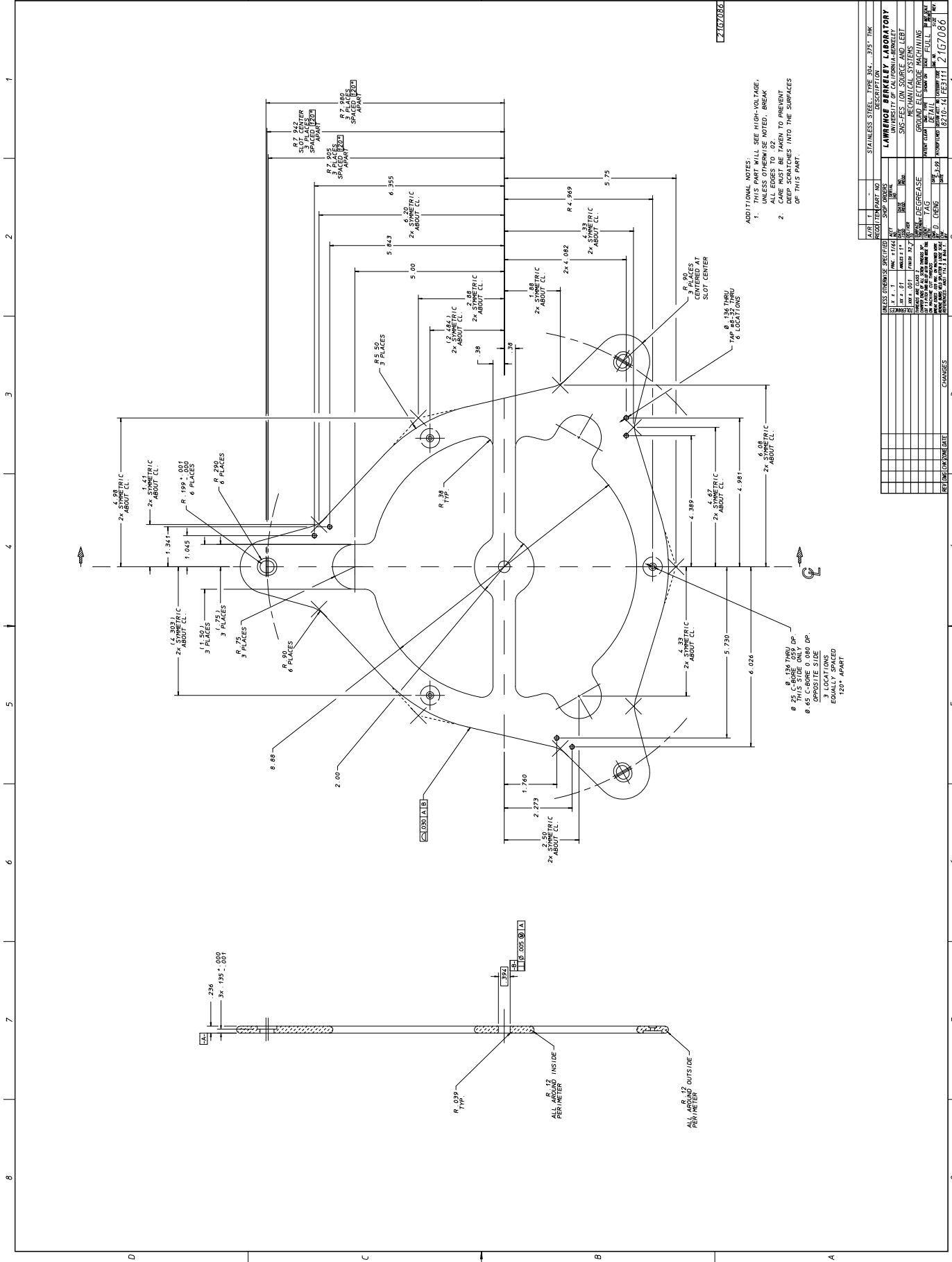
UNLESS OTHERWISE SPECIFIED		SHOP ORDERS	
XX ± .1	PRAC. ± 1/64	ACCT. NO.	SERIAL
XX ± .01	ANGLES ± .01°	ISSD	NO. RECD.
XX ± .001	FINISH 32 ✓	DELIVER	NO. RECD.
TOLERANCES ARE GAGES 2		SURFACE DECREASE TAG	
CHAMFER ENDS OF ALL SCREW THREADS 30°		IDENTIFY TREATMENT	
ON MACHINING CUT THREADS: FINISH MARK		DATE 2-29-99	
REMOVE BURRS, MILD SWARTER & LOOSE SCALE BY		BY D. CHENG	
REFERENCES: ANSI Y14.5 & B46.1		DATE	
REV		DATE	
CHANGES		DATE	
REV		DATE	

**LAWRENCE BERKELEY LABORATORY**  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SNS-FES ION SOURCE AND LEBT  
 MECHANICAL SYSTEMS  
 63 ELECTRODE CLAMP RING

PATENT CLEAR  
 DWG. TYPE  
 DETAIL  
 DWG. NO. 21G7063  
 SCALE 2:1  
 SHOW ON SCALE  
 DO NOT SCALE  
 SIZE  
 REV

8210-14 FE3111 21G7063





2167086

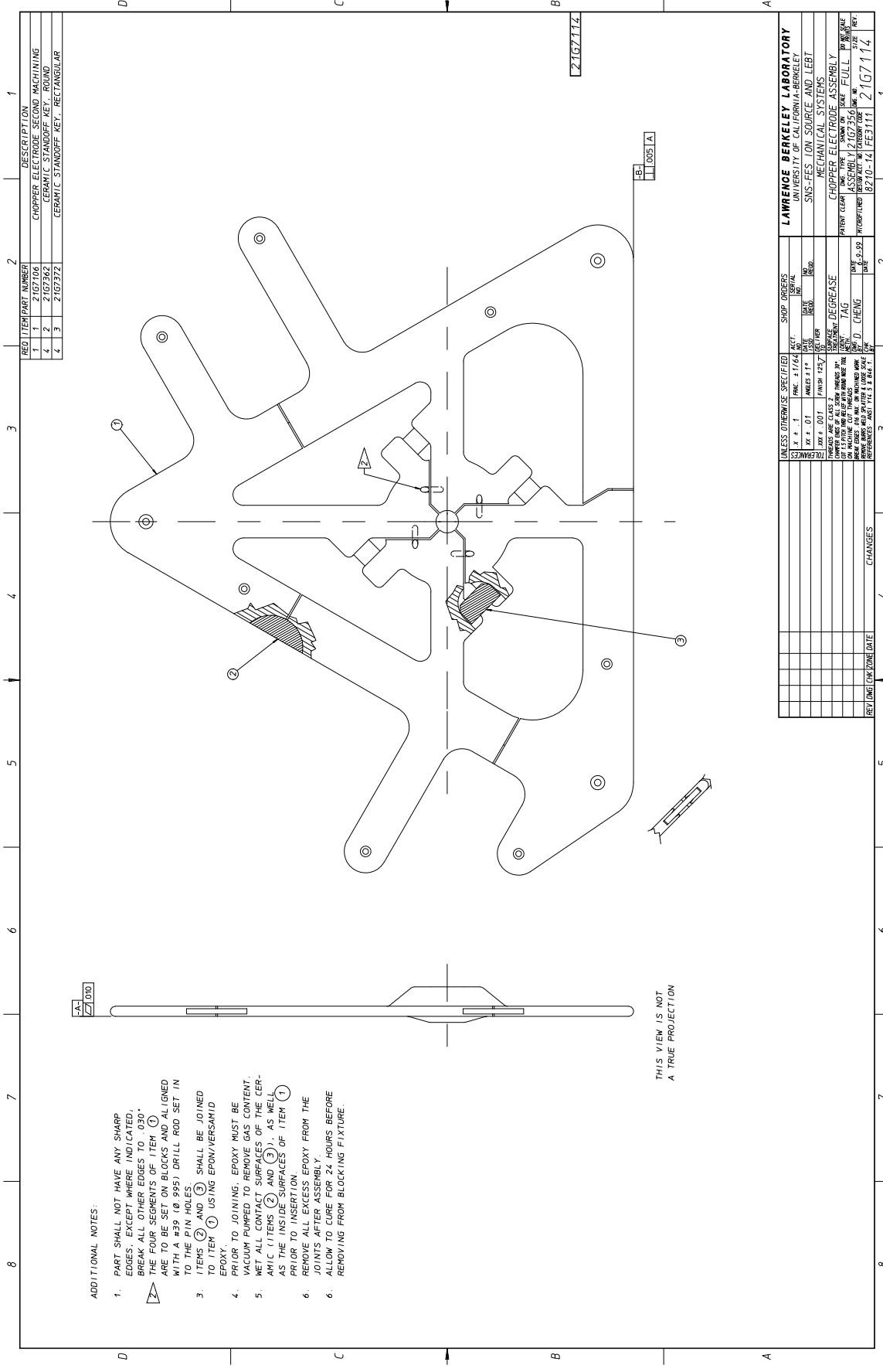
- ADDITIONAL NOTES:
1. THIS PART WILL SEE HIGH-VOLTAGE, UNLESS OTHERWISE NOTED. BREAK DOWN VOLTAGE OF THIS PART IS 1000 VDC.
  2. CARE MUST BE TAKEN TO PREVENT DEEP SCRATCHES INTO THE SURFACES OF THIS PART.

Ø .126 THRU DP.  
THIS SIDE ONLY.  
Ø .65 C-BORE Ø 1800 DP.  
SYMMETRIC SIZE  
EQUALLY SPACED  
120° APART

QTY	1	2	3	4	5	6	7	8
REVISION								
DATE								
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CHKD								
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REQ	ITEM/PART NUMBER	DESCRIPTION
1	2167106	CHOPPER ELECTRODE SECOND MACHINING
2	2167362	CERAMIC STANDOFF KEY, ROUND
3	2167372	CERAMIC STANDOFF KEY, RECTANGULAR

**ADDITIONAL NOTES:**

- PART SHALL NOT HAVE ANY SHARP EDGES, EXCEPT WHERE INDICATED. BREAK ALL OTHER EDGES TO .030". THE FOUR SEGMENTS OF ITEM ① ARE TO BE SET ON BLOCKS AND ALIGNED WITH THE PIN HOLES. UNTILL ROD SET IN TO THE PIN HOLES.
- ITEMS ② AND ③ SHALL BE JOINED TO ITEM ① USING EPOXY/VERSAMID EPOXY.
- PRIOR TO JOINING, EPOXY MUST BE VACUUM PUMPED TO REMOVE GAS CONTENT.
- WET ALL CONTACT SURFACES OF THE CERAMIC (ITEMS ② AND ③), AS WELL AS THE INSIDE SURFACES OF ITEM ① PRIOR TO INSERTION.
- REMOVE ALL EXCESS EPOXY FROM THE JOINTS AFTER ASSEMBLY.
- ALLOW TO CURE FOR 24 HOURS BEFORE REMOVING FROM BLOCKING FIXTURE.

THIS VIEW IS NOT  
A TRUE PROJECTION

UNLESS OTHERWISE SPECIFIED		SHOP ORDERS	
1	1/8" ± 1/64"	4427	100
2	1/8" ± 0.01	100	100
3	1/8" ± 0.01	100	100
4	1/8" ± 0.01	100	100
5	1/8" ± 0.01	100	100
6	1/8" ± 0.01	100	100
MATERIALS		MATERIALS	
EPOXY/VERSAMID		EPOXY/VERSAMID	
DEGREASE		DEGREASE	
TALC		TALC	
D. CHENG		D. CHENG	
DATE		DATE	
10/10/14		10/10/14	
BY		BY	
D. CHENG		D. CHENG	
CHECKED		CHECKED	
DATE		DATE	
10/10/14		10/10/14	
BY		BY	
D. CHENG		D. CHENG	

REV	DATE	DESCRIPTION
1	10/10/14	ISSUE FOR MANUFACTURE
2	10/10/14	ISSUE FOR MANUFACTURE
3	10/10/14	ISSUE FOR MANUFACTURE
4	10/10/14	ISSUE FOR MANUFACTURE
5	10/10/14	ISSUE FOR MANUFACTURE
6	10/10/14	ISSUE FOR MANUFACTURE
7	10/10/14	ISSUE FOR MANUFACTURE
8	10/10/14	ISSUE FOR MANUFACTURE

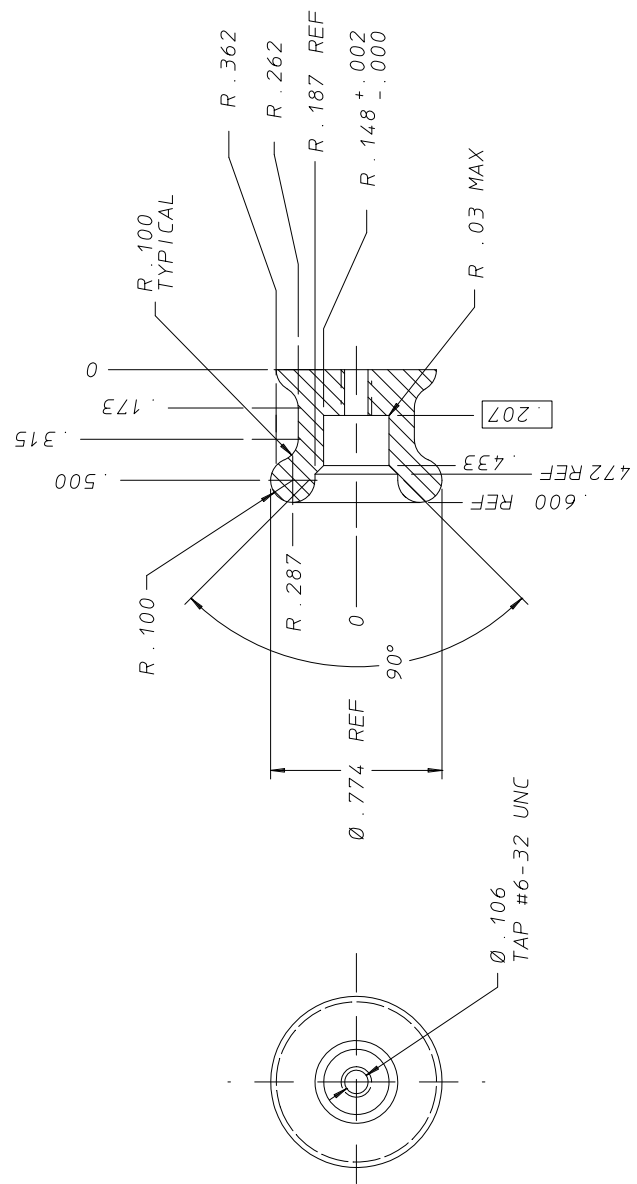
**LAWRENCE BERKELEY LABORATORY**  
UNIVERSITY OF CALIFORNIA-BERKELEY  
SNS-FEELION SOURCE AND LEET  
MECHANICAL SYSTEMS  
CHOPPER ELECTRODE ASSEMBLY  
PART NUMBER 2167356  
REVISED FOR FULL SCALE PRODUCTION  
10/10/14





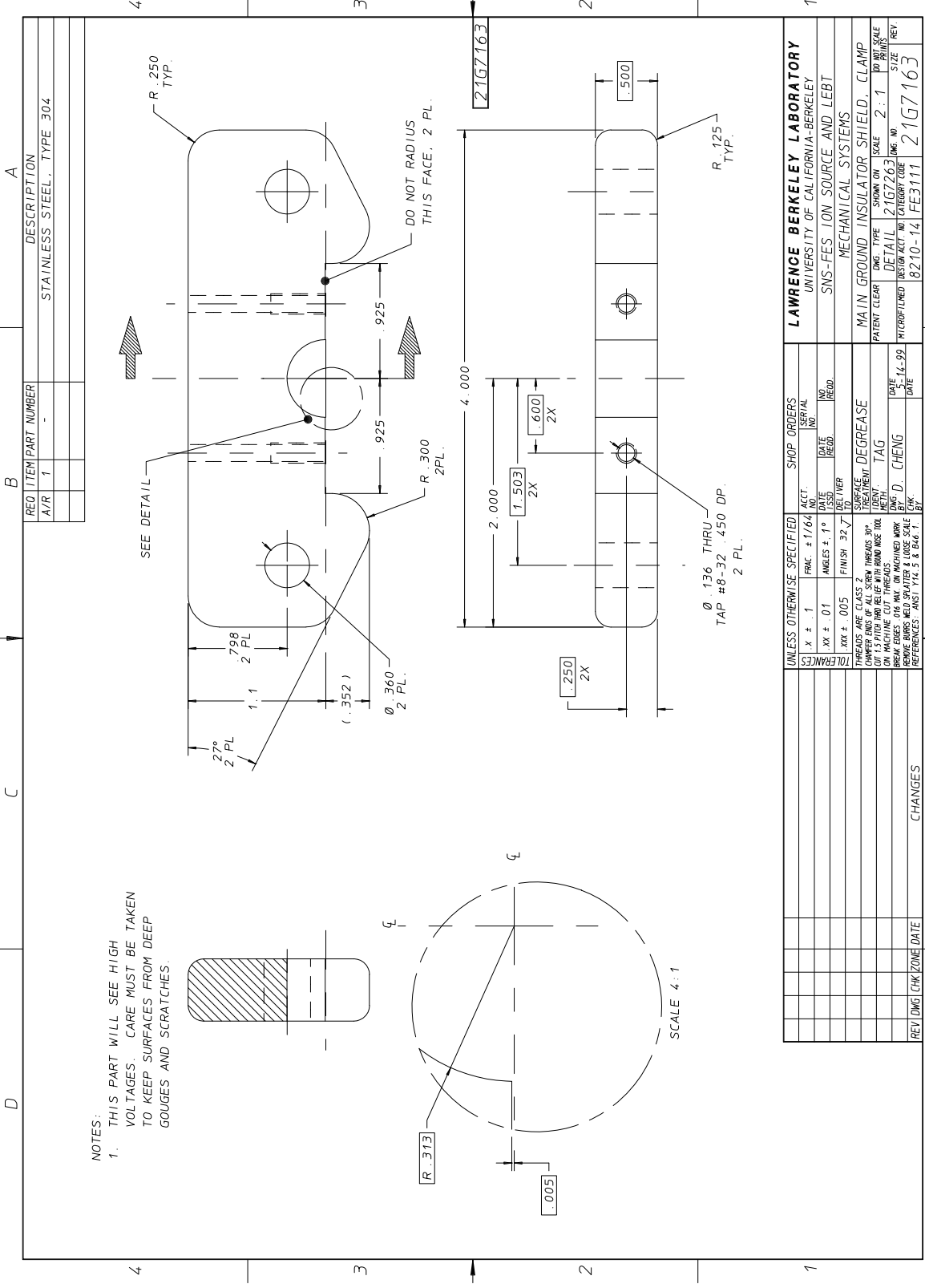


RECD / ITEM PART NUMBER	DESCRIPTION	
A/R 1	STAINLESS STEEL, TYPE 304	
21G7142		



UNLESS OTHERWISE SPECIFIED	SHOP ORDERS	LAWRENCE BERKELEY LABORATORY
TOLERANCE X ± .1 .XX ± .01 .XXX ± .005	ACCT NO	UNIVERSITY OF CALIFORNIA-BERKELEY
SURFACE FINISH	32	SNS-FES ION SOURCE AND LEBT
1. SAVED, FILM CUT	DATE TO DELIVER	MECHANICAL SYSTEMS
2. SHEAR OR CUT STOCK FINISH	DATE RECD	GROUND-CHOPPER INSULATOR SHIELD, INNER
3. THREADS CLASS 2	NO RECD	PAT CLEAR
4. CHAMFER ENDS OF ALL SCREW THRODS 30°	DATE	DWG TYPE
5. 1/12 PITCH RELIEF WITH ROUND NOSE	DATE	DETAIL
6. TOOL ON ALL MACHINE CUT THRODS	DATE	SHOWN ON
7. BREAK EDGES .1764 MAX ON MACHINE WORK	DATE	SCALE: 2:1
8. BROUTE EDGES .005 MAX AND WELD SURF	DATE	DO NOT SCALE PRINTS
9. REF-.06351 OR ASA 5105 SECT 1-14 & 846-1	DATE	DESIGN ACT NO
	DATE	8210-14
REV/DWN	CHK DATE	DESCRIPTION
	CHK	MICROFILMED
	BY	FE3111
		DWG NO
		21G7252
		REV
		21G7142





NOTES:  
 1. THIS PART WILL SEE HIGH VOLTAGES. CARE MUST BE TAKEN TO KEEP SURFACES FROM DEEP GOUGES AND SCRATCHES.

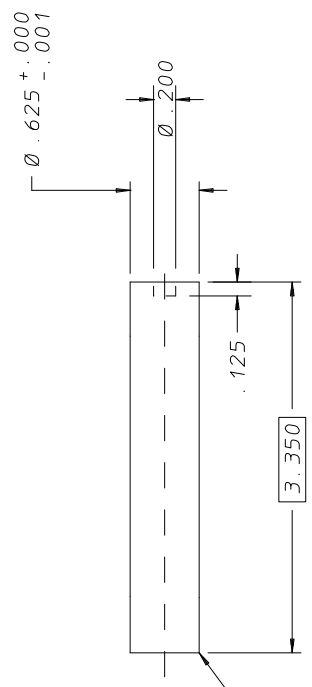
REV	ITEM	PART NUMBER	DESCRIPTION
A/R	1	-	STAINLESS STEEL, TYPE 304

UNLESS OTHERWISE SPECIFIED		SHOP ORDERS		
XX ± .1	FRAC. ± 1/64	ACCT. NO.	SERIAL NO.	
XX ± .01	ANGLES ± 1°	DRSS	DATE	
XX ± .005	FINISH 32	DELIVER	NO. REQD.	
TOLERANCES ARE CLASSES 2		SURFACE DECREASE		
CUMPER ENDS OF ALL SCREW THREADS 90°		TREATMENT TAG		
ON MACHINE CUT THREADS		DATE		
REMOVE BURRS, MILD SCRATCHES & LOOSE SCALE BY		DNG. NO.		
REFERENCES: ANSI Y14.5 & B46.1		DATE		
REV	DNG	CHK	ZONE	DATE
CHANGES				
LAWRENCE BERKELEY LABORATORY				
UNIVERSITY OF CALIFORNIA-BERKELEY				
SNS-FES ION SOURCE AND LEBT				
MECHANICAL SYSTEMS				
MAIN GROUND INSULATOR SHIELD, CLAMP				
PATENT CLEAR				
DNG. TYPE				
DETAIL				
SCALE				
2:1				
REV				
21G7263				
DNG. NO.				
8210-14 FE3111				
21G7163				

21G7172	RECD / ITEM PART NUMBER	DESCRIPTION
A/R 1	-	ALUMINA, AT LEAST 99% AI2O3

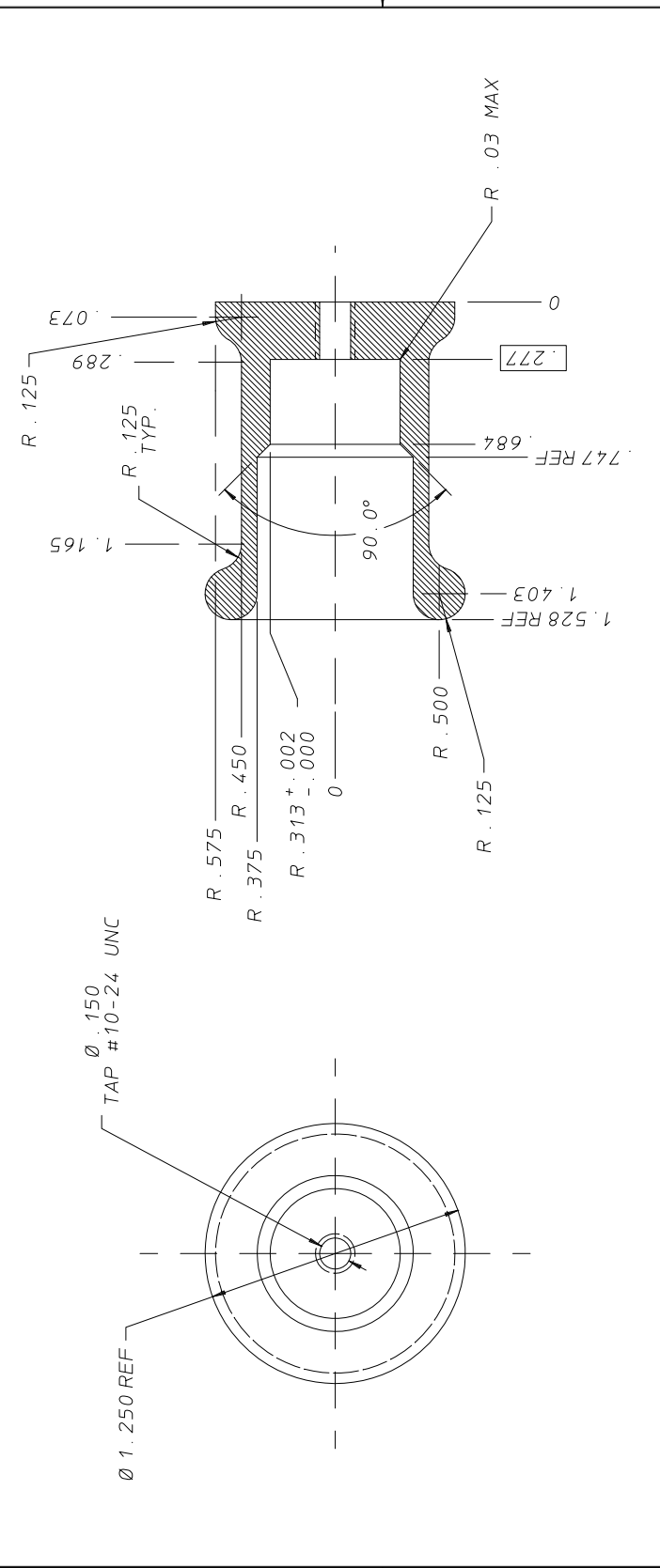


CHAM .05 x .05  
2 PL. ALL AROUND

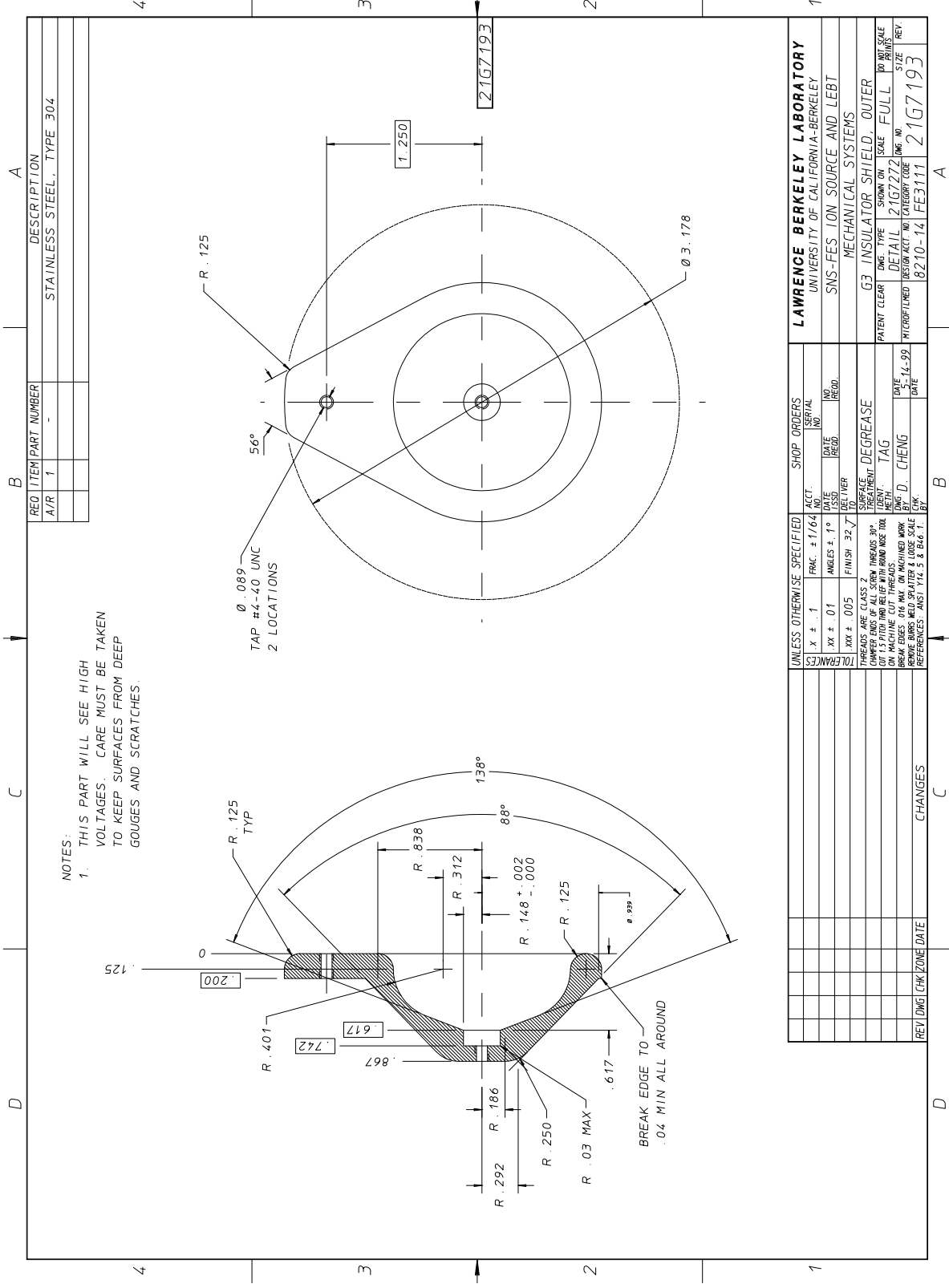


UNLESS OTHERWISE SPECIFIED	SHOP ORDERS	LAWRENCE BERKELEY LABORATORY
TOLERANCE X ± .1 .XX ± .01 .XXX ± .002	ACCT NO	UNIVERSITY OF CALIFORNIA-BERKELEY
SURFACE FINISH	DATE TSSD	SNS-FES ION SOURCE AND LEBT
1. SAVED, FILM-CUT	DELIVER TO	MECHANICAL SYSTEMS
2. SHEAR OR CUT STOCK FINISH	NO RECD	MAIN GROUND INSULATOR
3. THREADS CLASS 2	DATE RECD	PAT CLEAR
4. CHAMFER ENDS OF ALL SCREW THRODS 30°	SURFACE TREATMENT	DWG TYPE
5. 1/12 PITCH RELIEF WITH ROUND NOSE	DEGREASE	DETAIL
6. TOOL ON ALL MACHINE CUT THRODS	IDENTIFY TAG	SCALE: 2:1
7. BREAK EDGES 1/64 MAX ON MACHINE WORK	DWG D. CHENG	DO NOT SCALE PRINTS
8. BROUTE AND WELD SURFACES TO ASH 5105 SECT 7-14 & 846-1.	DATE 5-14-99	DESIGN ACCT NO
9. REF. USASI OR ASA 5105 SECT 7-14 & 846-1.	CHK BY	8210-14
	BY	FE3111
REV/DWN	CHK DATE	DESCRIPTION
		21G7172

RECD / ITEM PART NUMBER	DESCRIPTION	
A/R 1	STAINLESS STEEL, TYPE 304	
21G7182		



UNLESS OTHERWISE SPECIFIED		SHOP ORDERS	
TOLERANCE	X ± .1 .XX ± .01 .XXX ± .005	ACCT NO	SER NO
SURFACE FINISH	32	DATE ISSD	DATE RECD
		NO RECD	
1. SWED. FLAME CUT		MECHANICAL SYSTEMS	
2. SHEARED OR CUT STOCK FINISH		SNS-FES ION SOURCE AND LEBT	
3. THREADS CLASS 2		UNIVERSITY OF CALIFORNIA-BERKELEY	
4. CHAMFER ENDS OF ALL SCREW THRODS 30°		LAWRENCE BERKELEY LABORATORY	
5. 1/12 PITCH RELIEF WITH ROUND NOSE		MAIN GROUND INSULATOR SHIELD, INNER	
6. TOOL ON ALL MACHINE CUT THRODS		PAT CLEAR	
7. BREAK EDGES 1/64 MAX ON MACHINE WORK		DMG TYPE	
8. BROUTE EDGES 1/64 MAX AND WELD SURF. AFTER		DETAIL	
9. REF. UNAS1 OR ASA 5105 SECT 7-14 & 846-1.		SCALE: 2:1	
CHK	DWG D. CHENG	DATE	DO NOT SCALE PRINTS
BY	5-14-99	DESIGN ACT NO	21G7263
		CATEGORY	FE3111
REV		DWG NO	21G7182
DWN			
CHK			
DATE			
DESCRIPTION			



NOTES:  
 1. THIS PART WILL SEE HIGH VOLTAGES. CARE MUST BE TAKEN TO KEEP SURFACES FROM DEEP GOUGES AND SCRATCHES.

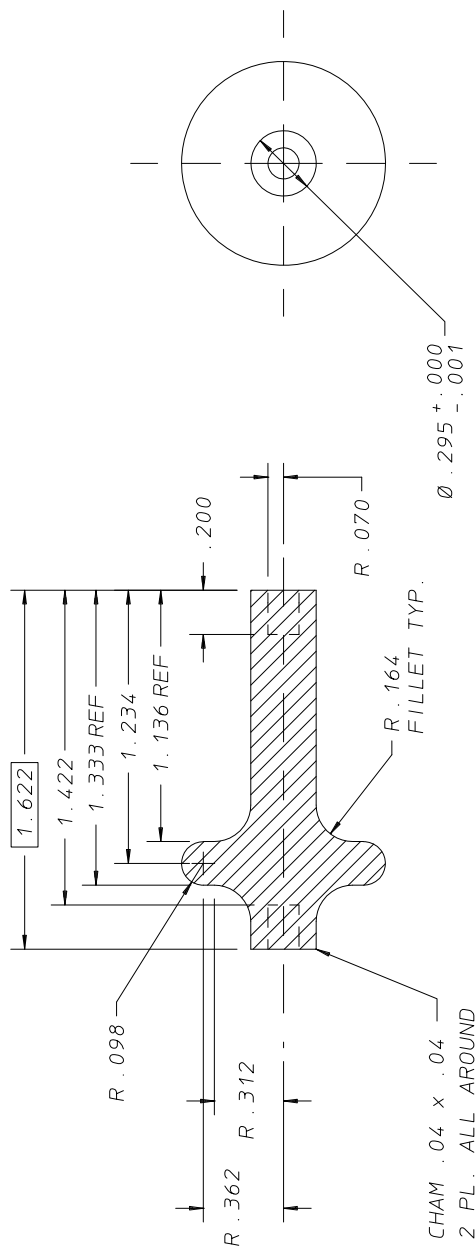
REQ	ITEM	PART NUMBER	DESCRIPTION
A/R	1	-	STAINLESS STEEL, TYPE 304

UNLESS OTHERWISE SPECIFIED		SHOP ORDERS	
XX ± .1	PRAC. ± 1/64	ACCT. NO.	SERIAL NO.
XX ± .01	ANGLES ± 1°	DESIGN	DATE
XX ± .005	FINISH 32	DELIVER	NO. REV.
TOLERANCES ARE CLASSES 2		SURFACE DECREASE	
CUMPER ENDS OF ALL SCREW THREADS 30°		TAG	
ON MACHINE CUT THREADS		IDENTIFY	
REMOVE BURRS WELD SPATTER & LOOSE SCALE BY		DATE	
REFERENCES: ANSI Y14.5 & B46.1		DATE	
REV		DATE	
CHANGES		DATE	

LAWRENCE BERKELEY LABORATORY			
UNIVERSITY OF CALIFORNIA-BERKELEY			
SNS-FES ION SOURCE AND LEPT			
MECHANICAL SYSTEMS			
G3 INSULATOR SHIELD, OUTER			
PATENT CLEAR	DWG. TYPE	SHOW ON SCALE	DO NOT SCALE
DETAIL	21G7272	DWG. NO.	FULL
SIZE	8210-14 FE3111	REV	21G7193

21G7202	RECD / ITEM PART NUMBER	DESCRIPTION
A/R 1	-	ALUMINA, 85% A1203

NOTES:  
 1. THIS PART TO BE MACHINED GREEN (85% A1203) PRIOR TO FIRING.



UNLESS OTHERWISE SPECIFIED		SHOP ORDERS	
TOLERANCE	X ± .1 .XX ± .01 .XXX ± .005	ACCT NO	SER NO
SURFACE FINISH	32 ✓	DATE ISSD	DATE RECD
DELIVER TO	NO RECD	DATE	NO RECD
1. SWED. FILM CUT		MECHANICAL SYSTEMS	
2. SHEARED OR CUT STOCK FINISH		G3 INSULATOR STANDOFF	
3. THREADS CLASS 2		PAT CLEAR	DWG TYPE
4. CHAMFER ENDS OF ALL SCREW THRODS 30°		DETAIL	SHOWN ON
5. 1/12 PITCH RELIEF WITH ROUND NOSE		21G7272	SCALE: 2:1
6. TOOL ON ALL MACHINE CUT THRODS		DESIGN ACT NO	DO NOT SCALE PRINTS
7. BREAK EDGES 1/64 MAX ON MACHINE WORK		8210-14	FE3111
8. PROTECT SURFACES AND HOLD SURFACES		CATEGORY CODE	DWG NO
9. REF. UNLESS OTHERWISE SPECIFIED		8210-14	21G7202
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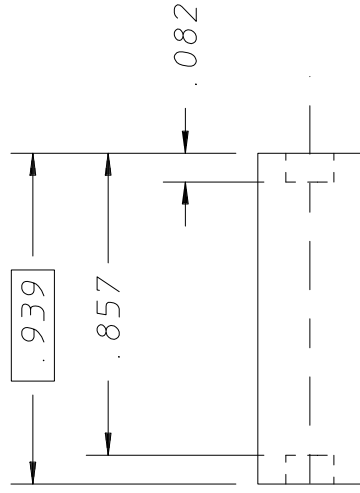
**LAWRENCE BERKELEY LABORATORY**  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SNS-FES ION SOURCE AND LEBT  
 MECHANICAL SYSTEMS  
 G3 INSULATOR STANDOFF  
 PAT CLEAR  
 DWG TYPE  
 DETAIL  
 DESIGN ACT NO  
 8210-14  
 CATEGORY CODE  
 FE3111  
 SCALE: 2:1  
 DO NOT SCALE PRINTS  
 DWG NO  
 21G7272  
 REV  
 21G7202







Dwg. No. **21G7231**  
Size Rev



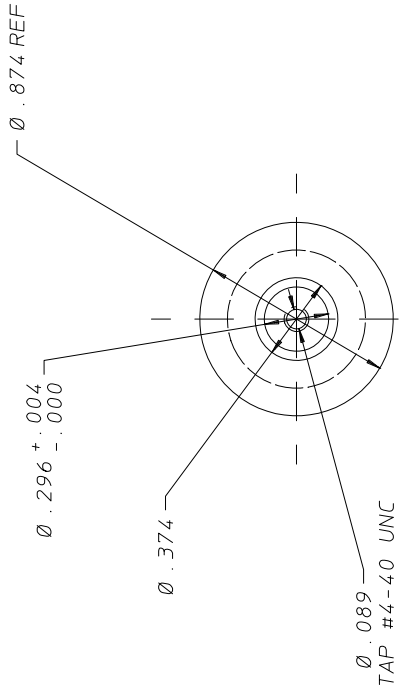
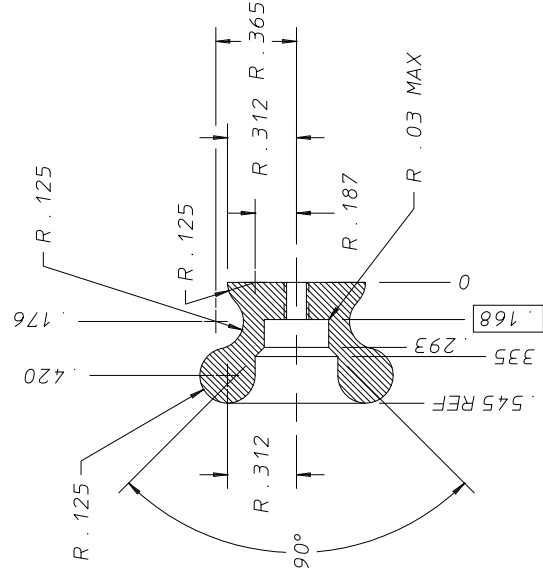
CHAM  $.03 \times .03$   
2 PL. ALL AROUND

Material - ALUMINA, AT LEAST 99% AI2O3 Unless Otherwise Noted		Rev	Dwn	Date	Changes
X ± .1	XX ± .025	XXX ± .005	Angles ± 5°		
Break Edges .016 Max on Machined Work Remove Burrs Weld Spallier and Loose Scale References: ANSI Y 14.5 & B46.1					
Account Number	Finish	Date Recd	Shown on Dwg No	Category	
Date Issued	Date Recd	Deliver To	21G7282	FE-3111	
Number Required	Degrease Tag	Identif Method	Patent Filled	Dwg No	Do not Scale Prints
Surface Treatment	Date	By	Design Account	8210-14	21G7231
Drawn	D. CHENG	Date	8210-14	Drawing Type	Detail
Check By					

**LAWRENCE BERKELEY LABORATORY**  
University of California - Berkeley

SNS-FES ION SOURCE AND LEBT  
MECHANICAL SYSTEMS  
EXTRACTOR INSULATOR STANDOFF

RECD / ITEM PART NUMBER	DESCRIPTION	
A/R 1	STAINLESS STEEL, TYPE 304	
21G7242		



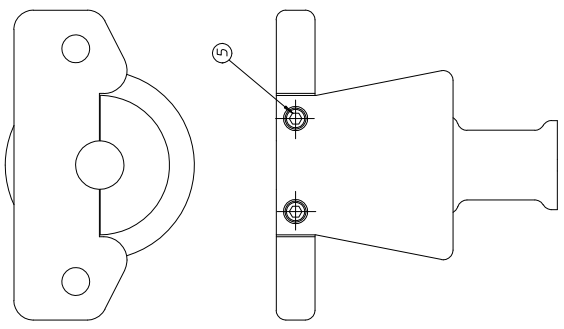
UNLESS OTHERWISE SPECIFIED	SHOP ORDERS	LAWRENCE BERKELEY LABORATORY
TOLERANCE X ± .1 .XX ± .01 .XXX ± .005	ACCT NO	UNIVERSITY OF CALIFORNIA-BERKELEY
SURFACE FINISH	DATE TSSD	SNS-FES ION SOURCE AND LEBT
1. SAVED, FLAME CUT	DATE RECD	MECHANICAL SYSTEMS
2. SHEARED OR CUT STOCK FINISH	NO RECD	EXTRACTOR INSULATOR SHIELD, INNER
3. THREADS CLASS 2	DELIVER	PAT CLEAR
4. CHAMFER ENDS OF ALL SCREW THRODS 30°	SURFACE TO DEGREASE	DWG TYPE
5. CHAMFER ENDS OF ALL SCREW THRODS WITH ROUND NOSE	IDENTIFY TAG	DETAIL
6. 1/12 PITCH RELIEF ON MACHINE WORK	DWG D. CHENG	SCALE: 2:1
7. TOOL ON ALL MACHINE CUT THRODS	DATE 5-16-99	DO NOT SCALE PRINTS
8. BREAK EDGES .1764 MAX ON MACHINE WORK	DATE	DESIGN ACT NO
9. BROUTE AND WELD SURFACES TO ASH 5105 SECT 7-14 & 846-1.	CHK BY	8210-14
10. REF: 06AS1	BY	FE3111
REV/DWN	CHK DATE	DESCRIPTION
		DWG NO 21G7282
		CATEGORY CODE
		DWG NO 21G7242



REV	ITEM	PART NUMBER	DESCRIPTION
1	1	21G7163	MAIN GROUND INSULATOR SHIELD, CLAMP
1	2	21G7153	MAIN GROUND INSULATOR SHIELD, OUTER
1	3	21G7172	MAIN GROUND INSULATOR STANDOFF
1	4	21G7182	MAIN GROUND INSULATOR SHIELD, INNER
2	5		#8-32 UNC SHCS, STAINLESS, .75" LONG

ADDITIONAL NOTES:

- PART ③ IS TO BE JOINED TO PART ④ USING EPON/VERSAMID EPOXY.
- PRIOR TO JOINING, EPOXY MUST BE VACUUM PUMPED TO REDUCE THE GAS CONTENT.
- AFTER CURING, ENSURE THAT NO TRAPPED VOLUMES ARE LEFT IN THE JOINT BY DRILLING AND CHASING THREADS WITH A TAP.



21G7263

UNLESS OTHERWISE SPECIFIED				SHOP ORDERS			
XX ± .1	PRAC. ± 1/64	ACCT. NO.	SERIAL	DATE	NO.	REV.	
XX ± .01	ANGLES ± .01°	FINISH	DELIVER				
XX ± .010							
THREDS ARE CLASS 2 LOWER ENDS OF ALL SCREW THREADS 3P. ON MACHINE CUT THREADS: UNLINED MARK REMOVE BARS WELD SPATTER & LOOSE SCALE BY REFERENCES: ANSI 114.5 & B46.1				SURFACE DECREASE TAG DATE 5-20-99 BY D. CHENG			
PATENT CLEAR DWG. TYPE DETAIL				SHOW ON SCALE FULL			
PATENT CLEAR DWG. NO. 8210-14 FE3111				DWG. NO. 21G7116			
REV. DWG. CHK. ZONE. DATE				CHANGES			

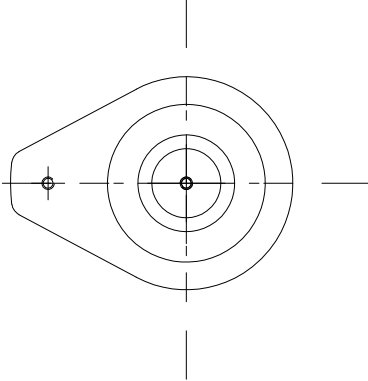
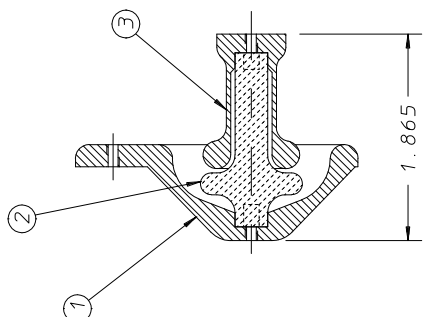
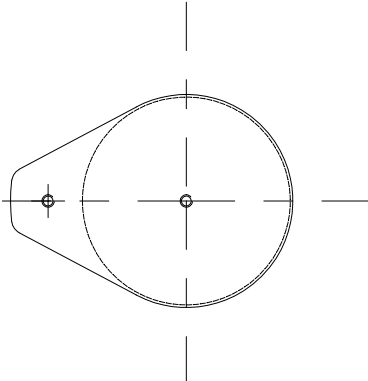
**LAWRENCE BERKELEY LABORATORY**  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SNS-FES ION SOURCE AND LEBT  
 MECHANICAL SYSTEMS  
 MAIN GROUND INSULATOR ASSEMBLY

21G7263

RECD	ITEM	PART NUMBER	DESCRIPTION
2167272	1	2167193	G3 INSULATOR SHIELD, OUTER
	1	2167202	G3 INSULATOR STANDOFF
	1	2167212	G3 INSULATOR SHIELD, INNER

**ADDITIONAL NOTES:**

1. PART ② IS TO BE JOINED TO PARTS ① AND ③ USING EPON/VERSAMID EPOXY.
2. PRIOR TO JOINING, EPOXY MUST BE VACUUM PUMPED TO REDUCE THE GAS CONTENT.
3. AFTER CURING, ENSURE THAT NO TRAPPED VOLUMES ARE LEFT IN THE JOINT BY DRILLING AND CHASING THREADS WITH A TAP.

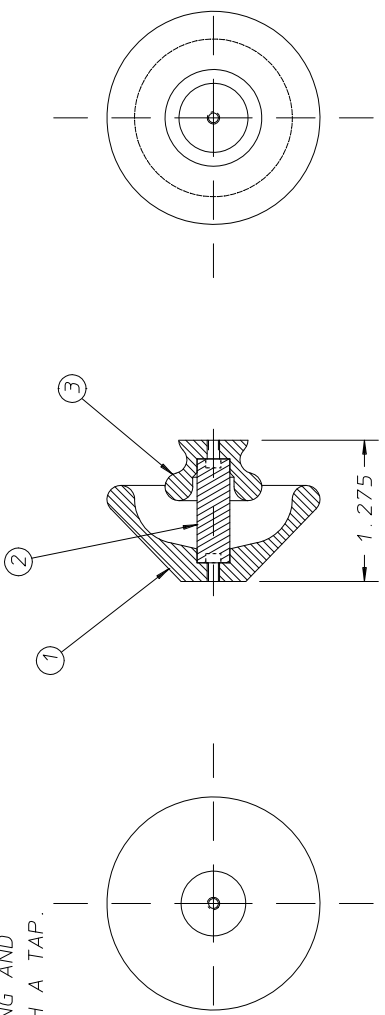


REV	DWN	CHK	DATE	DESCRIPTION
<b>UNLESS OTHERWISE SPECIFIED</b>				
TOLERANCE		X ± .1	.XX ± .01	.XXX ± .010
DATE		ISSD	DATE	SER NO
SURFACE FINISH		125	NO	RECD
1. SAVED, FILM-CUT		DELIVER		
2. SHEAR OR CUT STOCK FINISH		TO		
3. THREADS CLASS 2		SURFACE		
4. CHAMFER ENDS OF ALL SCREW THRODS 30°		TO		
5. 1/12 PITCH RELIEF WITH ROUND NOSE		TO		
6. TOOL ON ALL MACHINE CUT THRODS		TO		
7. BREAK EDGES 1/64 MAX ON MACHINE WORK		TO		
8. REMOVE BURRS AND WELD SPATTER		TO		
9. REF: USASI OR ASA 5105 SECT 1-14 & 846-1.		DATE	5-20-99	
		BY	D. CHENG	
		CHK		
		BY		
<b>LAWRENCE BERKELEY LABORATORY</b>				
UNIVERSITY OF CALIFORNIA-BERKELEY				
SNS-FES ION SOURCE AND LEBT				
MECHANICAL SYSTEMS				
G3 INSULATOR ASSEMBLY				
PAT CLEAR		DMG TYPE		SCALE: FULL
DETAIL		2167116		DO NOT SCALE PRINTS
MICROFILMED		DESIGN ACCT NO		CATEGORY CODE
8210-14		FE3111		DWG NO
2167272				REV

RECD	ITEM	PART NUMBER	DESCRIPTION
2167282	1	2167223	EXTRACTOR INSULATOR SHIELD, OUTER
	1	2167231	EXTRACTOR INSULATOR STANDOFF
	1	2167242	EXTRACTOR INSULATOR SHIELD, INNER

ADDITIONAL NOTES:

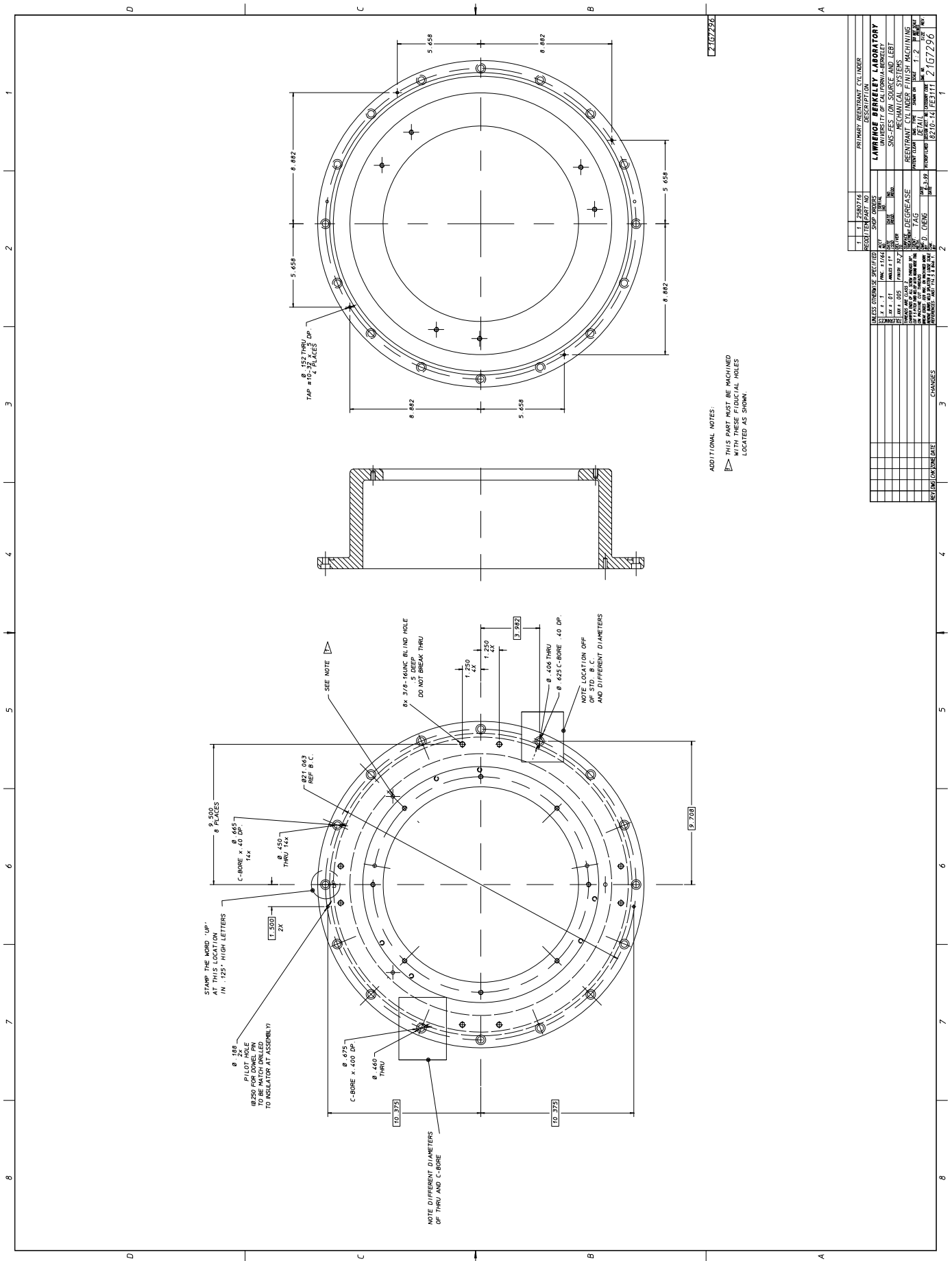
- PART ② IS TO BE JOINED TO PARTS ① AND ③ USING EPON/VERSAMID EPOXY.
- PRIOR TO JOINING, EPOXY MUST BE VACUUM PUMPED TO REDUCE THE GAS CONTENT.
- AFTER CURING, ENSURE THAT NO TRAPPED VOLUMES ARE LEFT IN THE JOINT BY DRILLING AND CHASING THREADS WITH A TAP.



UNLESS OTHERWISE SPECIFIED		SHOP ORDERS	
TOLERANCE	X ± .1 .XX ± .01 .XXX ± .010	ACCT NO	SER NO
DATE	125	DATE RECD	NO RECD
SURFACE FINISH	125	DELIVER TO	
1. SWEED, FLAMECUT		SURFACE TREATMENT	DEGREASE
2. SHEAR OR CUT STOCK FINISH		IDENTIFICATION METHOD	TAG
3. THREADS CLASS 2		DATE	5-20-99
4. CHAMFER ENDS OF ALL SCREW THRODS 30°		BY	D. CHENG
5. 1/12 PITCH RELIEF WITH ROUND NOSE		CHK	
6. TOOL ON ALL MACHINE CUT THRODS		DATE	5-20-99
7. BREAK EDGES 1/64 MAX ON MACHINE WORK		DATE	
8. BROUFE AND WELD SURFACES			
9. REF: 06AS1 OR ASA 5105 SECT 1-14 & 846-1.			
REV/DWN	CHK	DATE	DESCRIPTION

**LAWRENCE BERKELEY LABORATORY**  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SNS-FES ION SOURCE AND LEBT  
 MECHANICAL SYSTEMS  
 EXTRACTOR INSULATOR ASSEMBLY  
 PAT CLEAR DWG TYPE SHOWN ON SCALE: FULL  
 DETAIL 2167116 DO NOT SCALE PRINTS  
 MICROFILMED DESIGN ACCT NO CATEGORY CODE DWG NO 8210-14 FE3111 REV 2167282





ADDITIONAL NOTES:  
 THIS PART MUST BE MACHINED WITH THESE FIDUCIAL HOLES LOCATED AS SHOWN.

REV	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

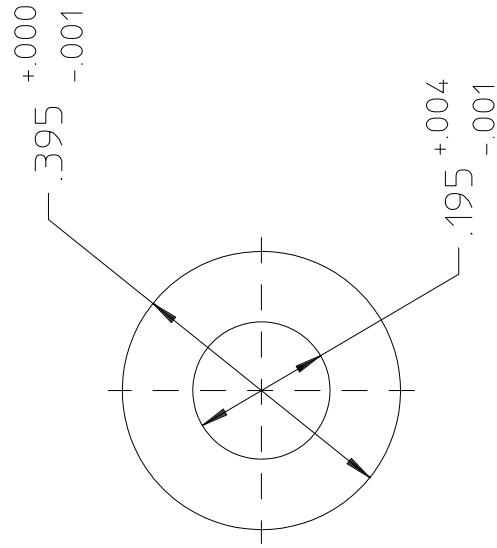
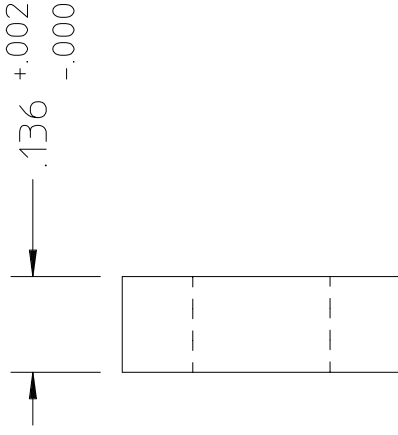
  

REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

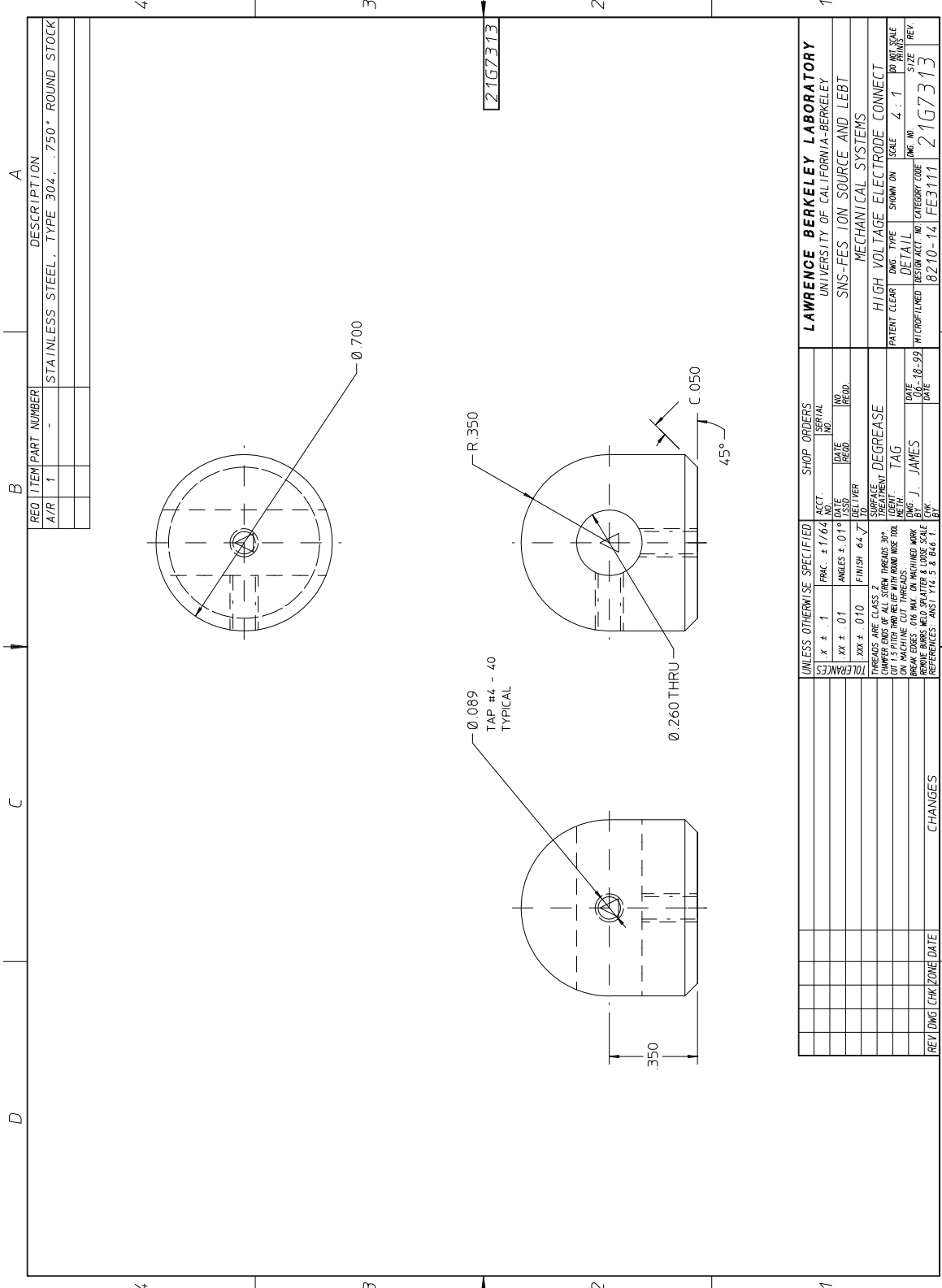
REVISION	DATE	BY	CHKD	DESCRIPTION
1	11/28/07	JL	JL	PRIMARY REENRANT CYLINDER

Dwg. No. **21G7301**  
Size Rev



Material	ALUMINA AL2O3	Rev	Date	Changes
UNLESS OTHERWISE SPECIFIED				
X ± .1	XX ± .025	XXX ± .010	Angles ± 5°	
Break Edges .016 Max on Machined Work				
Remove Burrs Weld Spatter and Loose Scale				
References: ANSI Y 14.5 & B46.1				
Account Number	Finish	Date Recd	SNS - FES ION SOURCE AND LEBT	
Date Issued	Tag	Deliver To	MECHANICAL SYSTEMS	
Number Required	Degrease	Identifying Method	MAIN SUPPORT CERAMIC HOLDOFF WASHER	
Surface Treatment	By	Date	Category FE-3111	
Drawn	J. JAMES	06-21-99	Drawing Scale 4:1	
Check By			Drawing Type Detail	
			Dwg. No. <b>21G7301</b>	
			Size Rev	

**LAWRENCE BERKELEY LABORATORY**  
**University of California - Berkeley**

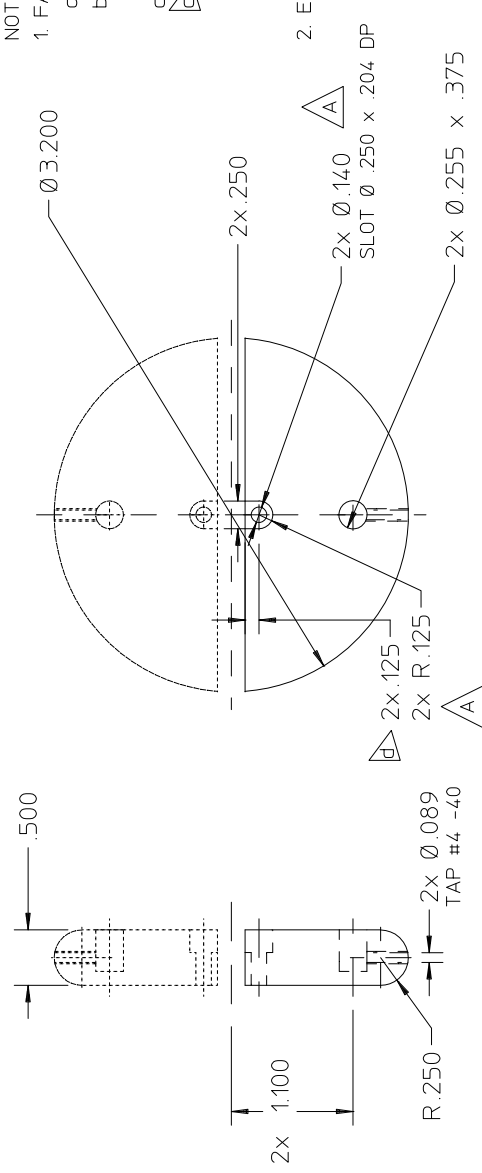


REV	ITEM	PART NUMBER	DESCRIPTION
A/R	1	-	STAINLESS STEEL, TYPE 304, .750" ROUND STOCK

UNLESS OTHERWISE SPECIFIED		SHOP ORDERS	
CX ± .1	PRAC. ± 1/64	ACCT. NO.	SERIAL NO.
XX ± .01	ANGLES ± .01°	DATE	NO. REV.
XXX ± .010	FINISH 64.7	DELIVER	
TOLERANCES ARE CLASS 2		SURFACE DECREASE	
CHAMFER ENDS OF ALL SCREW THREADS 30°		TREATMENT TAG	
ON MACHINE CUT THREADS		DATE 06-18-59	
REMOVE BURRS MILD BRAYER & LOOSE SCALING		BY J. JAMES	
REFERENCES: ANSI Y14.5 & B46.1		DATE	
REV		DATE	
CHANGES		DATE	
REV		DATE	
DWG. NO.		CATEGORY CODE	
4 : 1		8210-14 FE3111	
SIZE		REV	
4 : 1		21G7313	

**LAWRENCE BERKELEY LABORATORY**  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SNS-FES ION SOURCE AND LEBT  
 MECHANICAL SYSTEMS  
 HIGH VOLTAGE ELECTRODE CONNECT

RECD / ITEM PART NUMBER	DESCRIPTION	
A/R 1	STAINLESS STEEL, TYPE 304	
2167322		

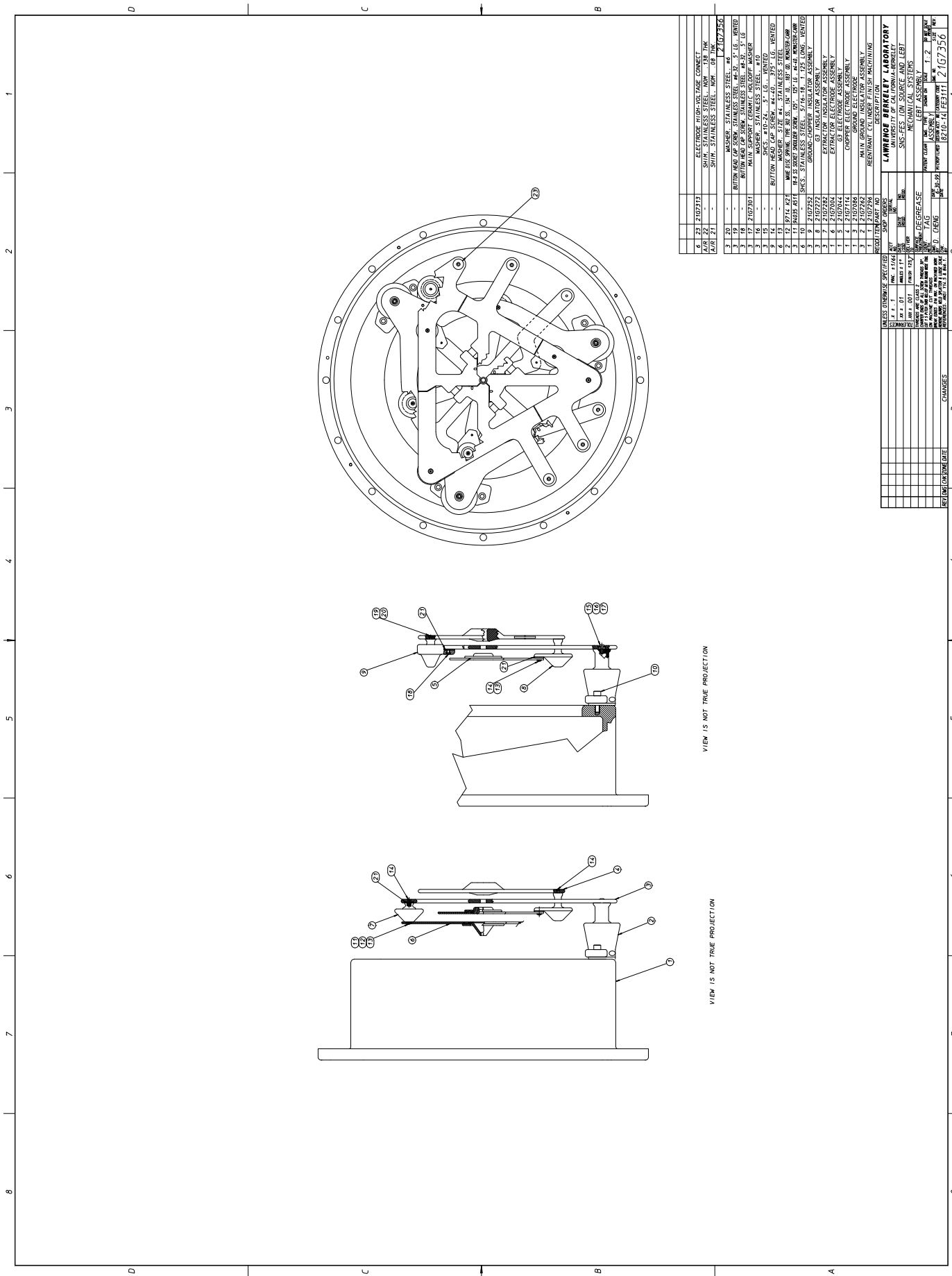


- NOTES:
- FABRICATION PROCEDURE AS FOLLOWS:
    - MACHINE DISK TO OD/RADIUS
    - MACHINE BOTH .255 x .375 DP AND THREADED HOLES
    - SLICE INTO TWO HEMISPHERES
  - EACH DISK MAKES TWO HEMISPHERES

UNLESS OTHERWISE SPECIFIED	SHOP ORDERS	
TOLERANCE X ± .1 .XX ± .01 .XXX ± .005	ACCT NO	SER NO
SURFACE FINISH	DATE ISSD	DATE RECD
64	✓	NO RECD
DELIVER TO	MECHANICAL SYSTEMS	
1. SAVED, FILM CUT	CHOPPER HI VOLTAGE FEED-THRU ELECTRICAL CONNECT	
2. SHEARED OR CUT STOCK FINISH	PAT CLEAR	
3. THREADS CLASS 2	DMG TYPE	
4. CHAMFER ENDS OF ALL SCREW THRODS 30°	DETAIL	
5. 1/12 PITCH RELIEF WITH ROUND NOSE	SCALE: FULL	
6. TOOL ON ALL MACHINE CUT THRODS	DO NOT SCALE PRINTS	
7. BREAK EDGES 1/64 MAX ON MACHINE WORK	DESIGN ACT NO	
8. BROUTE AND HOLD SURFACES AND HELD SURFACES	8210-14	
9. REF: 06AS1 OR ASA 5105 SECT 1-14 & 846-1	FE3111	
CHK BY	DATE	REV
DMG J. JAMES	06-22-99	2167322A
BY	DATE	
REV/DWN	CHK DATE	DESCRIPTION

**LAWRENCE BERKELEY LABORATORY**  
 UNIVERSITY OF CALIFORNIA-BERKELEY  
 SNS-FES ION SOURCE AND LEBT  
 MECHANICAL SYSTEMS





1 2 3 4 5 6 7 8

A B C D

6	2107313	ELECTRODE HIGH-VOLTAGE CONNECT	
5	2107312	SPRING WIRE STAINLESS STEEL #16-32	
4	2107311	WASHER STAINLESS STEEL #16-32	
3	18	BUTTON HEAD CAP SCREW STAINLESS STEEL #4-32	5 LG. UNFIN.
2	17	BUTTON HEAD CAP SCREW STAINLESS STEEL #4-32	5 LG. UNFIN.
1	16	WASHER STAINLESS STEEL #10	
	15	SPACER #10-24	5 LG. UNFIN.
	14	BUTTON WASHER SIZE #4 STAINLESS STEEL	VERTICAL
	13	WIRE DISC SPRING TYP. 302 SS. 1/4" ID. 1/8" OD. 1/16" THICK	
	12	SPRING WIRE STAINLESS STEEL #16-32	5 LG. UNFIN.
	11	SCREW STAINLESS STEEL #16-16	1/2" LG. UNFIN.
	10	GROUND CHOPPER INSULATOR ASSEMBLY	
	9	EXTRACTOR INSULATOR ASSEMBLY	
	8	EXTRACTOR ELECTRODE ASSEMBLY	
	7	GROUND ELECTRODE ASSEMBLY	
	6	WATER GROUND INSULATOR ASSEMBLY	
	5	REGULATOR INSULATOR ASSEMBLY	
	4	RECEPTOR PART NO. 2107356	

LAWRENCE BERKELEY LABORATORY		
PROJECT NO.	MECHANICAL SYSTEMS	
DATE	SEP 22 1968	
BY	W. L. 2	
CHECKED BY	W. L. 2	
APPROVED BY	W. L. 2	
REVISIONS	REV. NO. DATE DESCRIPTION	
1	1 11/15/68	ISSUED FOR FABRICATION
2	2 12/11/68	ISSUED FOR FABRICATION
3	3 1/11/69	ISSUED FOR FABRICATION
4	4 1/11/69	ISSUED FOR FABRICATION
5	5 1/11/69	ISSUED FOR FABRICATION
6	6 1/11/69	ISSUED FOR FABRICATION
7	7 1/11/69	ISSUED FOR FABRICATION
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100	100 1/11/69	ISSUED FOR FABRICATION

VIEW IS NOT TRUE PROJECTION

VIEW IS NOT TRUE PROJECTION

2 3 4 5 6 7 8

A B C D

REVISIONS

DATE

DESCRIPTION

BY

CHECKED BY

APPROVED BY

DATE

DESCRIPTION

BY

CHECKED BY

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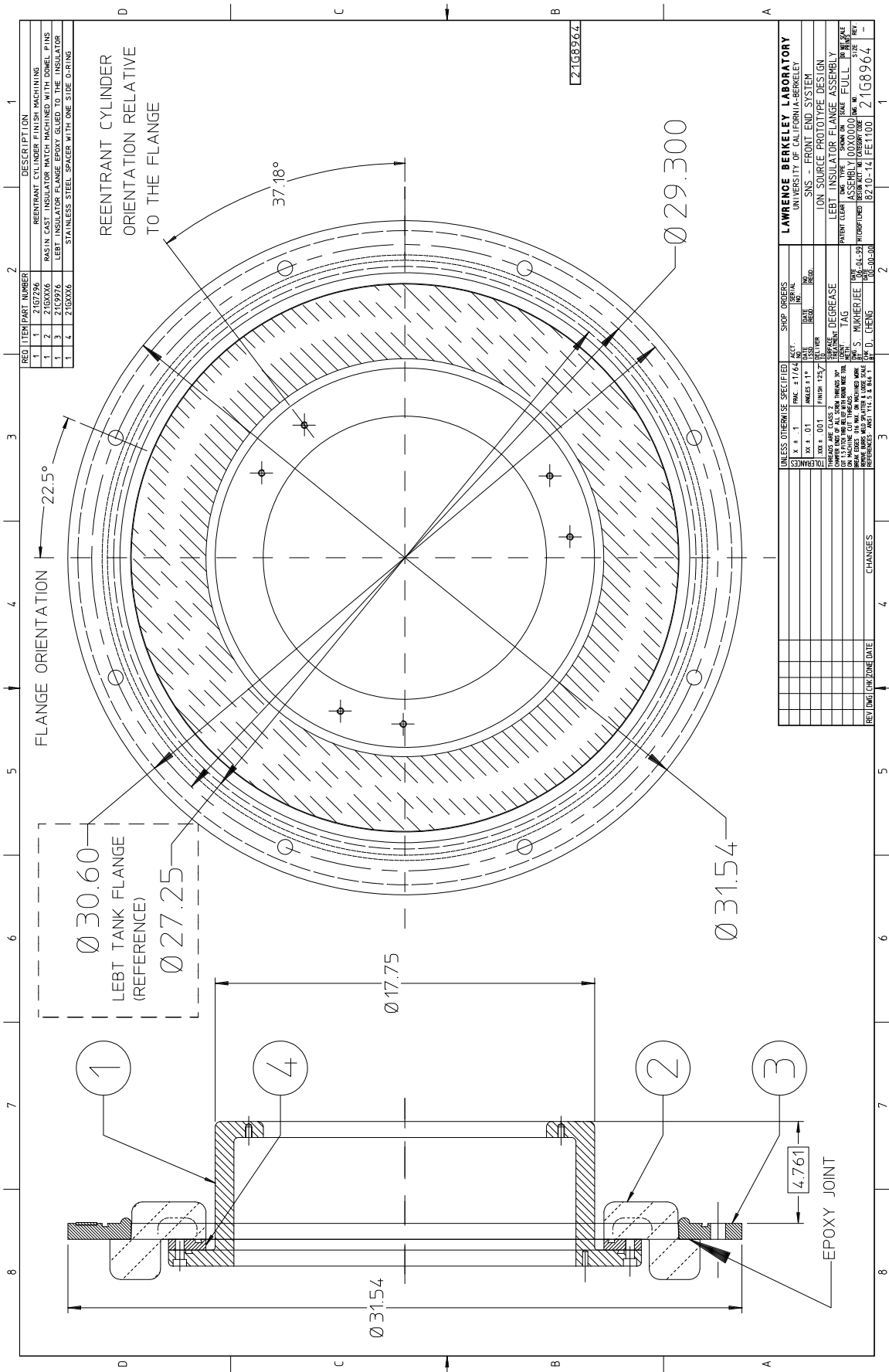
CHECKED BY

APPROVED BY

DATE

DESCRIPTION

BY



REQ	ITEM	PART NUMBER	DESCRIPTION
1	1	21G8296	REENTRANT CYLINDER FINISH MACHINING
1	2	21G8296	RASIN CAST INSULATOR MATCH MACHINED WITH DOWEL PINS
1	3	21G9276	LEBT INSULATOR FLANGE EPXY GLUED TO THE INSULATOR
1	4	21G8296	STAINLESS STEEL SPACER WITH ONE SIDE O-RING

REENTRANT CYLINDER  
ORIENTATION RELATIVE  
TO THE FLANGE

FLANGE ORIENTATION

Ø 30.60  
LEBT TANK FLANGE  
(REFERENCE)  
Ø 27.25

UNLESS OTHERWISE SPECIFIED	SHOP DIMENSIONS	FINISH
AS BUILT	AS BUILT	AS BUILT
± 0.1	± 0.1	± 0.1
± 0.01	± 0.01	± 0.01
± 0.005	± 0.005	± 0.005
± 0.002	± 0.002	± 0.002
± 0.001	± 0.001	± 0.001
± 0.0005	± 0.0005	± 0.0005
± 0.0002	± 0.0002	± 0.0002
± 0.0001	± 0.0001	± 0.0001
± 0.00005	± 0.00005	± 0.00005
± 0.00002	± 0.00002	± 0.00002
± 0.00001	± 0.00001	± 0.00001

REV	DATE	BY	CHK	APP	DESCRIPTION
1	10/29/00	S. MARQUETTE			ISSUE FOR PRODUCTION
2	10/29/00	D. CHENG			ISSUE FOR PRODUCTION

UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED
AS BUILT	AS BUILT
± 0.1	± 0.1
± 0.01	± 0.01
± 0.005	± 0.005
± 0.002	± 0.002
± 0.001	± 0.001
± 0.0005	± 0.0005
± 0.0002	± 0.0002
± 0.0001	± 0.0001
± 0.00005	± 0.00005
± 0.00002	± 0.00002
± 0.00001	± 0.00001

LAWRENCE BERKELEY LABORATORY  
UNIVERSITY OF CALIFORNIA-BERKELEY  
SNS - FRONT END SYSTEM  
ION SOURCE PROTOTYPE DESIGN  
LEBT INSULATOR FLANGE ASSEMBLY  
PART NUMBER: 21G8296  
ASSEMBLY: 00X0000  
DATE: 10/29/00  
DRAWN BY: S. MARQUETTE  
CHECKED BY: D. CHENG  
JOB NO.: 00-00-000

21G8264

Ø 31.54

Ø 29.30

Ø 17.75

22.5°

37.18°

Ø 30.60

Ø 27.25

4.761

EPOXY JOINT

1

2

3

4

CHANGES

REV. DATE

BY

CHK

APP

DESCRIPTION





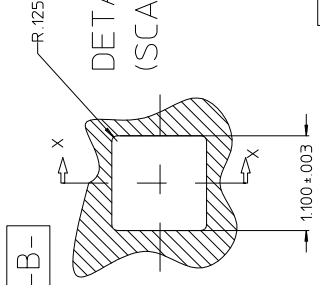
12X 3/8-16 HOLE  
5 DEEP  
Ø .005 ABC

8X Ø.703 THRU HOLE  
EQUISPACED ON 29.300 BCD  
Ø .002 ABC

8X SPOT FACE  
Ø 2.0  
64

SECTION X-X

DETAIL-1  
(SCALE 4X)



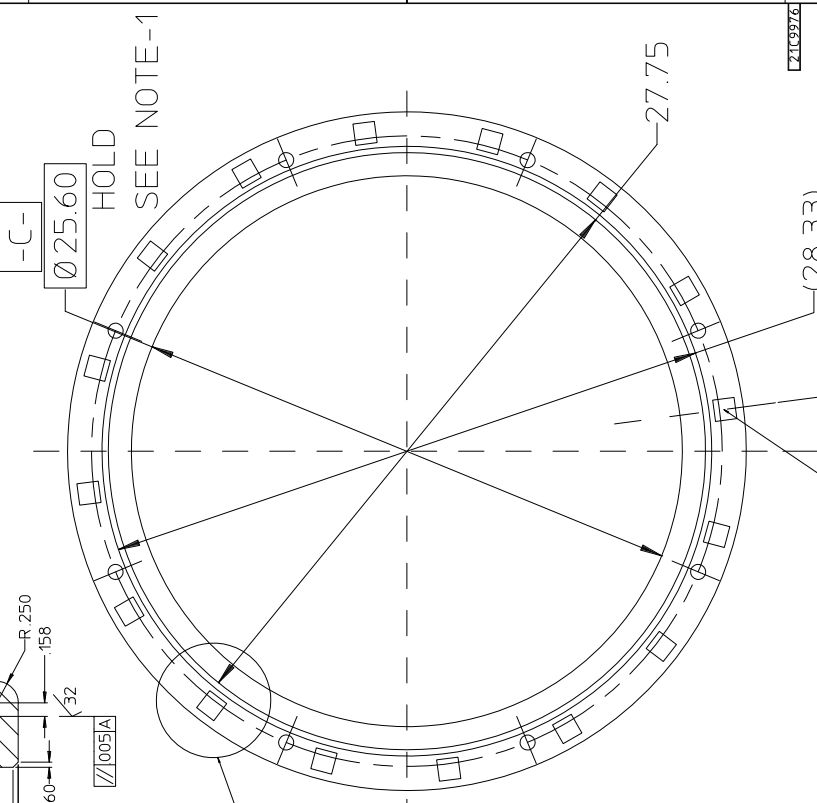
1.00  
.75

14.65

Ø 31.54

Ø 25.60  
HOLD  
SEE NOTE-1

-C-



Insulator  
(Ref)

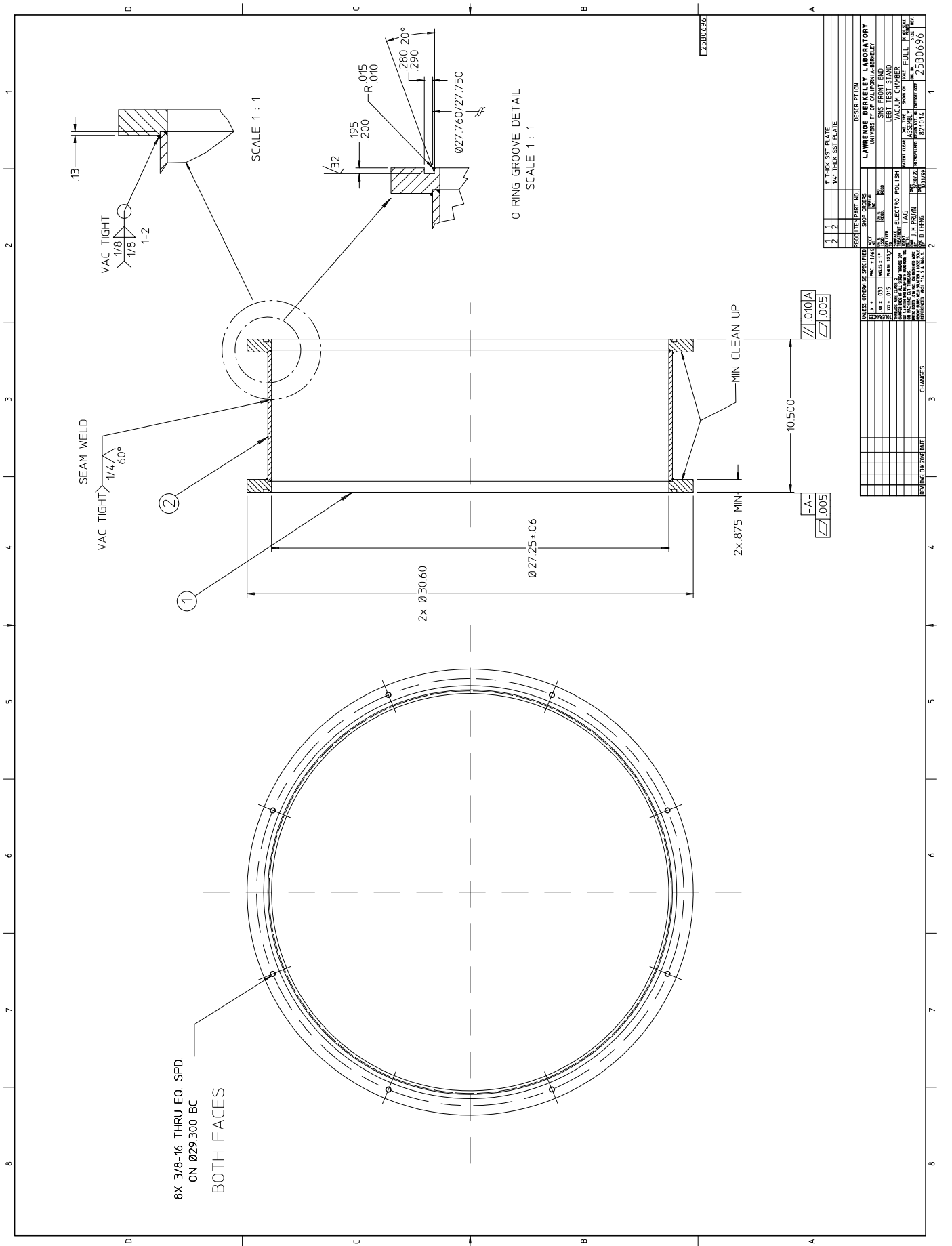
Ø .005  
-A-  
Ø .010 A

16X RECESS EQUISPACED  
ON Ø 29.804 BCD  
Ø .005 ABC

NOTE:  
1. MATCH ID WITH THE RESIN INSULATOR O.D.  
2. MACHINE THE .25R BULGE (DET-1) FIRST THEN  
EPOXY GLUE WITH THE INSULATOR & CURE.  
3. MILL THE FLANGE DETAILS (SHOWN HERE) AFTER CURE.  
4. COPY CYLINDER OD (21G7296) FIXED WITH THE INSULATOR  
AS THE MACHINING CENTER FOR MILLING THE DETAILS (BCD).

FINAL  
6/8/99

304 STAINLESS STEEL PLATE STOCK	21C9976
LAWRENCE BERKELEY LABORATORY	
UNIVERSITY OF CALIFORNIA-BERKELEY	
ION SOURCE - FRONT END SYSTEM	
ION SOURCE PROTOTYPE DESIGN	
LEAD INSULATOR FLANGE	
PART 010X0000	
REV. 01	
REV. 02	
REV. 03	
REV. 04	
REV. 05	
REV. 06	
REV. 07	
REV. 08	
REV. 09	
REV. 10	
REV. 11	
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REV. 92	
REV. 93	
REV. 94	
REV. 95	
REV. 96	
REV. 97	
REV. 98	
REV. 99	
REV. 100	



REVISION	DATE	DESCRIPTION
1		1/4" THICK SST PLATE
2		1/4" THICK SST PLATE

REVISION	DATE	DESCRIPTION
1		1/4" THICK SST PLATE
2		1/4" THICK SST PLATE

REVISION	DATE	DESCRIPTION
1		1/4" THICK SST PLATE
2		1/4" THICK SST PLATE

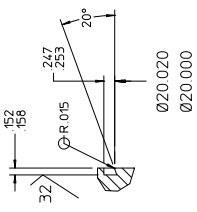
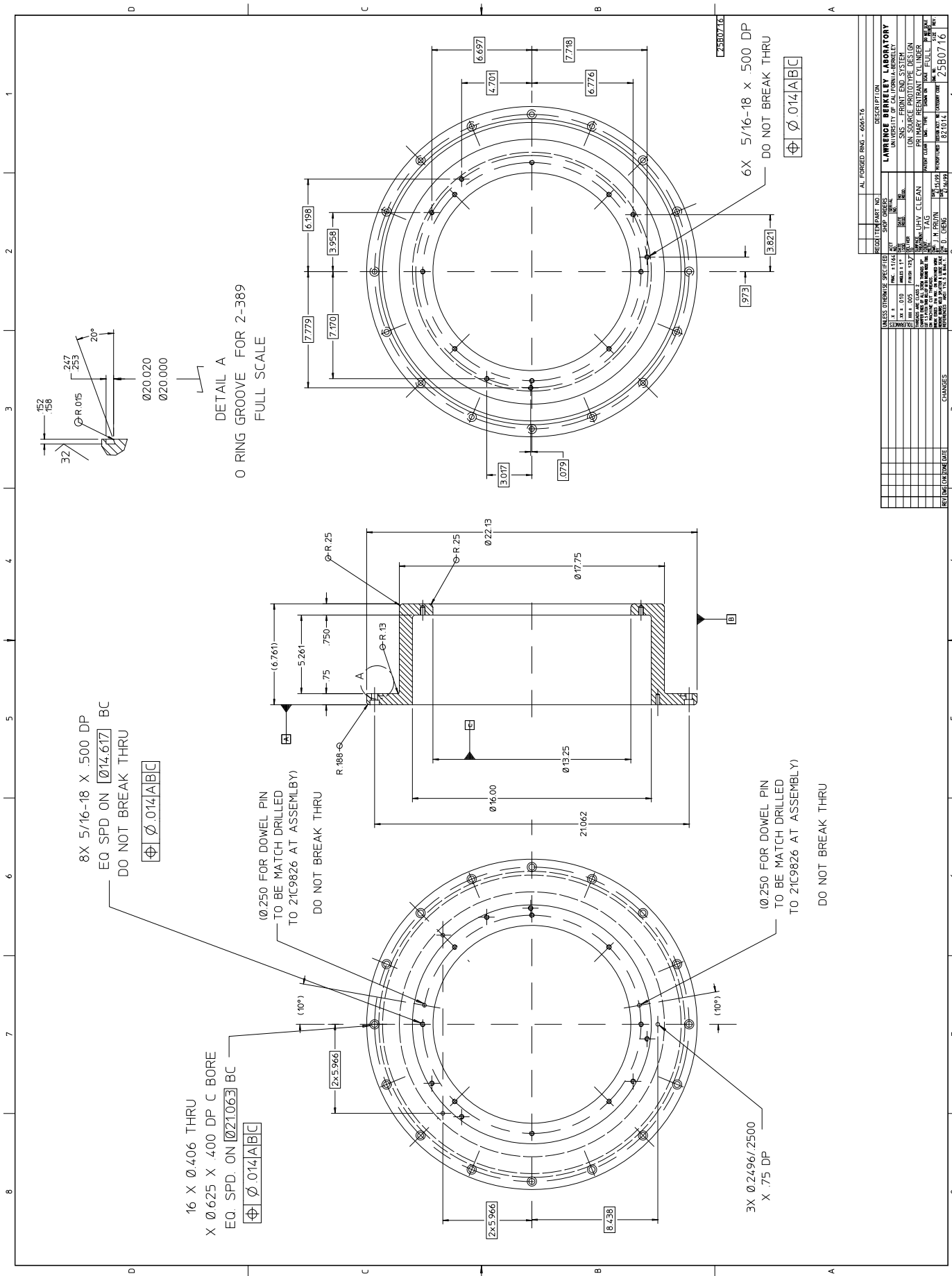
REVISION	DATE	DESCRIPTION
1		1/4" THICK SST PLATE
2		1/4" THICK SST PLATE

REVISION	DATE	DESCRIPTION
1		1/4" THICK SST PLATE
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REVISION	DATE	DESCRIPTION
1		1/4" THICK SST PLATE
2		1/4" THICK SST PLATE



DETAIL A  
 O RING GROOVE FOR 2-389  
 FULL SCALE

8X 5/16-18 X .500 DP  
 EQ SPD ON [Ø14.617] BC  
 DO NOT BREAK THRU  
 [Ø 0.14|A|B|C]

16 X Ø.406 THRU  
 X Ø.625 X .400 DP C BORE  
 EQ SPD ON [Ø21.063] BC  
 [Ø 0.14|A|B|C]

(Ø.250 FOR DOWEL PIN  
 TO BE MATCH DRILLED  
 TO 21C9826 AT ASSEMBLY)  
 DO NOT BREAK THRU

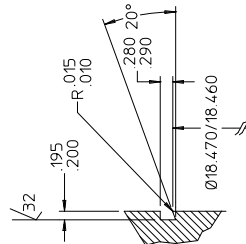
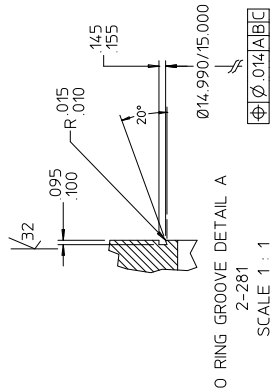
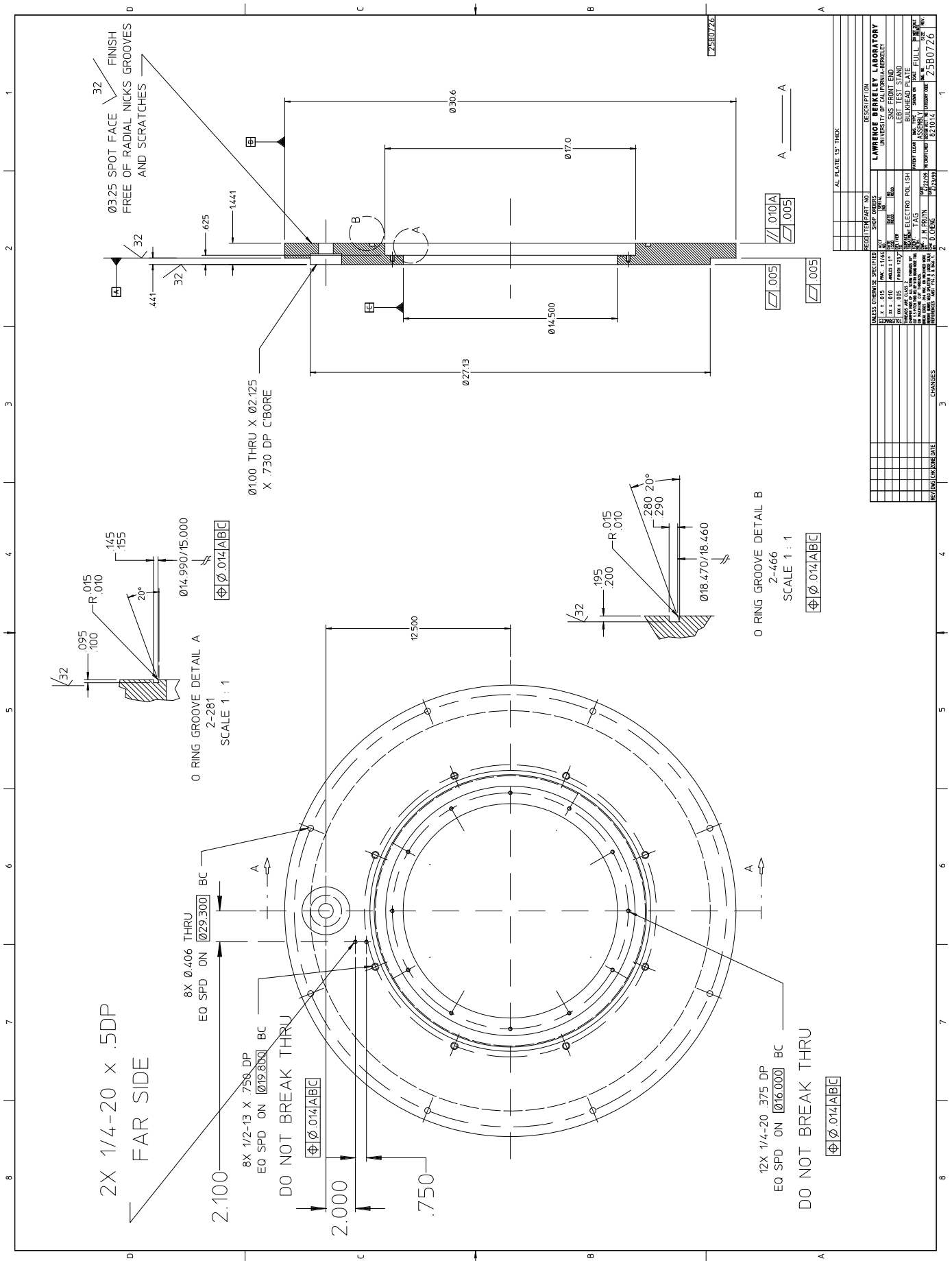
(Ø.250 FOR DOWEL PIN  
 TO BE MATCH DRILLED  
 TO 21C9826 AT ASSEMBLY)  
 DO NOT BREAK THRU

6X 5/16-18 X .500 DP  
 DO NOT BREAK THRU  
 [Ø 0.14|A|B|C]

REVISIONS		DESCRIPTION	
NO.	DATE	BY	APP.
1			
2			
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AL FORGED RING - 6061-T6	
REVISION PART NO.	DESCRIPTION
1	LAWRENCE BERKELEY LABORATORY
2	WISCONSIN - FRONT END SYSTEM
3	ION SOURCE PROTOTYPE DESIGN
4	PRIMARY BEAMLINE CYLINDER
5	ION SOURCE PROTOTYPE DESIGN
6	ION SOURCE PROTOTYPE DESIGN
7	ION SOURCE PROTOTYPE DESIGN
8	ION SOURCE PROTOTYPE DESIGN
9	ION SOURCE PROTOTYPE DESIGN
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100	ION SOURCE PROTOTYPE DESIGN



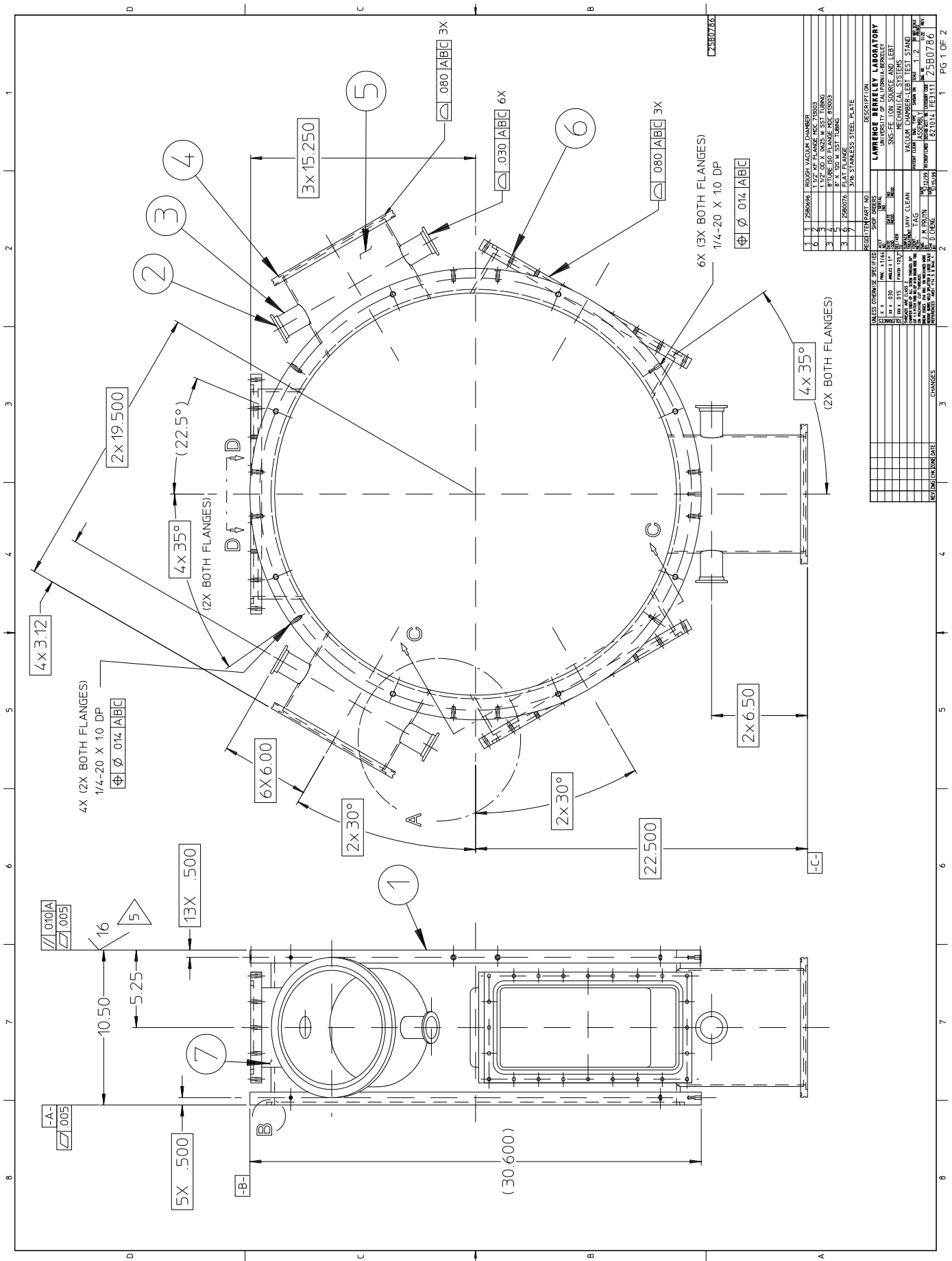
O RING GROOVE DETAIL B  
2-466  
SCALE 1:1  
Ø.014|A|B|C

REVISION	DATE	BY	CHKD	DESCRIPTION
1	08/21/93	J. W. H.	J. W. H.	ISSUED FOR FABRICATION
2	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
3	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
4	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
5	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
6	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
7	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
8	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS

REVISION	DATE	BY	CHKD	DESCRIPTION
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2	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
3	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
4	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
5	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
6	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
7	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS
8	08/21/93	J. W. H.	J. W. H.	REVISED TO ADD DIMENSIONS

AL. PLATE 1/8" THICK  
LAWRENCE BERKELEY LABORATORY  
PROJECT: SNS FRONT END  
SUBJECT: BELKHEAD PLATE  
DRAWN BY: J. W. H.  
CHECKED BY: J. W. H.  
DATE: 08/21/93  
PART NO: 2580726  
REV: 8

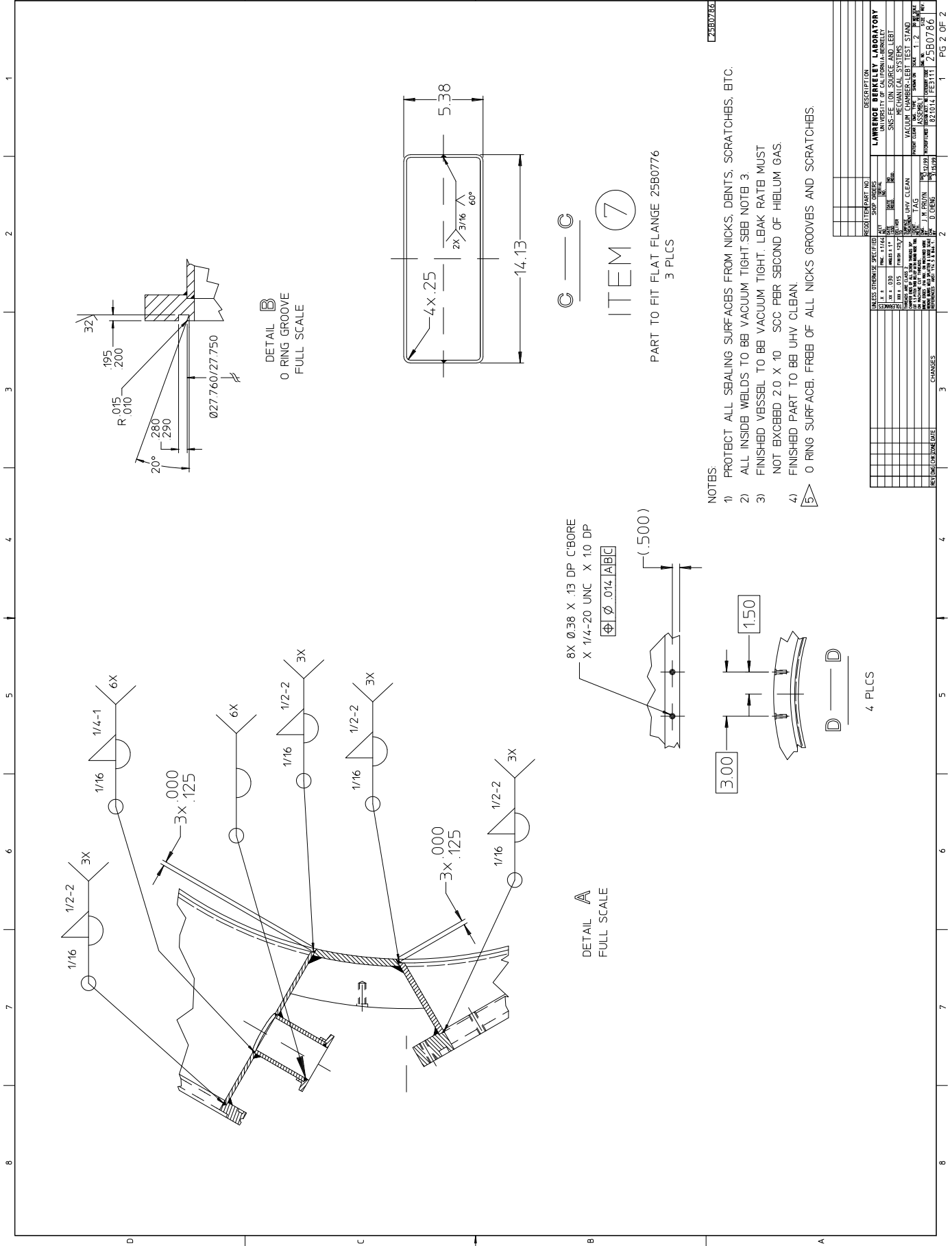




REV	DESCRIPTION	DATE	BY	CHK
1	ISSUE FOR FABRICATION			
2	ISSUE FOR FABRICATION			
3	ISSUE FOR FABRICATION			
4	ISSUE FOR FABRICATION			
5	ISSUE FOR FABRICATION			
6	ISSUE FOR FABRICATION			
7	ISSUE FOR FABRICATION			

REVISION NO.	DESCRIPTION	DATE	BY	CHK
1	ISSUE FOR FABRICATION			
2	ISSUE FOR FABRICATION			
3	ISSUE FOR FABRICATION			
4	ISSUE FOR FABRICATION			
5	ISSUE FOR FABRICATION			
6	ISSUE FOR FABRICATION			
7	ISSUE FOR FABRICATION			

REVISION NO.	DESCRIPTION	DATE	BY	CHK
1	ISSUE FOR FABRICATION			
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3	ISSUE FOR FABRICATION			
4	ISSUE FOR FABRICATION			
5	ISSUE FOR FABRICATION			
6	ISSUE FOR FABRICATION			
7	ISSUE FOR FABRICATION			



25B0786

REVISION	DATE	DESCRIPTION
1		
2		
3		

CLASSIFICATION	SPECIFIED	REVISION	DATE	DESCRIPTION
DESIGN	1	1		
MANUFACTURE	1	1		
INSPECTION	1	1		
TESTING	1	1		

**LAWRENCE BERKELEY LABORATORY**  
 SHIP ORDER NO. 25B0776  
 SPS-FC ION SOURCE AND LEIT  
 MECHANICAL SYSTEMS  
 VACUUM CHAMBER-LEM TEST STAGE  
 ASSEMBLY  
 PROJECT NO. 82-014  
 DRAWING NO. 25B0786  
 DATE 12/19/83  
 DRAWN BY J. W. HARRIS  
 CHECKED BY D. CHEW





