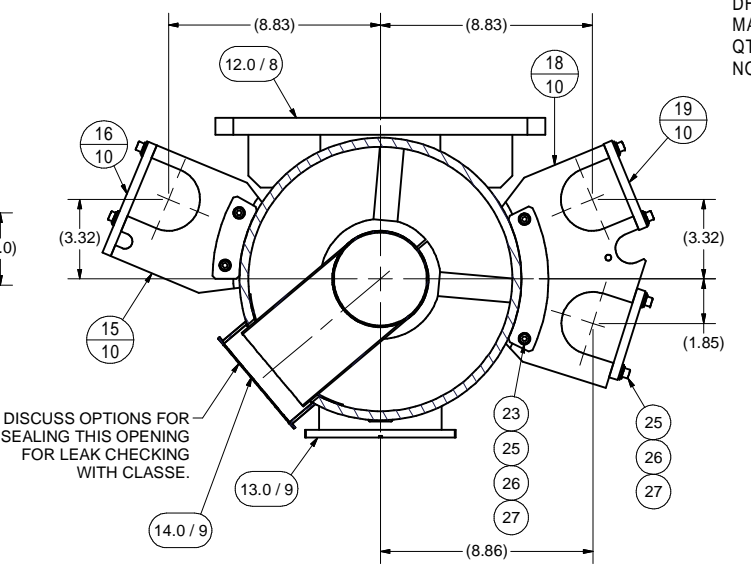
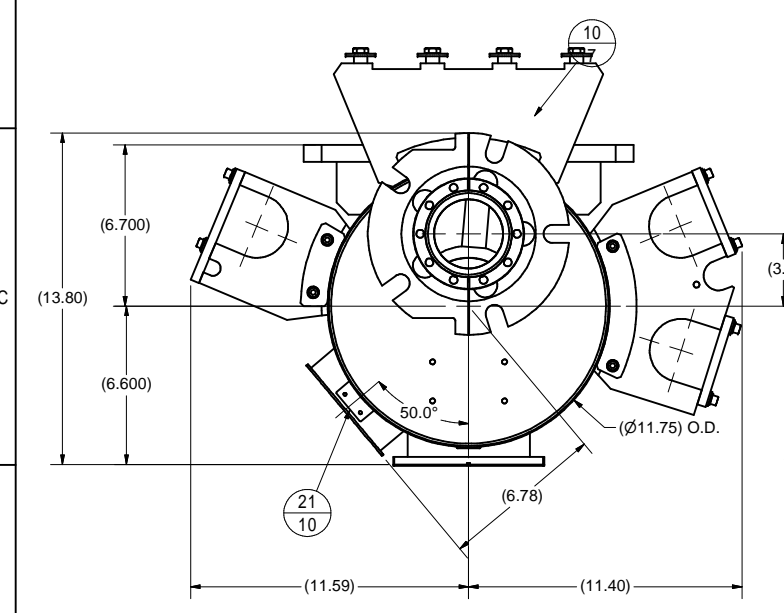


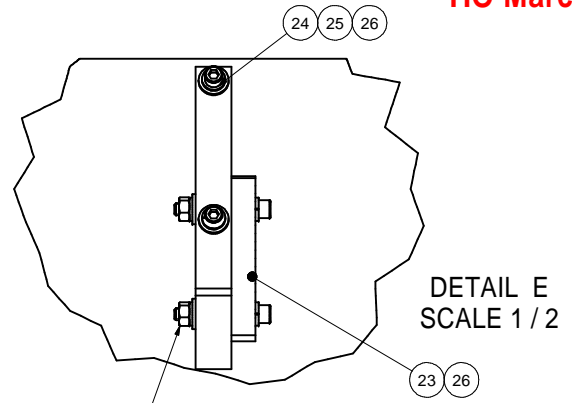
SECTION D-D  
SCALE 1 / 14

1 HELIUM GAS RETURN PIPE, EXIT SECTION, ASSEMBLY  
 FILE NAME: 7103-150  
 SHEET NO.: 1  
 DFT. SCALE: 1:14  
 MATERIAL: AS NOTED  
 QTY: 1 REQ'D  
 NOTES: 1. MAKE LN THERMAL COLD SHOCK AND LEAK TEST.  
 LEAK RATE: < 2.0E-10 TORR-L/SEC.

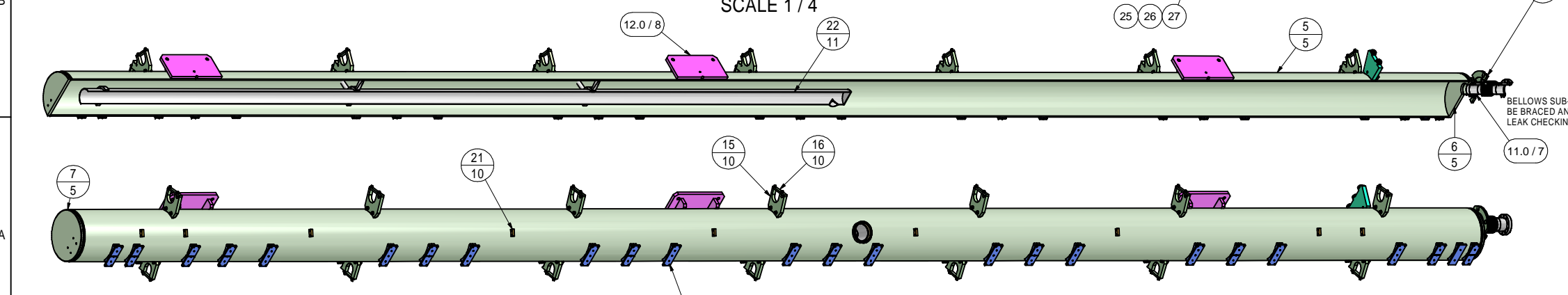
**RELEASED FOR QUOTE.  
 NOT FOR FABRICATION.  
 TIO March 19, 2013.**



SECTION BG-BG  
SCALE 1 / 4



DETAIL E  
SCALE 1 / 2



		REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE	APP.	
53		ANSI B18.2.1 - 3/8-16 UNC - 1.5 Hex Cap Screw	4		316L SS
48		ANSI B18.22.1 - 3/8 - wide - Type B Plain Washer (Inch )Type A and B	4		316L SS
44		collar	4		
43		hgrp_endsupport	1		
27	Purchase	HEX NUT 1/4-20UNC	28		316L SS
26	Purchase	HELICAL SPRING LOCK WASHER 1/4" REG CS	98		316L SS
25	Purchase	TYPE A-PLAIN WASHER 1/4" NARROW	70		316L SS
24	Purchase	HEX SOC HD CAP SCR 1/4-20UNC x 7/8" LG.	42		316L SS
23	Purchase	HEX SOC HD CAP SCR 1/4-20UNC x 1.75" LG.	28		316L SS
22	Sheet 11	BAFFLE SUBASM	1		
21	Sheet 10	2 - PHASE TUBE SUPPORT TAB	7		
20	Sheet 10	5 K TUBE SUPPORT PLATE - RIGHT	7		
19	Sheet 10	5 K TUBE CLAMP - III	14		
18	Sheet 10	5 K TUBE BRACKET - RIGHT	7		
17	Sheet 10	5 K TUBE SUPPORT PLATE - LEFT	7		
16	Sheet 10	5 K TUBE CLAMP - I	7		
15	Sheet 10	5 K TUBE BRACKET - LEFT	7		
14.0	Sheet 9	4.5" CHIMNEY PORT SUBASM	1		
13.0	Sheet 9	BOTTOM SUPPORT SUBASM	23		
12.0	Sheet 8	TOP SUPPORT PLATE SUBASM	3		
11.0	Sheet 7	3" TUBE SUBASM	1		
10	Sheet 7	CRYO-TUBE SUPPORT RING SUBASM	1		
9.0	Sheet 6	3" I.D. BELLOWS SUBASM	1		
8.0	Sheet 6	3" I.D. BELLOWS TUBE SUBASM	1		
7	Sheet 5	HGRP ENDPLATE	1		
6	Sheet 5	HGRP CRYOFEED ENDPLATE	1		
5	Sheet 5	HGRP PIPE	1		
4	Sheet 4	HELIUM GAS RETURN PIPE: WELDMENT I	X		
3	Sheet 3	HELIUM GAS RETURN PIPE: WELDMENT II (MACHINING)	X		
2	Sheet 2	HELIUM GAS RETURN PIPE: WELDMENT III	X		
1	Sheet 1	HGRP : EXIT SECTION, ASSEMBLY	1		

ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
			QUANTITY				

PRINT DISTR. 7103-150  
 PLOT DATE: 3/19/2013  
 CAD FILE NAME: 7103-150.idw  
 UNLESS OTHERWISE SPECIFIED:  
 DIMENSIONS ARE IN INCHES:  
 TOLERANCES ON:  
 .0 ± .02  
 .00 ± .010  
 .000 ± .005  
 FRACTIONS ± 1/32  
 ANGLES ± 0.5°  
 ALL SURFACES ✓

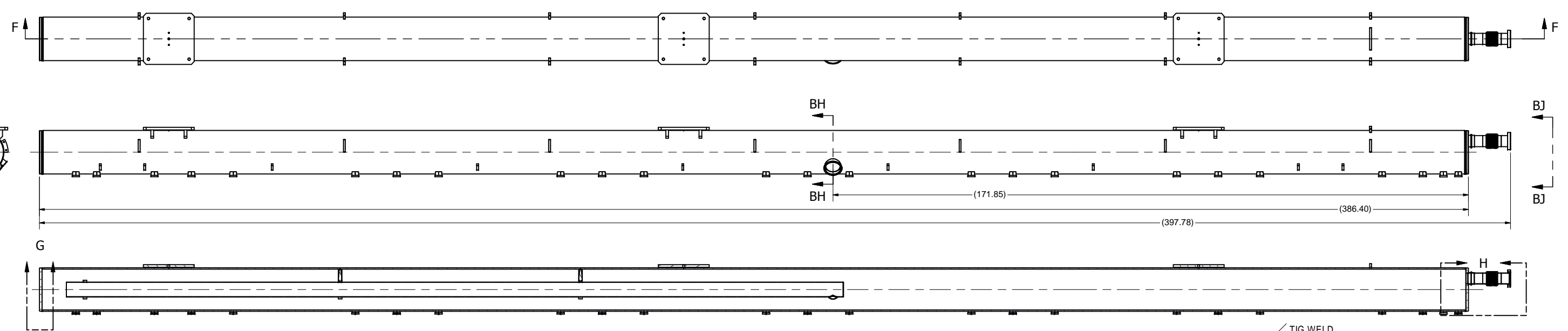
Cornell University  
 Laboratory for Elementary-Particle Physics  
 ERL LINAC CRYOMODULE  
 HELIUM GAS RETURN PIPE  
 ASSEMBLY

Floyd R. Newman Laboratory  
 Robert R. Wilson Laboratory  
 Ithaca, NY 14853

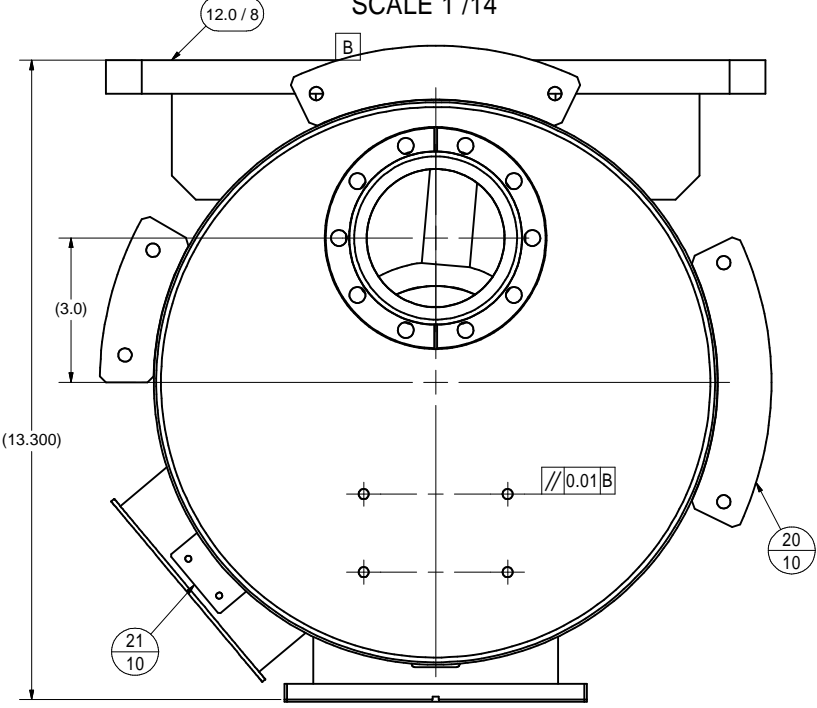
CHECKED BY: YH/JOS/TIO  
 DRAWN BY: Y.HE/J.CONWAY  
 DRAWN FOR: M. LIEPE  
 DATE: 11/27/2012  
 SCALE: D  
 7103-150  
 SH. NO. 1 OF 13

FOR MACHINING LUBRICANT USE ONLY  
 ALKALINE DETERGENT LUBRICANT CIMSTAR 40  
 OR EQUIVALENT APPROVED BY CORNELL LEPP

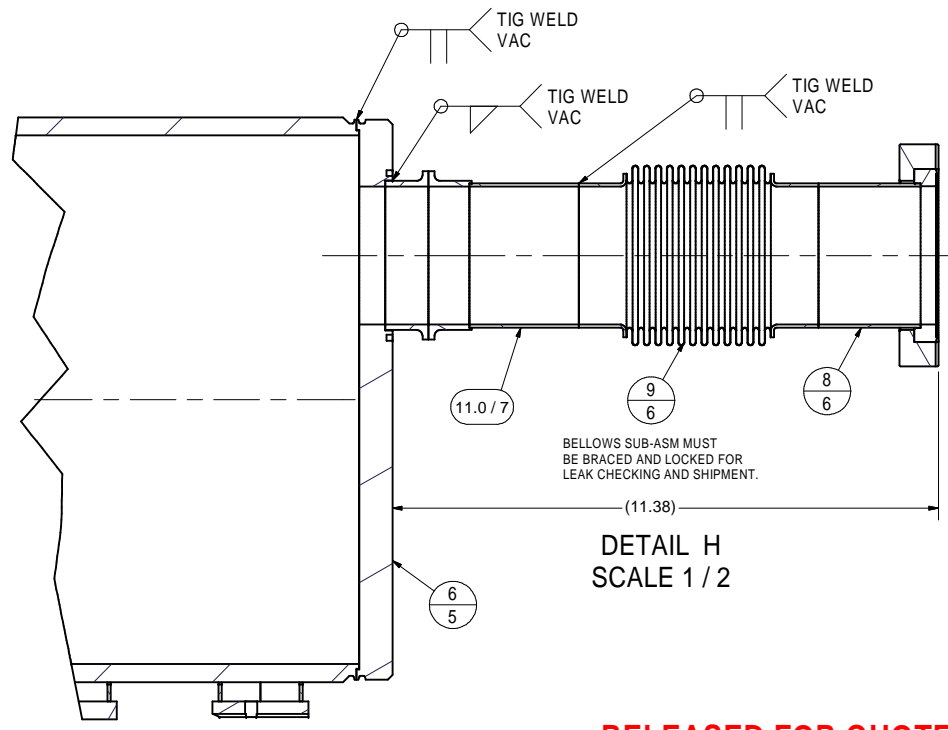
REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.



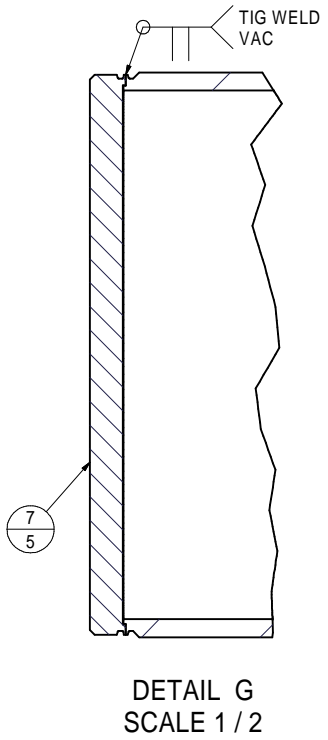
SECTION F-F  
SCALE 1/14



SECTION BH-BH  
SCALE 1/2



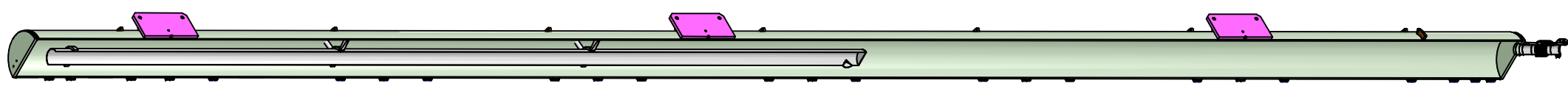
DETAIL H  
SCALE 1/2



DETAIL G  
SCALE 1/2

- 2 HELIUM GAS RETURN PIPE, WELDMENT III
- FILE NAME: 7103-150  
SHEET NO.: 2  
DFT. SCALE: 1:14  
MATERIAL: Ti Grade 2  
QTY: 1 REQ'D
- NOTES: 1. INSERT BAFFLE BEFORE WELD END PLATE  
2. SEE SHEET 11 FOR DETAILS OF BAFFLE ASSEMBLY  
3. AVOID DISTORTION TO SUPPORTS DUE TO HEAT FROM TIG WELDING OF END PLATES

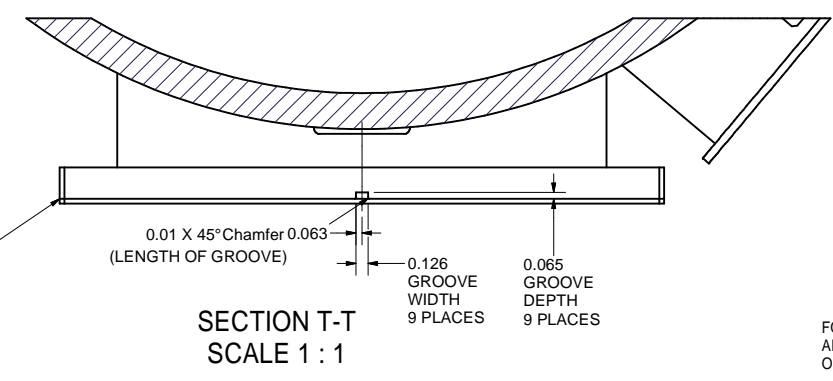
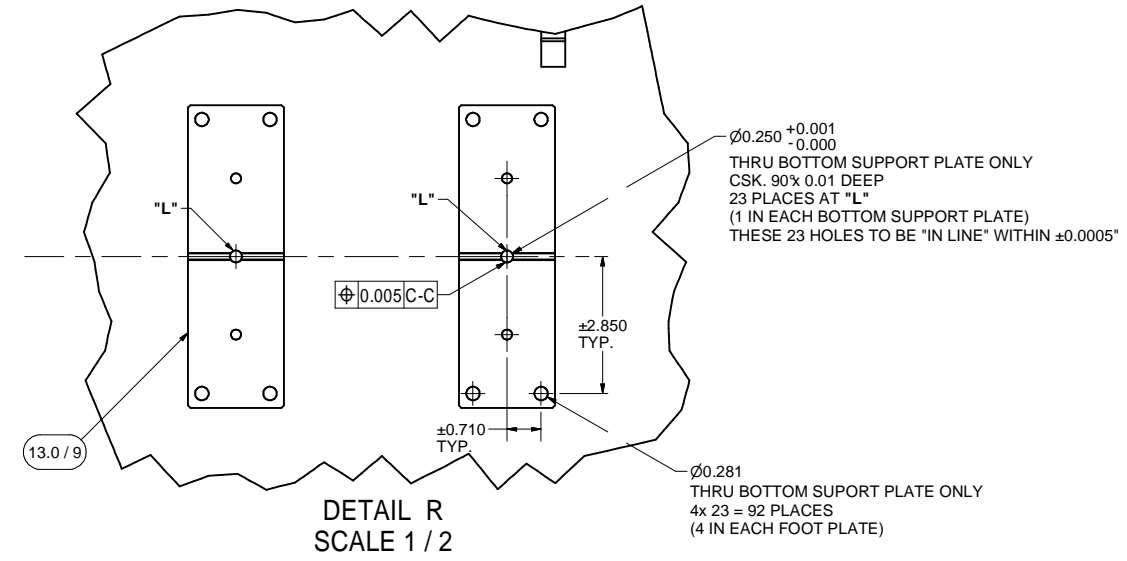
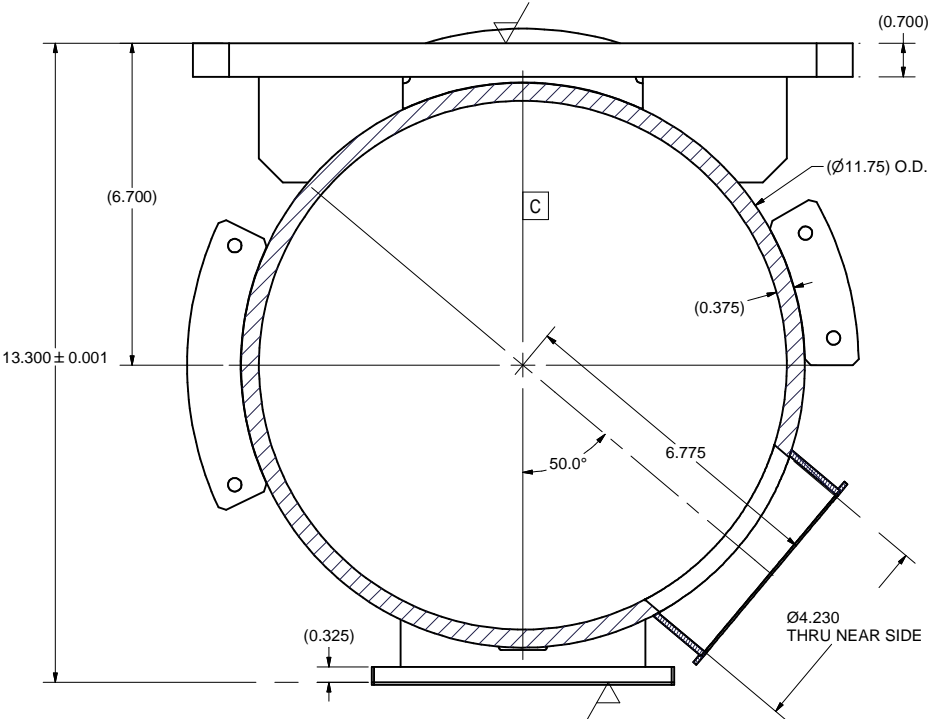
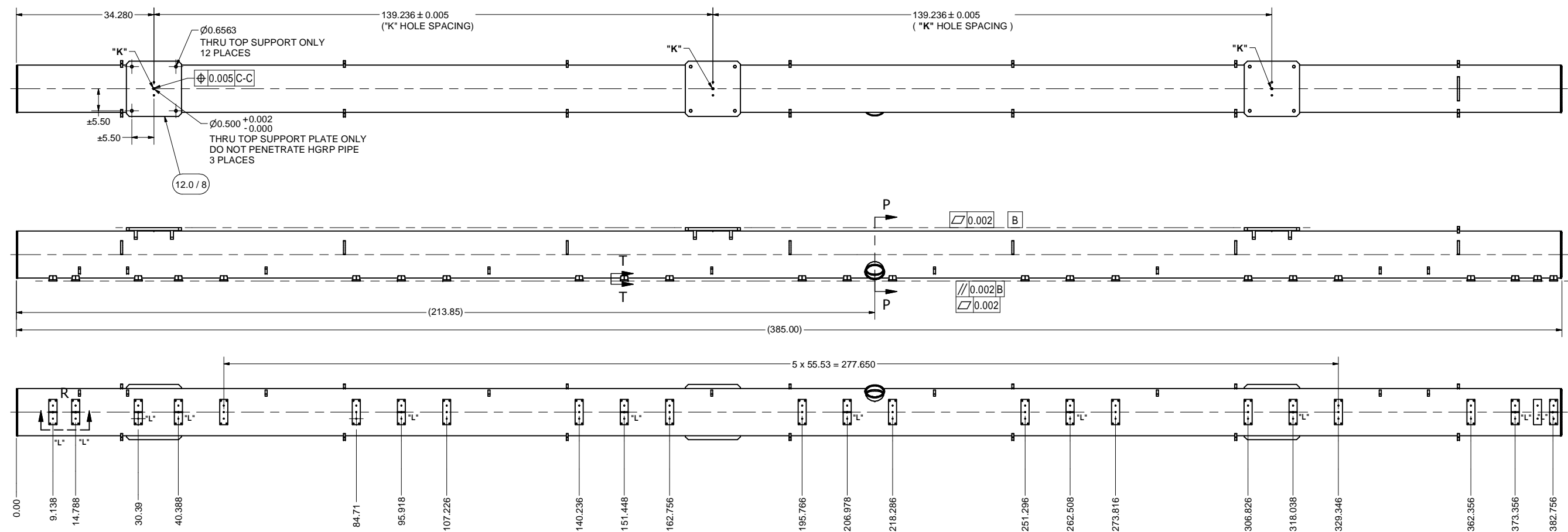
**RELEASED FOR QUOTE.  
NOT FOR FABRICATION.  
TIO March 19, 2013.**



FOR MACHINING LUBRICANT USE ONLY  
ALKALINE DETERGENT LUBRICANT CIMSTAR 40  
OR EQUIVALENT APPROVED BY CORNELL LEPP

ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
			QUANTITY				
PRINT DISTR.	PLOT DATE: 3/19/2013 CAD FILE NAME: 7103-150.idw						
CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .0 ± .02 .001 ± .010 .000 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓	Cornell University Laboratory for Elementary-Particle Physics	Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853				
7103-150 SH. NO. 2 OF 13		ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE WELDMENT III					
CHECKED BY: YH/JOS/TIO APPROVED BY: TIO	DRAWN BY: Y.HE/J.CONWAY	DRAWN FOR: M. LIEPE	DATE: 11/27/2012	SCALE: D	7103-150 SH. NO. 2 OF 13		

REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



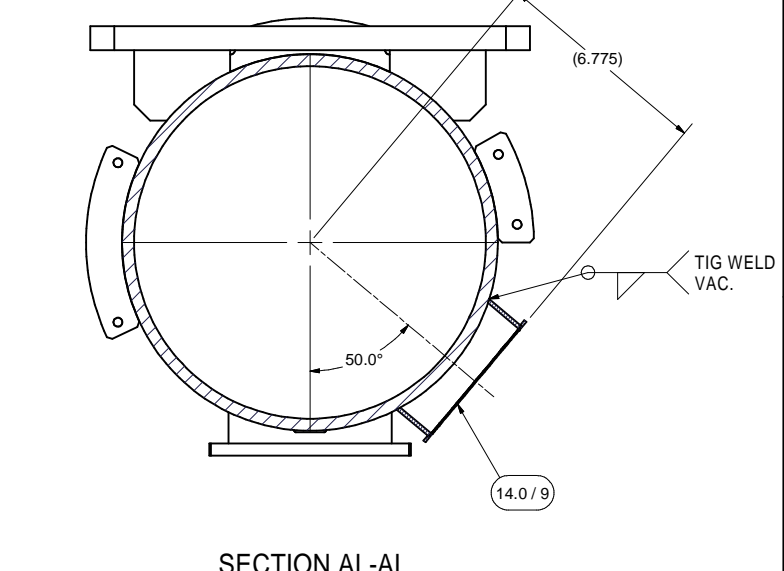
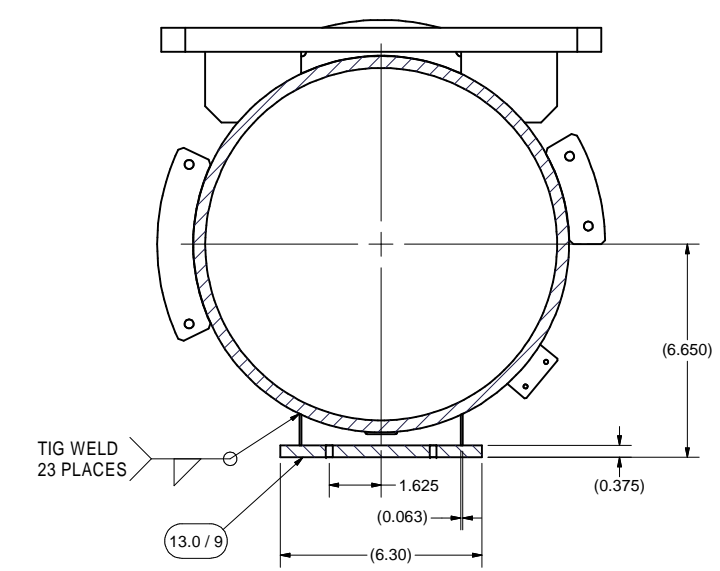
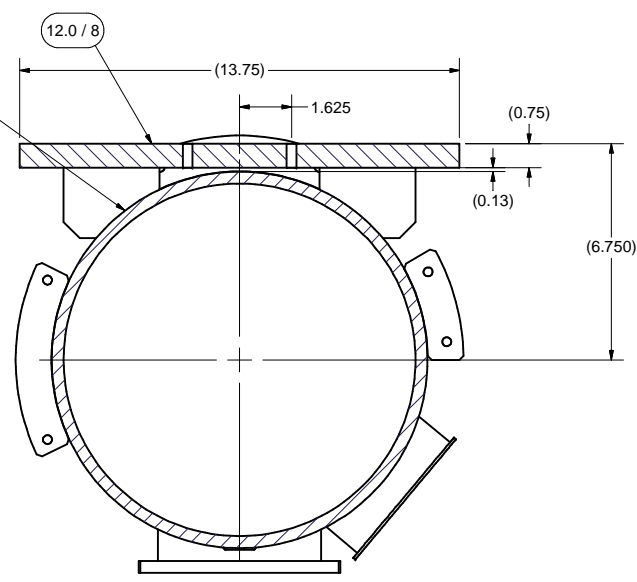
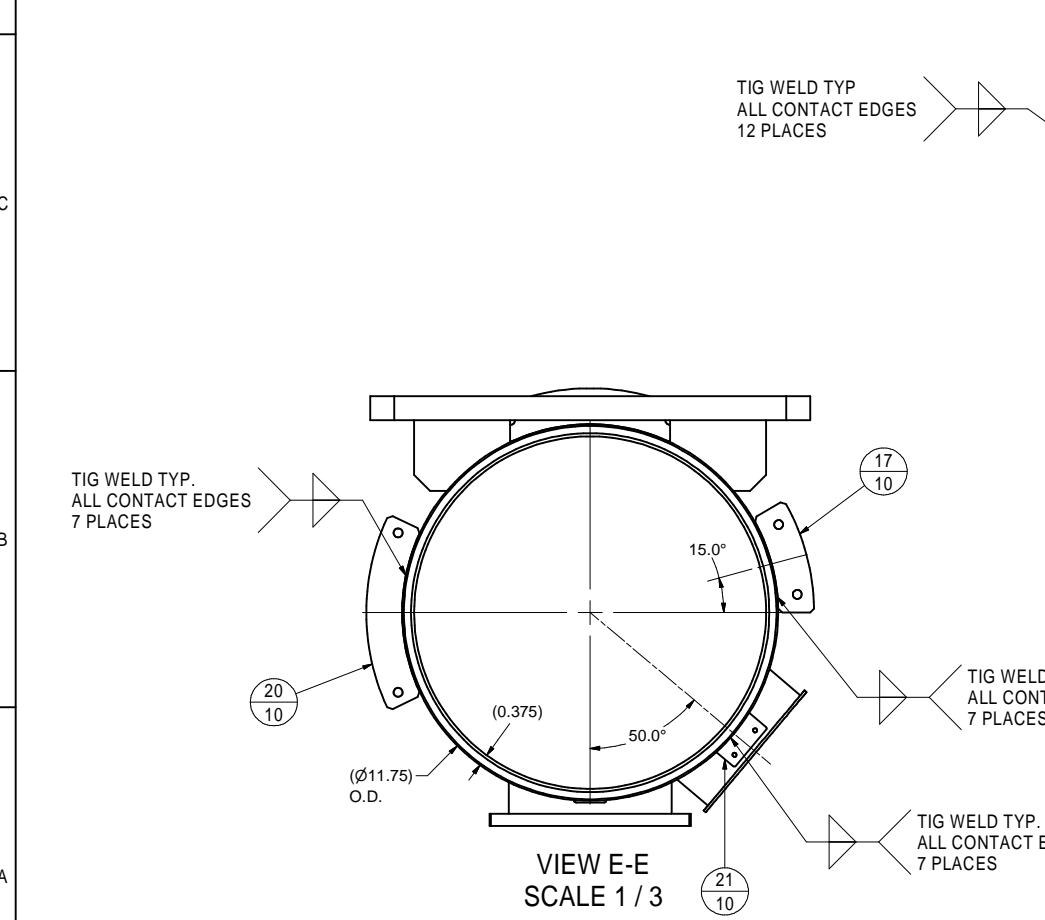
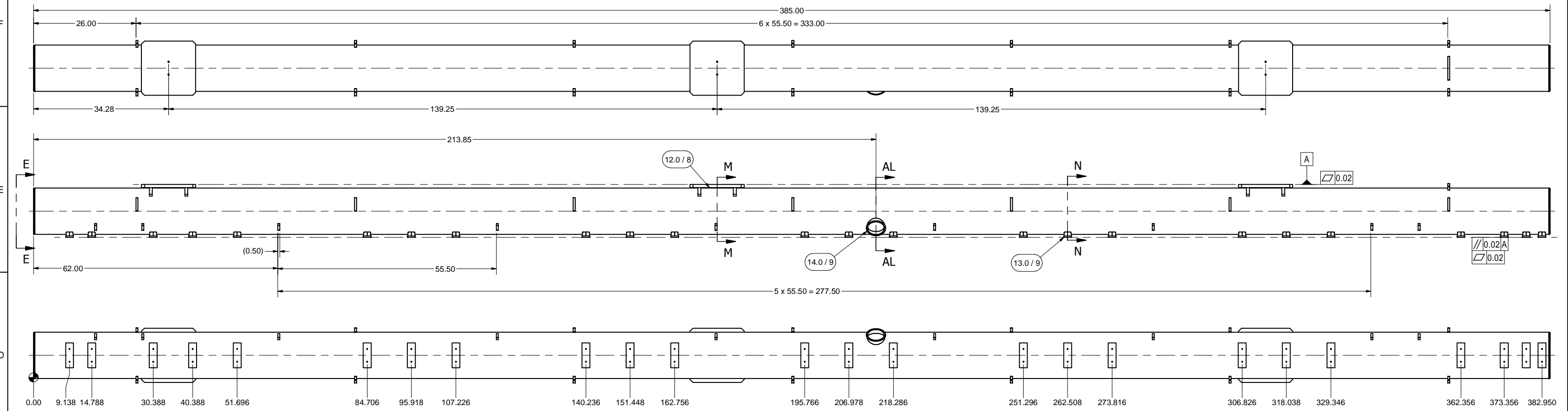
**3 HELIUM GAS RETURN PIPE, WELDMENT II (MACHINING)**  
 FILE NAME: 7103-150  
 SHEET NO.: 3  
 DFT. SCALE: 1:14  
 MATERIAL: Ti Grade 2  
 QTY: 1 REQ'D  
 NOTES: 1. MACHINE HOLE DIA 4.320 AND TRIM CHIMNEY PIPE TO FINAL SIZE  
 2. MACHINE TOP SURFACES OF TOP SUPPORT PLATES  
 3. MACHINE HOLES IN TOP SUPPORT PLATES  
 4. MACHINE BOTTOM SURFACES, GROOVES AND HOLES IN BOTTOM SUPPORT PLATES

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 TIO March 19, 2013.**

ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
			QUANTITY				
PRINT DISTR.	PLOT DATE: 3/19/2013 CAD FILE NAME: 7103-150.idw						
CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .0 ± .02 .001 ± .010 .005 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓						
7103-150 SH. NO. 3 OF 13	Cornell University Laboratory for Elementary-Particle Physics		Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853				
ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE WELDMENT II (MACHINING)							
CHECKED BY: YH/JOS/TIO	DRAWN BY: Y.HE/J.CONWAY	DRAWN FOR: M. LIEPE	DATE: 11/27/2012	SCALE: D	7103-150 SH. NO. 3 OF 13		REV.
APPROVED BY: TIO							

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 ALKALINE DETERGENT LUBRICANT CIMSTAR 40  
 OR EQUIVALENT APPROVED BY CORNELL LEPP

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.



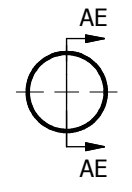
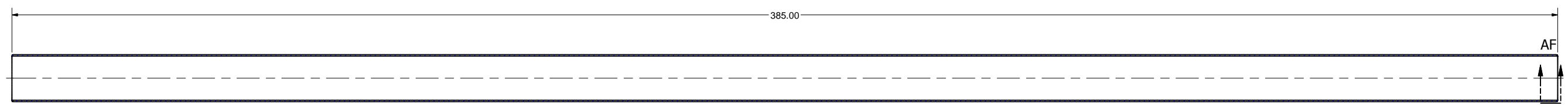
**4 HELIUM GAS RETURN PIPE, WELDMENT I (PRE\_MACHINING)**  
 FILE NAME: 7103-150  
 SHEET NO.: 4  
 DFT. SCALE: 1:12  
 MATERIAL: Ti Grade 2  
 QTY: 1 REQ'D  
 NOTES: PERFORM STRESS RELIEF WITH VIBRATION AFTER WELDING

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 TIO March 19, 2013.**

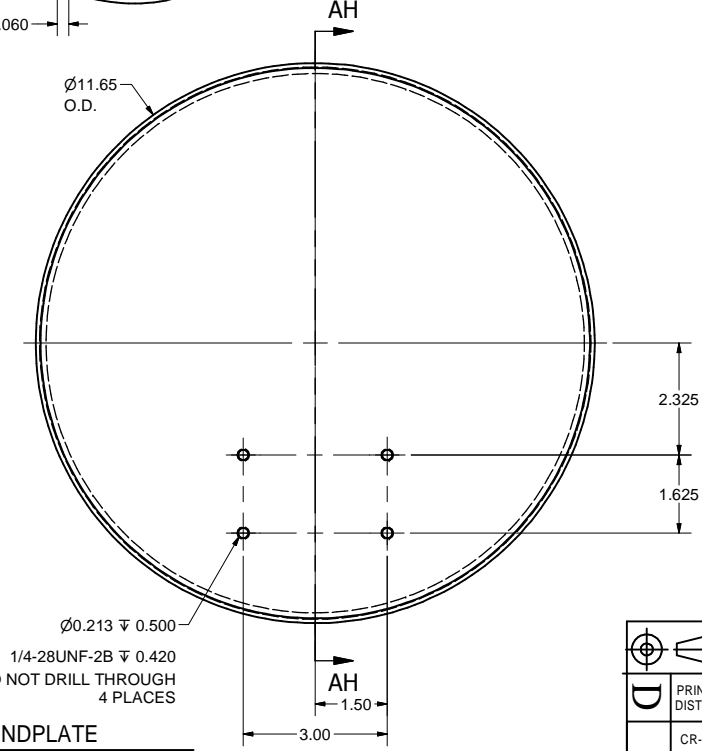
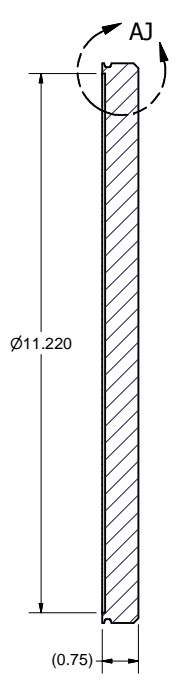
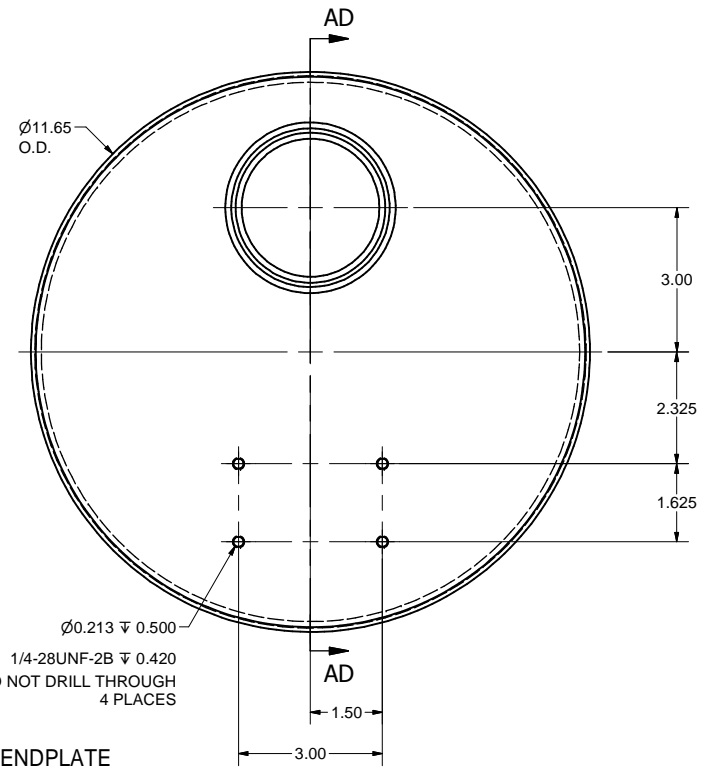
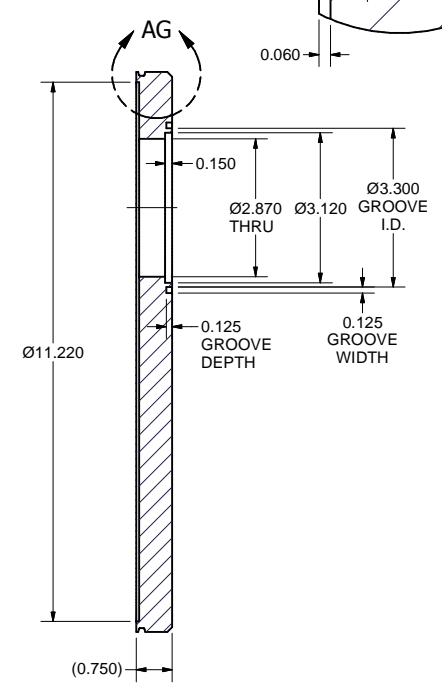
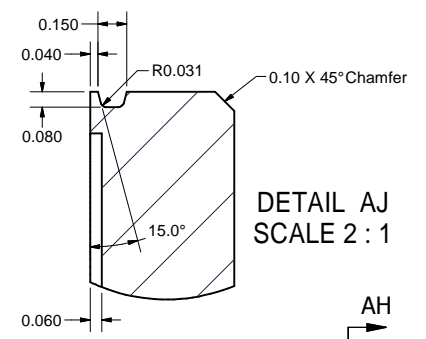
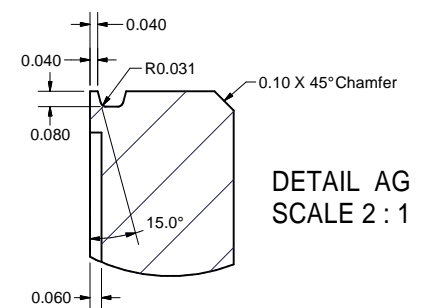
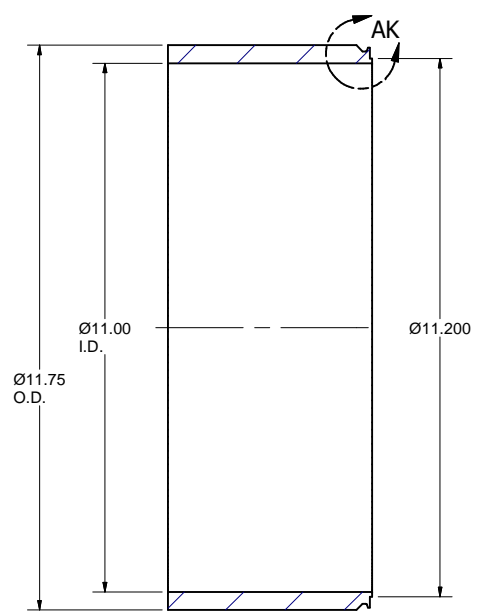
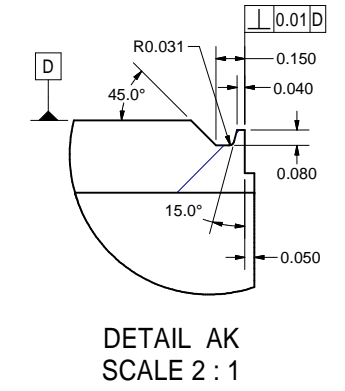
FOR MACHINING LUBRICANT USE ONLY  
 ALKALINE DETERGENT LUBRICANT CIMSTAR 40  
 OR EQUIVALENT APPROVED BY CORNELL LEPP

ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
			QUANTITY				
PRINT	PLOT DATE: 3/19/2013						
DISTR.	CAD FILE NAME: 7103-150.idw						
7103-150 SH. NO. 4 OF 13	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .0 ± .02 .00 ± .010 .000 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓					Cornell University Laboratory for Elementary-Particle Physics Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853
	REV.	ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE WELDMENT I					
CHECKED BY: YH/JOS/TIO	DRAWN BY: Y.HE/J.CONWAY	DRAWN FOR: M. LIEPE	DATE: 11/27/2012	SCALE: D	7103-150		REV.
APPROVED BY: TIO							SH. NO. 4 OF 13

REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



**5 HGRP PIPE**  
 FILE NAME: 7103-150  
 SHEET NO.: 5  
 DFT. SCALE: 1:14  
 MATERIAL: UHV GRADE 11" SCHEDULE 40 PIPE, GRADE 2 TITANIUM  
 QTY: 1 PER ASM  
 NOTES:



**6 HGRP CRYOFEED ENDPLATE**  
 FILE NAME: 7103-150  
 SHEET NO.: 5  
 DFT. SCALE: 1:2  
 MATERIAL: 3/4" GRADE 2 TITANIUM SHEET  
 QTY: 1 PER ASM  
 NOTES:

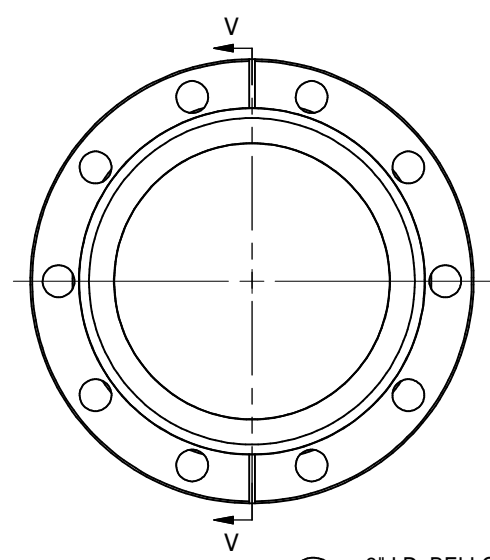
**7 HGRP ENDPLATE**  
 FILE NAME: 7103-150  
 SHEET NO.: 5  
 DFT. SCALE: 1:2  
 MATERIAL: 3/4" GRADE 2 TITANIUM SHEET  
 QTY: 1 PER ASM  
 NOTES:

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 ALKALINE DETERGENT LUBRICANT CIMSTAR 40  
 OR EQUIVALENT APPROVED BY CORNELL LEPP

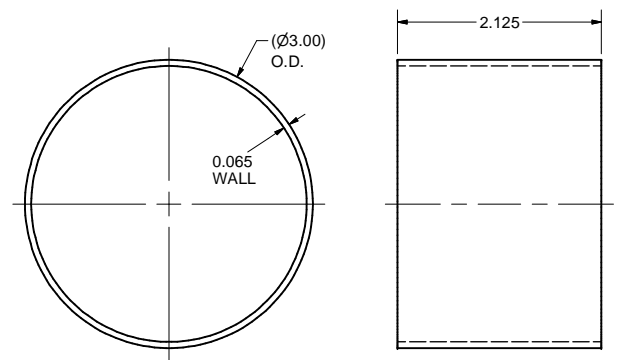
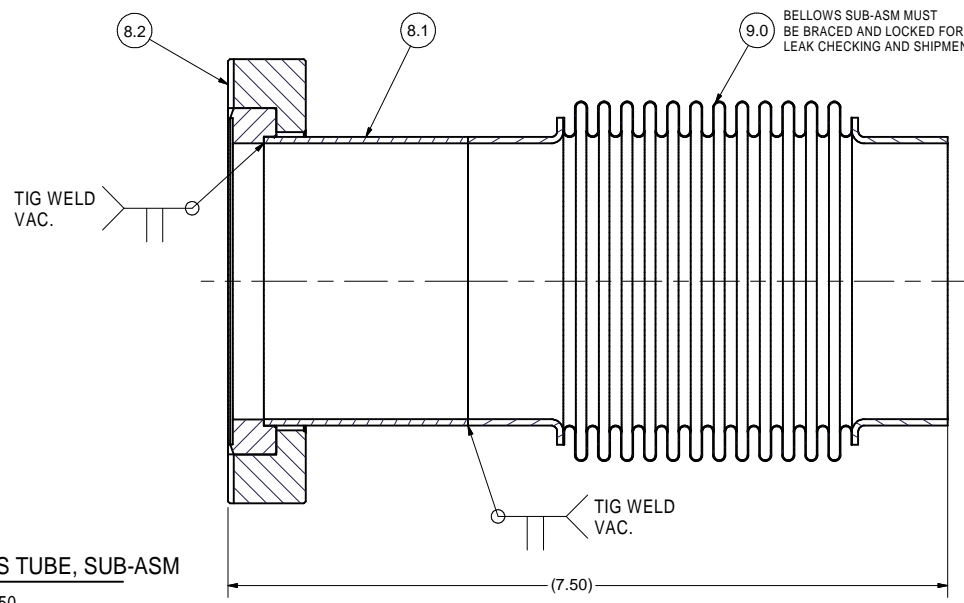
**RELEASED FOR QUOTE.  
 NOT FOR FABRICATION.  
 TIO March 19, 2013.**

ITEM	DWG. NO.	DESCRIPTION	QUANTITY			REMARKS	REV.
			G1	G2	G3		
PRINT DISTR.	7103-150	PLOT DATE: 3/19/2013 CAD FILE NAME: 7103-150.idw					
CR-1		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES ON: .0 ± .02 .00 ± .010 .000 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓					
		Cornell University Laboratory for Elementary-Particle Physics				Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853	
		ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE CYLINDER, END PLATES					
CHECKED BY: YH/JOS/TIO	DRAWN BY: Y.HE/J.CONWAY	DRAWN FOR: M. LIEPE	DATE: 11/27/2012	SCALE: D	7103-150	REV.	
APPROVED BY: TIO					SH. NO. 5 OF 13		

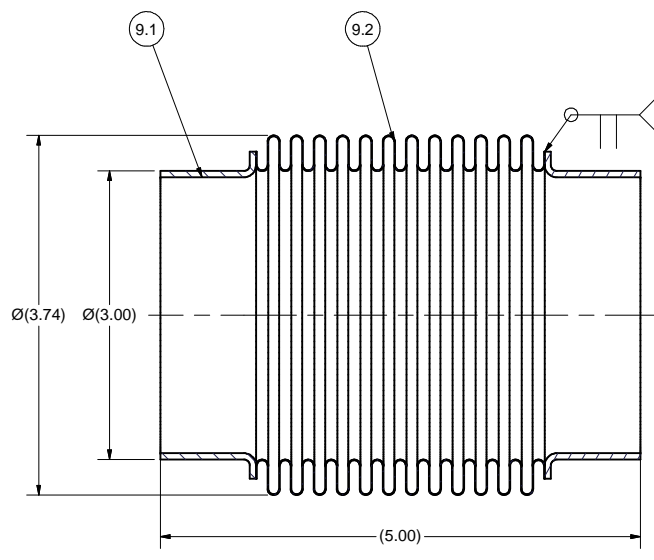
REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



**8.0 3" I.D. BELLOWS TUBE, SUB-ASM**  
 FILE NAME: 7103-150  
 SHEET NO.: 6  
 DFT. SCALE: 1:1  
 MATERIAL: AS NOTED  
 QTY: 1 PER ASM  
 NOTES:



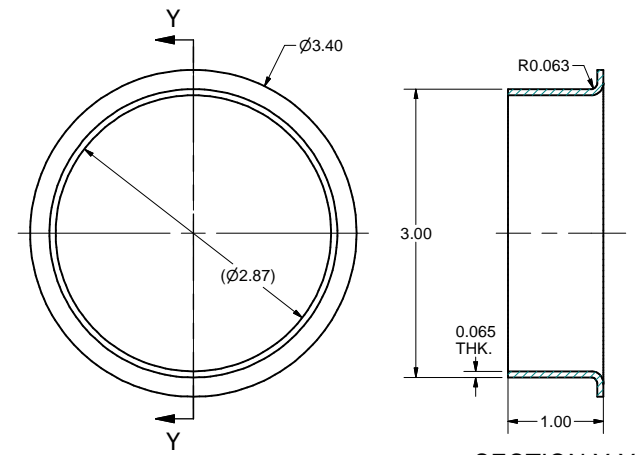
**8.1 3" TUBE**  
 FILE NAME: 7103-150  
 SHEET NO.: 6  
 DFT. SCALE: 1:1  
 MATERIAL: 3"O.D. x 0.065 WALL UHV GRADE 316L STN STL TUBE  
 QTY: 1 PER SUB-ASM  
 NOTES:



**9.0 3" I.D. BELLOWS, SUB-ASM**  
 FILE NAME: 7103-150  
 SHEET NO.: 6  
 DFT. SCALE: 1:1  
 MATERIAL:  
 QTY: 1 PER SUB-ASM  
 NOTES: 1. BELLOWS AND CUFFS CAN BE ORDERED AS FINISHED ASSEMBLY.

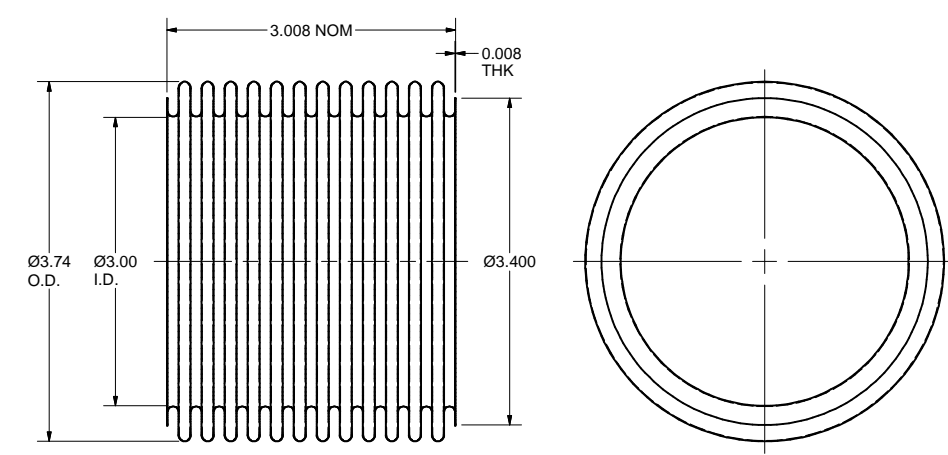
**OPERATING CONDITIONS:**  
 Temperature: 2 K  
 Vacuum outside  
 Helium gas inside  
 Stroke: 10.0 mm (0.4 inch)  
 Shift: ± 2.5 mm (± 0.1 inch)  
 Maximum temperature: 200 C (473 K)  
 Minimum temperature: -265 C (2 K)  
**Leak Rate:** < 1E-9 mbar x l/sec

**DESIGN SPECIFICATION:**  
 Burst Pressure, Internal: ≥ 30 psia (2 bar) @ 293 K  
 External: ≥ 22.5 psia (1.5 bar) @ 293 K  
 Working Pressure: > 15 psia (1 bar) @ 293K, 30 mbar @ 2K  
**Size:**  
 O.D.: 3.74 inch (95.0 mm)  
 I.D.: 3.00 inch (76.2 mm)  
 Wall Thickness: 0.008 inch (0.2 mm)  
 Pitch: 0.24 inch (6.1 mm)  
 Overall Length: 5.00 inch (127.0 mm)  
 Minimum Stroke: +0.30/-0.75 inch (+7.6/-19.1 mm)  
 Minimum Lateral Shift: ± 0.15 inch (± 3.8 mm)  
 Minimum Cycle Life: 10000



SECTION Y-Y  
 SCALE 1:1

**9.1 3" I.D. BELLOWS CUFF**  
 FILE NAME: 7103-150  
 SHEET NO.: 6  
 DFT. SCALE: 1:1  
 MATERIAL: UHV GRADE 316L ST. STEEL  
 QTY: 2 PER ASSEMBLY  
 NOTES:



**9.2 3" I.D. BELLOWS**  
 FILE NAME: 7103-150  
 SHEET NO.: 6  
 DFT. SCALE: 1:1  
 MATERIAL: 316L ST. STEEL  
 QTY: 1 PER ASSEMBLY  
 NOTES: 1. NO. OF CONFOULATIONS: N = 12  
 2. MANUFACTURER: AMERIFLEX INC. OR EQUIV.

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 ALKALINE DETERGENT LUBRICANT CIMSTAR 40  
 OR EQUIVALENT APPROVED BY CORNELL LEPP

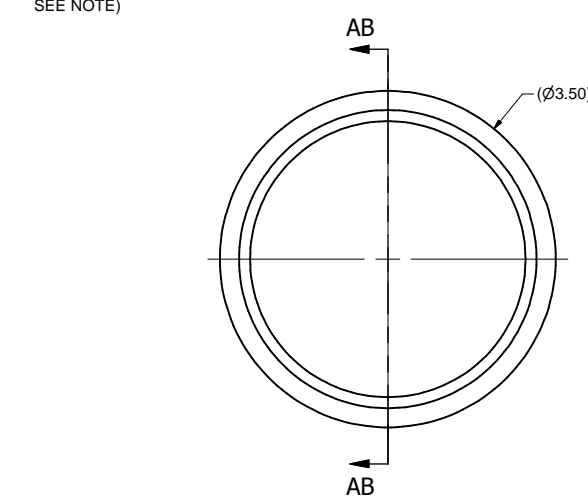
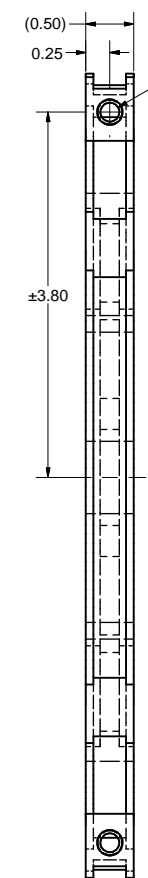
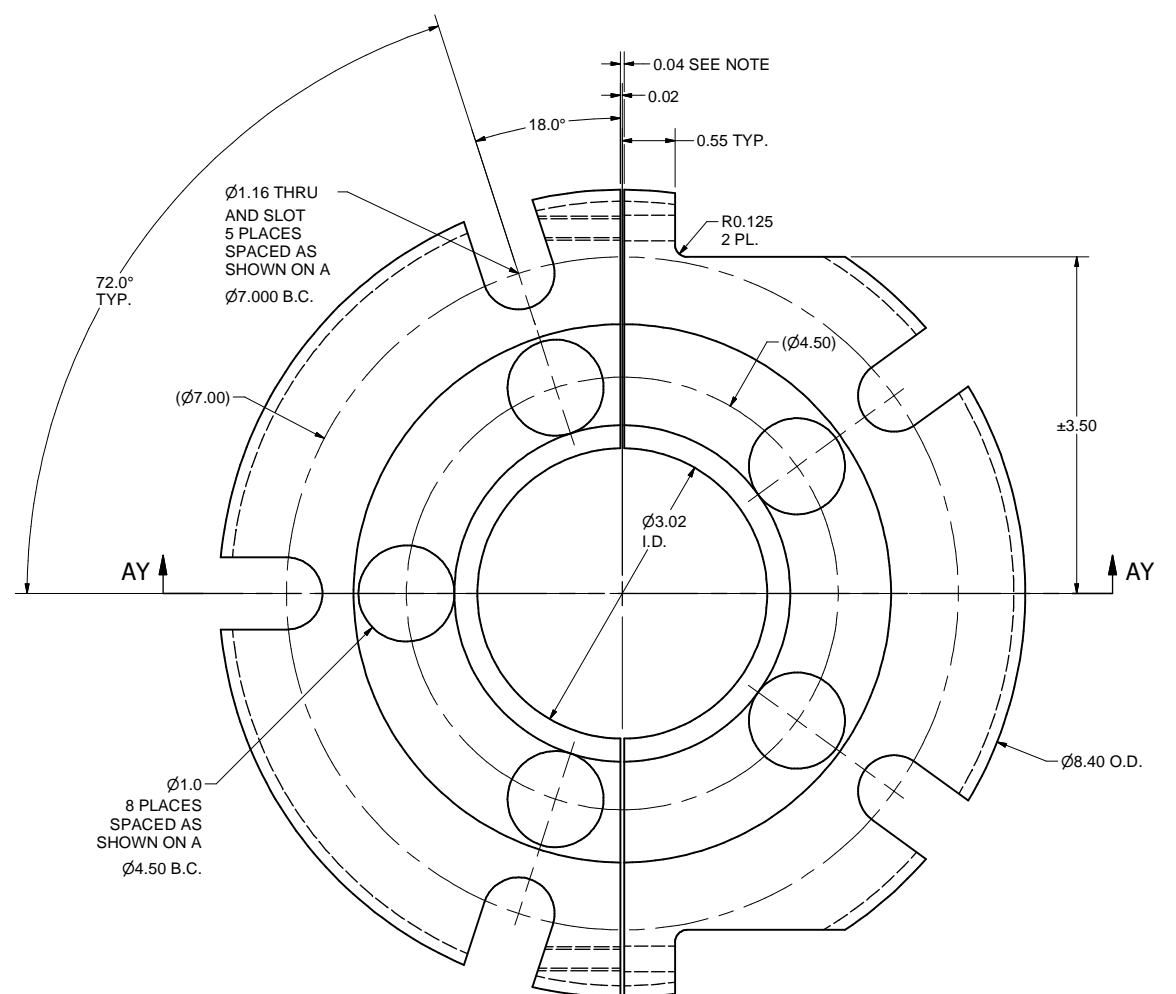
**RELEASED FOR QUOTE.  
 NOT FOR FABRICATION.  
 TIO March 19, 2013.**

ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
9.2	Sheet 6	3" I.D. BELLOWS	1				
9.1	Sheet 6	3" I.D. BELLOWS CUFF	2				
8.2	Purchase	4-5/8" CF ROTATABLE FLANGE	1			Varian's F0462-0300-RC4	
8.1	Sheet 6	3" TUBE	1				

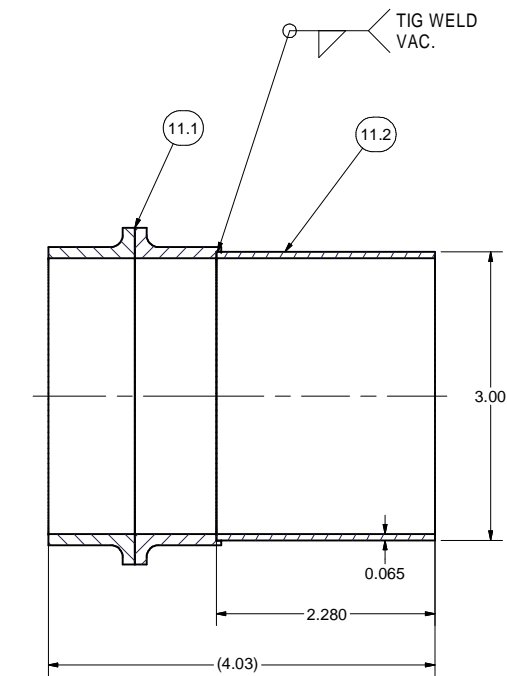
  

D	PRINT	PLOT DATE: 3/19/2013	
	DISTR.	CAD FILE NAME: 7103-150.idw	
7103-150	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES ON: .0 ± .02 .001 ± .010 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES	Cornell University Laboratory for Elementary-Particle Physics Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853
	REV.	ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE BELLOWS SUB-ASM & PARTS	
	CHECKED BY: YH/JOS/TIO	DRAWN BY: Y.HE/J.CONWAY	DRAWN FOR: M. LIEPE DATE: 11/27/2012 SCALE: D 7103-150 SH. NO. 6 OF 13

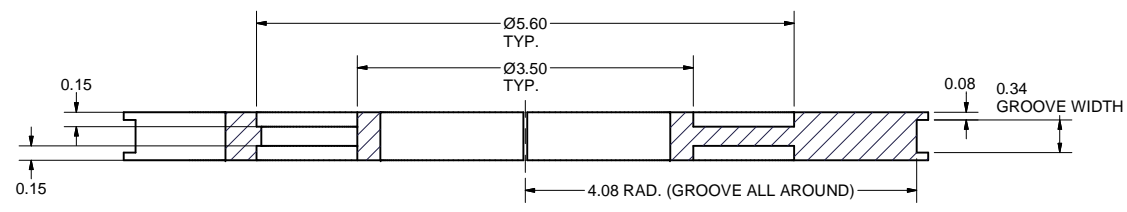
REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



**11.0 3" TUBE SUB-ASM**  
 FILE NAME: 7103-150  
 SHEET NO.: 7  
 DFT. SCALE: 1:1  
 MATERIAL:  
 QTY: 1 PER ASSEMBLY  
 NOTES:

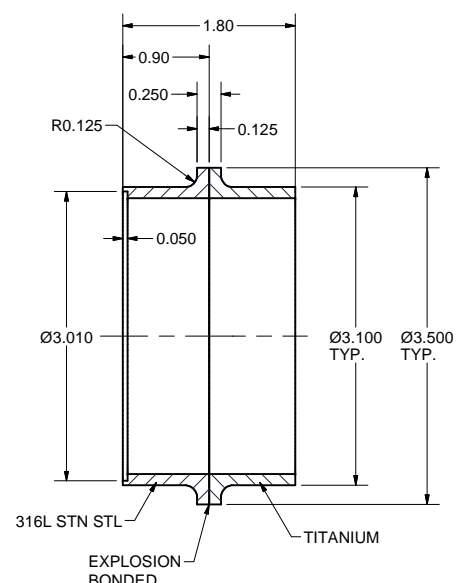


**SECTION AB-AB**  
**SCALE 1 : 1**



**SECTION AY-AY**  
**SCALE 1 : 1**

**10 CRYO-TUBE SUPPORT RING, SUB-ASM**  
 FILE NAME: 7103-150  
 SHEET NO.: 7  
 DFT. SCALE: 1:1  
 MATERIAL: 1/2" SHEET G-10  
 QTY: 1 PER ASM  
 NOTES: MAKE .04" WIDE CUT THRU  
 AFTER ALL OTHER MACHINING



**11.1 Ti-STN STL 3.00" TRANSITION**  
 FILE NAME: 7103-150  
 SHEET NO.: 7  
 DFT. SCALE: 1:1  
 MATERIAL: SEE NOTES  
 QTY: 1 PER SUB-ASM  
 NOTES: USE EXPLOSION BONDED TITANIUM AND  
 316L STN STL

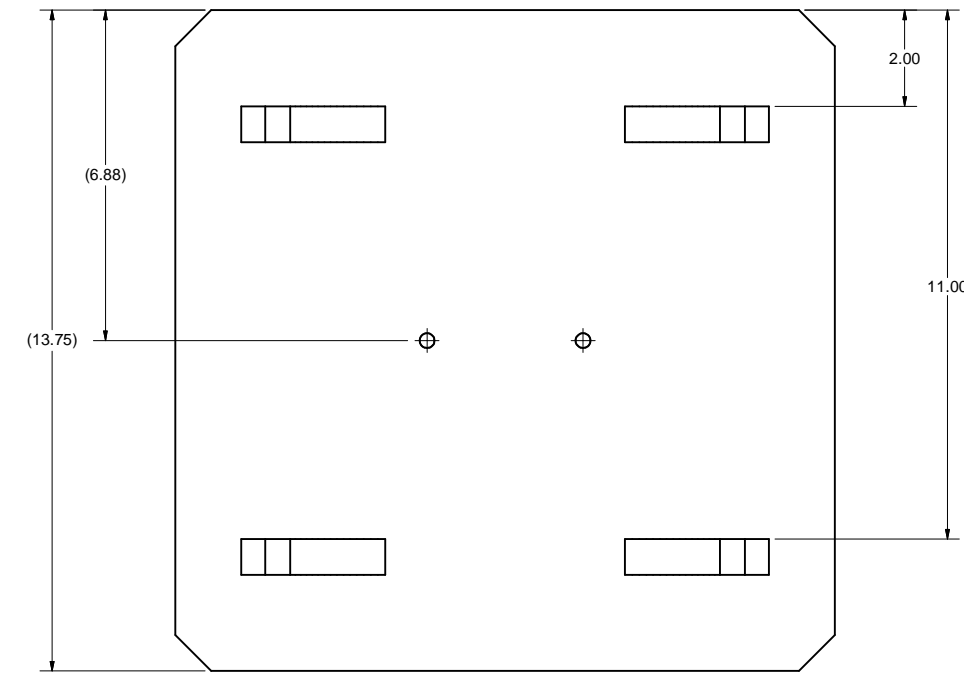
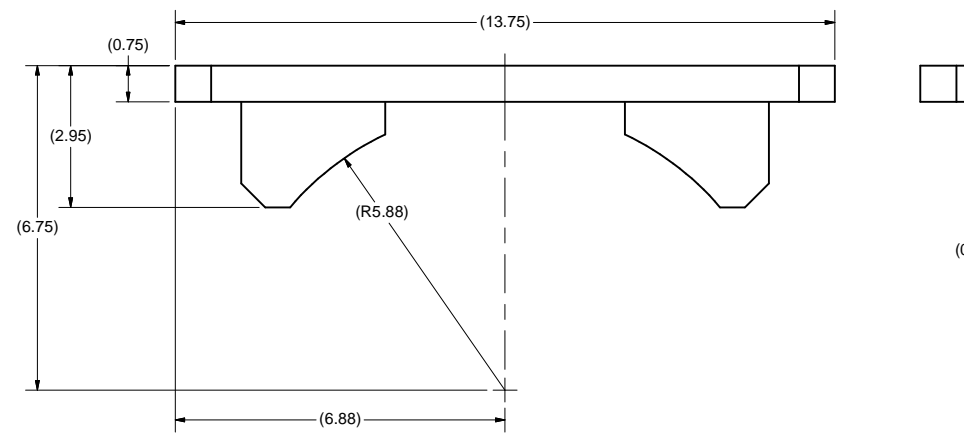
FOR MACHINING LUBRICANT USE ONLY  
 ALKALINE DETERGENT LUBRICANT CIMSTAR 40  
 OR EQUIVALENT APPROVED BY CORNELL LEPP

**RELEASED FOR QUOTE.**  
**NOT FOR FABRICATION.**  
**TIO March 19, 2013.**

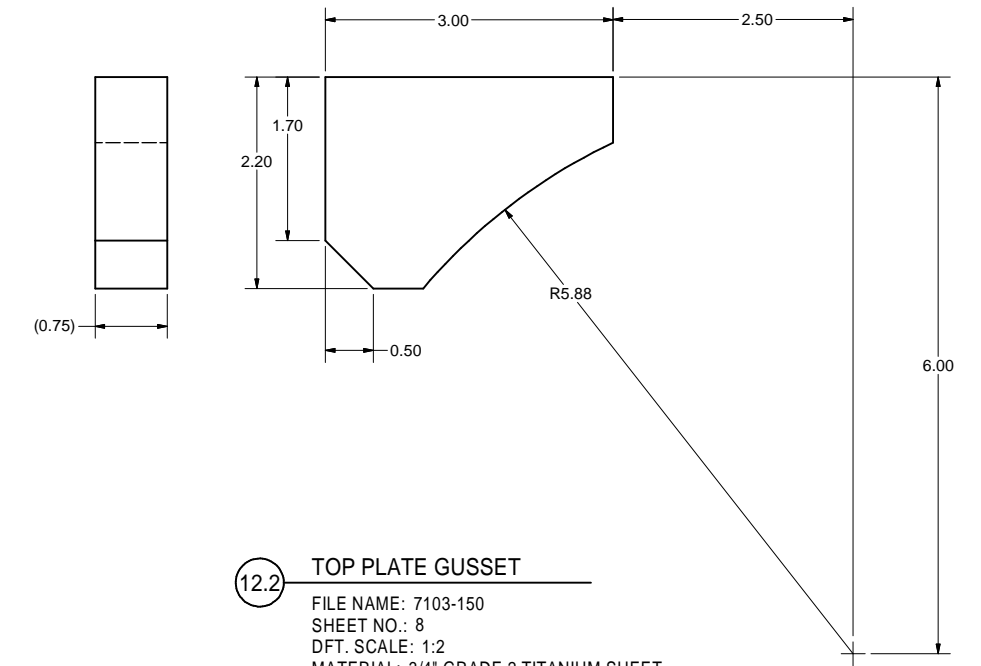
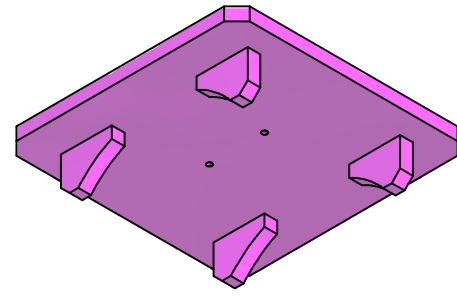
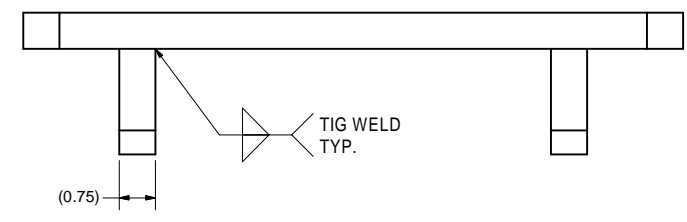
ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
11.2	Sheet 7	316L SST TUBE: 3" O.D. x 0.065" Wall	1				
11.1	Sheet 7	Ti-STN STL 3" TRANSITION	1				

ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
PRINT	7103-150	PLOT DATE: 3/19/2013 CAD FILE NAME: 7103-150.idw					
DISTR.							
CR-1		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .0 ± .02 .00 ± .010 .000 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓					
		Cornell University Laboratory for Elementary-Particle Physics Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853					
		ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE CRYOFEEED HEAD PARTS					
CHECKED BY:	YH/JOS/TIO	DRAWN BY:	Y.HE/J.CONWAY	DRAWN FOR:	M. LIEPE	DATE:	11/27/2012
APPROVED BY:	TIO	SCALE:	D	7103-150	SH. NO. 7 OF 13	REV.	

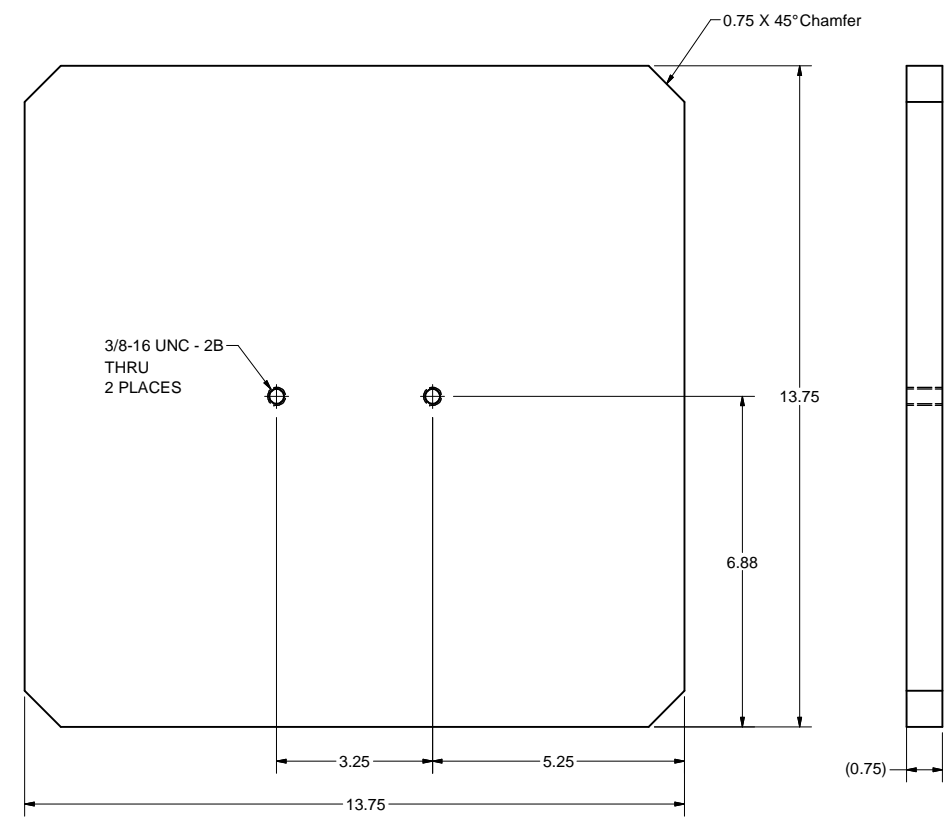
REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



**12.0** TOP SUPPORT PLATE, SUB-ASM  
 FILE NAME: 7103-150  
 SHEET NO.: 8  
 DFT. SCALE: 1:2  
 MATERIAL: AS NOTED  
 QTY: 3 PER ASM  
 NOTES:



**12.2** TOP PLATE GUSSET  
 FILE NAME: 7103-150  
 SHEET NO.: 8  
 DFT. SCALE: 1:2  
 MATERIAL: 3/4" GRADE 2 TITANIUM SHEET  
 QTY: 4 PER SUB-ASM  
 NOTES:



**12.1** TOP SUPPORT PLATE  
 FILE NAME: 7103-150  
 SHEET NO.: 8  
 DFT. SCALE: 1:2  
 MATERIAL: 3/4" GRADE 2 TITANIUM SHEET  
 QTY: 1 PER SUB-ASM  
 NOTES:

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 OR EQUIVALENT APPROVED BY CORNELL LEPP

**RELEASED FOR QUOTE.  
 NOT FOR FABRICATION.  
 TIO March 19, 2013.**

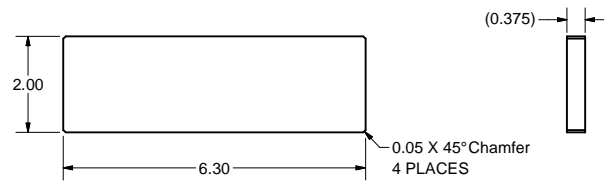
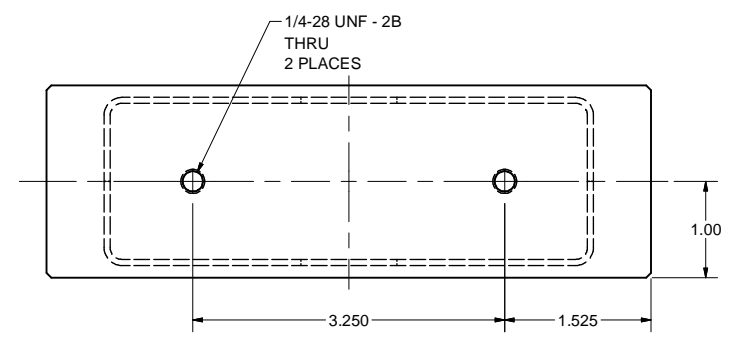
ITEM	DWG. NO.	DESCRIPTION	QUANTITY			REMARKS	REV.
			G1	G2	G3		
12.2	Sheet 8	TOP PLATE GUSSET	4				
12.1	Sheet 8	TOP SUPPOT PLATE	1				

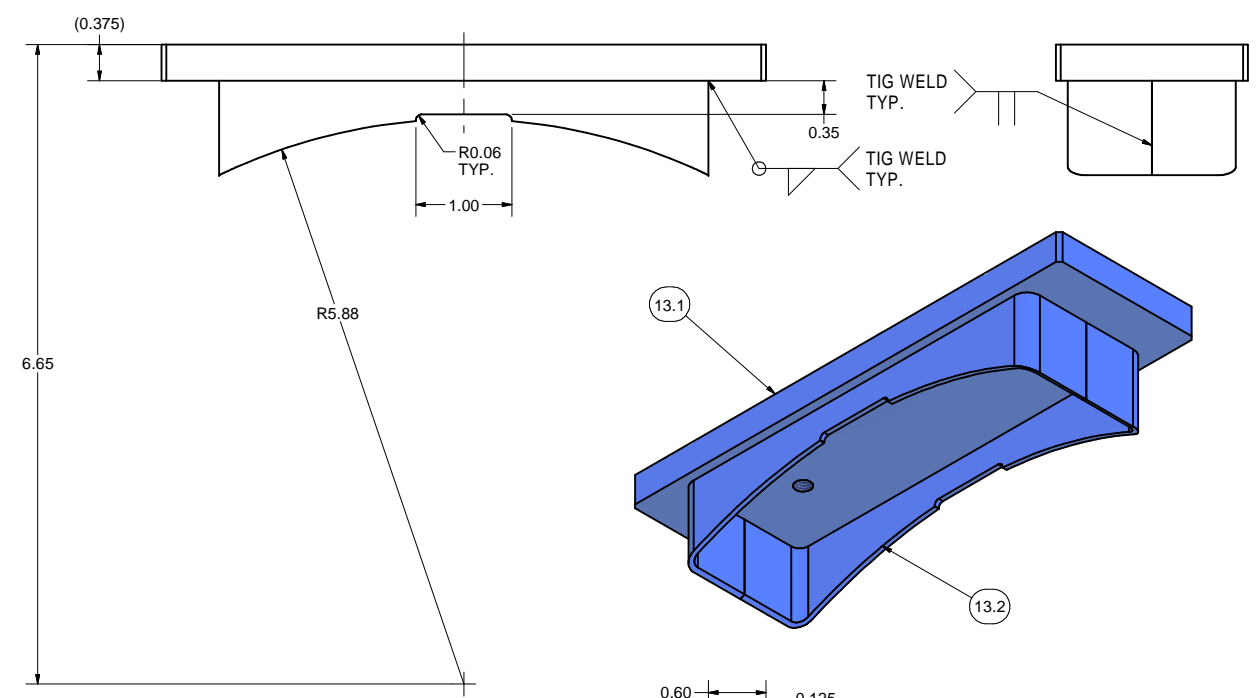
D	PRINT	PLOT DATE: 3/19/2013		7103-150	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES ON: .0 ± .02 .00 ± .010 .000 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓	Cornell University Laboratory for Elementary-Particle Physics Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853	ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE TOP SUPPORT SUB-ASM & PARTS
	DISTR.	CAD FILE NAME: 7103-150.idw						
REV.	CHECKED BY: YH/JOS/TIO	DRAWN BY: Y.HE/J.CONWAY	DRAWN FOR: M. LIEPE	DATE: 11/27/2012	SCALE: D	7103-150	REV.	
	APPROVED BY: TIO					SH. NO. 8 OF 13		



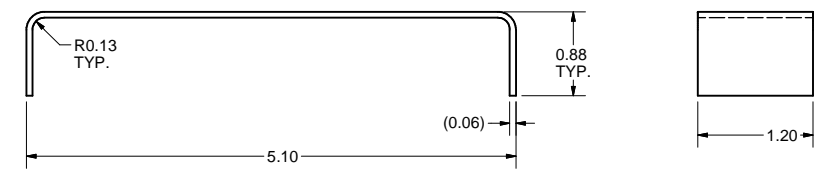
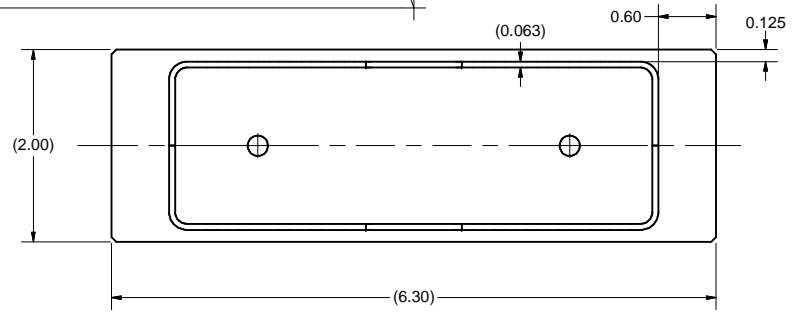
REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.



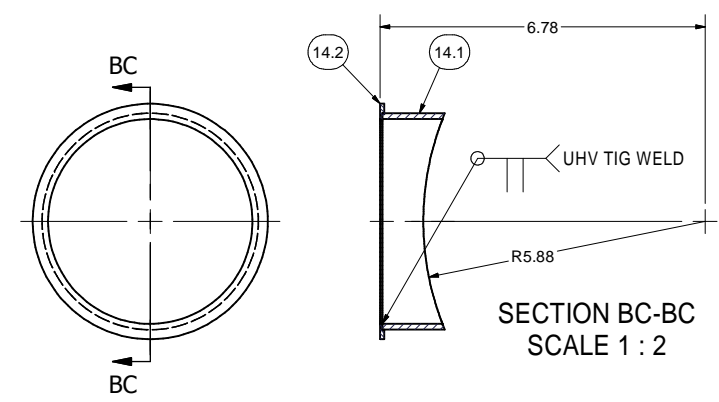
**13.1 BOTTOM SUPPORT PLATE**  
 FILE NAME: 7103-150  
 SHEET NO.: 9  
 DFT. SCALE: 1:1  
 MATERIAL: 3/8" GRADE 2 TITANIUM SHEET  
 QTY: 1 PER SUB-ASM  
 NOTES:



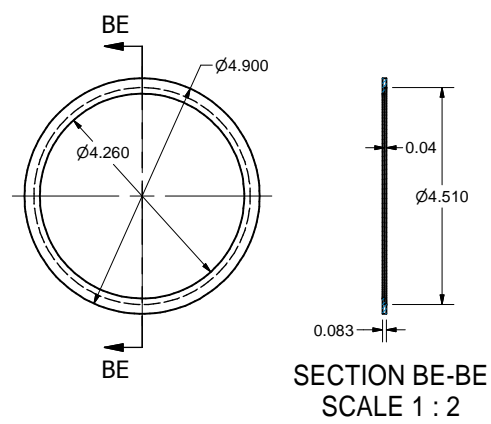
**13.0 BOTTOM SUPPORT, SUB-ASM**  
 FILE NAME: 7103-150  
 SHEET NO.: 9  
 DFT. SCALE: 1:1  
 MATERIAL: AS NOTED  
 QTY: 23 PER ASM  
 NOTES: 1. WELD AS SHOWN  
 2. MACHINE AS SHOWN



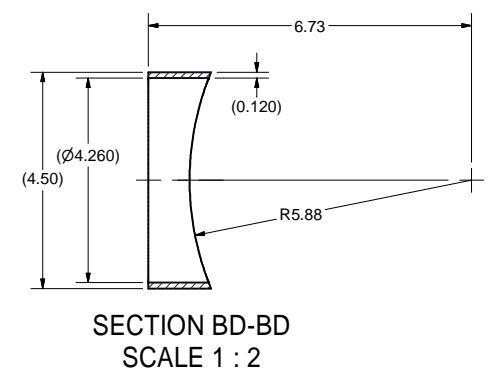
**13.2 BOTTOM SUPPORT SHELL**  
 FILE NAME: 7103-150  
 SHEET NO.: 9  
 DFT. SCALE: 1:1  
 MATERIAL: 1/16" GRADE 2 TITANIUM SHEET  
 QTY: 2 PER SUB-ASM  
 NOTES:



**14.0 4.5" CHIMNEY PORT SUBASM**  
 FILE NAME: 7103-150  
 SHEET NO.: 9  
 DFT. SCALE: 1:2  
 MATERIAL: GRADE 2 TITANIUM  
 QTY: 1 PER ASSEMBLY  
 NOTES:



**14.2 CHIMNEY PIPE WELD FLANGE**  
 FILE NAME: 7103-150  
 SHEET NO.: 9  
 DFT. SCALE: 1:2  
 MATERIAL: GRADE 2 TITANIUM  
 QTY: 1 PER SUBASM  
 NOTES:



**14.1 4.5" SCHED 10 CHIMNEY PIPE**  
 FILE NAME: 7103-150  
 SHEET NO.: 9  
 DFT. SCALE: 1:2  
 MATERIAL: GRADE 2 TITANIUM  
 QTY: 1 PER SUBASM  
 NOTES:

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 TIO March 19, 2013.**

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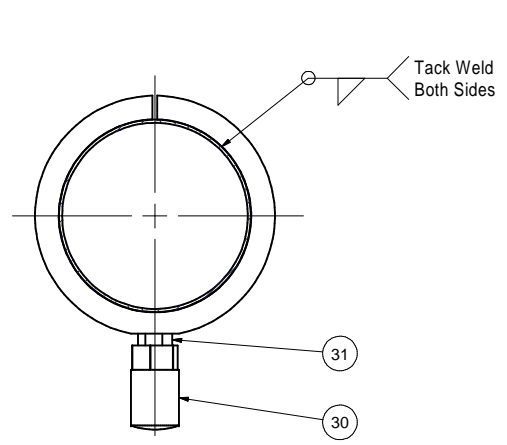
ITEM	DWG. NO.	DESCRIPTION	Q1	Q2	Q3	REMARKS	REV.
14A	Sheet 13	4.5" CHIMNEY PORT ( 1 PIECE )	1				
14.2	Sheet 8	CHIMNEY PIPE WELD FLANGE	1				
14.1	Sheet 8	4.5" SCHED 10 CHIMNEY PIPE	1				
13.2	Sheet 8	BOTTOM SUPPORT SHELL	2				
13.1	Sheet 8	BOTTOM SUPPORT PLATE	1				

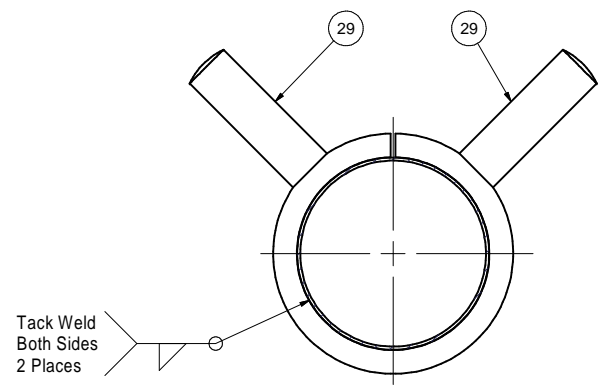
PRINT DISTR.	PLLOT DATE: 3/19/2013 CAD FILE NAME: 7103-150.idw	Cornell University Laboratory for Elementary-Particle Physics Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853	ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE BOTTOM SUPPORT SUB-ASM & PARTS
CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .0 ± .02 .00 ± .010 .000 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓		
7103-150	CHECKED BY: YH/JOS/TIO	DRAWN BY: Y.HE/J.CONWAY	DRAWN FOR: M. LIEPE
REV.	APPROVED BY: TIO	DATE: 11/27/2012	SCALE: D
			7103-150 SH. NO. 9 OF 13



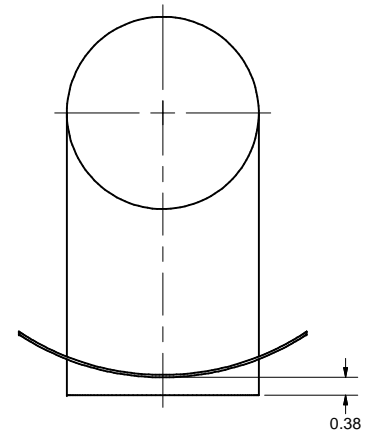
REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



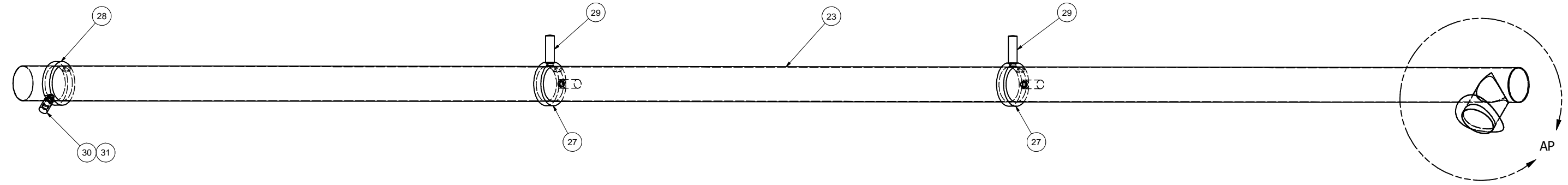
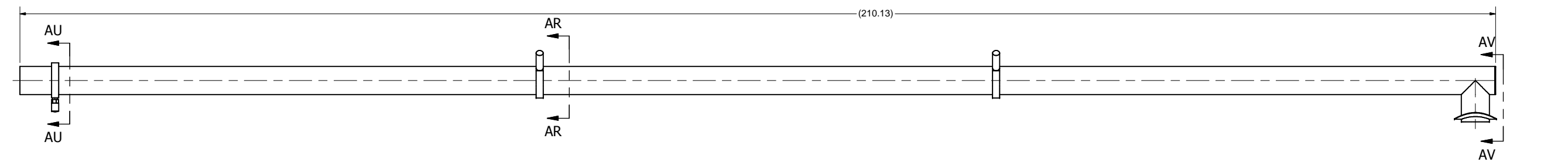
SECTION AU-AU  
SCALE 1:2



SECTION AR-AR  
SCALE 1/2

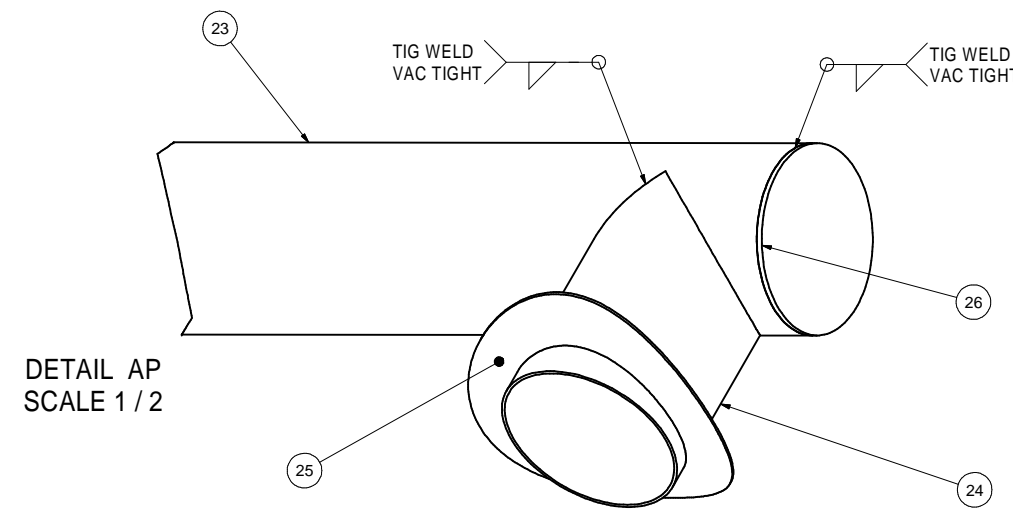


VIEW AV-AV  
SCALE 1/2



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TIO March 19, 2013.**

TIG WELD  
VAC TIGHT



DETAIL AP  
SCALE 1/2

**22 HELIUM GAS RETURN PIPE BAFFLE SUBASM**

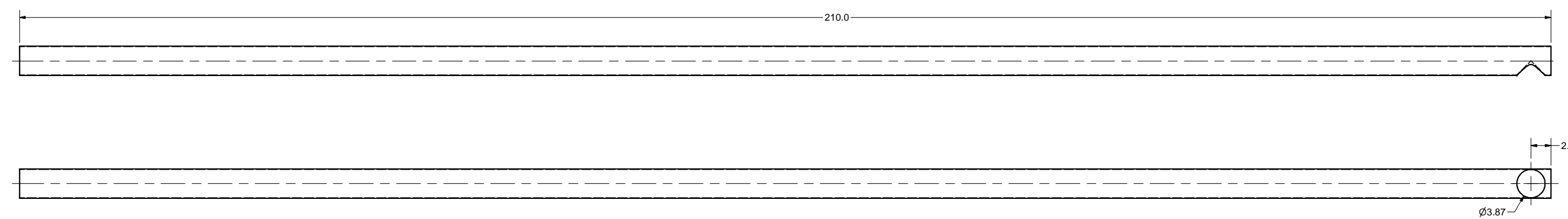
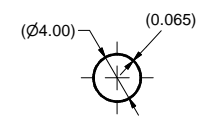
FILE NAME: 7103-150  
SHEET NO.: 11  
DFT. SCALE:  
MATERIAL: AS NOTED  
QTY: 1 REQ'D  
NOTES:

ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
31	Sheet 13	END THREADED STUB	1				
30	Sheet 13	BAFFLE SUPPORT POST END	1				
29	Sheet 13	BAFFLE SUPPORT POST CENTER	4				
28	Sheet 13	BAFFLE COLLAR END	1				
27	Sheet 13	BAFFLE COLLAR CENTER	2				
26	Sheet 12	LONG BAFFLE TUBE END CAP	1				
25	Sheet 12	VERTICAL TUBE BAFFLE COLLAR	1				
24	Sheet 12	VERTICAL BAFFLE TUBE CHIMNEY	1				
23	Sheet 12	LONG BAFFLE TUBE	1				

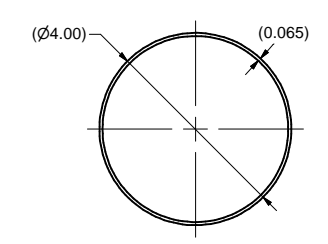
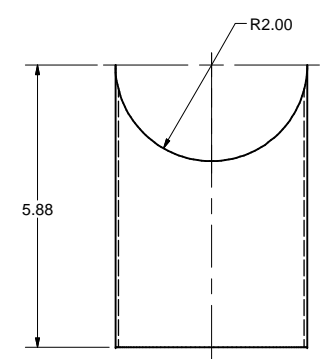
D	PRINT	PLOT DATE: 3/19/2013		7103-150	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .0 ± .02 .00 ± .010 .000 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓	Cornell University Laboratory for Elementary-Particle Physics ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE BAFFLE SUB-ASM	Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853
	DISTR.	CAD FILE NAME: 7103-150.idw					
CR-1	CHECKED BY: YH/JOS/TIO	DRAWN BY: Y.HE/J.CONWAY	DRAWN FOR: M. LIEPE	DATE: 11/27/2012	SCALE: D	7103-150	REV.
	APPROVED BY: TIO					SH. NO. 11 OF 13	

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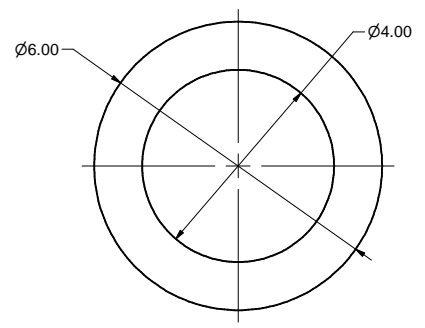
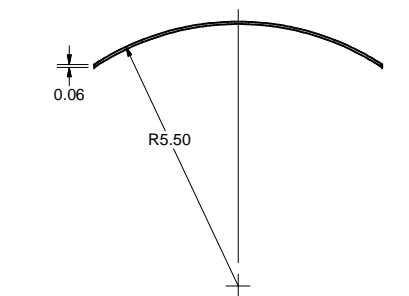
REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



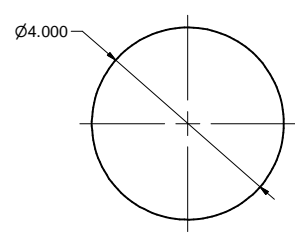
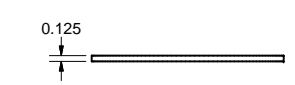
**23 LONG BAFFLE TUBE**  
 FILE NAME: 7103-150  
 SHEET NO.: 12  
 DFT. SCALE: 1:8  
 MATERIAL: 316L SS 4in OD x 0.065n Wall Tube  
 QTY: 1 Req'd  
 NOTES:



**24 VERTICAL BAFFLE TUBE CHIMNEY**  
 FILE NAME: 7103-150  
 SHEET NO.: 12  
 DFT. SCALE: 1:2  
 MATERIAL: 316L SS 4in OD x 0.065in Wall  
 QTY: 1 Req'd  
 NOTES:



**25 VERTICAL TUBE BAFFLE COLLAR**  
 FILE NAME: 7103-150  
 SHEET NO.: 12  
 DFT. SCALE: 1:2  
 MATERIAL: 316L SS  
 QTY: 1 Req'd  
 NOTES:



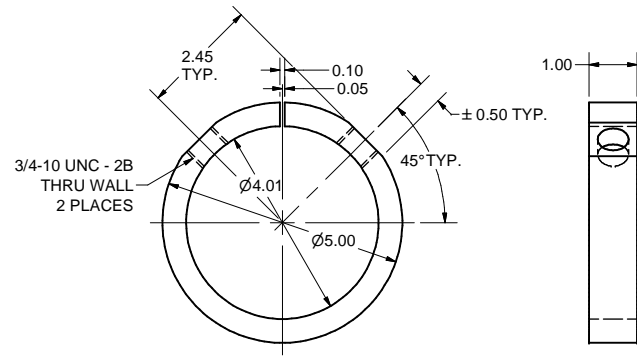
**26 LONG BAFFLE TUBE END CAP**  
 FILE NAME: 7103-150  
 SHEET NO.: 12  
 DFT. SCALE: 1:2  
 MATERIAL: 316L SS  
 QTY: 1 Req'd  
 NOTES:

**RELEASED FOR QUOTE.  
 NOT FOR FABRICATION.  
 TIO March 19, 2013.**

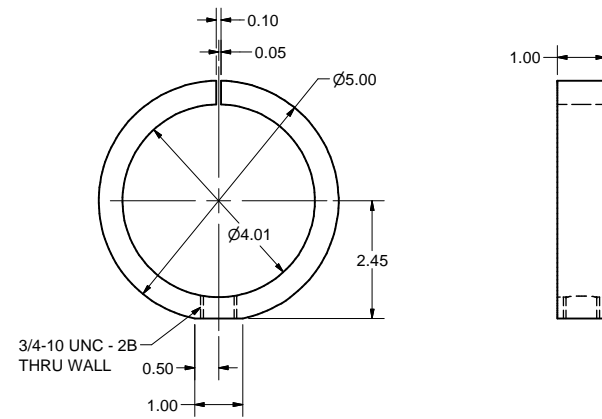
FOR MACHINING LUBRICANT USE ONLY  
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 OR EQUIVALENT APPROVED BY CORNELL LEPP

ITEM	DWG. NO.	DESCRIPTION	QUANTITY			REMARKS	REV.
			G1	G2	G3		
<b>D</b>	7103-150	PRINT DISTR.	PLOT DATE: 3/19/2013 CAD FILE NAME: 7103-150.idw			Cornell University Laboratory for Elementary-Particle Physics Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853	ERL LINAC CRYOMODULE HELIUM GAS RETURN PIPE BAFFLE PARTS
CR-1	7103-150	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .0 ± .02 .00 ± .010 .000 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓	7103-150	12	13		

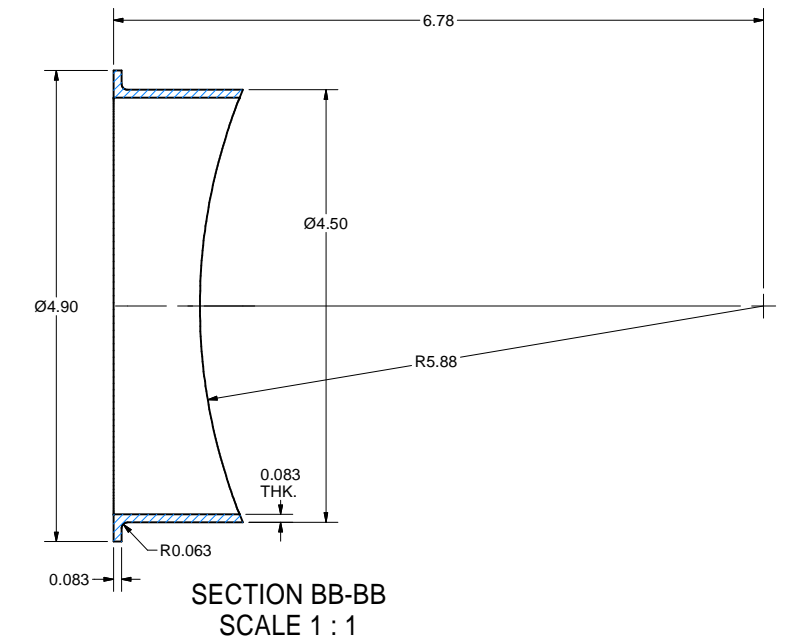
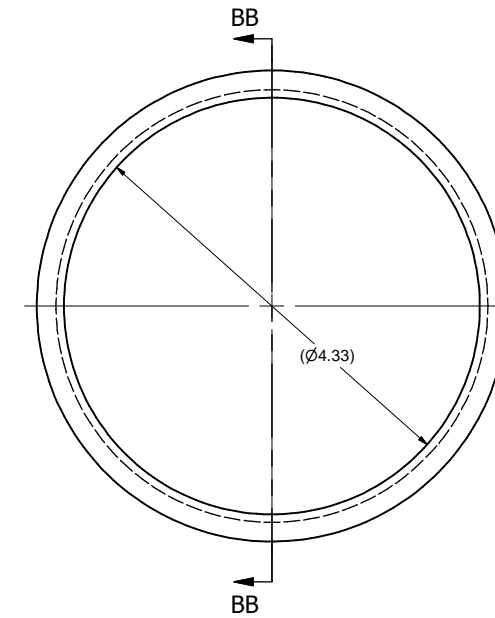
REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



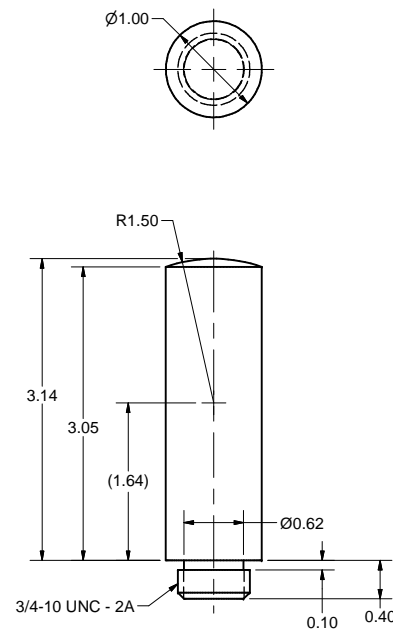
**27** BAFFLE COLLAR CENTER  
 FILE NAME: 7103-150  
 SHEET NO.: 13  
 DFT. SCALE: 1:2  
 MATERIAL: 316L SS  
 QTY: 2  
 NOTES:



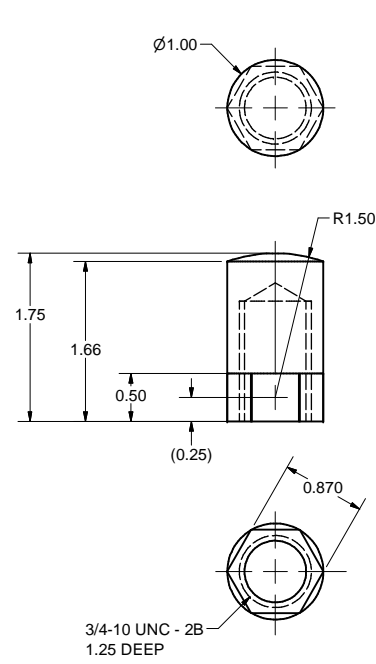
**28** BAFFLE COLLAR END  
 FILE NAME: 7103-150  
 SHEET NO.: 13  
 DFT. SCALE: 1:2  
 MATERIAL: 316L SS  
 QTY: 1  
 NOTES:



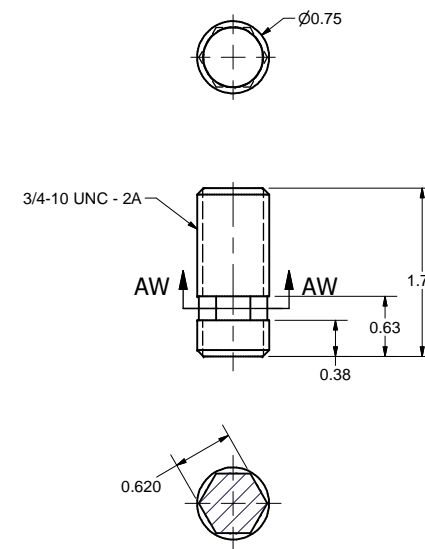
**14A** 4.5" CHIMNEY PORT  
 FILE NAME: 7103-150  
 SHEET NO.: 13  
 DFT. SCALE: 1:1  
 MATERIAL: GRADE 2 TITANIUM  
 QTY: 1 PER ASSEMBLY  
 NOTES:



**29** BAFFLE SUPPORT POST CENTER  
 FILE NAME: 7103-150  
 SHEET NO.: 13  
 DFT. SCALE: 1:1  
 MATERIAL: 316L SS  
 QTY: 4  
 NOTES:



**30** BAFFLE SUPPORT POST END  
 FILE NAME: 7103-150  
 SHEET NO.: 13  
 DFT. SCALE: 1:1  
 MATERIAL: 316L SS  
 QTY: 1  
 NOTES:



**31** END THREADED STUB  
 FILE NAME: 7103-150  
 SHEET NO.: 13  
 DFT. SCALE: 1:1  
 MATERIAL: 316L SS  
 QTY: 1  
 NOTES:

**RELEASED FOR QUOTE.  
 NOT FOR FABRICATION.  
 TIO March 19, 2013.**

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ITEM	DWG. NO.	DESCRIPTION	QUANTITY			REMARKS	REV.
			G1	G2	G3		
PRINT DISTR.	PLOT DATE: 3/19/2013 CAD FILE NAME: 7103-150.idw						
CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .0 ± .02 .00 ± .010 .000 ± .005 FRACTIONS ± 1/32 ANGLES ± 0.5° ALL SURFACES ✓	Cornell University Laboratory for Elementary-Particle Physics Floyd R. Newman Laboratory Robert R. Wilson Laboratory Ithaca, NY 14853					
7103-150 SH. NO. 13 OF 13	<b>ERL LINAC CRYOMODULE          HELIUM GAS RETURN PIPE          BAFFLE PARTS / MISC PARTS</b>						
CHECKED BY: YH/JOS/TIO	DRAWN BY: Y.HE/J.CONWAY	DRAWN FOR: M. LIEPE	DATE: 11/27/2012	SCALE: D	7103-150 SH. NO. 13 OF 13	REV.	
APPROVED BY: TIO							