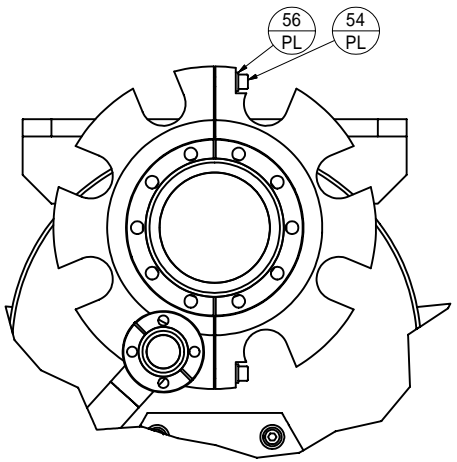
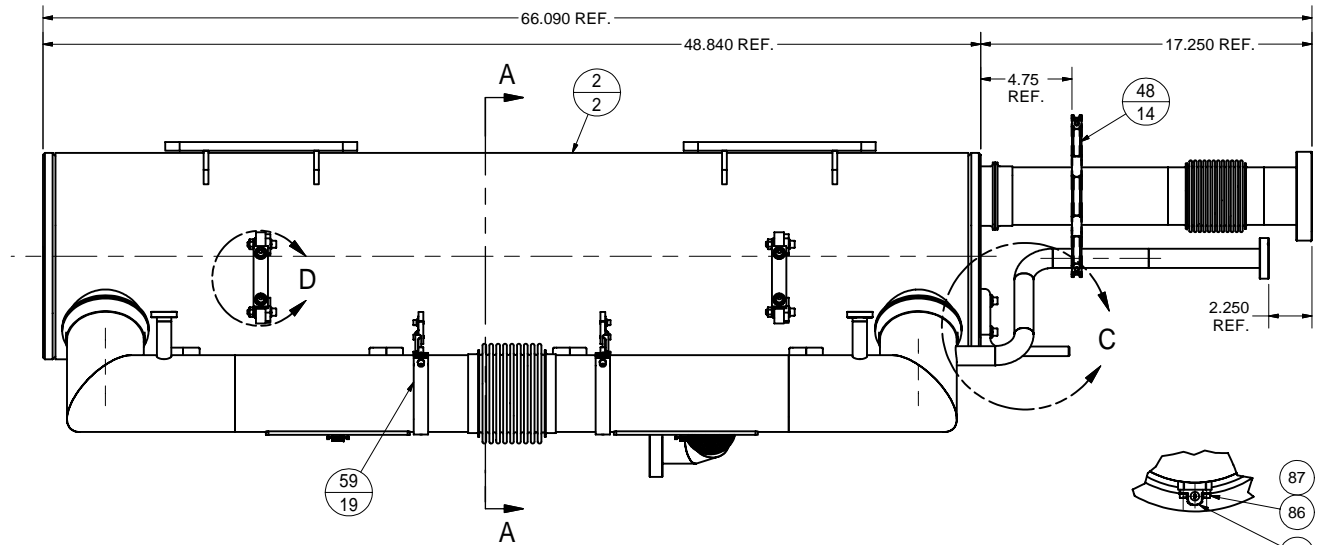
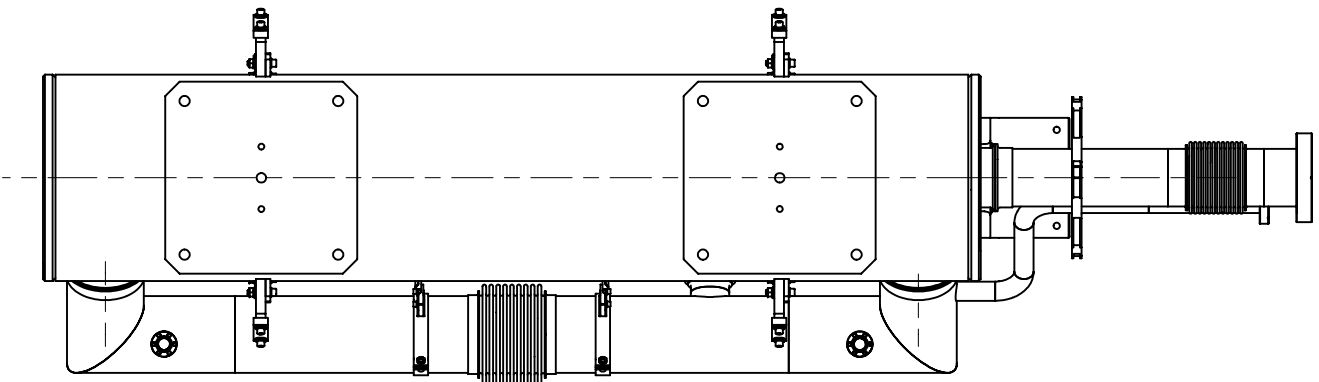
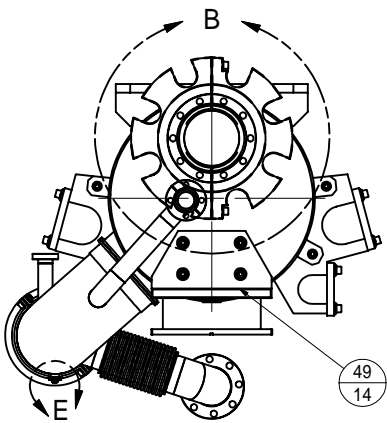


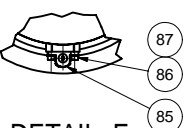
REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A	-	BELLOWS ADDED ON CAVITY BRANCH OF 2-PHASE TUBE. 2-PHASE TUBE MODIFIED: ONE BELLOWS LEFT. 3" AND 1" TUBES MODIFIED. 2-PHASE TUBE SPRING SUPPORTS ADDED.	10/25/06	ML
B		PARTS ITEM 85, 86, 87, AND DETAIL "E" ADDED.	12/07/06	VM



DETAIL B
SCALE 1:2.5



DETAIL C
SCALE 1:2.5



DETAIL E
SCALE 1:2

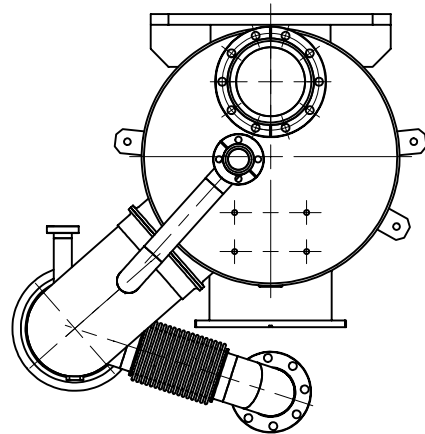
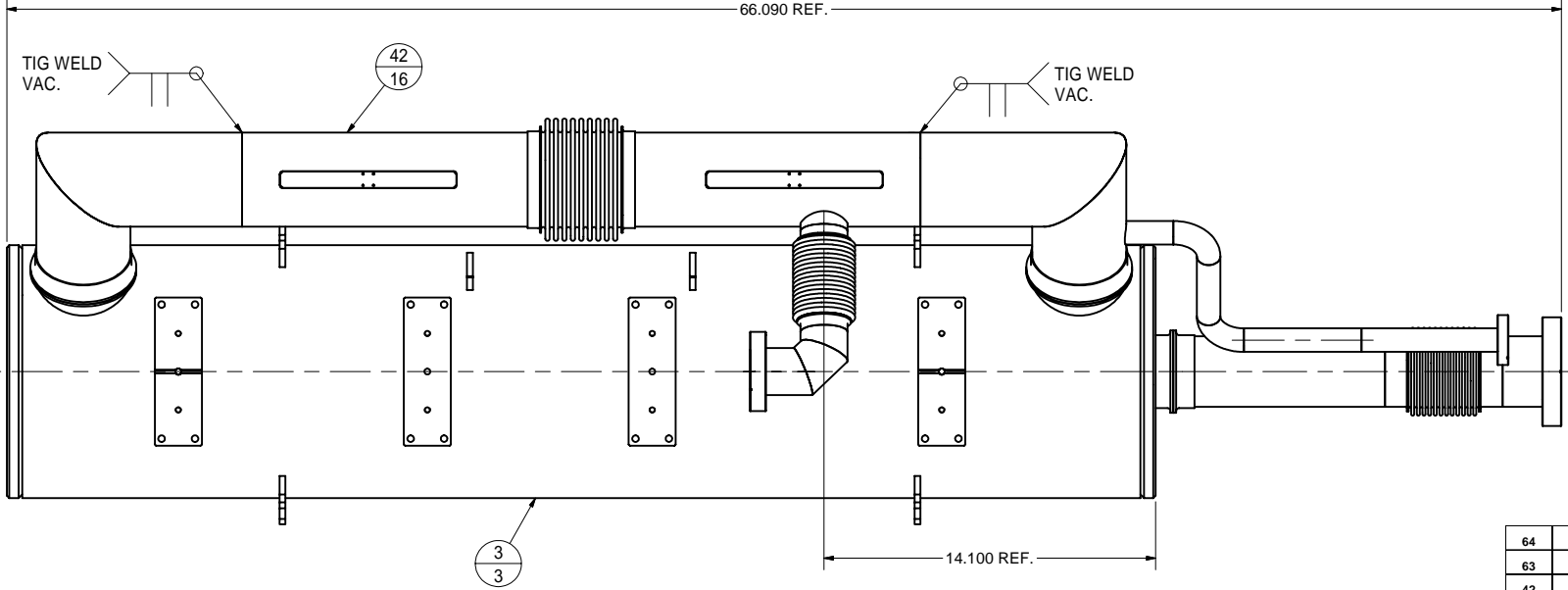
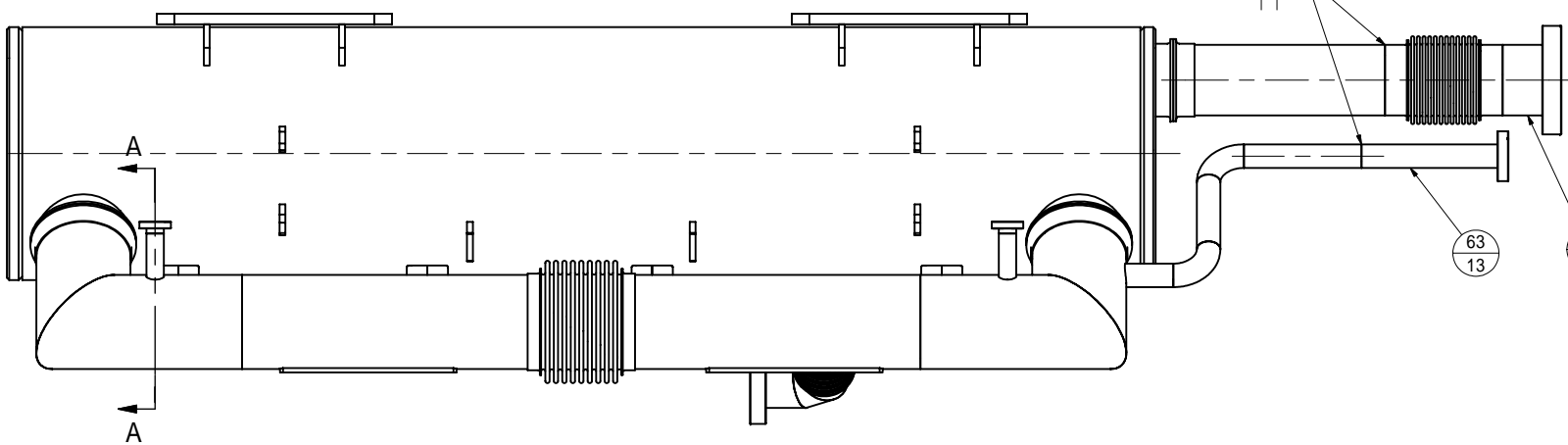
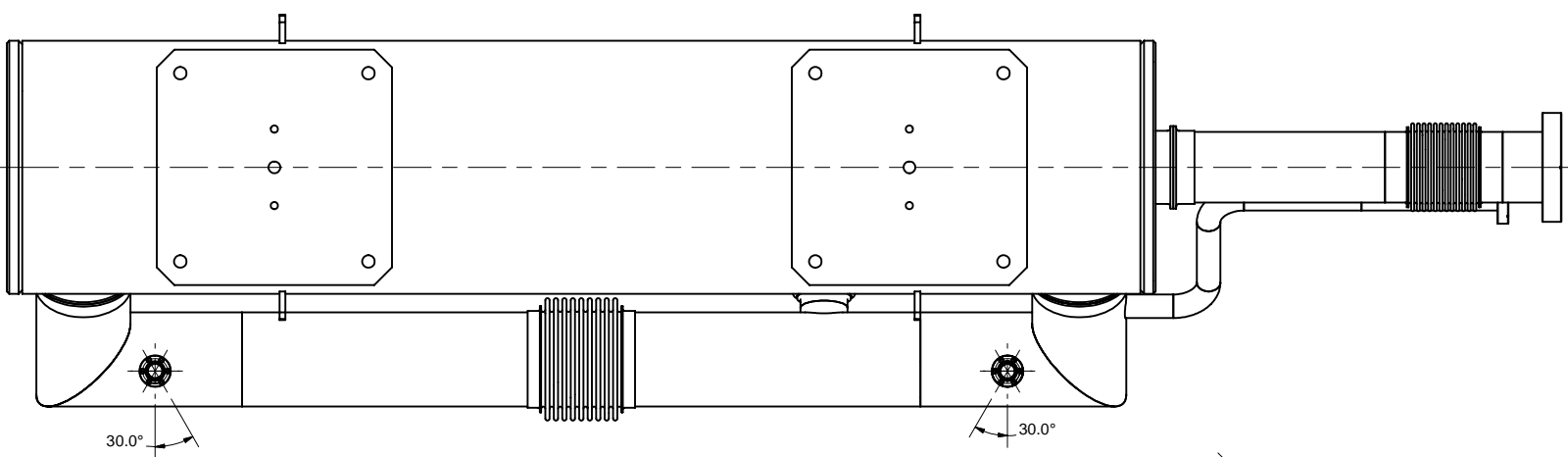
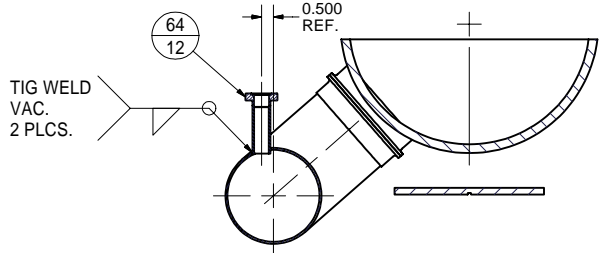
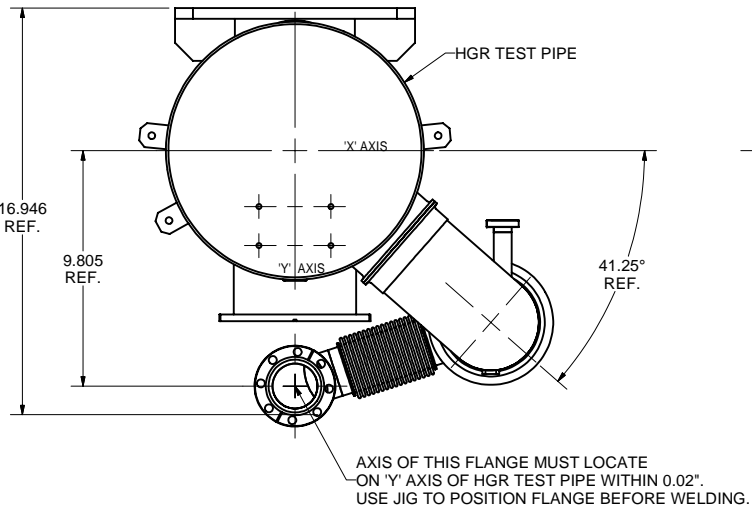
1 HELIUM GAS RETURN PIPE, ASSEMBLY
FILE NAME: 7110-006
SHEET NO.: 1
DFT. SCALE: 1:5
MATERIAL: AS NOTED
QTY: 1 REQ'D
NOTES: 1. MAKE LN THERMAL COLD SHOCK AND LEAK TEST.
LEAK RATE: < 2.0E-10 TORR-L/SEC.

87	-	#2 Spring Lock Washer	4		316 St. Steel	
86	-	#2-56 x 1/4 Socket Head Cap Screw	4		316 St. Steel	
85	-	5 W RESISTOR (RH005 TYPE)	2			
59	7110-006 (Sh.19)	2-PHASE TUBE SPRING SUPPORT SUB-ASM	2			
58	-	1/4-20 x 7/8 Sock. Head Cap Screw	16		316 St. Steel	
57	-	1/4 Washer	24		316 St. Steel	
56	-	1/4 Spring Lock Washer	34		316 St. Steel	
55	-	1/4-20 Hex Nut	8		Silicon Bronze	
54	-	1/4-20 x 1-1/4 Socket Head Cap Screw	10		316 St. Steel	
53	7110-006 (Sh.15)	WARM-UP TUBE CLAMP	2			
52	7110-006 (Sh.15)	5 K TUBE CLAMP	4			
51	7110-006 (Sh.15)	5 K TUBE BRACKET RIGHT	2			
50	7110-006 (Sh.15)	5 K TUBE BRACKET LEFT	2			
49	7110-006 (Sh.14)	GATE VALVE BRACKET	1			
48	7110-006 (Sh.14)	CRYOTUBES SUPPORT RING	1			
2	7110-006 (Sh. 2)	HGRP WELDMENT III	1			
1	7110-006 (Sh. 1)	HELIUM GAS RETURN PIPE ASM	X			

ITEM	DWG. NO.	DESCRIPTION	QUANTITY	REMARKS	REV.
G1	G2	G3			
PRINT DISTR.	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES	CORNELL UNIVERSITY FLOYD R. NEWMAN LABORATORY ITHACA, NY 14853		
7110-006	SH. NO. 1	OF 20	ERL Horizontal Test Cryomodule Helium Gas Return Pipe Assembly		
REV. B	CHECKED BY: VM APPROVED BY: ML	DRAWN BY: TMK DRAWN FOR: M.LIEPE	DATE: 6/15/2006	SCALE: D	7110-006 SH. NO. 1 OF 20 REV. B

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

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		PARTS ITEM 17, 63, 64 ADDED.	10/29/06	VM
B		BOTTOM VIEW SHOWS NEW DESIGN FOR PART ITEM 42.	12/07/06	VM



2 HGRP WELDMENT III

FILE NAME: 7110-006

SHEET NO.: 2

DFT. SCALE: 1:4

MATERIAL: AS NOTED

QTY: 1 REQ'D

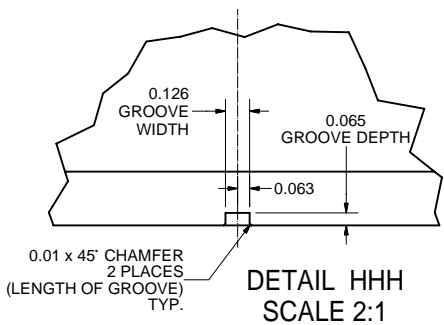
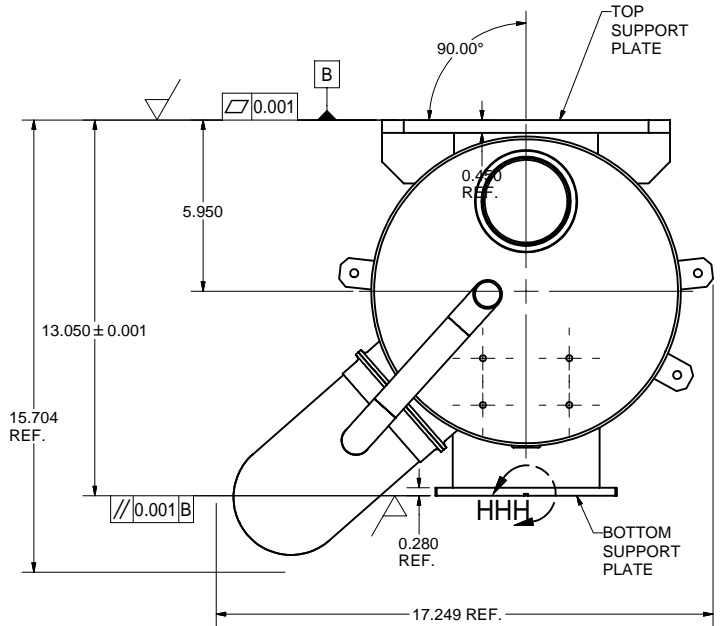
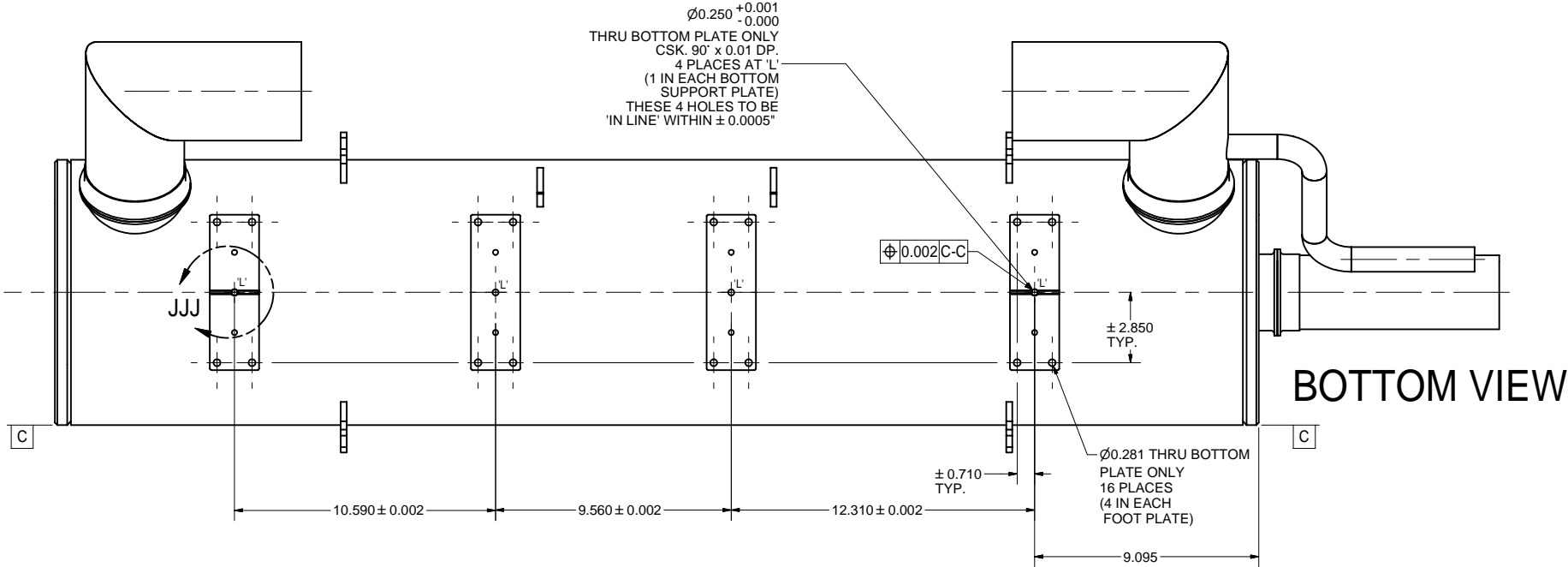
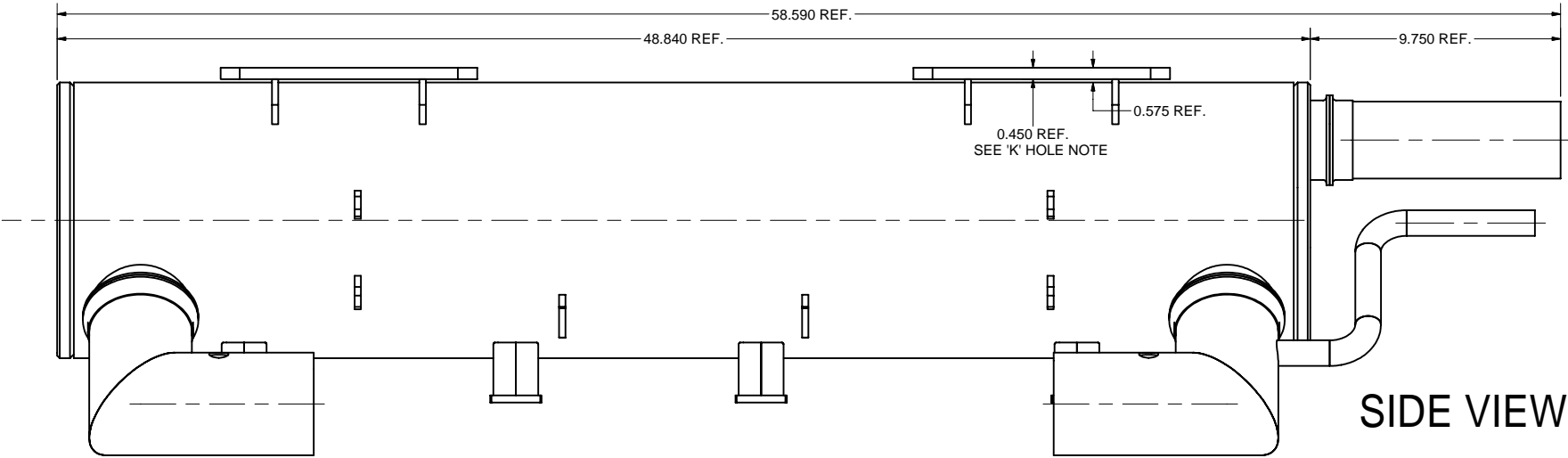
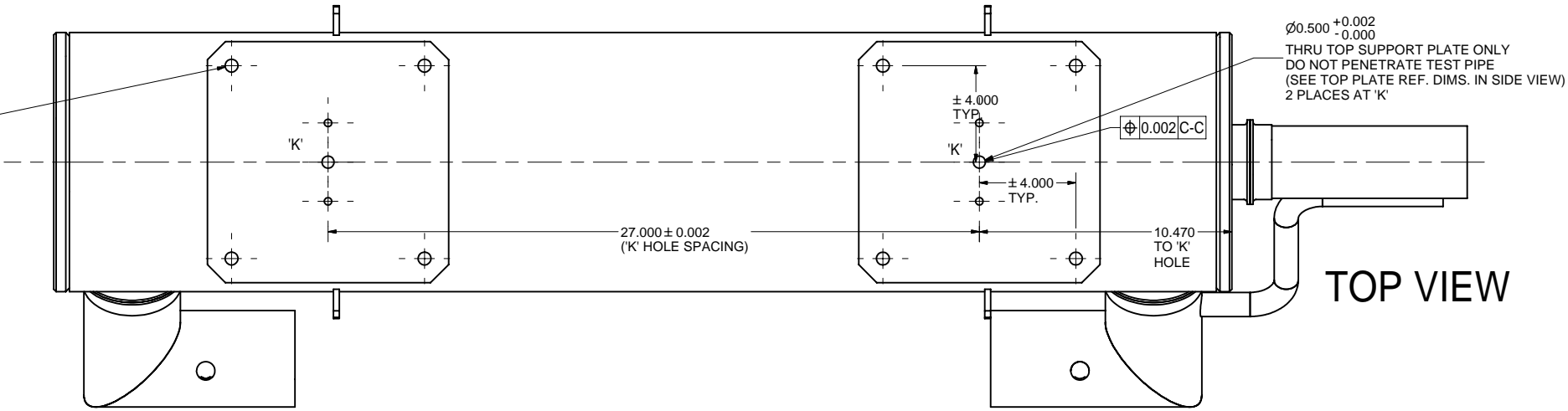
NOTES:

64	SH.12	He LEVEL SENSOR TUBE SUB-ASM		2		
63	SH.13	2 K He TUBE SUB-ASM		1		
42	SH.16	2K MAIN TUBE, SUB-ASM		1		
17	SH.9	3.0" BELLOWS TUBE SUB-ASM		1		
3	SH.3	HGRP WELDMENT II (MACHINING)		1		
2	SH.2	HGRP WELDMENT III	1	X		

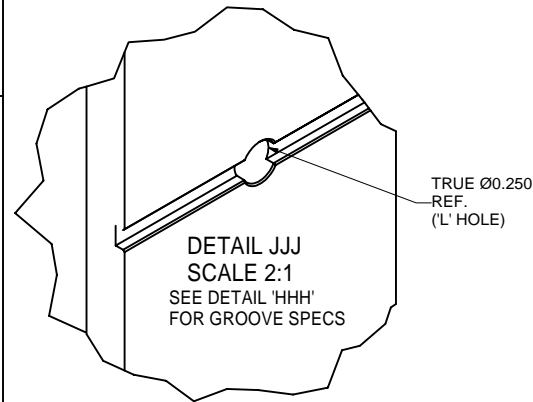
ITEM	DWG. NO.	DESCRIPTION	QUANTITY			REMARKS	REV.
			G1	G2	G3		
D	PRINT DISTR.	PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw					
7110-006 SH. NO. 2 CR. 20	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES	CORNELL UNIVERSITY LABORATORY FOR ELEMENTARY PARTICLE PHYSICS				CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853
REV. B	CHECKED BY: VM APPROVED BY: ML	DRAWN BY: TMK DRAWN FOR: M.LIEPE	DATE: 6/15/2006	SCALE: D	7110-006 SH. NO. 2 OF 20	REV. B	

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ALKALINE DETERGENT LUBRICANT CIMSTAR 40
OR EQUIVALENT APPROVED BY CORNELL LEPP

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		BELLOWS AND H ₂ LEVEL SENSOR TUBES REMOVED.	10/29/06	VM





NOTE: 0.126 WD. GROOVE IS CUT ONLY IN FIRST AND LAST BOTTOM SUPPORT PLATE. SEE BOTTOM SIDE VIEW

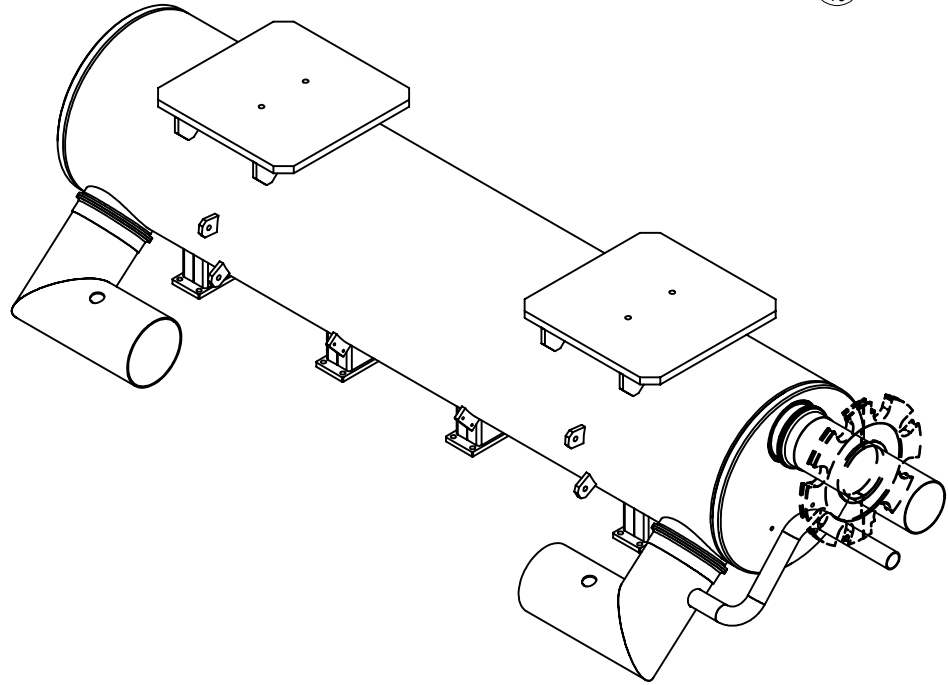
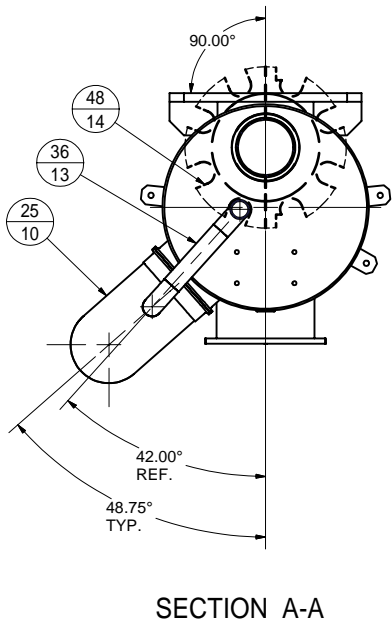
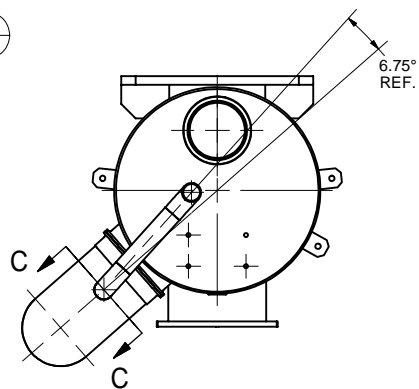
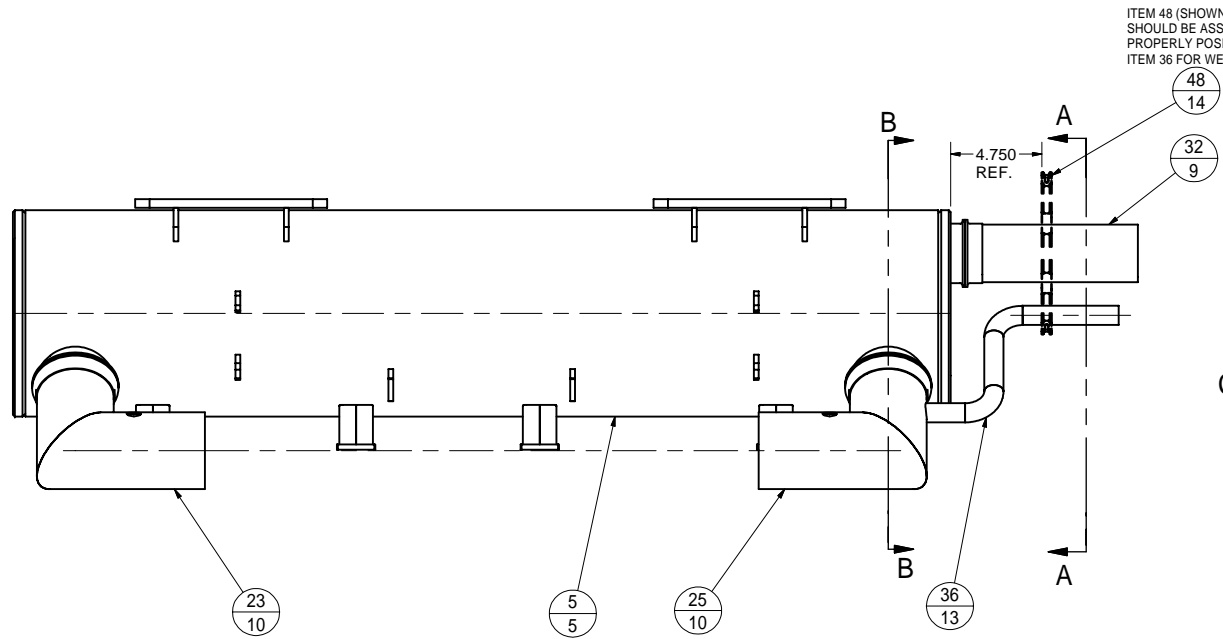
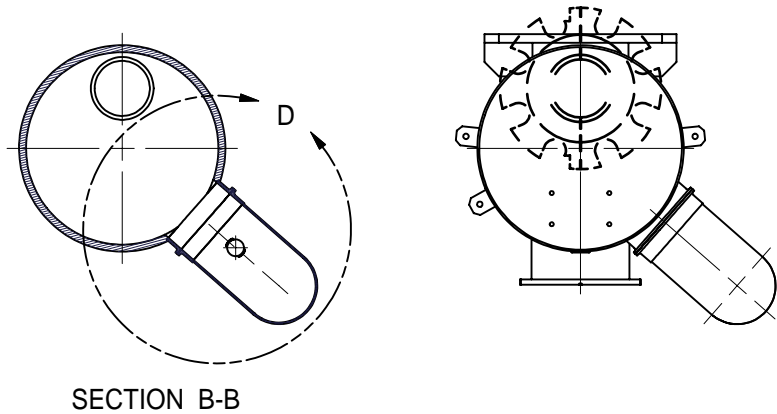
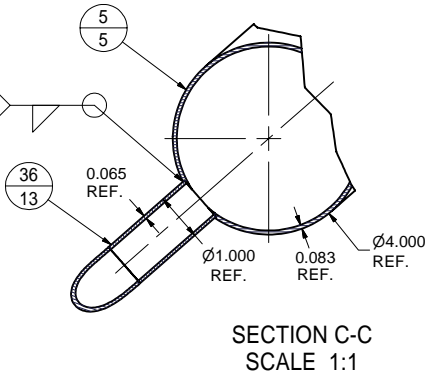
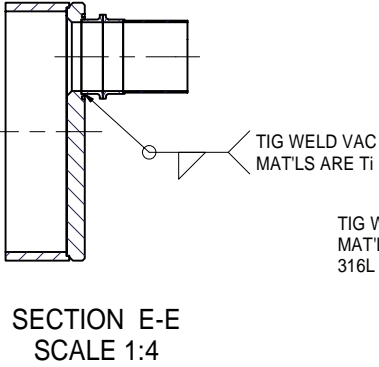
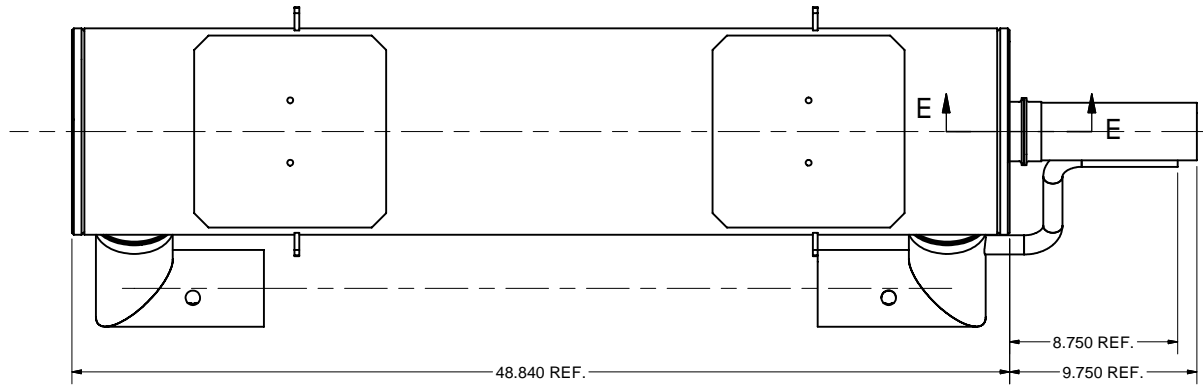
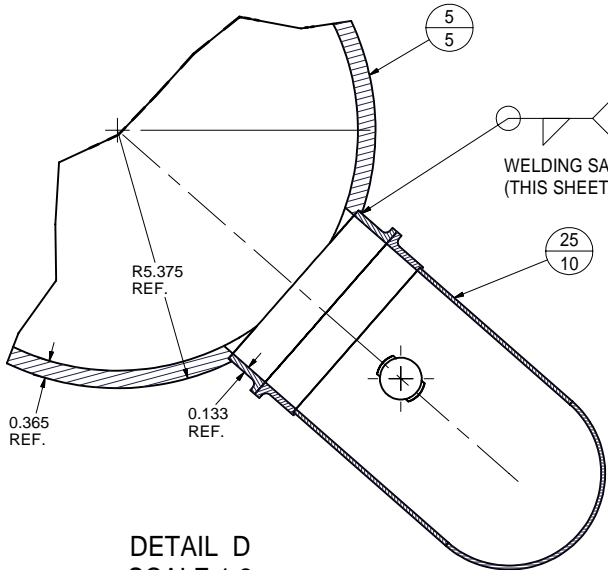


- 3 HGRP WELDMENT II (MACHINING)
- FILE NAME: 7110-006
SHEET NO.: 3
DFT. SCALE: 0.3:1
MATERIAL: MAKE FROM ITEM 4.
QTY: 1 REQ'D
- NOTES: 1. REMOVE ITEM 48. HEAT TREAT OR VIBRATE TO RELIEVE STRESS.
2. MACHINE SURFACES OF TOP AND BOTTOM SUPPORT PLATES (SEE FRONT VIEW).
3. MACHINE HOLES IN TOP SUPPORT PLATES (SEE TOP SIDE VIEW).
4. MACHINE GROOVES AND HOLES IN BOTTOM SUPPORT PLATES (SEE DETAIL-HHH, DETAIL-JJJ AND BOTTOM SIDE VIEW).

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ALKALINE DETERGENT LUBRICANT CIMSTAR 40
OR EQUIVALENT APPROVED BY CORNELL LEPP

		ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS		REV.		
								QUANTITY						
D	PRINT DISTR.	PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw												
7110-006 SH. NO. 3 OF 20	CR-1	UNLESS OTHERWISE SPECIFIED:		<div><div><div>CORNELL UNIVERSITY</div><div></div><div>LEPP</div><div>LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS</div></div><div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div></div>										
		DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES 												
		ERL Horizontal Test Cryomodule Helium Gas Return Pipe HGR Weldment III (Machining)												
A	REV.	CHECKED BY: VM		DRAWN BY		DRAWN FOR		DATE		SCALE		D	7110-006 SH. NO. 3 OF 20	REV. A
		APPROVED BY: ML		TMK		M.LIEPE		6/15/2006						

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		PARTS ITEM 23, 25, 36 MODIFIED. PART ITEM 32 NEW.	10/29/06	VM



4 HGRP WELDMENT II
FILE NAME: 7110-006
SHEET NO.: 4
DFT. SCALE: 1:5
MATERIAL: AS NOTED
QTY: 1 REQ'D
NOTES: 1. ADDITIONAL MACHINING ON PREVIOUS SHEET.
2. HORIZONTAL TUBES OF PARTS 23 AND 25
SHOULD BE ALIGNED WITHIN ±0.2°.

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ALKALINE DETERGENT LUBRICANT CIMSTAR 40
OR EQUIVALENT APPROVED BY CORNELL LEPP

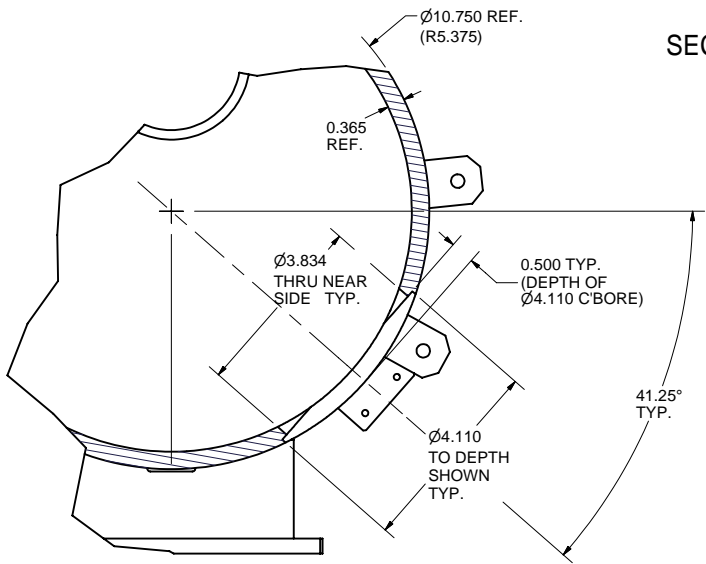
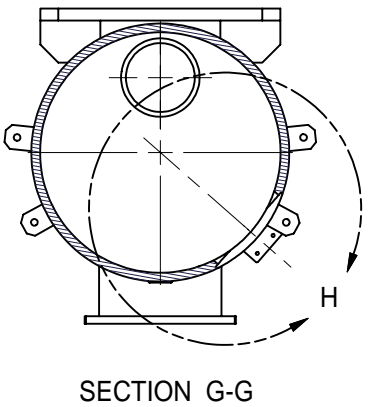
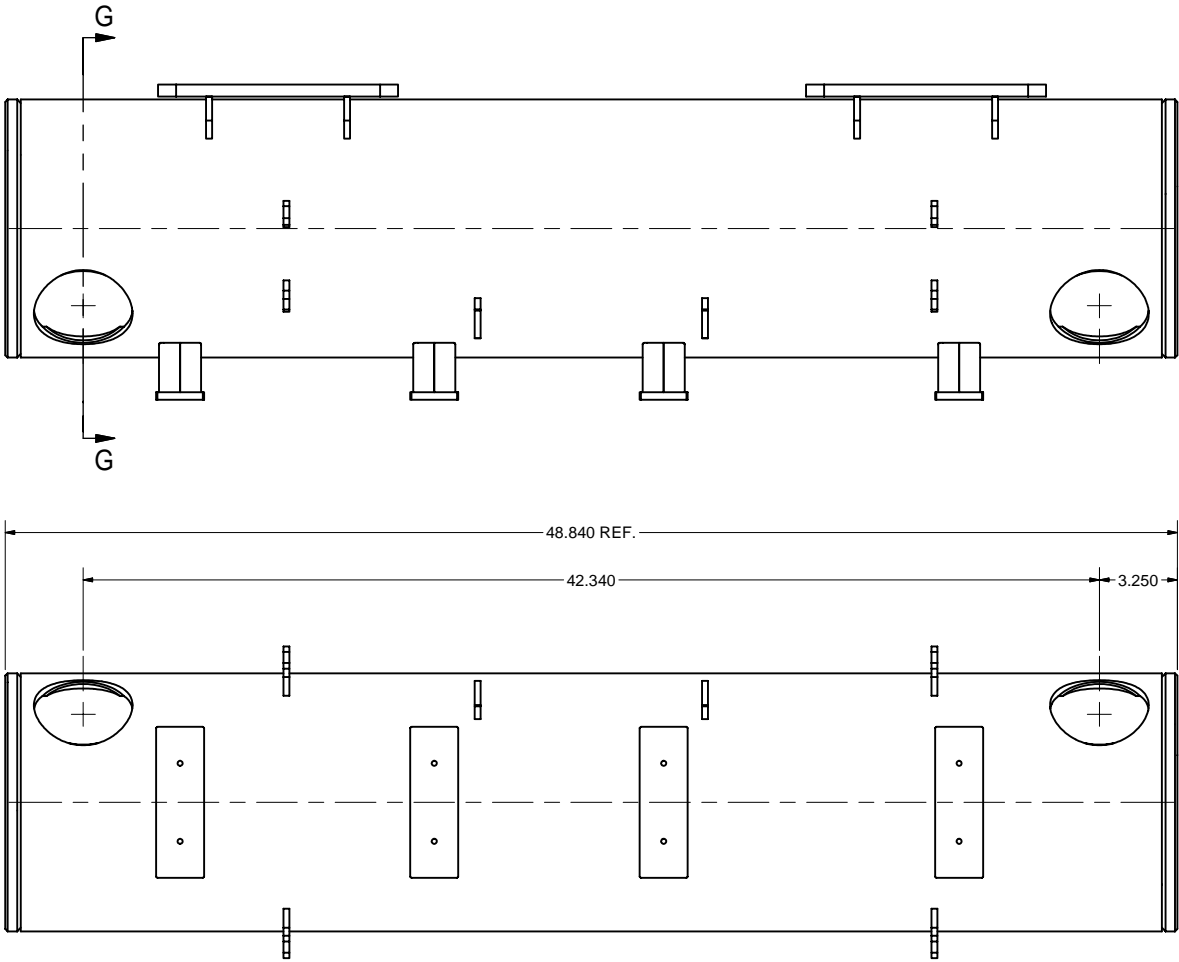
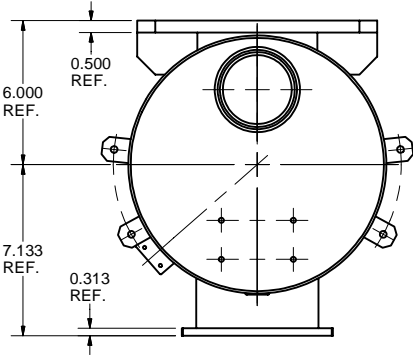
48	SH.14	CRYO-TUBE SUPPORT RING, SUB-ASM	1		TO POSITION PT.36 FOR WELD
36	SH.13	2K TUBE, SUB-ASM	1		
32	SH. 9	3" TUBE SUB-ASM	1		
25	SH.10	2-PHASE 2 K ELBOW FRONT, SUB-ASM	1		
23	SH.10	2-PHASE 2 K ELBOW BACK, SUB-ASM	1		
5	SH.5	HGRP WELDMENT I (MACHINING)	1		
4	SH.4	HGRP WELDMENT II	1	X	

ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
PRINT DISTR.	7110-006	ERL Horizontal Test Cryomodule Helium Gas Return Pipe HGRP Weldment II					
CR-1	7110-006	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES					
REV.	A	CHECKED BY: VM APPROVED BY: ML	DRAWN BY: TMK	DRAWN FOR: M.LIEPE	DATE: 6/15/2006	SCALE: D	7110-006 SH. NO. 4 OF 20 REV. A

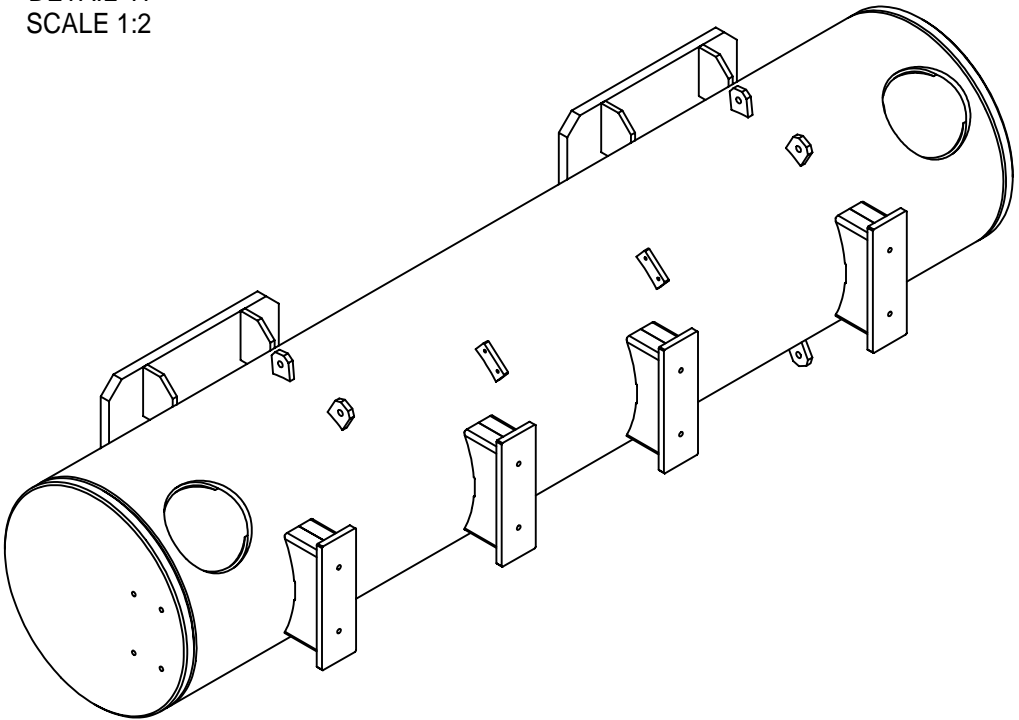
CORNELL UNIVERSITY
FLOYD R. NEWMAN LABORATORY
ITHACA, NY 14853

ERL Horizontal Test Cryomodule
Helium Gas Return Pipe
HGRP Weldment II

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		3" BELLOWS TUBE SUB-ASM REMOVED. ISO VIEW ADDED.	10/27/06	VM





DETAIL H
SCALE 1:2

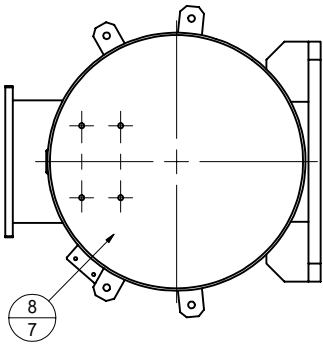


- 5 HGRP WELDMENT I (MACHINING)
- FILE NAME: 7110-006
SHEET NO.: 5
DFT. SCALE: 1:4
MATERIAL: AS NOTED
QTY: 1 REQ'D
NOTES: 1. MAKE FROM ITEM 6.

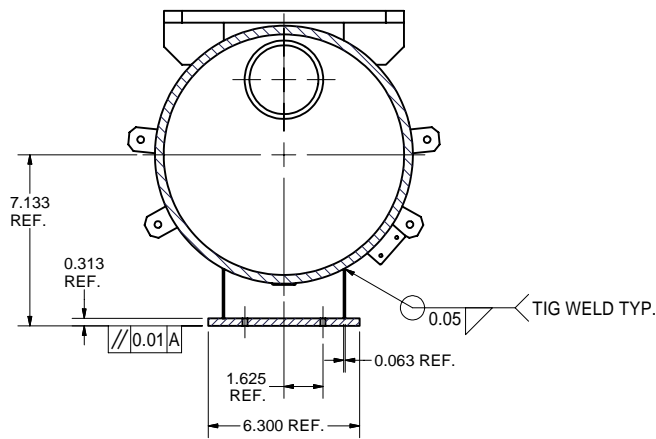
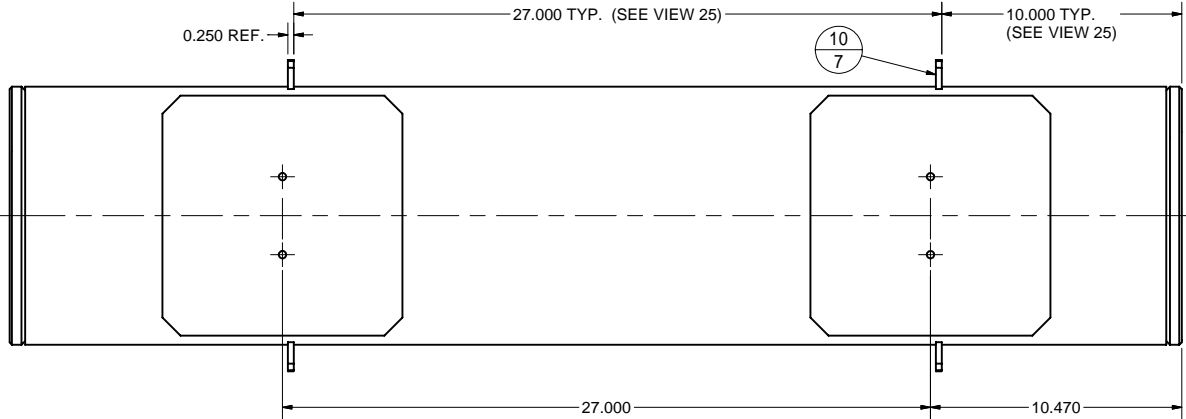
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OR EQUIVALENT APPROVED BY CORNELL LEPP

	ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS	REV.
				QUANTITY						
D	PRINT DISTR.	PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw								
7110-006 SH. NO. 5 OF 20	CR-1	UNLESS OTHERWISE SPECIFIED:	<div><div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div></div>							
		DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES ✓								
		ERL Horizontal Test Cryomodule Helium Gas Return Pipe HGRP Weldment I (Machining)								
A	REV.	CHECKED BY: VM	DRAWN BY	DRAWN FOR	DATE	SCALE	D	7110-006	SH. NO. 5 OF 20	REV. A
		APPROVED BY: ML	TMK	M.LIEPE	6/15/2006					

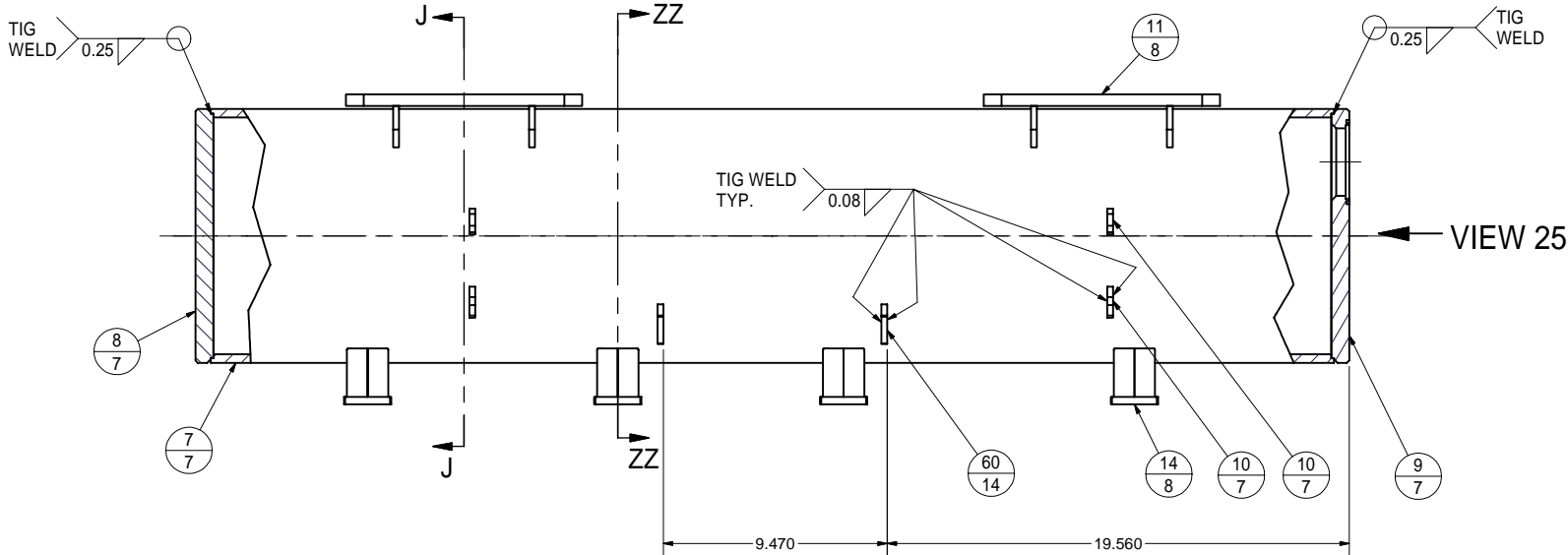
REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		TABS ITEM 60 ADDED. 3" BELLOWS TUBE SUB-ASM REMOVED. ISO VIEW ADDED.	10/29/06	VM



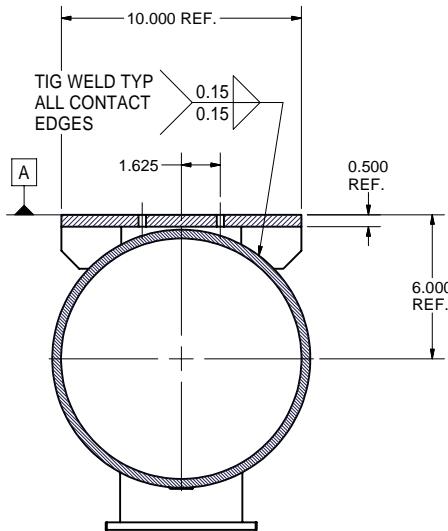
VIEW TO SHOW ORIENTATION OF
1/4-28UNF HOLES IN ITEM 8 TO SUB-ASM



SECTION ZZ-ZZ

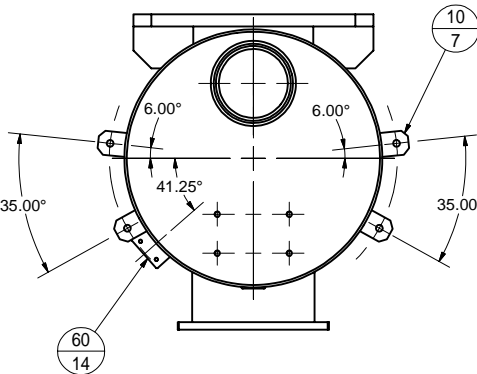


VIEW 25



SECTION J-J

NOTE: SEE TOP VIEW

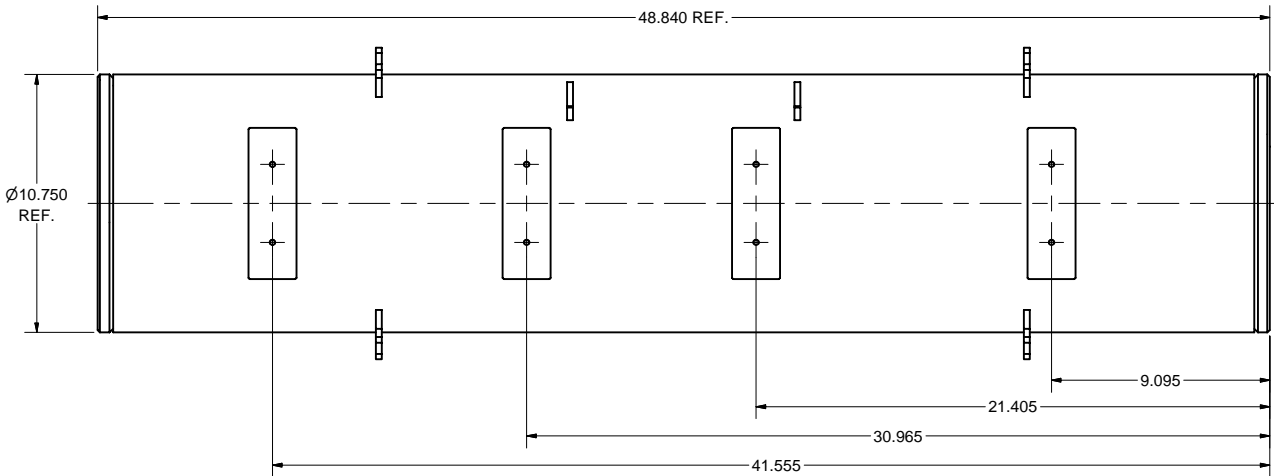


VIEW25

NOTE: SEE TOP VIEW




6 HGRP WELDMENT I (PRE-MACHINING)

FILE NAME: 7110-006
SHEET NO.: 6
DFT. SCALE: 1:4
MATERIAL: AS NOTED
QTY: 1 REQ'D.
NOTES: SEE PREVIOUS SHEET FOR
ADDITIONAL MACHINING.

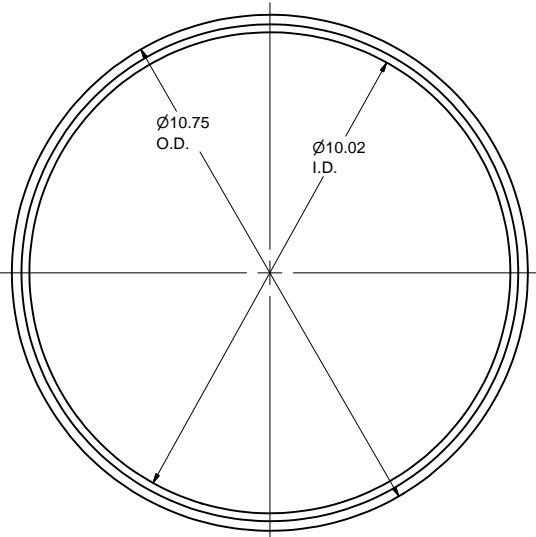
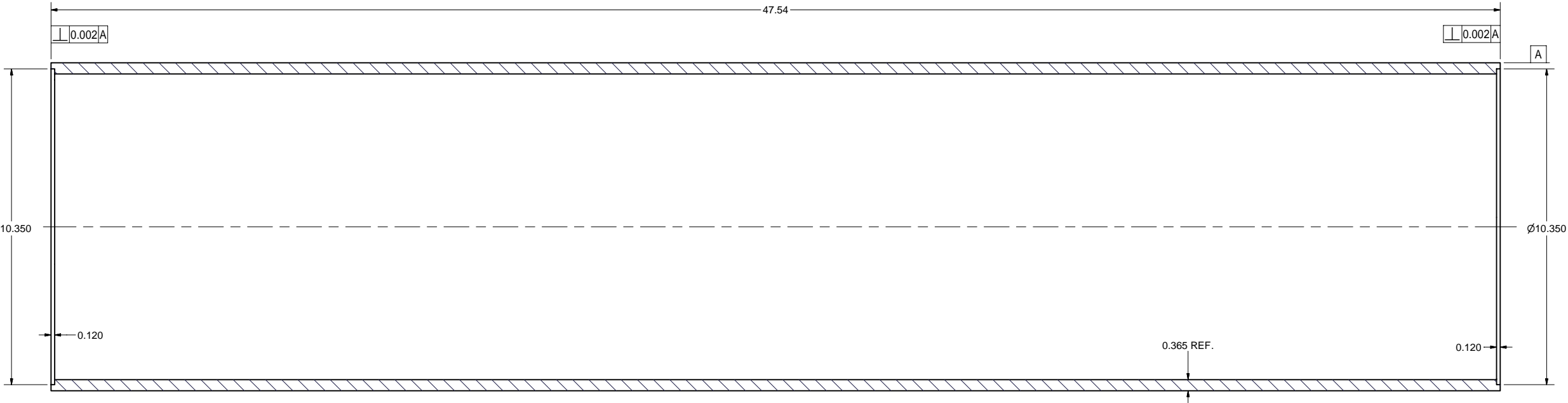


60	SH.14	2-PHASE TUBE SUPPORT TAB			2
14	SH.8	BOTTOM SUPPORT, SUB-ASM			4
11	SH.8	TOP SUPPORT PLATE, SUB-ASM			2
10	SH.7	5K TUBE SUPPORT PLATE			8
9	SH.7	HGRP ENDPLATE II			1
8	SH.7	HGRP ENDPLATE I			1
7	SH.7	HGR TEST PIPE			1
6	SH.6	HGRP WELDMENT I (PRE MACHINING)		1	X

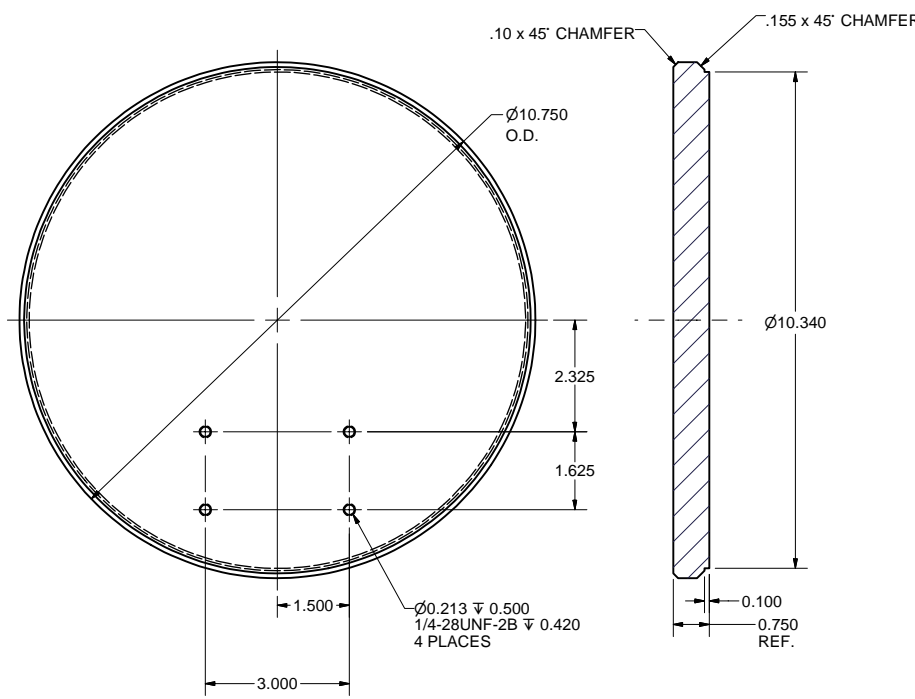
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OR EQUIVALENT APPROVED BY CORNELL LEPP

	ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS	REV.
				QUANTITY						
D	PRINT DISTR.	PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw								
7110-006 SH. NO. 6 OF 20	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES 	 CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853			ERL Horizontal Test Cryomodule Helium Gas Return Pipe HGRP Weldment I (Pre-Machining)				
A	REV.	CHECKED BY: VM	DRAWN BY	DRAWN FOR	DATE	SCALE	D	7110-006	REV.	
		APPROVED BY: ML	TMK	M.LIEPE	6/15/2006			SH. NO. 6 OF 20	A	

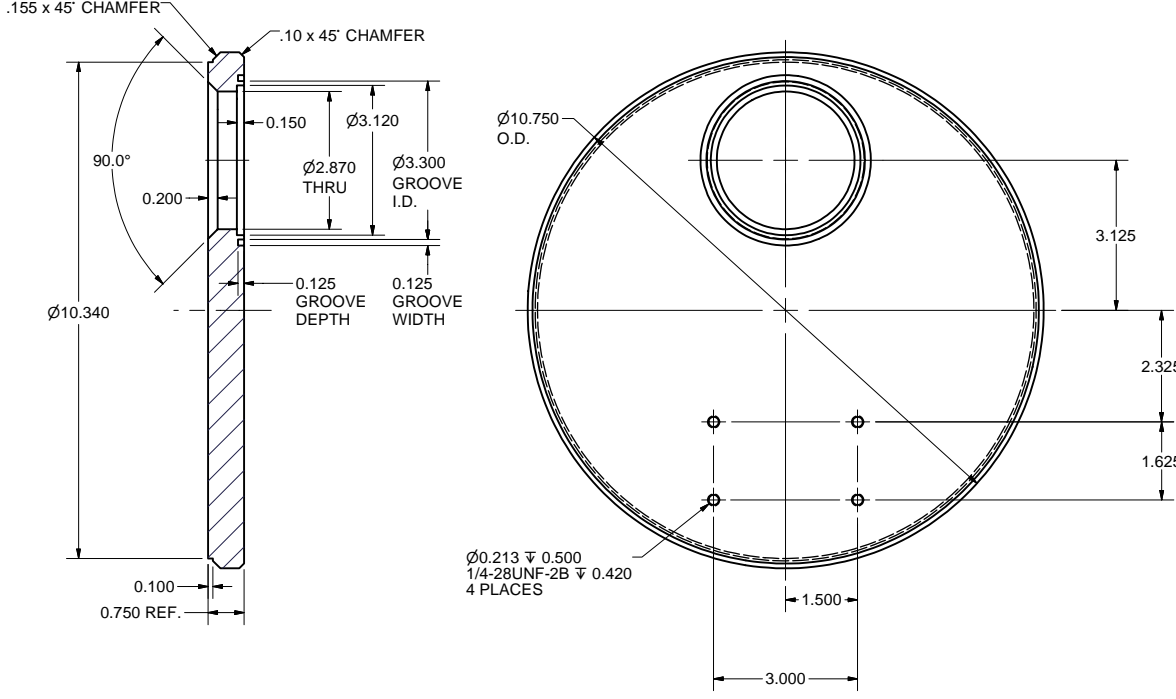
REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



7 HGR TEST PIPE
FILE NAME: 7110-006
SHEET NO.: 7
DFT. SCALE: 1:2
MATERIAL: 10" SCHEDULE 40 PIPE, GRADE 2 TITANIUM
QTY: 1 PER ASM
NOTES:

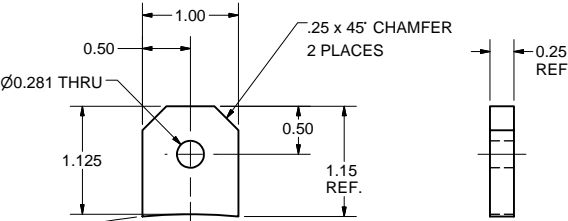


8 HGRP ENDPLATE I
FILE NAME: 7110-006
SHEET NO.: 7
DFT. SCALE: 1:2
MATERIAL: 3/4" GRADE 2 TITANIUM SHEET
QTY: 1 PER ASM
NOTES: SEE 'ENDPLATE II' NOTE.





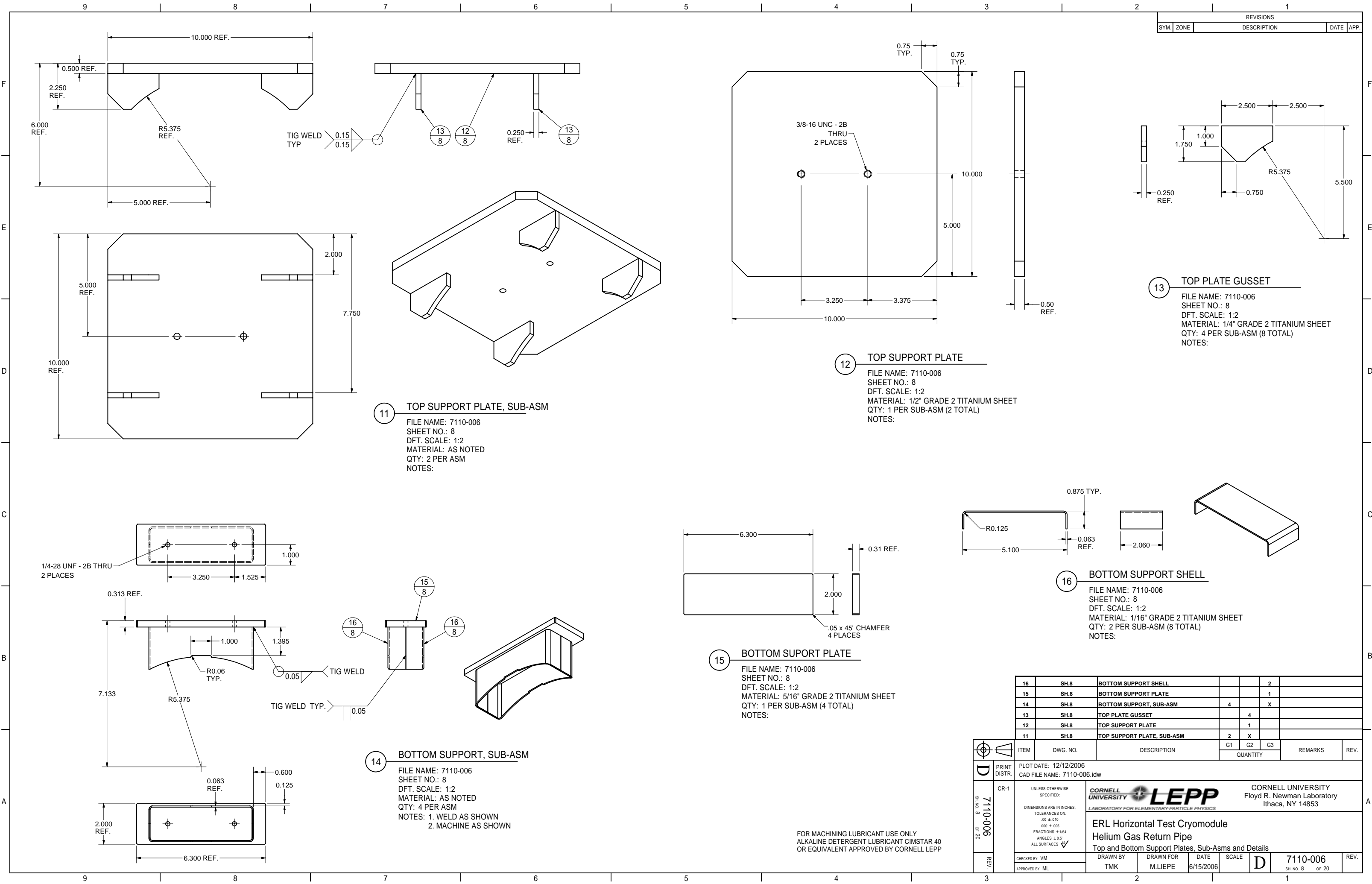
9 HGRP ENDPLATE II
FILE NAME: 7110-006
SHEET NO.: 7
DFT. SCALE: 1:2
MATERIAL: 3/4" GRADE 2 TITANIUM SHEET
QTY: 1 PER ASM
NOTES: SAME AS 'ENDPLATE I' BUT ADD 2.870 DIA. HOLE AND INCLUDED FEATURES.

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ALKALINE DETERGENT LUBRICANT CIMSTAR 40
OR EQUIVALENT APPROVED BY CORNELL LEPP



10 5K TUBE SUPPORT PLATE
FILE NAME: 7110-006
SHEET NO.: 7
DFT. SCALE: 1:1
MATERIAL: 1/4" GRADE 2 TITANIUM SHEET
QTY: 8 REQ'D
NOTES:

		ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS		REV.
		QUANTITY										
D		PRINT DISTR.	PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw									
7110-006 SH. NO. 7 OF 20		CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES ✓		<div><div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div></div> <div>ERL Horizontal Test Cryomodule Helium Gas Return Pipe Details - Test Pipe, Endplates I + II, 5K Tube Support Plate</div>							
REV.			CHECKED BY: VM	DRAWN BY	DRAWN FOR	DATE	SCALE	D		7110-006		REV.
			APPROVED BY: ML	TMK	M.LIEPE	6/15/2006				SH. NO. 7 OF 20		



REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.

13 TOP PLATE GUSSET
FILE NAME: 7110-006
SHEET NO.: 8
DFT. SCALE: 1:2
MATERIAL: 1/4" GRADE 2 TITANIUM SHEET
QTY: 4 PER SUB-ASM (8 TOTAL)
NOTES:

12 TOP SUPPORT PLATE
FILE NAME: 7110-006
SHEET NO.: 8
DFT. SCALE: 1:2
MATERIAL: 1/2" GRADE 2 TITANIUM SHEET
QTY: 1 PER SUB-ASM (2 TOTAL)
NOTES:


11 TOP SUPPORT PLATE, SUB-ASM
FILE NAME: 7110-006
SHEET NO.: 8
DFT. SCALE: 1:2
MATERIAL: AS NOTED
QTY: 2 PER ASM
NOTES:

16 BOTTOM SUPPORT SHELL
FILE NAME: 7110-006
SHEET NO.: 8
DFT. SCALE: 1:2
MATERIAL: 1/16" GRADE 2 TITANIUM SHEET
QTY: 2 PER SUB-ASM (8 TOTAL)
NOTES:

15 BOTTOM SUPORT PLATE
FILE NAME: 7110-006
SHEET NO.: 8
DFT. SCALE: 1:2
MATERIAL: 5/16" GRADE 2 TITANIUM SHEET
QTY: 1 PER SUB-ASM (4 TOTAL)
NOTES:

14 BOTTOM SUPPORT, SUB-ASM
FILE NAME: 7110-006
SHEET NO.: 8
DFT. SCALE: 1:2
MATERIAL: AS NOTED
QTY: 4 PER ASM
NOTES: 1. WELD AS SHOWN
2. MACHINE AS SHOWN

16	SH.8	BOTTOM SUPPORT SHELL			2	
15	SH.8	BOTTOM SUPPORT PLATE			1	
14	SH.8	BOTTOM SUPPORT, SUB-ASM	4		X	
13	SH.8	TOP PLATE GUSSET		4		
12	SH.8	TOP SUPPORT PLATE		1		
11	SH.8	TOP SUPPORT PLATE, SUB-ASM	2	X		

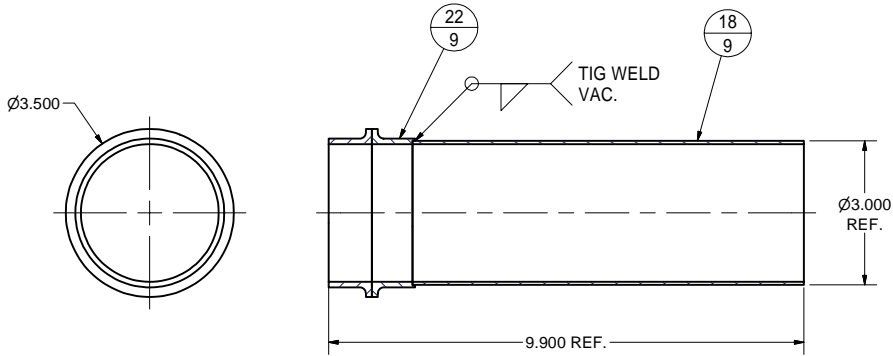
		ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS		REV.
								QUANTITY				
D		PRINT DISTR.	PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw									
7110-006 SH. NO. 8 OF 20		CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES ✓		<div>CORNELL UNIVERSITY  CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div> <div>ERL Horizontal Test Cryomodule Helium Gas Return Pipe Top and Bottom Support Plates, Sub-Asms and Details</div>							
					DRAWN BY: TMK DRAWN FOR: M.LIEPE DATE: 6/15/2006 SCALE: D 7110-006 SH. NO. 8 OF 20							
REV.		CHECKED BY: VM	APPROVED BY: ML									

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

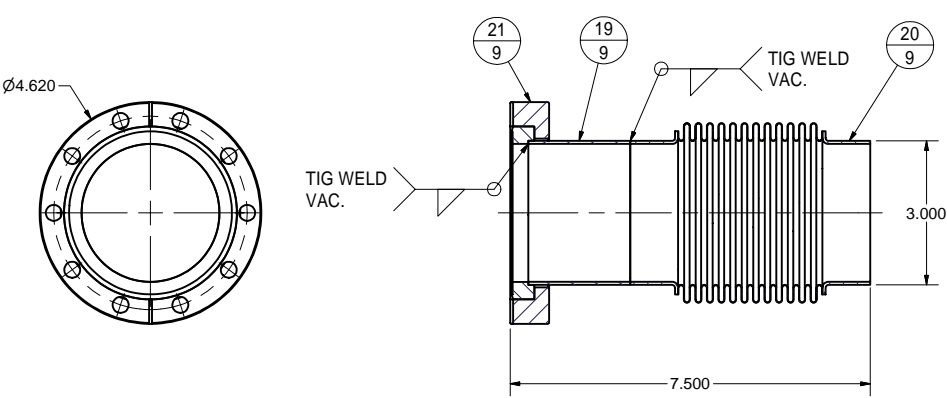
CORNELL UNIVERSITY
Floyd R. Newman Laboratory
Ithaca, NY 14853

ERL Horizontal Test Cryomodule
Helium Gas Return Pipe
Top and Bottom Support Plates, Sub-Asms and Details

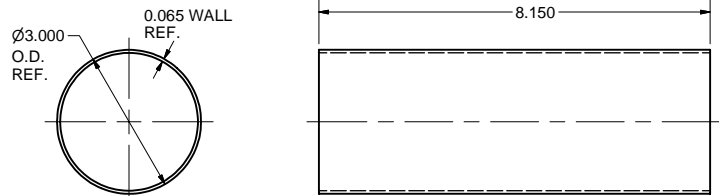
REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		ITEMS 17 AND 20 MODIFIED. ITEM 32 ADDED.	10/29/06	VM



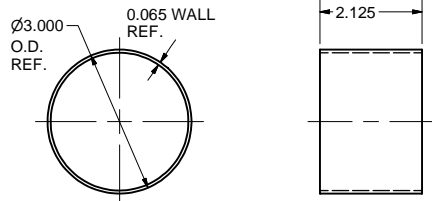
32 3" TUBE SUB-ASM
FILE NAME: 7110-006
SHEET NO.: 9
DFT. SCALE: 1:2
MATERIAL:
QTY: 1 PER ASSEMBLY
NOTES:



17 3" I.D. BELLOWS TUBE, SUB-ASM
FILE NAME: 7110-006
SHEET NO.: 9
DFT. SCALE: 1:1
MATERIAL: AS NOTED
QTY: 1 PER ASM
NOTES:



18 3" TUBE - II
FILE NAME: 7110-006
SHEET NO.: 9
DFT. SCALE: 1:2
MATERIAL: 3"O.D. x 0.065 WALL 316L STN STL TUBE
QTY: 1 PER SUB-ASM
NOTES:

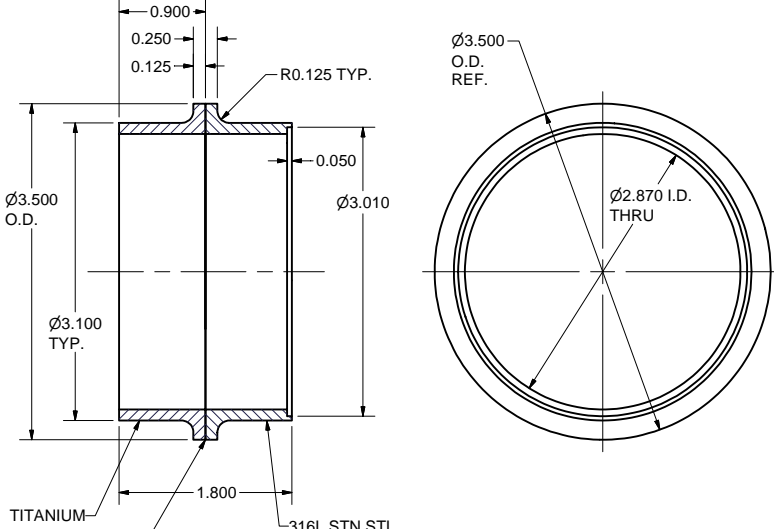
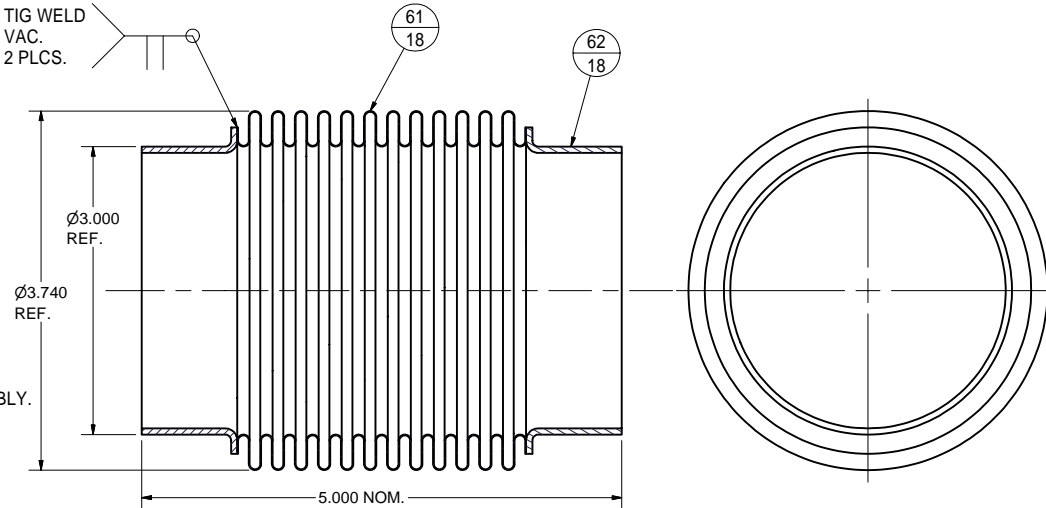


19 3" TUBE - I
FILE NAME: 7110-006
SHEET NO.: 9
DFT. SCALE: 1:2
MATERIAL: 3"O.D. x 0.065 WALL 316L STN STL TUBE
QTY: 1 PER SUB-ASM
NOTES:

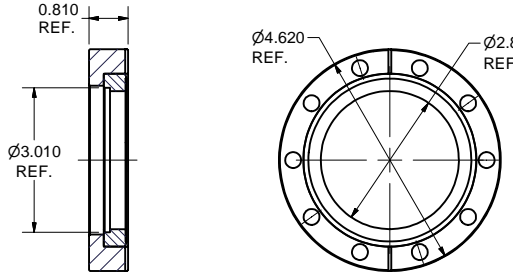
20 3" I.D. BELLOWS, SUB-ASM
FILE NAME: 7110-006
SHEET NO.: 9
DFT. SCALE: 1:1
MATERIAL:
QTY: 1 PER SUB-ASM
NOTES: 1. BELLOWS AND CUFFS CAN BE ORDERED AS FINISHED ASSEMBLY.

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





22 Ti-STN STL 3.00" TRANSITION
FILE NAME: 7110-006
SHEET NO.: 9
DFT. SCALE: 1:1
MATERIAL: SEE NOTES
QTY: 1 PER SUB-ASM
NOTES: USE EXPLOSION BONDED TITANIUM AND 316L STN STL



21 4 5/8 ROTATABLE CF FLANGE
FILE NAME: 7110-006
SHEET NO.: 9
DFT. SCALE: 1:2
MATERIAL: SEE NOTE 1
QTY: 1 PER SUB-ASM
NOTES: 1. MATERIAL - 316LN (OR 316L) ST. STEEL
VARIAN'S F0462-0300-RC6 OR EQUIV.

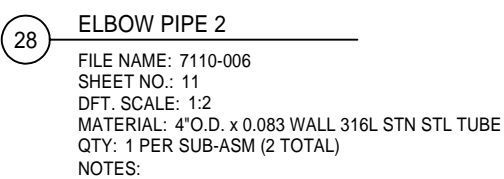
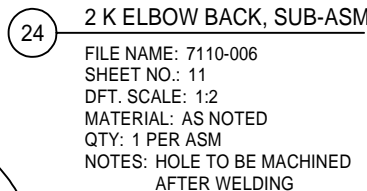
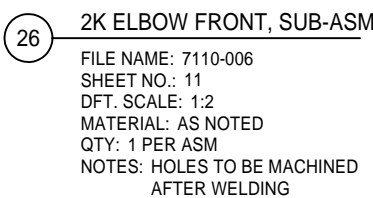
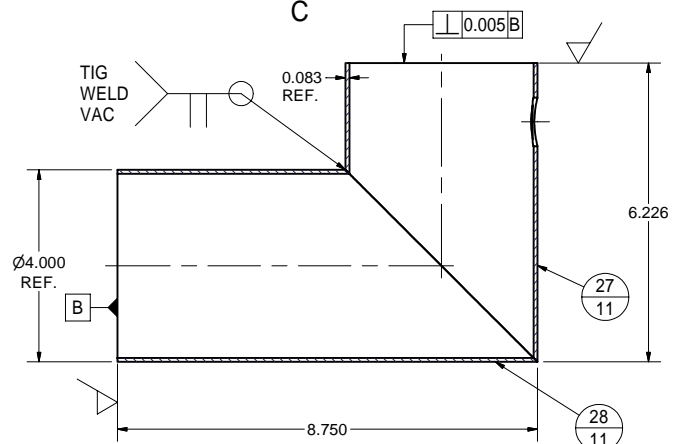
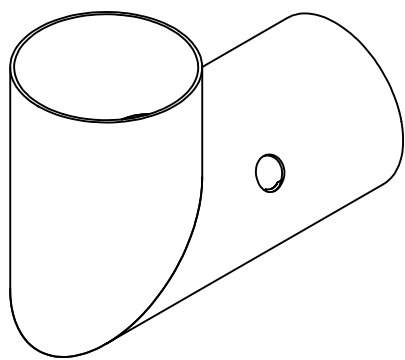
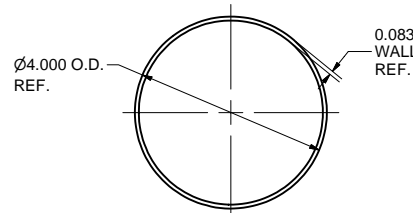
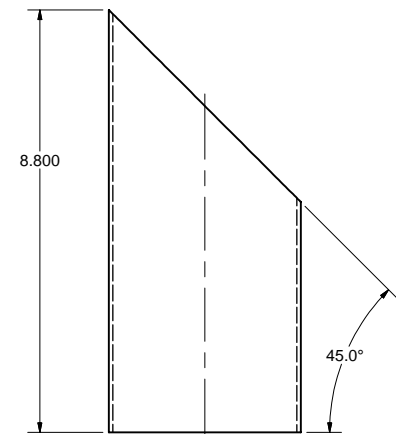
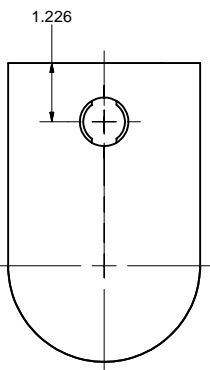
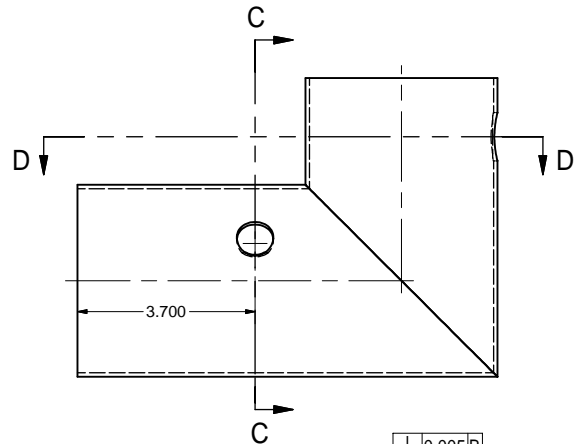
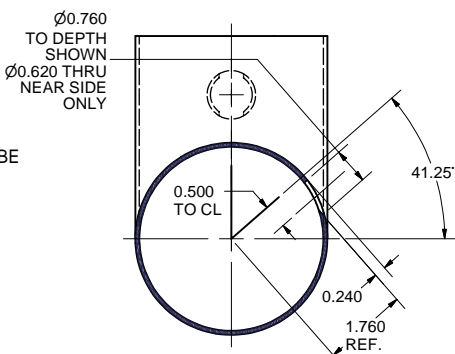
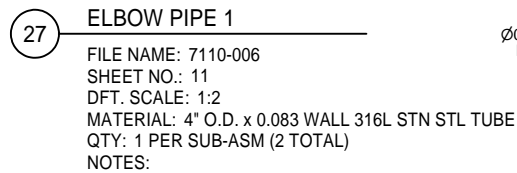
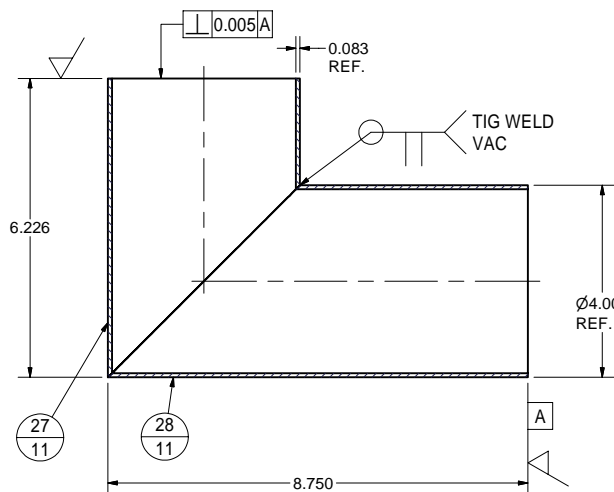
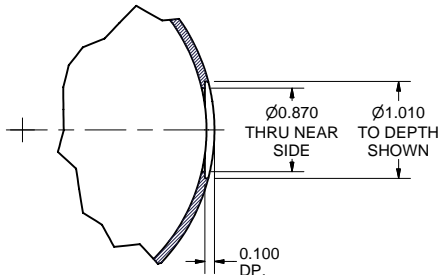
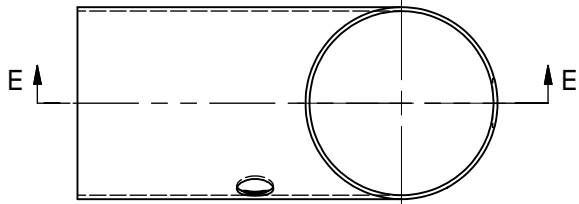
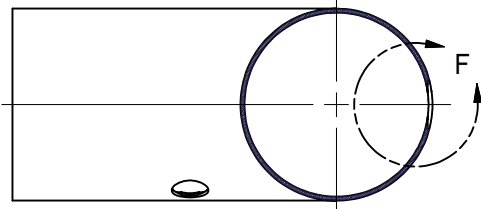
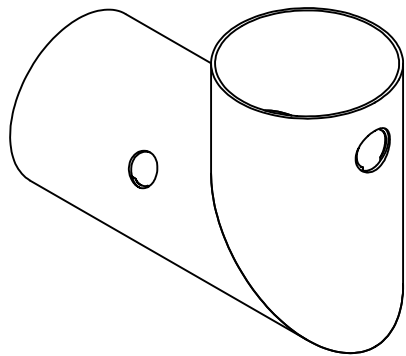
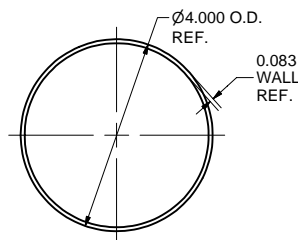
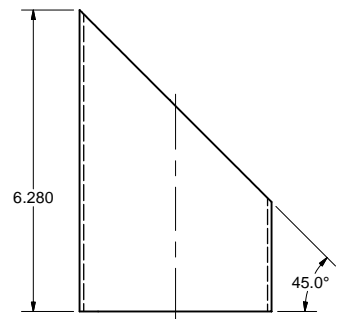
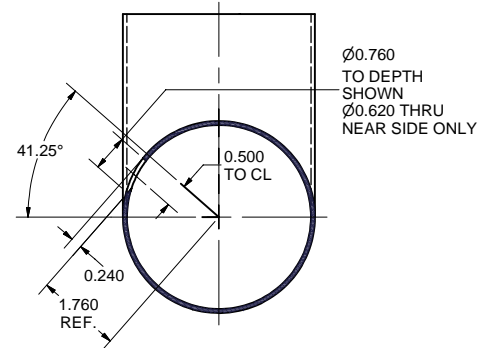
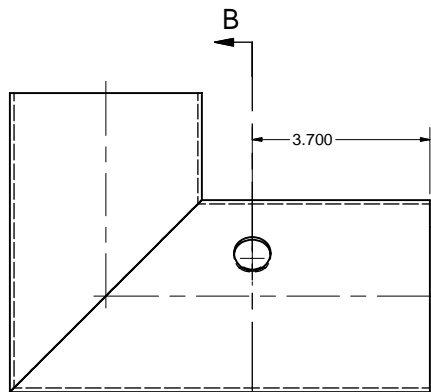
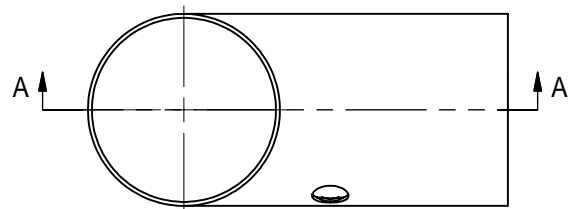
FOR MACHINING LUBRICANT USE ONLY
ALKALINE DETERGENT LUBRICANT CIMSTAR 40
OR EQUIVALENT APPROVED BY CORNELL LEPP

62	SH.18	3" I.D. BELLOWS CUFF		2		
61	SH.18	3" I.D. BELLOWS		1		
22	SH.9	Ti-STN STL 3.00" TRANSITION			1	
18	SH.9	3" TUBE-II			1	
32	SH.9	3" TUBE SUB-ASM			X	
21	SH.9	4 5/8 ROTATABLE CF FLANGE	1			PURCHASE
20	SH.9	3" I.D. BELLOWS, SUB-ASM	1	X		
19	SH.9	3" TUBE I	1			
17	SH.9	3" I.D. BELLOWS TUBE, SUB-ASM	X			

		ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS	REV.
					QUANTITY						
	PRINT DISTR.	PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw									
	7110-006 SH. NO. 9 OF 20	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES ✓		CORNELL UNIVERSITY FLOYD R. NEWMAN LABORATORY ITHACA, NY 14853						
ERL Horizontal Test Cryomodule Helium Gas Return Pipe 3.00" Bellows Tube, Details and Sub-Asm											
A	REV.	CHECKED BY: VM		DRAWN BY	DRAWN FOR	DATE	SCALE	D	7110-006 SH. NO. 9 OF 20	REV. A	
		APPROVED BY: ML		TMK	M.LIEPE	6/15/2006					





A


REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		DIM. 8.800 WAS 6.250, 8750 WAS 6.200.	10/29/06	VM



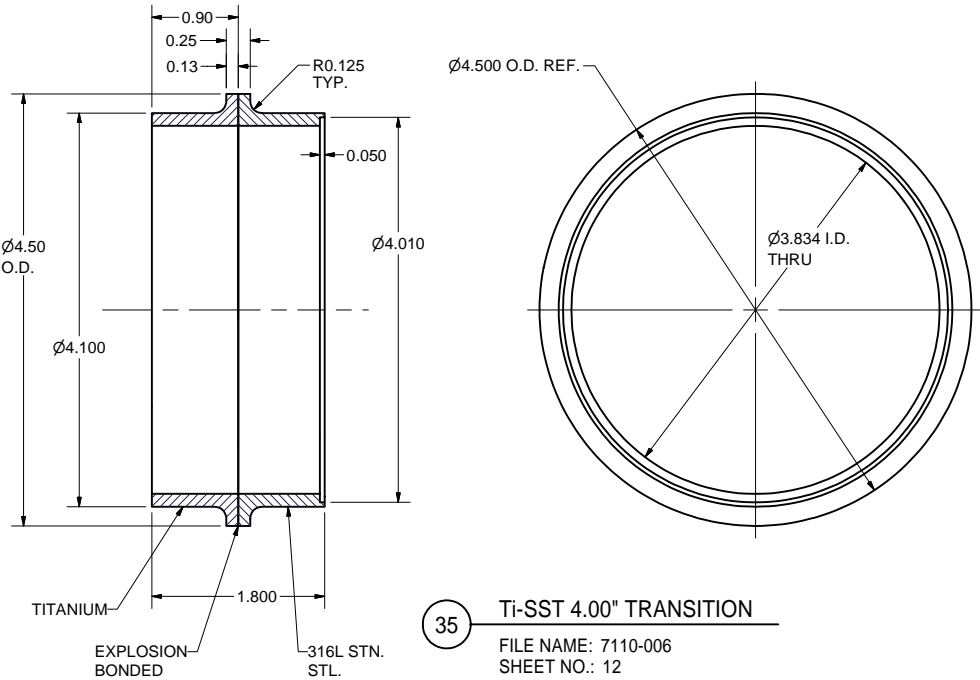
FOR MACHINING LUBRICANT USE ONLY
ALKALINE DETERGENT LUBRICANT CIMSTAR 40
OR EQUIVALENT APPROVED BY CORNELL LEPP

28	SH.11	ELBOW PIPE 2		1	1	
27	SH.11	ELBOW PIPE 1		1	1	
26	SH.11	2K ELBOW FRONT, SUB-ASM	1		X	
24	SH.11	2K ELBOW BACK, SUB-ASM	1	X		

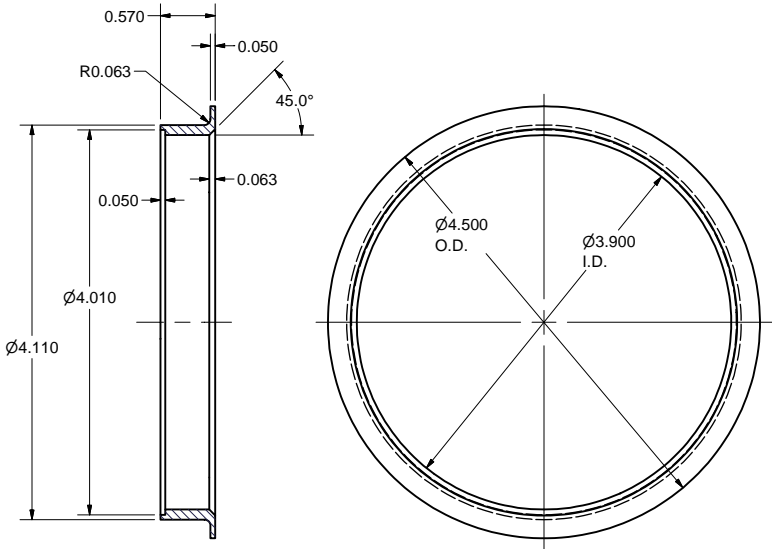
		24	2K ELBOW BACK, SUB-ASM		G1	G2	G3	REMARKS	REV.	
ITEM		DWG. NO.	DESCRIPTION			QUANTITY				
	PRINT DISTR.		PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw							
7110-006 SH. NO. 11 OF 20	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES 		<div> LEPP LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS</div> <div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div>						
		ERL Horizontal Test Cryomodule Helium Gas Return Pipe 2K Elbow, Sub-Assemblies								
A	REV.	CHECKED BY: VM		DRAWN BY	DRAWN FOR	DATE	SCALE	D	7110-006 SH. NO. 11 OF 20	REV. A
		APPROVED BY: ML		TMK	M.LIEPE	6/15/2006				

7110-006 SH. NO. 11 OF 20	CR-1	UNLESS OTHERWISE SPECIFIED:	<div><div>CORNELL UNIVERSITY</div><div></div><div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div></div>		ERL Horizontal Test Cryomodule Helium Gas Return Pipe 2K Elbow, Sub-Assemblies		REV. A
		DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES ✓					
REV. A		CHECKED BY: VM	DRAWN BY TMK	DATE 6/15/2006	SCALE D	7110-006 SH. NO. 11 OF 20	REV. A
		APPROVED BY: ML					

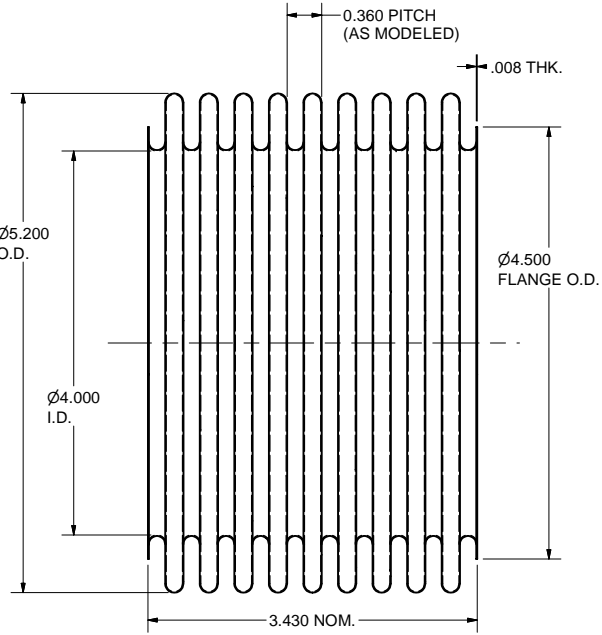
REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		ITEM 64 ADDED.	10/31/06	VM



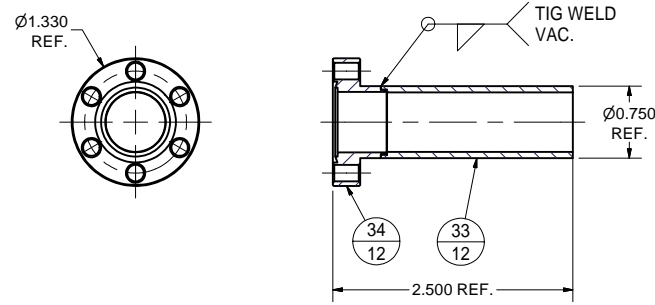
35 Ti-SST 4.00\"
FILE NAME: 7110-006
SHEET NO.: 12
DFT. SCALE: 1:2
MATERIAL: USE EXPLOSION BONDED TITANIUM AND 316L STN STL
QTY: 1 PER SUB-ASM
NOTES:



31 4\"
FILE NAME: 7110-006
SHEET NO.: 12
DFT. SCALE: 1:1
MATERIAL: 316L STN STL
QTY: 2 PER SUB-ASM (4 TOTAL)
NOTES:



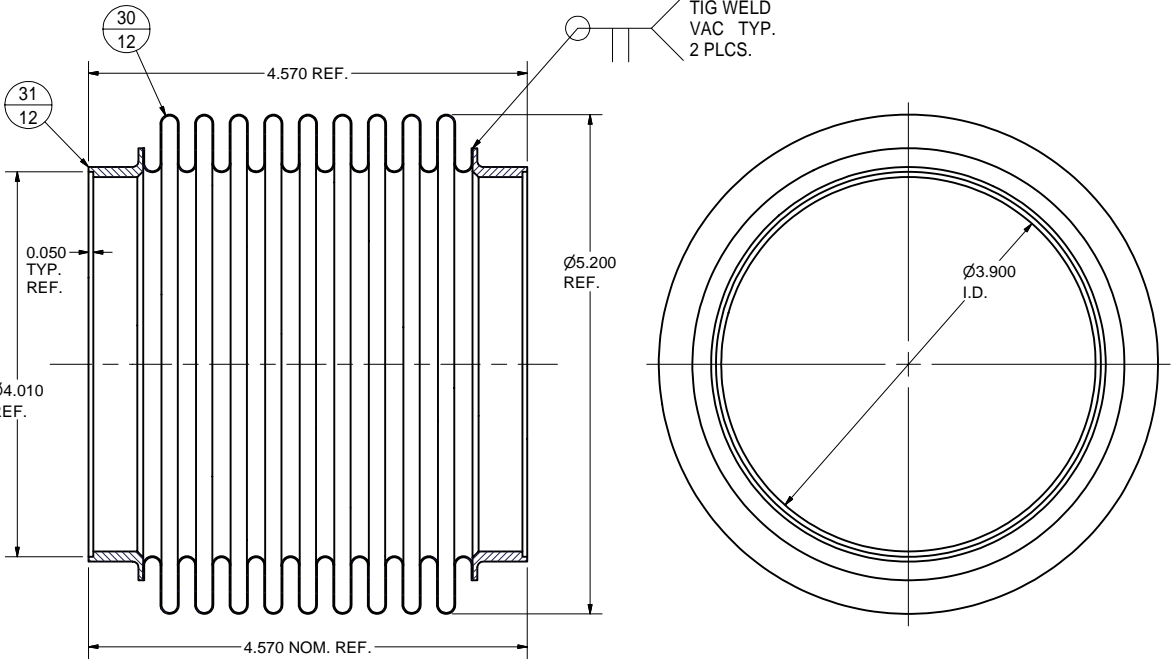
30 4\"
FILE NAME: 7110-006
SHEET NO.: 12
DFT. SCALE: 1:1
MATERIAL: 316L STN STL
QTY: 1 PER SUB-ASM (2 TOTAL)
NOTES: 1. NUMBER OF CONVOLUTIONS: N=9
2. MAUFACTURER: AMERIFLEX INC. OR EQUIV.



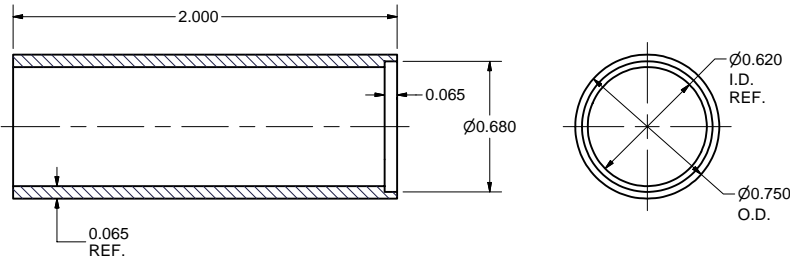
64 He LEVEL SENSOR TUBE SUB-ASM
FILE NAME: 7110-006
SHEET NO.: 12
DFT. SCALE: 1:1
MATERIAL:
QTY: 2 PER ASSEMBLY
NOTES:

OPERATING CONDITIONS:
Temperature: 2 K
Vacuum outside
Helium Inside
Stroke: 5.0 mm (0.2 inch)
Shift: ± 1.5 mm (± 0.06 inch)
Maximum temperature: 200 C (473 K)
Minimum temperature: -265 C (2 K)
Leak Rate: < 1E-9 mbar x l/sec

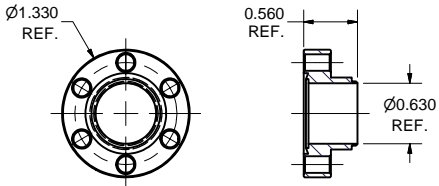
DESIGN SPECIFICATION:
Burst Pressure, Internal: >= 30 psia (2 bar) @ 293 K
External: >= 22.5 psia (1.5 bar) @ 293 K
Working Pressure: > 15 psia (1 bar) @ 293K, 30 mbar @ 2K
Size:
O.D.: 5.2 inch (132.1 mm)
I.D.: 4.0 inch (101.6 mm)
Overall Length: 3.43 inch (87.1 mm)
Pitch: 0.36 inch (9.1 mm)
Minimum Stroke: ± 0.5 inch (± 12.7 mm)
Minimum Lateral Shift: ± 0.1 inch (± 2.5 mm)
Minimum Cycle Life: 10000



29 2-PHASE 2 K BELLOWS, SUB-ASM
FILE NAME: 7110-006
SHEET NO.: 12
DFT. SCALE: 1:1
MATERIAL: AS NOTED
QTY: 1 PER SUB-ASM (2 TOTAL)
NOTES: 1. SEE TABLES (OPERATING CONDITIONS + DESIGN SPECS.).
2. BELLOWS AND CUFFS CAN BE ORDERED AS FINISHED ASSEMBLY.



33 He LEVEL SENSOR TUBE
FILE NAME: 7110-006
SHEET NO.: 12
DFT. SCALE: 2:1
MATERIAL: 3/4\"



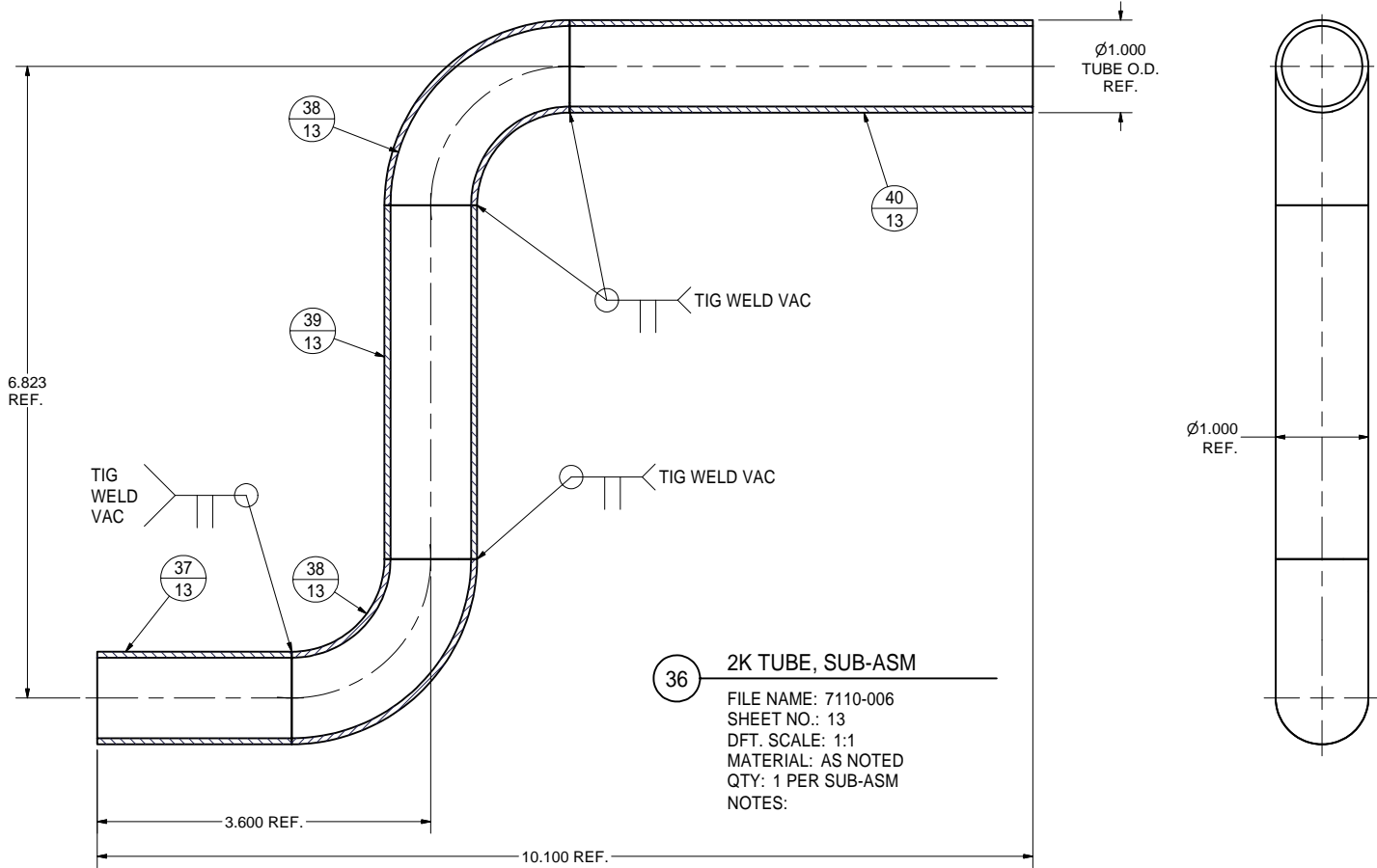
34 He LEVEL SENSOR TUBE CF FLANGE
FILE NAME: 7110-006
SHEET NO.: 12
DFT. SCALE: 1:1
MATERIAL: SEE NOTE 1
QTY: 2 REQ'D
NOTES: 1. MATERIAL - 316LN (OR 316L) ST. STEEL, VARIAN'S F0133-0075-NC6W OR VG SCIENTA'S ZFCL919 OR EQUIV.

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ALKALINE DETERGENT LUBRICANT CIMSTAR 40
OR EQUIVALENT APPROVED BY CORNELL LEPP

34	SH.12	He LEVEL SENSOR TUBE CF FLANGE		1	
33	SH.12	He LEVEL SENSOR TUBE		1	
64	SH.12	He LEVEL SENSOR TUBE SUB-ASM		X	
31	SH.12	4\"	2		
30	SH.12	4\"	1		PURCHASE
29	SH.12	2-PHASE 2 K BELLOWS, SUB-ASM	X		

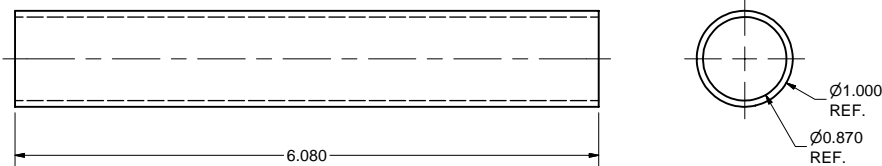
ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw			QUANTITY				
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES			CORNELL UNIVERSITY FLOYD R. NEWMAN LABORATORY ITHACA, NY 14853			ERL Horizontal Test Cryomodule Helium Gas Return Pipe Details and Sub-Assemblies	
CHECKED BY: VM APPROVED BY: ML		DRAWN BY: TMK	DRAWN FOR: M.LIEPE	DATE: 6/15/2006	SCALE: D	7110-006 SH. NO. 12 OF 20	REV. A

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		ITEM 36 MODIFIED. ITEMS 63, 65 ADDED.	10-31-06	VM



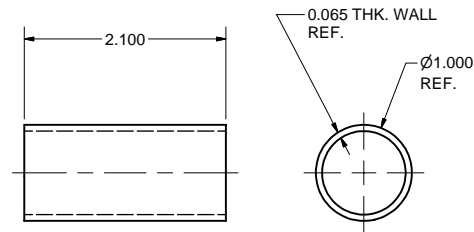
36 2K TUBE, SUB-ASM

FILE NAME: 7110-006
SHEET NO.: 13
DFT. SCALE: 1:1
MATERIAL: AS NOTED
QTY: 1 PER SUB-ASM
NOTES:



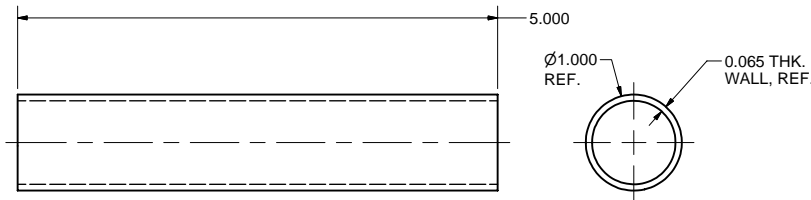
65 2 K TUBE-IV

FILE NAME: 7110-006
SHEET NO.: 13
DFT. SCALE: 1:1
MATERIAL: 316L STN STL 1.000 O.D. x .065 WALL TUBE
QTY: 1 PER SUB-ASM
NOTES:



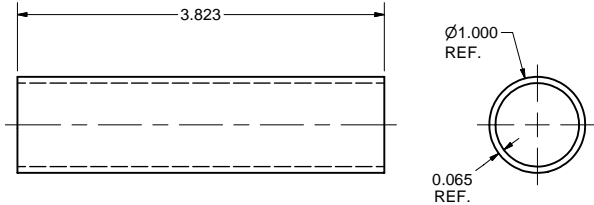
37 2 K TUBE -I

FILE NAME: 7110-006
SHEET NO.: 13
DFT. SCALE: 1:1
MATERIAL: 316L STN STL 1.000 O.D. x .065 WALL TUBE
QTY: 1 PER SUB-ASM
NOTES:



40 2 K TUBE-III

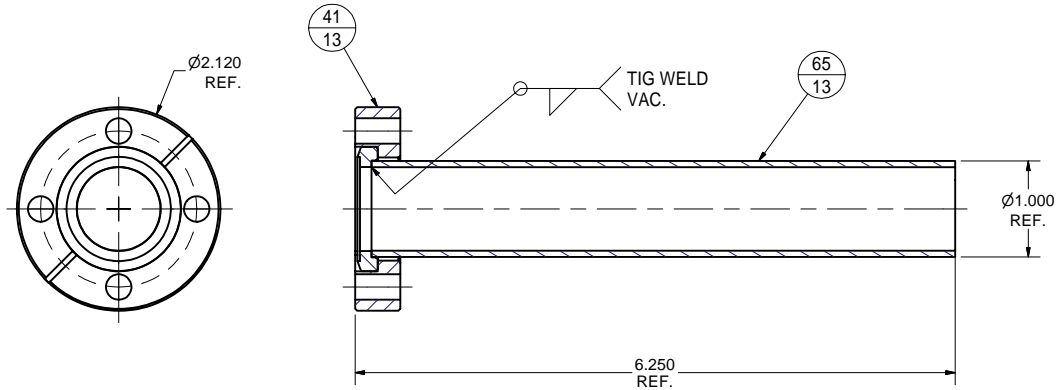
FILE NAME: 7110-006
SHEET NO.: 13
DFT. SCALE: 1:1
MATERIAL: 316L STN STL 1.000 O.D. x .065 WALL TUBE
QTY: 1 PER SUB-ASM
NOTES:



39 2 K TUBE-II

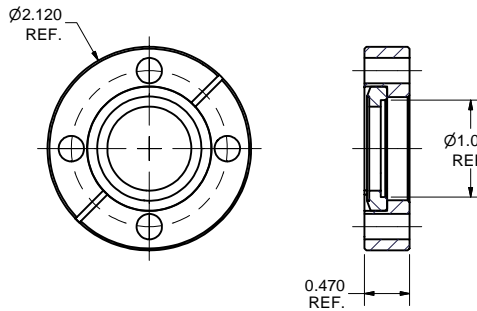
FILE NAME: 7110-006
SHEET NO.: 13
DFT. SCALE: 1:1
MATERIAL: 316L STN STL 1.000 O.D. x .065 WALL TUBE
QTY: 1 PER SUB-ASM
NOTES:

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



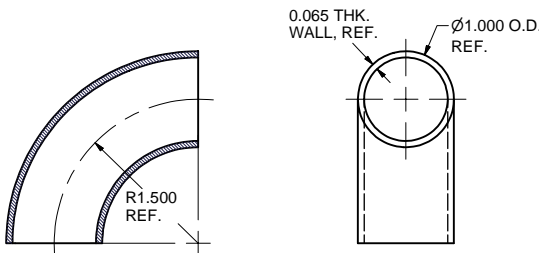
63 2 K He TUBE SUB-ASM

FILE NAME: 7110-006
SHEET NO.: 13
DFT. SCALE: 1:1
MATERIAL:
QTY: 1 PER ASSEMBLY
NOTES:



41 2K TUBE CF ROTATABLE FLANGE





FILE NAME: 7110-006
SHEET NO.: 13
DFT. SCALE: 1:1
MATERIAL: SEE NOTE 1
QTY: 1 REQ'D
NOTES: 1. MATERIAL - 316LN (OR 316L) ST. STEEL
VARIAN'S F0212-0100-RC6 OR EQUIV.



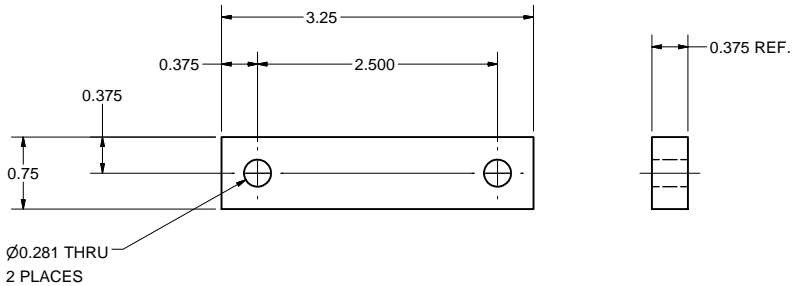
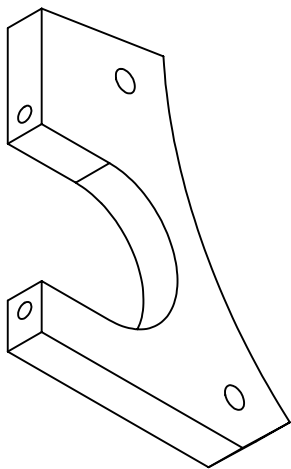
38 1" TUBE ELBOW

FILE NAME: 7110-006
SHEET NO.: 13
DFT. SCALE: 1:1
MATERIAL: 316L STN STL 1.000 O.D. x .065 WALL TUBE
QTY: 2 PER SUB-ASM
NOTES: PURCHASE VARIAN 90100 OR EQUIV.

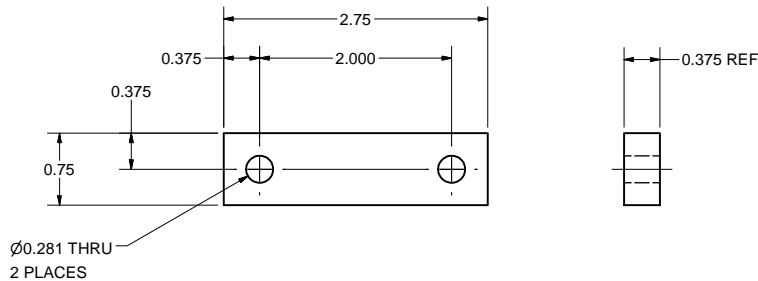
ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
65	SH.13	2 K TUBE-IV		1			
41	SH.13	2K TUBE CF ROTATABLE FLANGE		1		PURCHASE	
63	SH.13	2 K He TUBE SUB-ASM		X			
40	SH.13	2K TUBE-III		1			
39	SH.13	2K TUBE -II		1			
38	SH.13	1" TUBE ELBOW		2		PURCHASE	
37	SH.13	2K TUBE-I		1			
36	SH.13	2K TUBE, SUB-ASM	X				

		ITEM		DWG. NO.		DESCRIPTION		G1		G2		G3		REMARKS		REV.	
		PRINT DISTR.		PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw													
SH. NO. 13 OF 20		7110-006		CR-1		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES ✓		<div>CORNELL UNIVERSITY</div>  <div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div>									
								ERL Horizontal Test Cryomodule Helium Gas Return Pipe 2K Tube, Details and Sub-Assemblies									
REV. A		CHECKED BY: VM APPROVED BY: ML		DRAWN BY		DRAWN FOR		DATE		SCALE				7110-006 SH. NO. 13 OF 20		REV. A	
				TMK		M.LIEPE		6/15/2006									

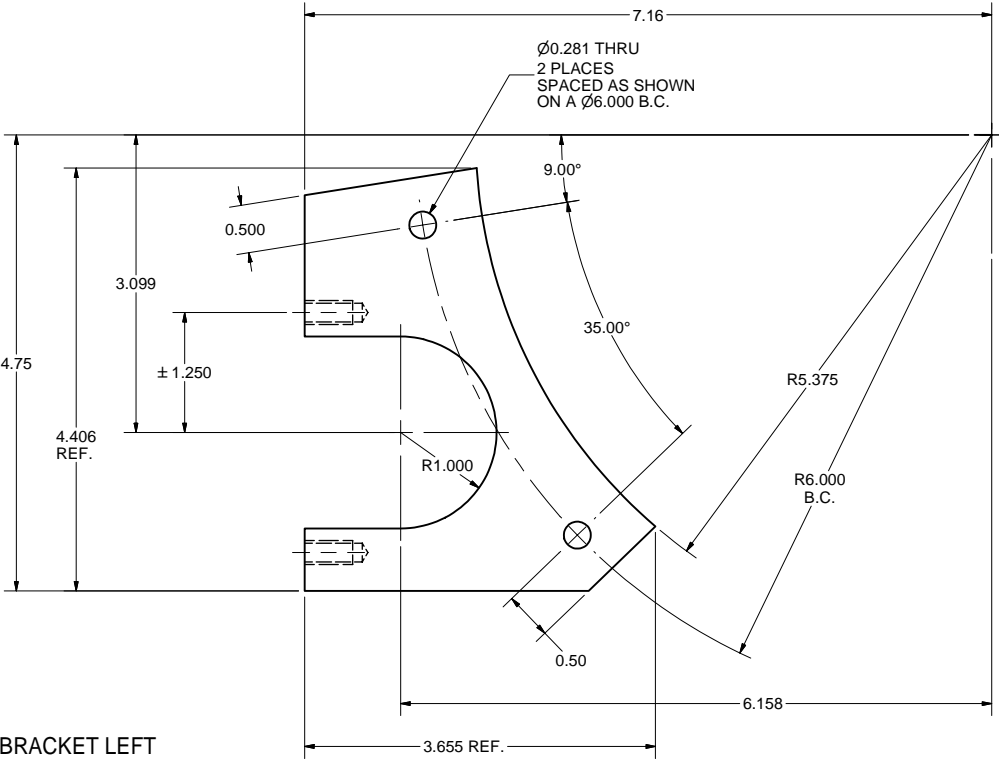
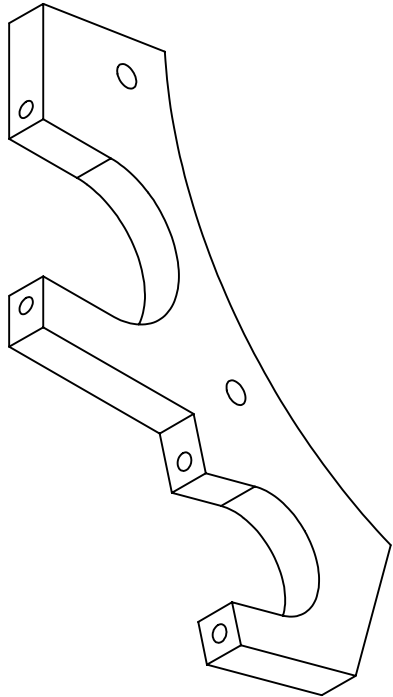
REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



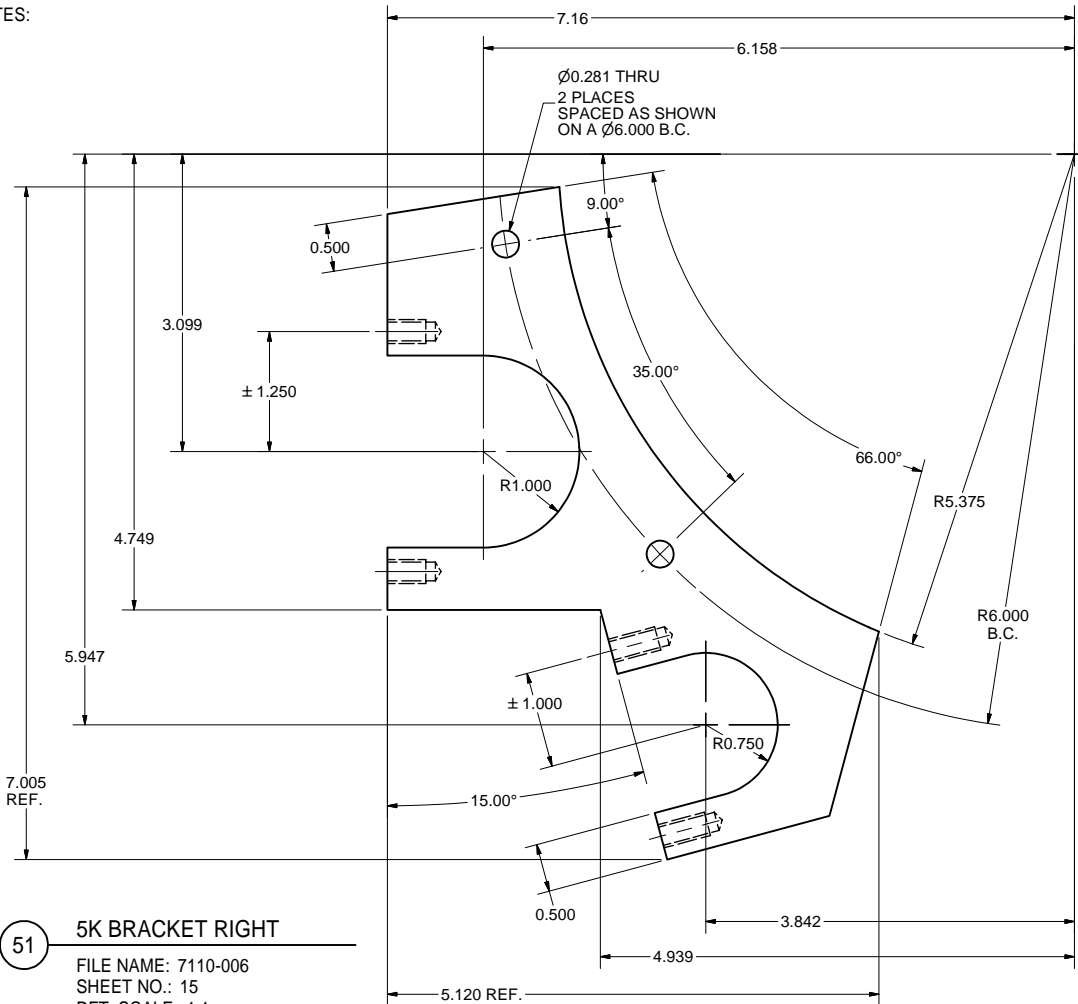
52 5K TUBE CLAMP
FILE NAME: 7110-006
SHEET NO.: 15
DFT. SCALE: 1:1
MATERIAL: 3/8" SHEET G-10
QTY: 4 PER ASM
NOTES:



53 WARM UP TUBE CLAMP
FILE NAME: 7110-006
SHEET NO.: 15
DFT. SCALE: 1:1
MATERIAL: 3/8" SHEET G-10
QTY: 2 PER ASM
NOTES:




50 5K BRACKET LEFT
FILE NAME: 7110-006
SHEET NO.: 15
DFT. SCALE: 1:1
MATERIAL: 1/2" SHEET G-10
QTY: 2 PER ASM
NOTES:

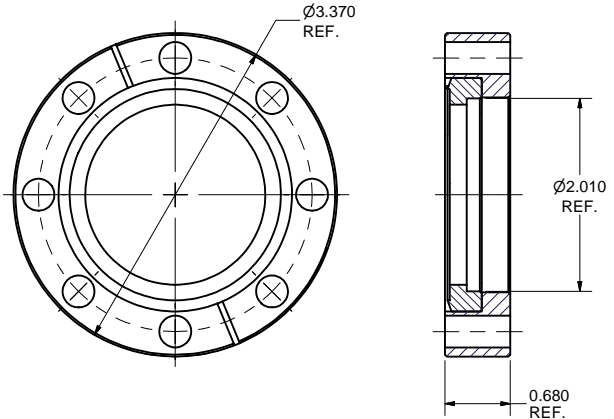
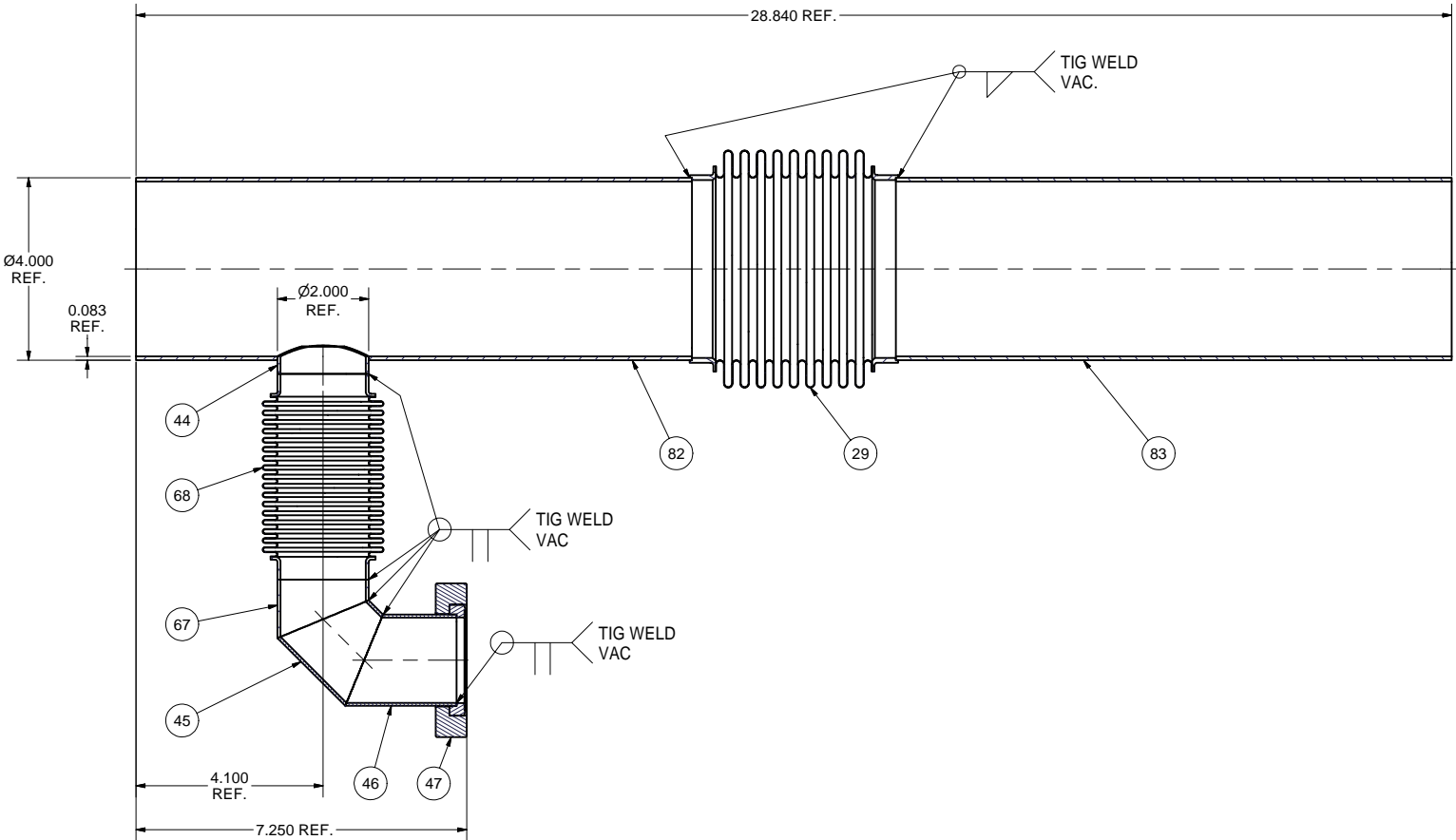


51 5K BRACKET RIGHT
FILE NAME: 7110-006
SHEET NO.: 15
DFT. SCALE: 1:1
MATERIAL: 1/2" SHEET G-10
QTY: 2 PER ASM
NOTES:

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

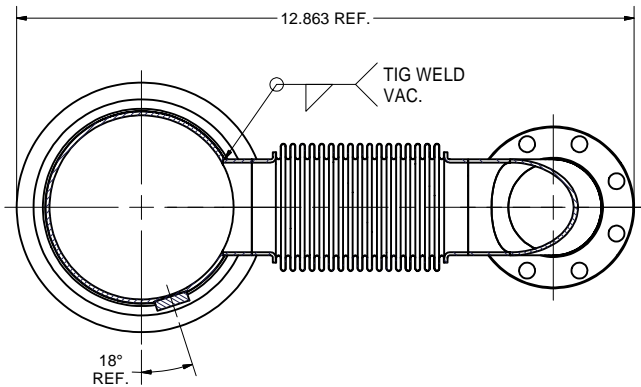
		ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS		REV.
								QUANTITY				
D	PRINT DISTR.	PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw										
	7110-006 SH. NO. 15 OF 20	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ±.010 .000 ±.005 FRACTIONS ±1/64 ANGLES ±0.5° ALL SURFACES ✓		<div> CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div> <div>ERL Horizontal Test Cryomodule Helium Gas Return Pipe 5K Brackets and Clamps</div>							
CHECKED BY: VM		DRAWN BY		DRAWN FOR		DATE		SCALE		D	7110-006 SH. NO. 15 OF 20	
APPROVED BY: ML		TMK		M.LIEPE		6/15/2006						
REV.												

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		BELLOWS ITEM 68 ADDED.	10/29/06	VM
B		PARTS ITEM 43 AND 66 SUBSTITUTED BY PARTS ITEM 82 AND 83.	12/08/06	VM

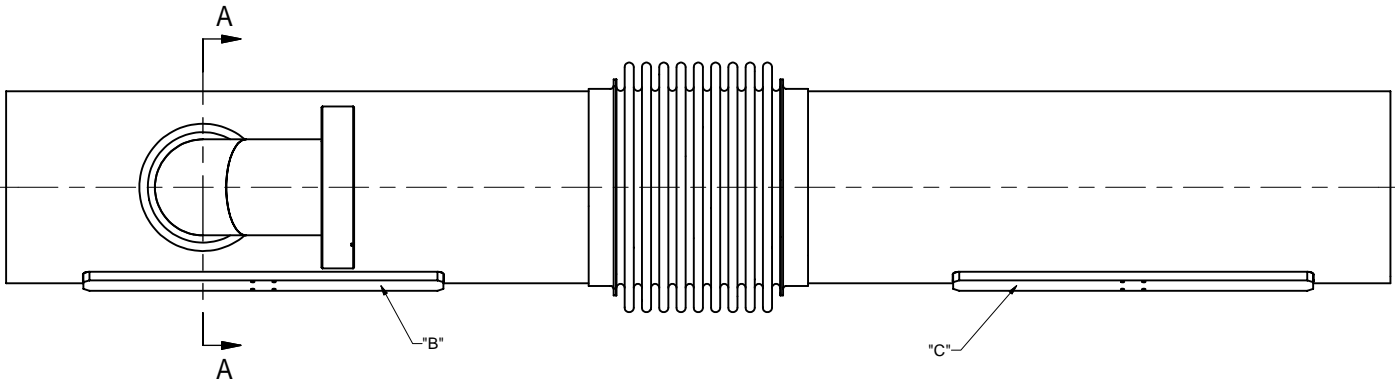


47 3-3/8" CF Rotatable 2" Tube Flange

FILE NAME: 7110-006
SHEET NO.: 16
DFT. SCALE: 1:1
MATERIAL: SEE NOTE 1
QTY: 1 PER SUB-ASM
NOTES: 1. MATERIAL - 316LN ST. STEEL
VARIAN'S F0338-0200-RC6 OR EQUIV.





SECTION A-A



42 2K MAIN TUBE, SUB-ASM

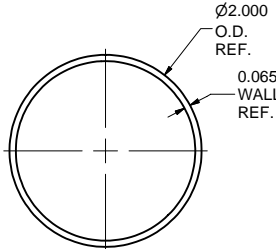
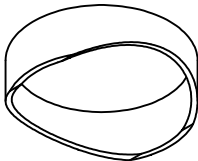
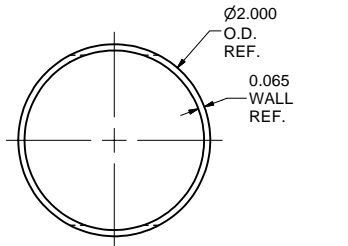
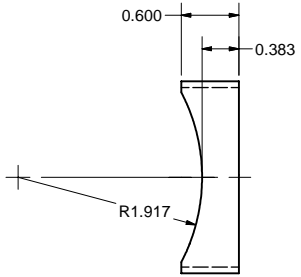
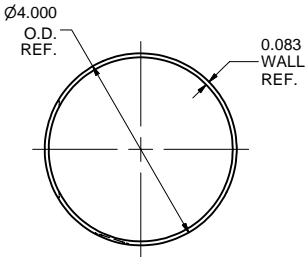
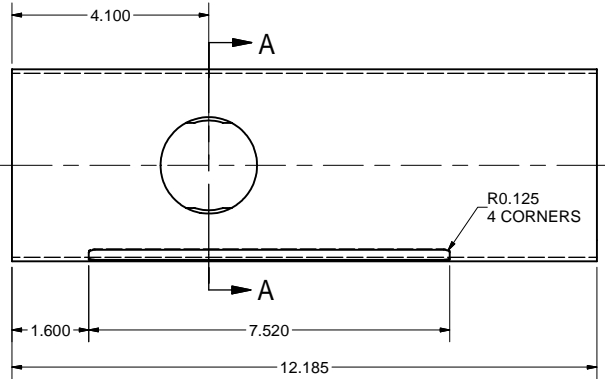
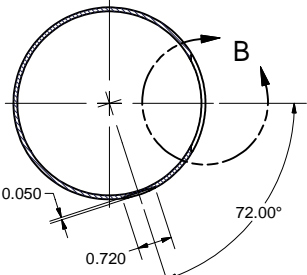
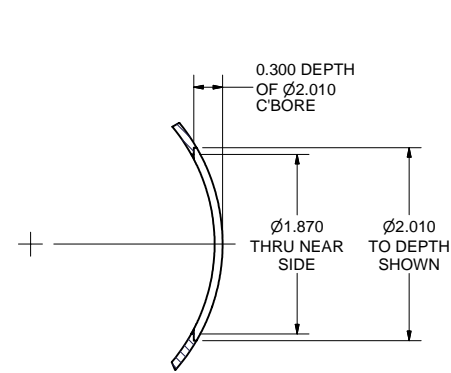
FILE NAME: 7110-006
SHEET NO.: 16
DFT. SCALE: 1:2
MATERIAL:
QTY: 1 PER ASM
NOTES: 1. SURFACES "B" AND "C" SHOULD BE ALIGNED WITHIN 0.5 DEG.
2. PROTECT SOLDERED PLATES "B" AND "C" FROM OVERHEATING DURING WELDING.

83	7110-006 (SH.20)	2-PHASE 2 K MAIN TUBE RIGHT SUB-ASM	1					
82	7110-006 (SH.20)	2-PHASE 2 K MAIN TUBE LEFT SUB-ASM	1					
68	7110-006 (SH.18)	2" I.D. BELLOWS SUB-ASM	1					
67	7110-006 (SH.17)	2 K MAIN BRANCH TUBE-II	1					
47	7110-006 (SH.16)	3-3/8" CF Rotatable 2" Tube Flange, 316L St. Steel	1				Varian's F0338-0200-RC6, or equiv.	
46	7110-006 (SH.17)	2 K MAIN TUBE CF TUBE	1					
45	7110-006 (SH.17)	2 K MAIN TUBE WEDGE TUBE	1					
44	7110-006 (SH.17)	2 K MAIN BRANCH TUBE-I	1					
29	7110-006 (SH.12)	2-PHASE 2 K BELLOWS SUB-ASM	1					
42	7110-006 (SH.16)	2 K MAIN TUBE SUB-ASM	X					

		ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS		REV.	
								QUANTITY					
D		PRINT DISTR.		PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw									
7110-006 SH. NO. 16 OF 20		CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES ✓		<div> CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853 ERL Horizontal Test Cryomodule Helium Gas Return Pipe DKN Main Tube, Sub-Arm</div>								
REV. B		CHECKED BY: VM APPROVED BY: ML		DRAWN BY TMK		DRAWN FOR M.LIEPE		DATE 6/15/2006		SCALE	D	7110-006 SH. NO. 16 OF 20	REV. B

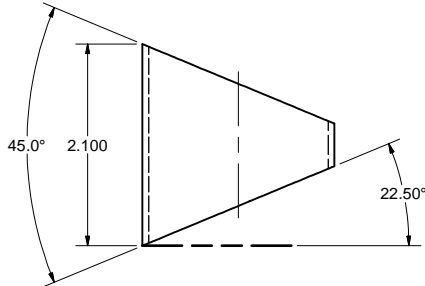
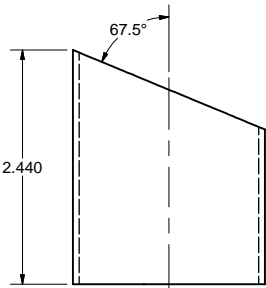
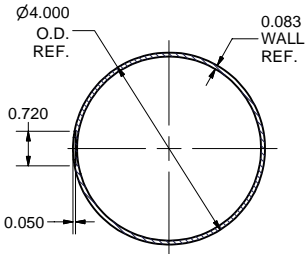
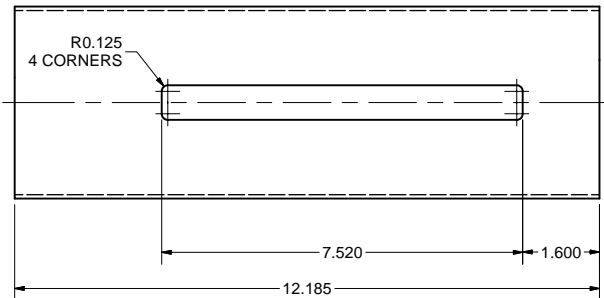
FOR MACHINING LUBRICANT USE ONLY
ALKALINE DETERGENT LUBRICANT CIMSTAR 40
OR EQUIVALENT APPROVED BY CORNELL LEPP

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A		ITEMS 43 AND 44 MODIFIED. ITEM 67 ADDED. ADDED SHEETS 18 & 19.	10/29/06	VM
B		0.71" WIDE x 7.51" LONG x 0.05" DEEP RECESS ADDED TO PARTS ITEM 43 AND 66.	12/07/06	VM

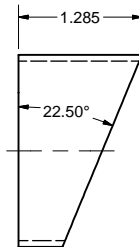
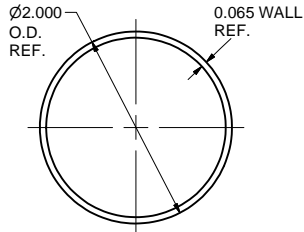


DETAIL B
SCALE 1:1

43 2 K MAIN TUBE LEFT
FILE NAME: 7110-006
SHEET NO.: 17
DFT. SCALE: 1:2
MATERIAL: 4" O.D. x 0.083 WALL 316L STN STL TUBE
QTY: 1 PER SUB-ASM
NOTES:



45 2 K MAIN TUBE WEDGE TUBE
FILE NAME: 7110-006
SHEET NO.: 17
DFT. SCALE: 1:1
MATERIAL: 2" O.D. x 0.065 WALL 316L STN STL TUBE
QTY: 1 PER SUB-ASM
NOTES:









67 2 K MAIN BRANCH TUBE-II
FILE NAME: 7110-006
SHEET NO.: 17
DFT. SCALE: 1:1
MATERIAL: 2" O.D. x 0.065 WALL 316L STN STL TUBE
QTY: 1 PER SUB-ASM
NOTES:

66 2 K MAIN TUBE RIGHT
FILE NAME: 7110-006
SHEET NO.: 17
DFT. SCALE: 1:2
MATERIAL: 4" O.D. x 0.083 WALL 316L STN STL TUBE
QTY: 1 PER SUB-ASM
NOTES:

46 2 K MAIN TUBE CF TUBE
FILE NAME: 7110-006
SHEET NO.: 17
DFT. SCALE: 1:1
MATERIAL: 2" O.D. x 0.065 WALL 316L STN STL TUBE
QTY: 1 PER SUB-ASM
NOTES:

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: 12/12/2006 CAD FILE NAME: 7110-006.idw									
	CR-1	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES 	 CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853 ERL Horizontal Test Cryomodule Helium Gas Return Pipe Details - 2K Main Tube								
			CHECKED BY: VM APPROVED BY: ML	DRAWN BY TMK	DRAWN FOR M.LIEPE	DATE 6/15/2006	SCALE		7110-006 SH. NO. 17 OF 20	REV. B	

OPERATING CONDITIONS:

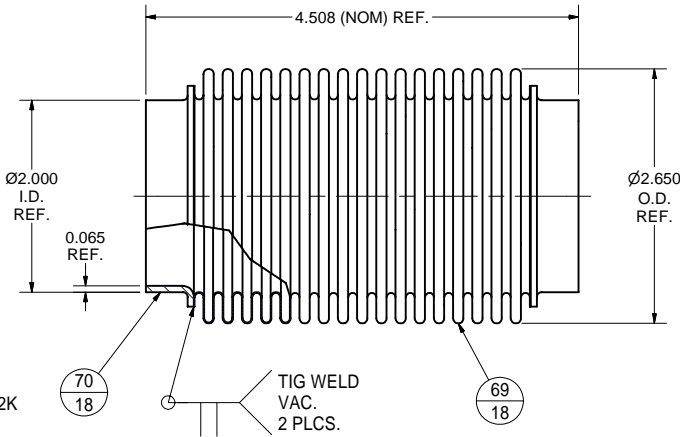
Temperature: 2 K
Vacuum outside
Helium inside
Stroke: 10.0 mm (0.4 inch)
Shift: ± 4.0 mm (± 0.16 inch)
Maximum temperature: 200 C (473 K)
Minimum temperature: -265 C (2 K)
Leak Rate: < 1E-9 mbar x l/sec

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

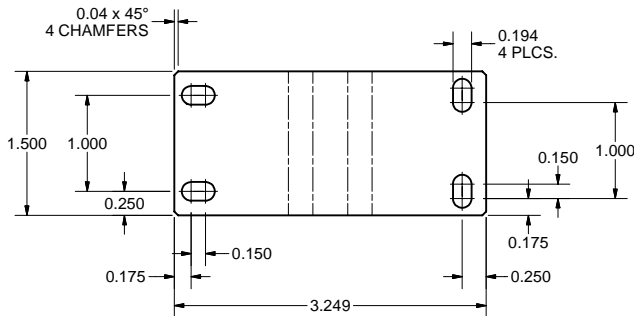
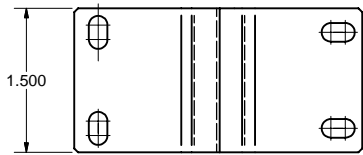
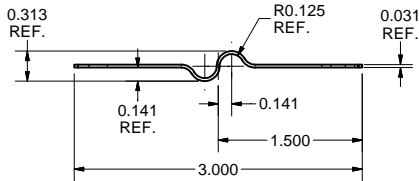
Size:

O.D.: 2.65 inch (67.3 mm)
I.D.: 2.00 inch (50.8 mm)
Wall Thickness: 0.008 inch (0.2 mm)
Pitch: 0.20 inch (5.1 mm)
Overall Length: 4.508 inch (114.5 mm)
Minimum Stroke: ± 0.75 inch (± 19.1 mm)
Minimum Lateral Shift: ± 0.2 inch (± 5 mm)
Minimum Cycle Life: 10000



68 2" I.D. BELLOWS SUB-ASM

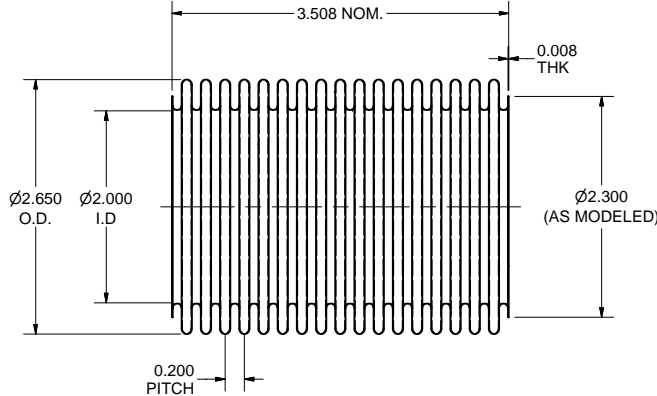
FILE NAME: 7110-006
SHEET NO.: 18
DFT. SCALE: 1:1
MATERIAL:
QTY: 1 PER ASSEMBLY
NOTES: 1. SEE TABLES (OPERATING CONDITIONS AND DESIGN SPEC.).
2. BELLOWS AND CUFFS CAN BE ORDERED AS FINISHED ASSEMBLIES.



FLAT PATTERN

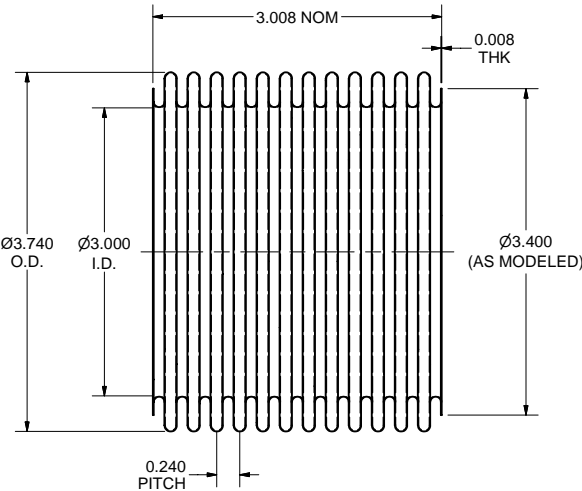
75 SPRING SUPPORT PLATE

FILE NAME: 7110-006
SHEET NO.: 18
DFT. SCALE: 1:1
MATERIAL: 1/32" 316L ST. STEEL SHEET
QTY: 2 PER ASSEMBLY
NOTES:



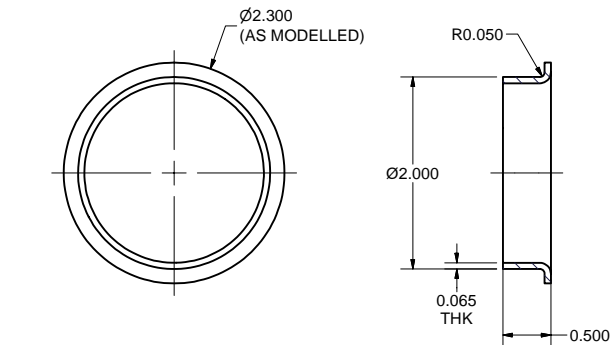
69 2" I.D. BELLOWS

FILE NAME: 7110-006
SHEET NO.: 18
DFT. SCALE: 1:1
MATERIAL: 316L ST. STEEL
QTY: 1 PER ASSEMBLY
NOTES: 1. NO. OF CONFOULUTIONS: N = 17
2. MANUFACTURER: AMERIFLEX INC. OR EQUIV.



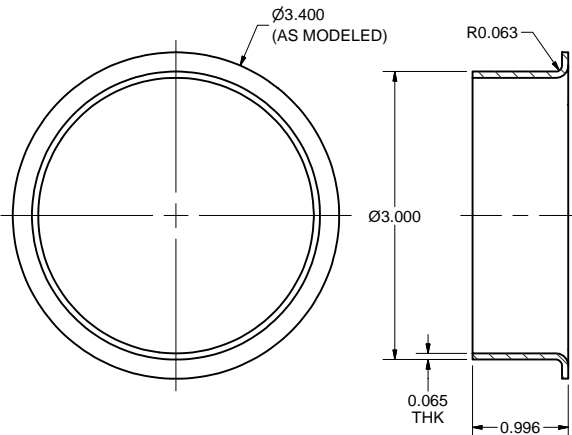
61 3" I.D. BELLOWS

FILE NAME: 7110-006
SHEET NO.: 18
DFT. SCALE: 1:1
MATERIAL: 316L ST. STEEL
QTY: 1 PER ASSEMBLY
NOTES: 1. NO. OF CONFOULUTIONS: N = 12
2. MANUFACTURER: AMERIFLEX INC. OR EQUIV.



70 2" I.D. BELLOWS CUFF

FILE NAME: 7110-006
SHEET NO.: 18
DFT. SCALE: 1:1
MATERIAL: 316L ST. STEEL
QTY: 2 PER ASSEMBLY
NOTES:



62 3" I.D. BELLOWS CUFF

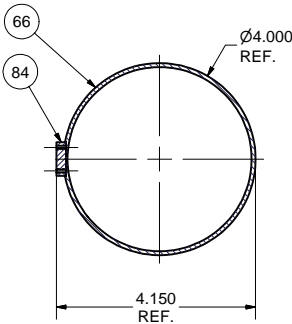
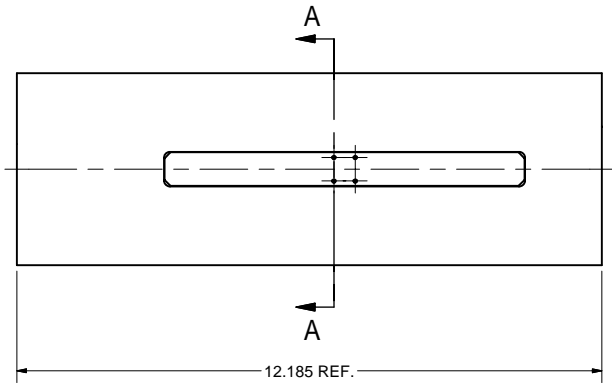
FILE NAME: 7110-006
SHEET NO.: 18
DFT. SCALE: 1:1
MATERIAL: 316L ST. STEEL
QTY: 2 PER ASSEMBLY
NOTES:

70	SH. 18	2" I.D. BELLOWS CUFF	2					
69	SH. 18	2" I.D. BELLOWS	1					
68	SH. 18	2" I.D. BELLOWS SUB-ASM	X					

ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw			QUANTITY				
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES			CORNELL UNIVERSITY FLOYD R. NEWMAN LABORATORY ITHACA, NY 14853				
ERL Horizontal Test Cryomodule Helium Gas Return Pipe							
CHECKED BY: VM APPROVED BY: ML	DRAWN BY: TMK	DRAWN FOR: M.LIEPE	DATE: 6/15/2006	SCALE: D	7110-006 SH. NO. 18 OF 20	REV. A	

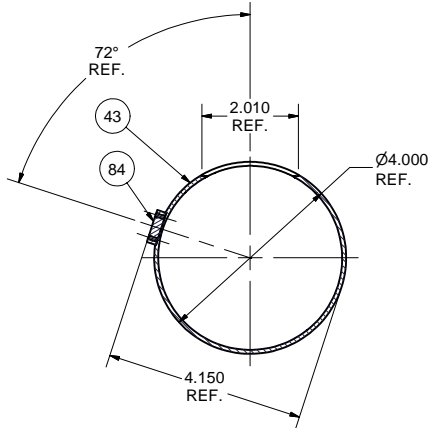
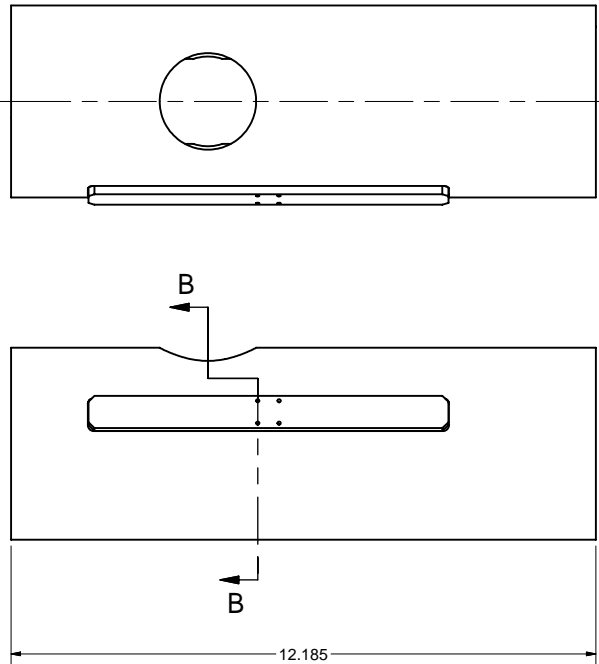
FOR MACHINING LUBRICANT USE ONLY
ALKALINE DETERGENT LUBRICANT CIMSTAR 40
OR EQUIVALENT APPROVED BY CORNELL LEPP

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
B		NEW SHEET, ALL ITEMS NEW.	12/08/06	VM



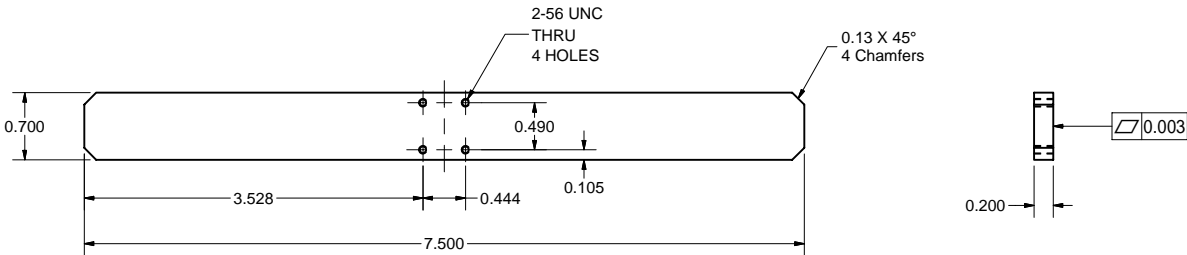
SECTION A-A

83 2-PHASE 2 K MAIN TUBE RIGHT SUB-ASM
FILE NAME: 7110-006
SHEET NO.: 20
DFT. SCALE: 1:2
MATERIAL:
QTY: 1 PER ASSEMBLY
NOTES: 1. SOLDER PART 84 TO PART 66 WITH STAY BRITE #8 SOLDER (OR EQUIVALENT). REMOVE FLUX AND THOROUGHLY CLEAN PART AFTER SOLDERING.



SECTION B-B



82 2-PHASE 2 K MAIN TUBE LEFT SUB-ASM
FILE NAME: 7110-006
SHEET NO.: 20
DFT. SCALE: 1:2
MATERIAL:
QTY: 1 PER ASSEMBLY
NOTES: 1. SOLDER PART 84 TO PART 43 WITH STAY BRITE #8 SOLDER (OR EQUIVALENT). REMOVE FLUX AND THOROUGHLY CLEAN PART AFTER SOLDERING.



84 HEAT PLATE
FILE NAME: 7110-006
SHEET NO.: 20
DFT. SCALE: 1:1
MATERIAL: OFE COPPER
QTY: 2 PER ASSEMBLY
NOTES:

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

84	7110-006 (SH.20)	HEAT PLATE	1	1				
43	7110-006 (SH.17)	2 K MAIN TUBE LEFT	1					
82	7110-006 (SH.20)	2-PHASE 2 K MAIN TUBE LEFT SUB-ASM	X					
66	7110-006 (SH.17)	2 K MAIN TUBE RIGHT		1				
83	7110-006 (SH.20)	2-PHASE 2 K MAIN TUBE RIGHT SUB-ASM		X				

		ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS		REV.
								QUANTITY				
D	PRINT DISTR.	PLOT DATE: 12/12/2006 CAD FILE NAME: 7110-006.idw										
7110-006 SH. NO. 20 OF 20	CR-1	UNLESS OTHERWISE SPECIFIED:		<div><div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div></div> <div>ERL Horizontal Test Cryomodule Helium Gas Return Pipe</div>								
		DIMENSIONS ARE IN INCHES: TOLERANCES ON: .00 ± .010 .000 ± .005 FRACTIONS ± 1/64 ANGLES ± 0.5° ALL SURFACES ✓										
		CHECKED BY: VM APPROVED BY: ML		DRAWN BY TMK	DRAWN FOR M.LIEPE	DATE 6/15/2006	SCALE	D	7110-006 SH. NO. 20 OF 20		REV. B	