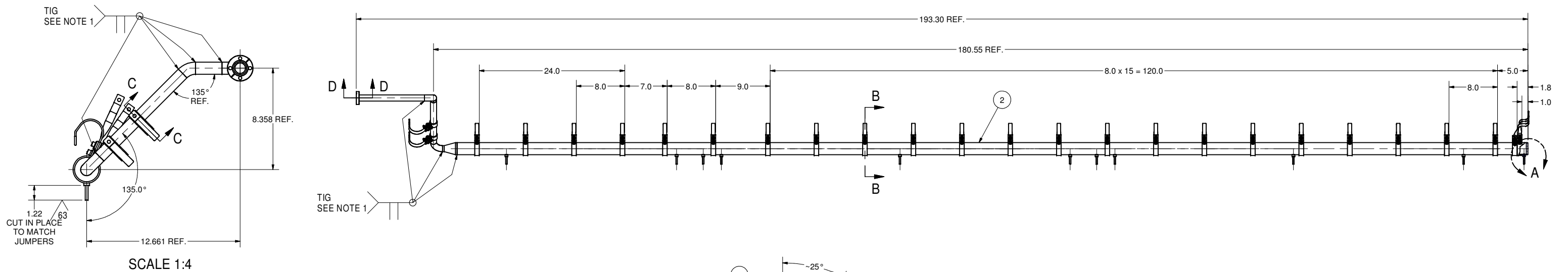
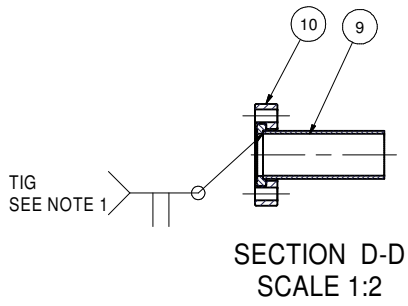


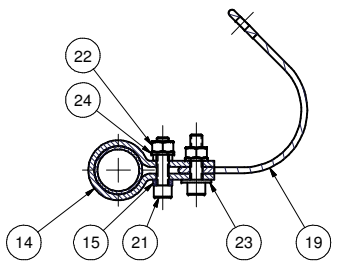
REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



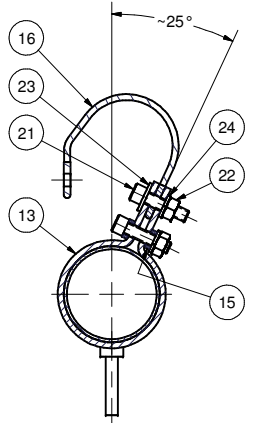
SCALE 1:4



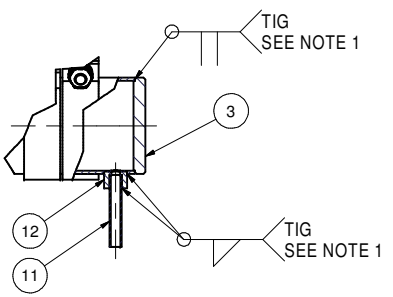
SECTION D-D  
SCALE 1:2



SECTION C-C  
SCALE 1:2



SECTION B-B  
SCALE 1:2



DETAIL A  
SCALE 1:2

- 1 LEFT OUTER 80 K COOLING PIPE ASSEMBLY**
- FILE NAME: 7102-058  
SHEET NO.: 1  
DFT. SCALE: 1:8  
MATERIAL:  
QTY: 1  
NOTES: 1. WELDS TO CONFORM TO UHV SPEC.  
2. MAKE LN THERMAL COLD SHOCK AND LEAK TEST; LEAK RATE: < 2.0E-10 TORR-L/SEC.  
3. PARTS 16, 17, 18, 19 ARE SAME PURCHASED FLEX> ITEM BUT SHOWN IN DIFFERENT SHAPES FOR MODELLING PURPOSE.

24	PUR.	1/4 Spring Washer, 316 SS	52		McMaster-Carr's 92147A029
23	PUR.	1/4 Washer, 0.625 OD, Thick, 316 SS	26		McMaster-Carr's 91950A029
22	PUR.	1/4-20 Hex Nut, Silicon Bronze	52		McMaster-Carr's 93439A610
21	PUR.	1/4-20 x 1 Socket Head Cap Screw, 316 SS	52		McMaster-Carr's 92185A542
19	PUR.	80 K COOLING PIPE BRAID 3	2		Thomas & Betts FBB-6-1
18	PUR.	80 K COOLING PIPE BRAID 2	1		Thomas & Betts FBB-6-1
17	PUR.	80 K COOLING PIPE BRAID 1	1		Thomas & Betts FBB-6-1
16	PUR.	80 K COOLING PIPE BRAID	22		Thomas & Betts FBB-6-1
15	7102-077 (SH. 2)	CLAMP SPACER	52		
14	7102-058 (SH.5)	1" COPPER CLAMP	2		
13	7102-077 (SH. 2)	2" COPPER CLAMP	24		
12	7102-058 (SH. 2)	1/4" WELD COUPLING	11		PUR & MODIFIED
11	7102-058 (SH. 2)	1/4" OD TUBE STUB	11		
10	PUR.	2-1/8" CF 1" TUBE Rotatable Flange, 316L S.S.	1		VARIAN'S F0212-0100-RC OR EQUIV.
9	7102-058 (SH.2)	1" TUBE TO FLANGE	1		
8	7102-058 (SH. 2)	1" OD TUBE II	1		
7	PUR.	1" OD, 45 DEG. ELBOW, 316L S.S.	1		VARIAN'S WE45100 OR EQUIV.
6	7102-058 (SH. 2)	1" OD TUBE I	1		
5	PUR.	1"OD, 90 DEG. ELBOW, 316L S.S.	2		VARIAN'S WE90100 OR EQUIV.
4	PUR.	2" OD TO 1" OD CONICAL REDUCER, 316L St.St.	1		VARIAN'S WRC200100 OR EQUIV.
3	7102-058 (SH.2)	2" END CAP	1		
2	7102-058 (SH. 2)	2" OD TUBE I	1		
1	7102-058 (SH.1)	LEFT OUTER 80K COOLING PIPE ASM	1	X	

Release of final PO version for Meyer Tool - July 11, 2007.

**CORNELL UNIVERSITY**  
FLOYD R. NEWMAN LABORATORY  
ITHACA, NY 14853

**ERL Injector Cryomodule**  
**80K Cooling Pipes**  
**Left Outer 80K Cooling Pipe Assembly Details**

CHECKED BY: EPC  
APPROVED BY: EPC

DRAWN BY: RHE/DI  
DRAWN FOR: M.Liepe

DATE: 9/6/2006

SCALE: D

7102-058  
SH. NO. 1 OF 6

REV.

PRINT DISTR.

CR-1

7102-058  
SH. NO. 1 OF 6

REV.

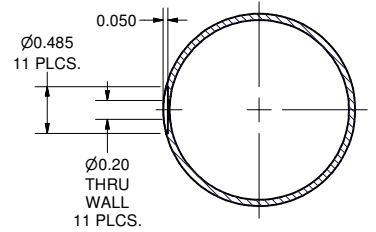
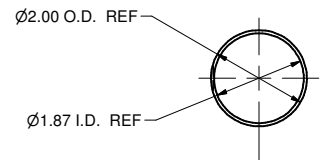
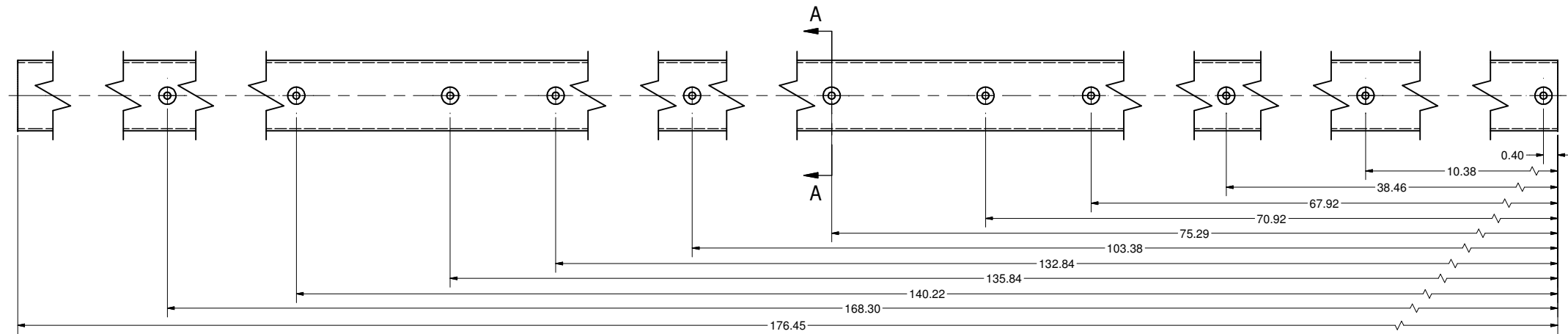
UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN INCHES:  
TOLERANCES ON:  
.0 ± .02  
.00 ± .010  
FRACTIONS ± 1/32  
ANGLES ± 0.5°  
ALL SURFACES

PLLOT DATE: 9/24/2007  
CAD FILE NAME: 7102-058.idw

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

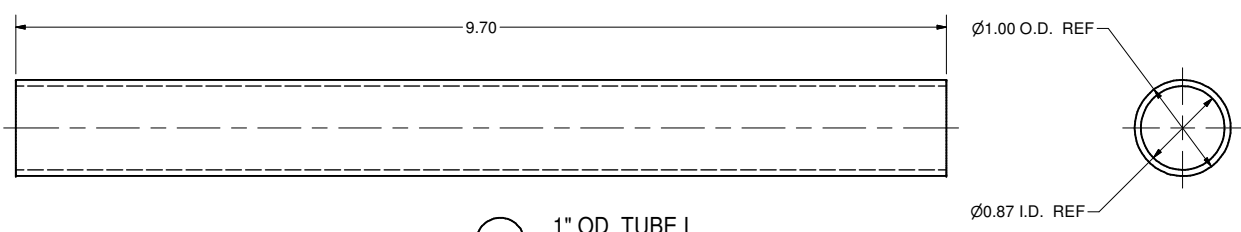
FOR MACHINING LUBRICANT USE ONLY  
ALKALINE DETERGENT LUBRICANT CIMSTAR 40  
OR EQUIVALENT APPROVED BY CORNELL LEPP

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A	D1	DIMENSION (DIA.) 1.86 CHANGED TO (DIA.) 1.860.	5/14/07	VM

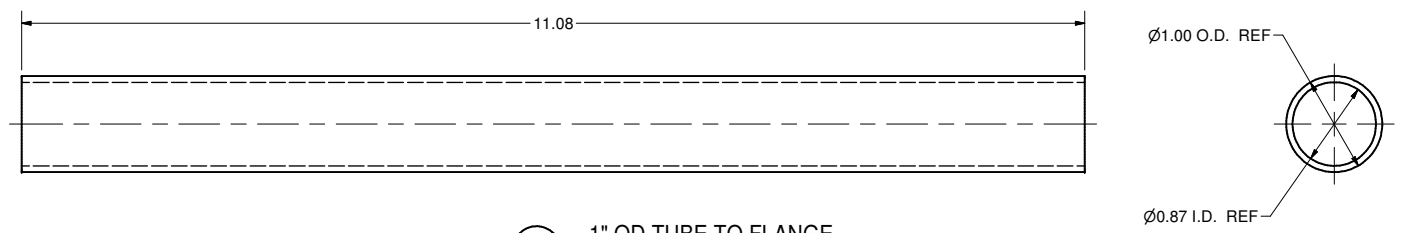


SECTION A-A  
SCALE 1 : 1

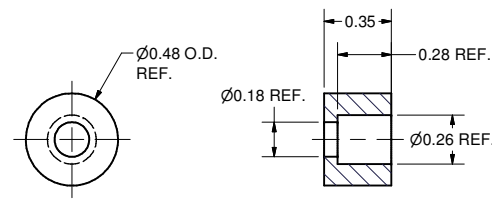
**2** 2" OD TUBE I  
FILE NAME: 7102-058  
SHEET NO.: 2  
DFT. SCALE: 1:2  
MATERIAL: 2" OD x 0.065" W, UHV GRADE 316L STAINLESS STEEL TUBE  
QTY: 1 PER ASSEMBLY  
NOTES:



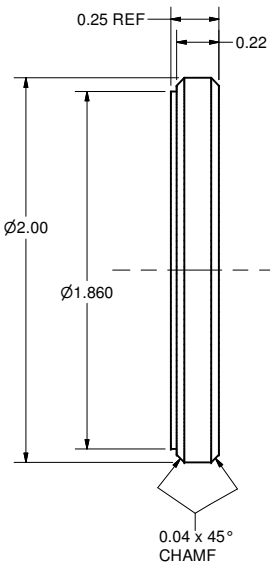
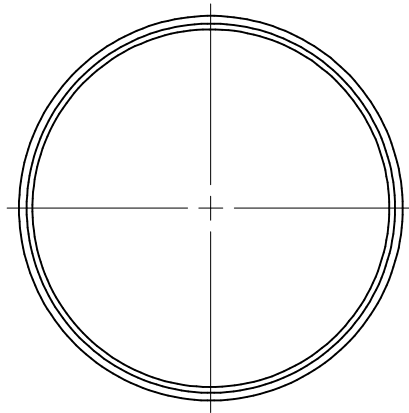
**6** 1" OD TUBE I  
FILE NAME: 7102-058  
SHEET NO.: 2  
DFT. SCALE: 1:1  
MATERIAL: 1" OD x 0.065" W, UHV GRADE 316L STAINLESS STEEL TUBE  
QTY: 1 PER ASSEMBLY  
NOTES:



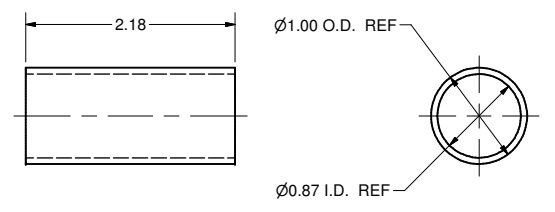
**9** 1" OD TUBE TO FLANGE  
FILE NAME: 7102-058  
SHEET NO.: 2  
DFT. SCALE: 1:1  
MATERIAL: 1" OD x 0.065" W, UHV GRADE 316L STAINLESS STEEL TUBE  
QTY: 1 PER ASSEMBLY  
NOTES:



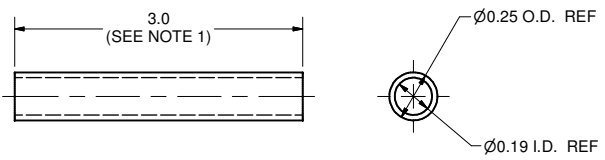
**12** 1/4" WELD COUPLING  
FILE NAME: 7102-058  
SHEET NO.: 2  
DFT. SCALE: 2:1  
MATERIAL: SWAGELOK Union Pt. no. SS-4-TSW-6 or EQUIV.  
QTY: 11 PER ASSEMBLY  
NOTES:



**3** 2" END CAP  
FILE NAME: 7102-058  
SHEET NO.: 2  
DFT. SCALE: 2:1  
MATERIAL: 1/4" 316 STAINLESS STEEL SHEET  
QTY: 1 PER ASSEMBLY  
NOTES:








**8** 1" OD TUBE II  
FILE NAME: 7102-058  
SHEET NO.: 2  
DFT. SCALE: 1:1  
MATERIAL: 1" OD x 0.065" W, UHV GRADE 316L STAINLESS STEEL TUBE  
QTY: 1 PER ASSEMBLY  
NOTES:



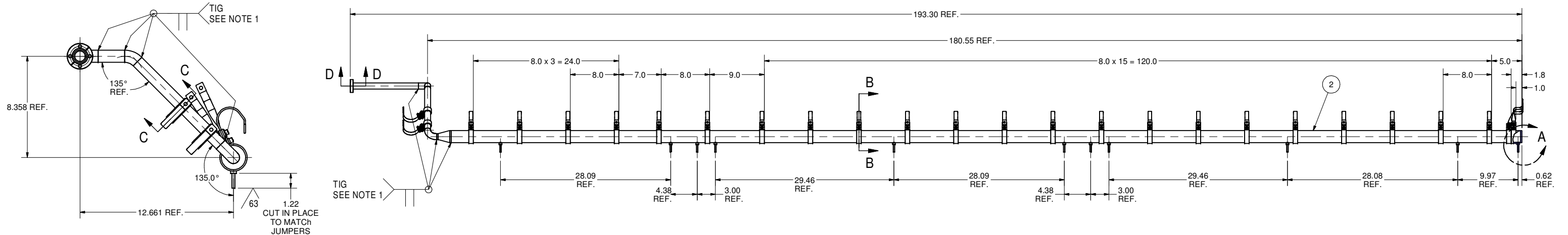
**11** 1/4" OD TUBE STUB  
FILE NAME: 7102-058  
SHEET NO.: 2  
DFT. SCALE: 2:1  
MATERIAL: 1/4" OD x 0.028" W, UHV GRADE 316L STAINLESS STEEL TUBE  
QTY: 3 PER ASSEMBLY  
NOTES: 1. DIMENSION 1.5" LONGER THAN NOMINAL. WILL BE SHORTEN IN PLACE DURING ASSEMBLY.  
2. PINCH ONE END AND TIG WELD SEAL FOR PRESSURE, UHV, AND COLD SHOCK TEST.

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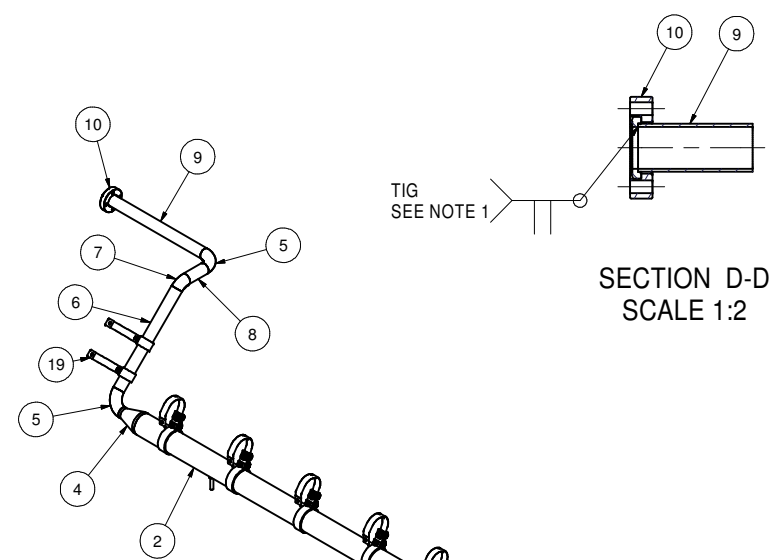
Release of final PO version for Meyer Tool - July 11, 2007.

		ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
					QUANTITY				
D	PRINT DISTR.	PLOT DATE: 9/24/2007 CAD FILE NAME: 7102-058.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 	<div><div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div></div> <div>ERL Injector Cryomodule 80K Cooling Pipes 80K Tube Details</div>					
SH. NO. 2 OF 6	7102-058								
		APPROVED BY: EPC	RHE/Di	M.Liepe	9/6/2006	SH. NO. 2 OF 6			

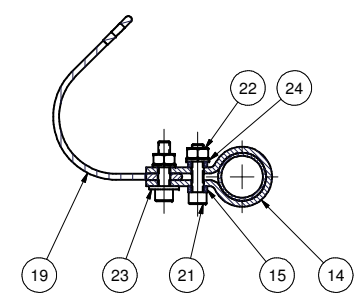
REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.



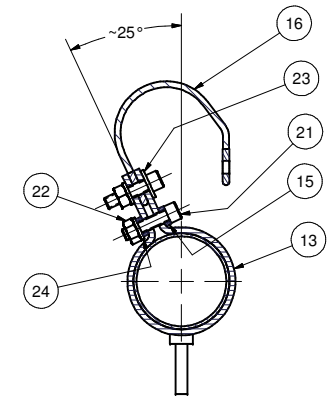
SCALE 1:4



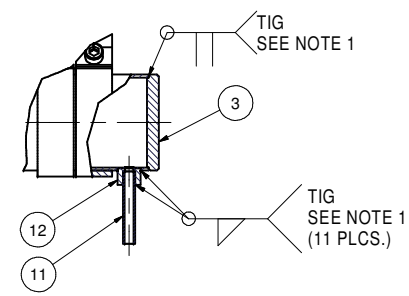
SECTION D-D  
SCALE 1:2



SECTION C-C  
SCALE 1:2



SECTION B-B  
SCALE 1:2








DETAIL A  
SCALE 1:2

**20 RIGHT OUTER 80 K COOLING PIPE ASSEMBLY**  
FILE NAME: 7102-058  
SHEET NO.: 3  
DFT. SCALE: 1:8  
MATERIAL:  
QTY: 1  
NOTES: 1. WELDS TO CONFORM TO UHV SPEC.  
2. MAKE LN THERMAL COLD SHOCK AND LEAK TEST LEAK RATE: < 2.0E-10 TORR-L/SEC.  
3. PARTS 16, 17, 18, 19 ARE SAME PURCHASED FLEX. ITEM BUT SHOWN IN DIFFERENT SHAPES FOR MODELLING PURPOSE.

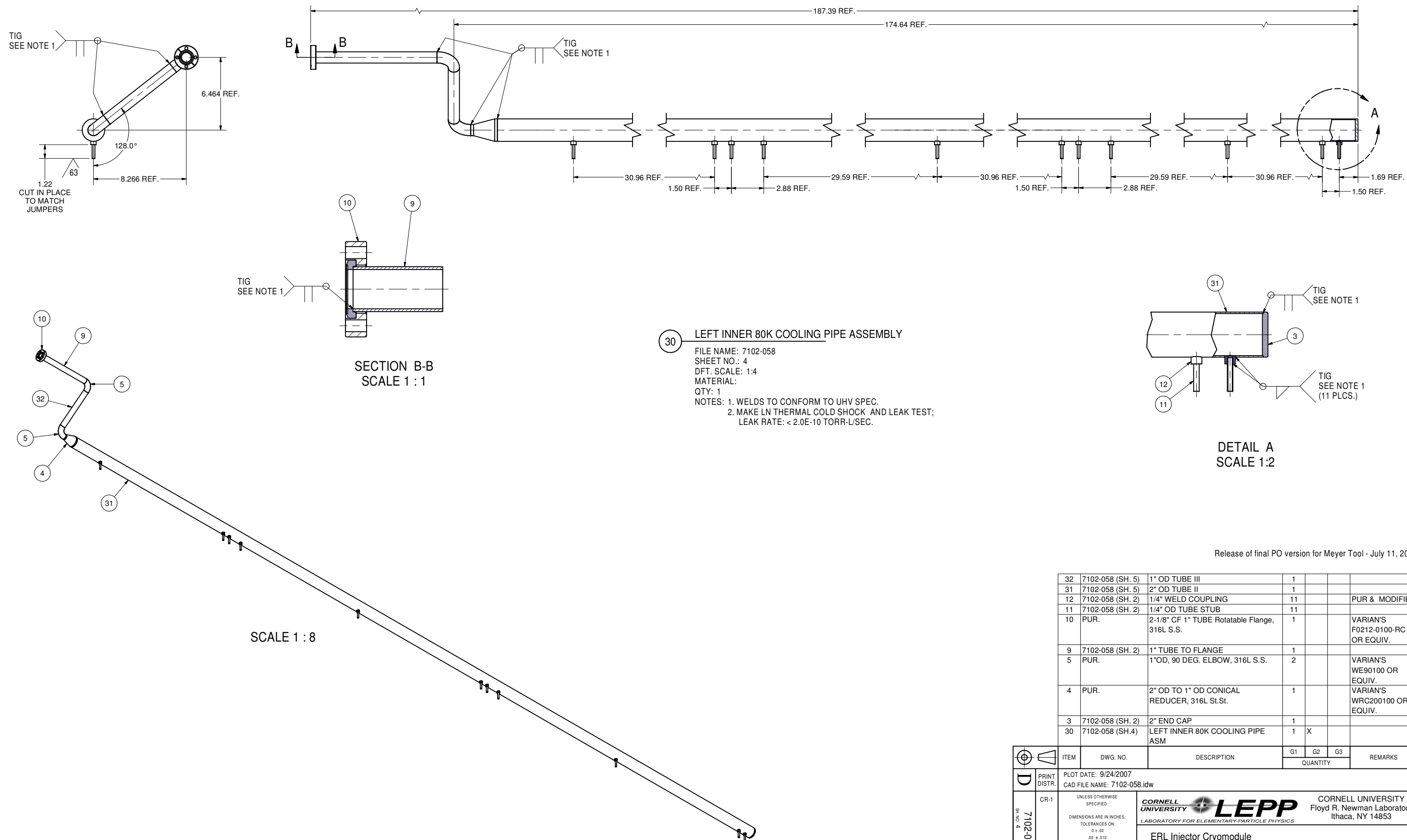
Release of final PO version for Meyer Tool - July 11, 2007.

24	PUR.	1/4 Spring Washer, 316 SS	52		McMaster-Carr's 92147A029	
23	PUR.	1/4 Washer, 0.625 OD, Thick, 316 SS	26		McMaster-Carr's 91950A029	
22	PUR.	1/4-20 Hex Nut, Silicon Bronze	52		McMaster-Carr's 93439A610	
21	PUR.	1/4-20 x 1 Socket Head Cap Screw, 316 SS	52		McMaster-Carr's 92185A542	
19	PUR.	80 K COOLING PIPE BRAID 3	2		Thomas & Betts FBB-6-1	
18	PUR.	80 K COOLING PIPE BRAID 2	1		Thomas & Betts FBB-6-1	
17	PUR.	80 K COOLING PIPE BRAID 1	1		Thomas & Betts FBB-6-1	
16	PUR.	80 K COOLING PIPE BRAID	22		Thomas & Betts FBB-6-1	
15	7102-077 (SH. 2)	CLAMP SPACER	52			
14	7102-058 (SH. 5)	1" COPPER CLAMP	2			
13	7102-077 (SH. 2)	2" COPPER CLAMP	24			
12	7102-058 (SH. 2)	1/4" WELD COUPLING	11		PUR & MODIFIED	
11	7102-058 (SH. 2)	1/4" OD TUBE STUB	11			
10	PUR.	2-1/8" CF 1" TUBE Rotatable Flange, 316L S.S.	1		VARIAN'S F0212-0100-RC OR EQUIV.	
9	7102-058 (SH. 2)	1" TUBE TO FLANGE	1			
8	7102-058 (SH. 2)	1" OD TUBE II	1			
7	PUR.	1" OD, 45 DEG. ELBOW, 316L S.S.	1		VARIAN'S WE45100 OR EQUIV.	
6	7102-058 (SH. 2)	1" OD TUBE I	1			
5	PUR.	1"OD, 90 DEG. ELBOW, 316L S.S.	2		VARIAN'S WE90100 OR EQUIV.	
4	PUR.	2" OD TO 1" OD CONICAL REDUCER, 316L St.St.	1		VARIAN'S WRC200100 OR EQUIV.	
3	7102-058 (SH. 2)	2" END CAP	1			
2	7102-058 (SH. 2)	2" OD TUBE I	1			
20	7102-058 (SH. 3)	RIGHT OUTER 80 K COOLING PIPE ASM	1	X		

		ITEM	DWG. NO.	DESCRIPTION			G1	G2	G3	REMARKS	REV.		
						QUANTITY							
	PRINT DISTR.	PLOT DATE: 9/24/2007 CAD FILE NAME: 7102-058.idw											
	SH. NO. 3 OF 6	7102-058	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 		<div><div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div></div> <div>ERL Injector Cryomodule 80K Cooling Pipes Right Outer 80K Cooling Pipe Assembly Details</div>							
CHECKED BY: EPC						DRAWN BY	DRAWN FOR	DATE	SCALE		7102-058	REV.	
APPROVED BY: EPC						RHE/Di	M.Liepe	9/6/2006					SH. NO. 3 OF 6








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

REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.



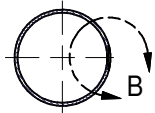
Release of final PO version for Meyer Tool - July 11, 2007.

32	7102-058 (SH. 5)	1" OD TUBE III	1				
31	7102-058 (SH. 5)	2" OD TUBE II	1				
12	7102-058 (SH. 2)	1/4" WELD COUPLING	11			PUR & MODIFIED	
11	7102-058 (SH. 2)	1/4" OD TUBE STUB	11				
10	PUR.	2-1/8" CF 1" TUBE Rotatable Flange, 316L S.S.	1			VARIAN'S F0212-0100-RC OR EQUIV.	
9	7102-058 (SH. 2)	1" TUBE TO FLANGE	1				
5	PUR.	1"OD, 90 DEG. ELBOW, 316L S.S.	2			VARIAN'S WE90100 OR EQUIV.	
4	PUR.	2" OD TO 1" OD CONICAL REDUCER, 316L St.St.	1			VARIAN'S WRC200100 OR EQUIV.	
3	7102-058 (SH. 2)	2" END CAP	1				
30	7102-058 (SH.4)	LEFT INNER 80K COOLING PIPE	1	X			

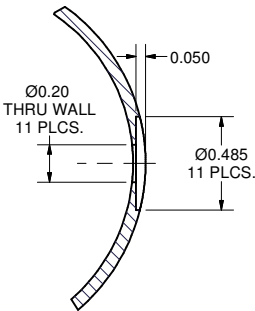
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	QUANTITY									
	PRINT DISTR.	PLOT DATE: 9/24/2007 CAD FILE NAME: 7102-058.idw								
	CR-1	<div>UNLESS OTHERWISE SPECIFIED:</div> <div>DIMENSIONS ARE IN INCHES:</div> <div>TOLERANCES ON:</div> <div>    .01 ± .02</div> <div>    .00 ± .010</div> <div>    .000 ± .005</div> <div>FRACTIONS ± 1/32</div> <div>ANGLES ± 0.5°</div> <div>ALL SURFACES </div>	<div><div><b>CORNELL UNIVERSITY</b></div><div><b>LEPP</b></div><div>LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS</div></div> <div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div>							
			<div>ERL Injector Cryomodule</div> <div>80K Cooling Pipes</div> <div>Left Inner 80 K Cooling Pipe Assembly</div>							
REV.	CHECKED BY: EPC APPROVED BY: EPC	DRAWN BY: RHE/Di	DRAWN FOR: M.Liepe	DATE: 9/6/2006	SCALE		7102-058 SH. NO. 4 OF 6		REV.	

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

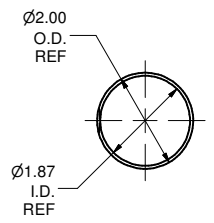
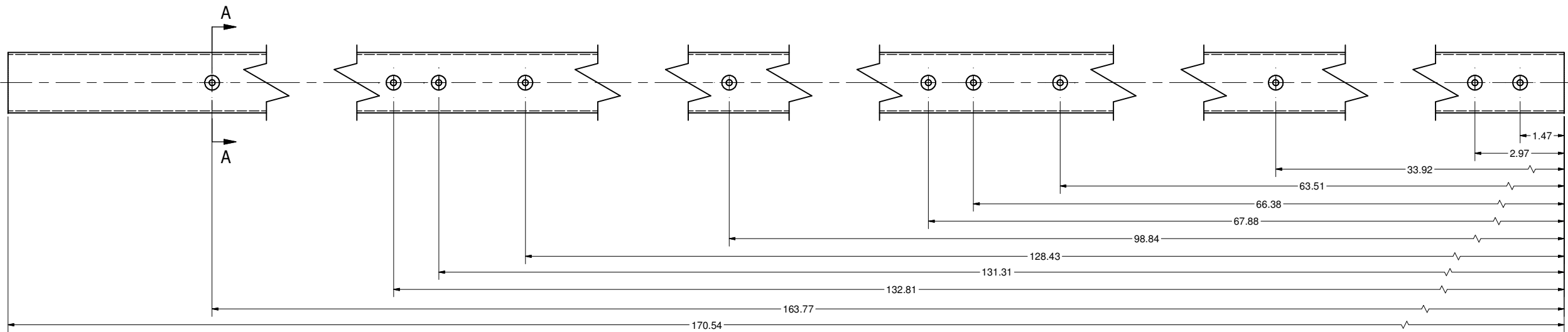
REVISIONS				
SYM.	ZONE	DESCRIPTION	DATE	APP.
A	E7	ADDED HOLE LOCATION DIM TO PT.31 TMK	9/24/07	TIO



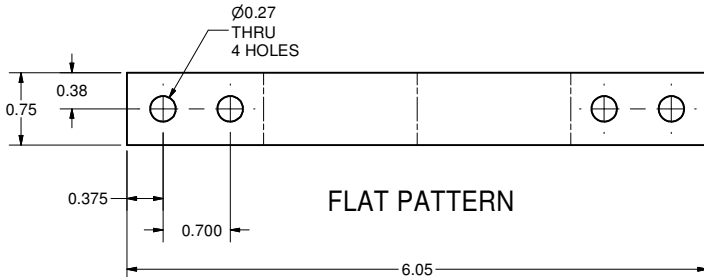
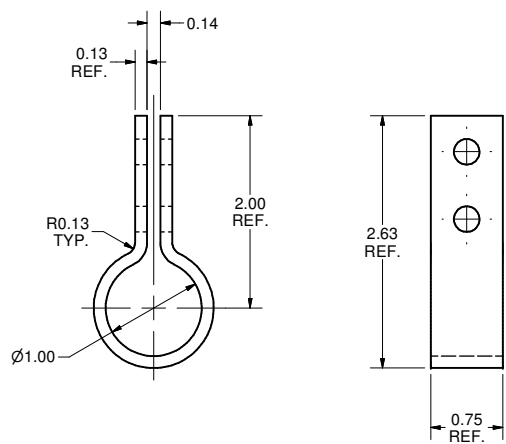
SECTION A-A



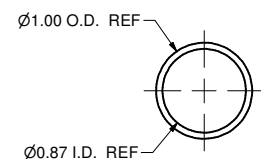
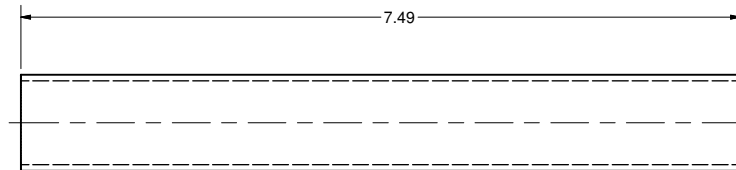
DETAIL B  
SCALE 2:1



31 2" OD TUBE II  
FILE NAME: 7102-058  
SHEET NO.: 5  
DFT. SCALE: 1:2  
MATERIAL: 2" OD x 0.065" W, UHV GRADE 316L STAINLESS STEEL TUBE  
QTY: 1 PER ASSEMBLY  
NOTES:






14 1" COPPER CLAMP  
FILE NAME: 7102-058  
SHEET NO.: 5  
DFT. SCALE: 1:1  
MATERIAL: 1/8" OFHC COPPER SHEET  
QTY: 4 PER ASSEMBLY  
NOTES:



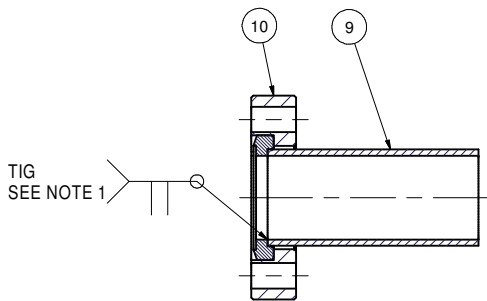
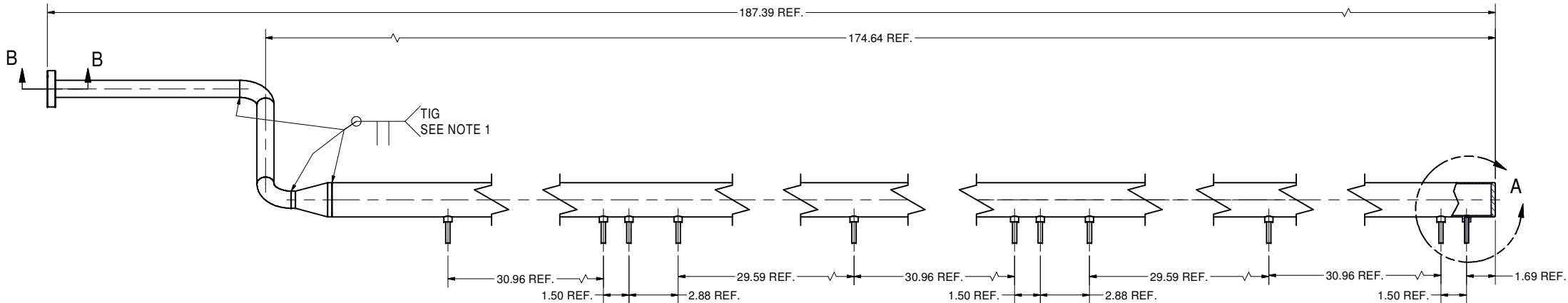
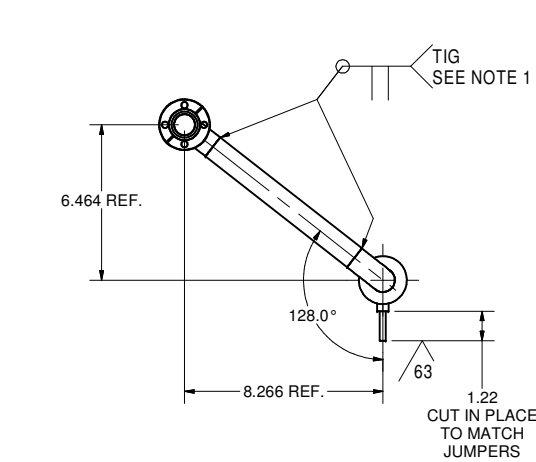
32 1" OD TUBE III  
FILE NAME: 7102-058  
SHEET NO.: 5  
DFT. SCALE: 1:1  
MATERIAL: 1" OD x 0.065"W, UHV GRADE 316L STAINLESS STEEL TUBE  
QTY: 1 PER ASSEMBLY  
NOTES:

Release of final PO version for Meyer Tool - July 11, 2007.

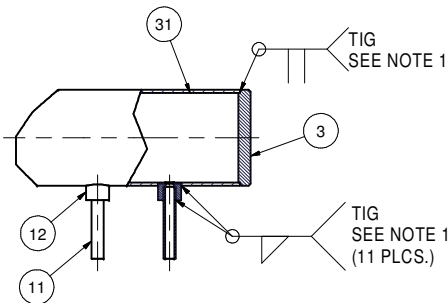
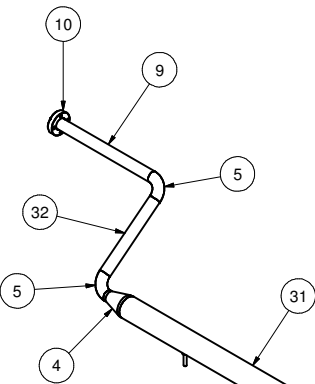
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ALKALINE DETERGENT LUBRICANT CIMSTAR 40  
OR EQUIVALENT APPROVED BY CORNELL LEPP

	ITEM	DWG. NO.	DESCRIPTION	G1	G2	G3	REMARKS	REV.
				QUANTITY				
D	PRINT DISTR.	PLOT DATE: 9/24/2007 CAD FILE NAME: 7102-058.idw						
SH. NO. 5 OF 6	7102-058	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 	<div>CORNELL UNIVERSITY  <b>LEPP</b></div> <div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div> <div>LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS</div> ERL Injector Cryomodule 80K Cooling Pipes 80K li - Long and Short Tube Details				
REV. A	CHECKED BY: EPC	DRAWN BY: RHE/Di	DRAWN FOR: M.Liepe	DATE: 9/6/2006	SCALE: D	7102-058	SH. NO. 5 OF 6	REV. A
	APPROVED BY: EPC							

REVISIONS			
SYM.	ZONE	DESCRIPTION	DATE APP.



SECTION B-B  
SCALE 1 : 1









DETAIL A  
SCALE 1:2

40 RIGHT INNER 80K COOLING PIPE ASSEMBLY

FILE NAME: 7102-058  
SHEET NO.: 6  
DFT. SCALE: 1:4  
MATERIAL:  
QTY: 1  
NOTES: 1. WELDS TO CONFORM TO UHV SPEC.  
2. MAKE LN THERMAL COLD SHOCK AND LEAK TEST;  
LEAK RATE: < 2.0E-10 TORR-L/SEC.

Release of final PO version for Meyer Tool - July 11, 2007.

32	7102-058 (SH. 5)	1" OD TUBE III	1				
31	7102-058 (SH. 5)	2" OD TUBE II	1				
12	7102-058 (SH. 2)	1/4" WELD COUPLING	11				PUR & MODIFIED
11	7102-058 (SH. 2)	1/4" OD TUBE STUB	11				
10	PUR.	2-1/8" CF 1" TUBE Rotatable Flange, 316L S.S.	1				VARIAN'S F0212-0100-RC OR EQUIV.
9	7102-058 (SH. 2)	1" TUBE TO FLANGE	1				
5	PUR.	1"OD, 90 DEG. ELBOW, 316L S.S.	2				VARIAN'S WE90100 OR EQUIV.
4	PUR.	2" OD TO 1" OD CONICAL REDUCER, 316L St.St.	1				VARIAN'S WRC200100 OR EQUIV.
3	7102-058 (SH. 2)	2" END CAP	1				
40	7102-058 (SH. 6)	RIGHT INNER 80K COOLING PIPE ASM	1	X			

		ITEM		DWG. NO.		DESCRIPTION		G1		G2		G3		REMARKS		REV.	
								QUANTITY									
		PRINT DISTR.		PLOT DATE: 9/24/2007 CAD FILE NAME: 7102-058.idw													
7102-058 SH. NO. 6 OF 6		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 		<div> </div> <div>CORNELL UNIVERSITY Floyd R. Newman Laboratory Ithaca, NY 14853</div> <div>ERL Injector Cryomodule 80K Cooling Pipes Right Inner 80K Cooling Pipe Assembly Details</div>											
		CHECKED BY: EPC		DRAWN BY		DRAWN FOR		DATE		SCALE				7102-058		REV.	
		APPROVED BY: EPC		RHE/Di		M.Liepe		9/6/2006						SH. NO. 6 OF 6			

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