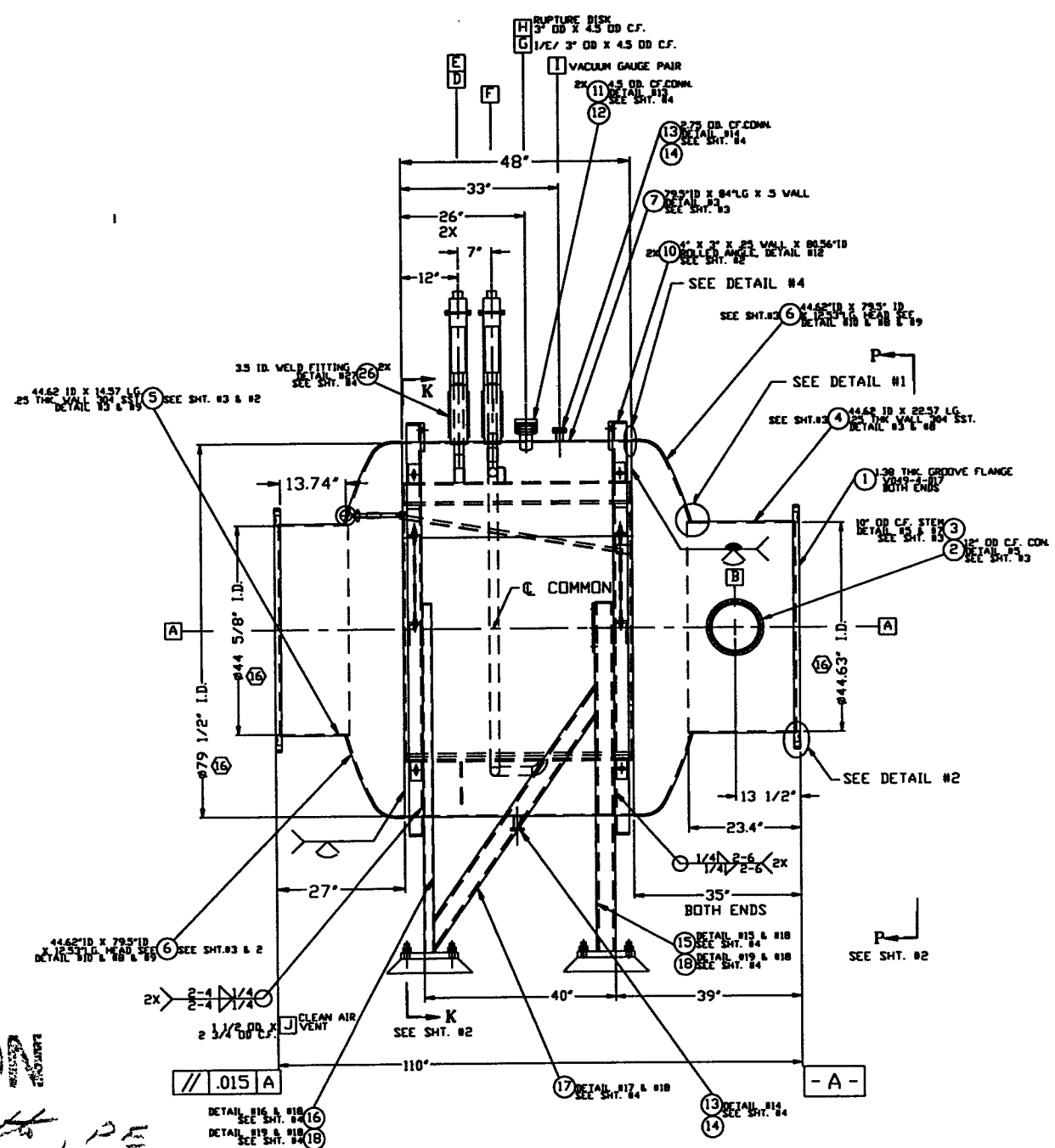
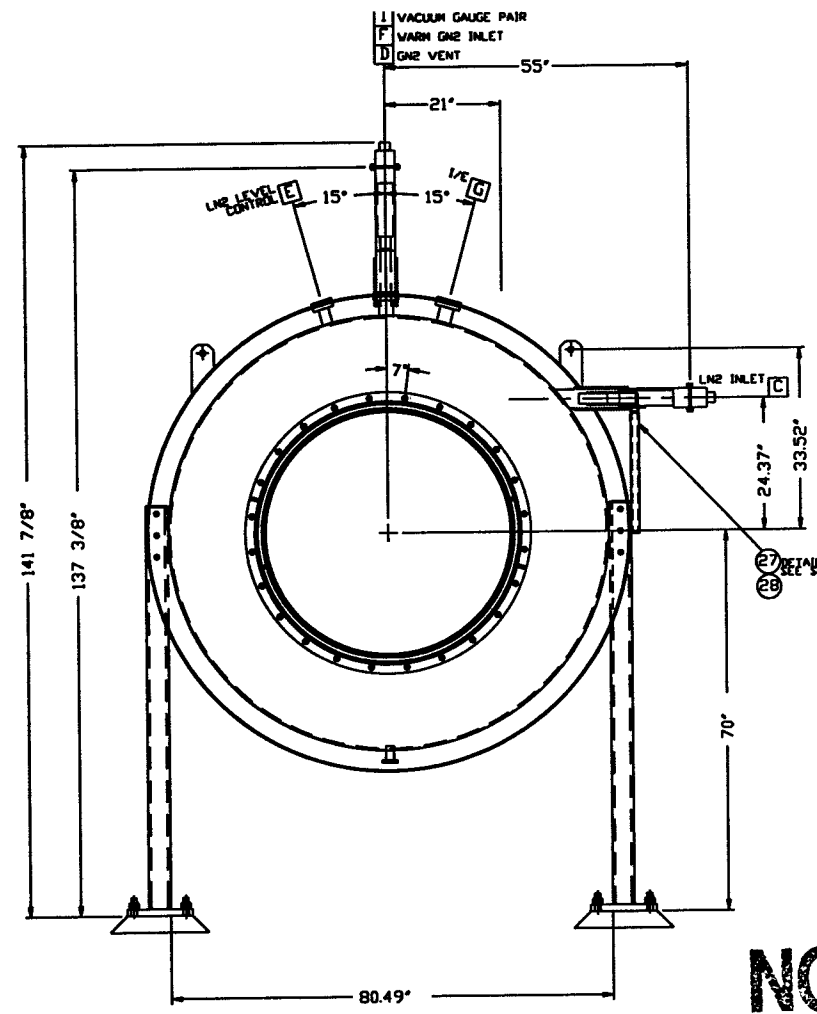


NOZZLE SCHEDULE				NOZZLE TYPE						WELD TYPE					NOZZLE DATA				WELD DATA							
MARK	QTY	SIZE	RATING	TYPE	DESCRIPTION	TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	NOZZLE TYPE I	NOZZLE TYPE II	NOZZLE TYPE III	NOZZLE TYPE IV	WELD TYPE 1	WELD TYPE 2	WELD TYPE 3	WELD TYPE 4
A	2	44.63" I.D.		SEE NOTE #1 & #2	LASER BEAM / ACCESS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA								
B	1	10" OD TUBE		1 1/2" OD CONFLAT W/BLIND FLANGE	PUMPOUT PORT																					
C	1	1/2" x 2"		VAC. JACKET W/ BAYONET BLIND	LN2 INLET																					
D		1 1/2" x 1 1/2"		VAC. JACKET W/ BAYONET BLIND	GN2 VENT																					
E		2" OD TUBE		PANT LEG	LN2 LEVEL CONTROL																					
F	1	1 1/2" x 1 1/2"		VAC. JACKET W/ BAYONET BLIND	WARM GN2 INLET																					
G	1	2 1/2" OD TUBE		1 1/2" OD CONFLAT W/BLIND FLANGE	1/E FEED THRU																					
I	1	1 1/2" OD TUBE		2 3/4" OD CONFLAT W/BLIND FLANGE	VACUUM GAUGE PAIR																					
J	1	1 1/2" OD TUBE		2 3/4" OD CONFLAT W/BLIND FLANGE	PURGE AIR																					
H	1	2" OD TUBE		5 3/8" OD CONFLAT W/BLIND FLANGE	RUPTURE DISC.																					

WELDING PROCEDURES					
VPS No.	PROCESS	MATERIAL	VPS No.	PROCESS	MATERIAL

DESIGN DATA	
CORROSION ALLOWANCE:	0
POSTWELD HEAT TREATMENT:	MBS
FIREPROOFING:	N.A.
RADIOGRAPHING:	NONE
MATERIALS	
HEADS:	SA 240-304L
SHELL:	SA 240-304, 304L
FLANGES:	SA 182 GRADE F, 304L
PIPE NECKS:	SA 312-304L; SA 240-304L
REINFORCING:	SA 240-304L
BOLTS & NUTS:	SA 193-B7
WEIGHTS:	
ASSEMBLED WT=6300 LB.	



**NOT FOR CONSTRUCTION**  
*Raymond A. Smith, PE*  
 5/17/96

- LEAK TEST & METHOD PER PSI SPEC: V049-2-014, BY PSI.
  - CERTIFIED MANUFACTURER'S MATERIAL TEST REPORTS REQUIRED.
  - FLANGE BOLT HOLES TO STRADDLE NATURAL CENTERLINES OF VESSEL. UNLESS NOTED.
  - CLEAN PER SPEC: V049-2-015
  - ALL NOZZLES TO BE CONTOURED TO INSIDE DIAMETER OF SHELL OR TO CURVATURE OF HEAD, UNLESS OTHERWISE NOTED.
  - DO NOT USE CARBON STEEL BRUSHES OR BRUSHES CONTAMINATED WITH CARBON STEEL ON STAINLESS OR ALUMINUM MATERIAL. GRINDING TO INTERNAL VACUUM BOUNDARY SURFACES IS NOT ALLOWED.
  - DIMENSIONS SHOWN IN PARENTHESES ARE IN MILLIMETERS.
  - HEADS ARE ASME F&D.
  - CHAMBER FABRICATION TO BE IN ACCORDANCE WITH SPEC: V049-2-096
  - FOR FLANGE DETAILS SEE DWG: V049-4-017
  - THESE FLANGES EACH INCLUDE AN ANNUAL CHANNEL BETWEEN O-RINGS, MANIFOLD TO A SINGLE PUMPOUT PORT ON EACH CHAMBER.
- ## 1 REGISTERED TRADEMARK, VARIAN VACUUM PRODUCTS; COMPATIBLE ALTERNATIVES ARE ACCEPTABLE.

HOLD  
 LIGO D961096-00-V

SYMBOL	CHARACTERISTIC	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	TOLERANCES: FUNCTIONAL ± J ANGULAR/CHAM 30°-30° BOTH ± 2° TWO PLACE DECIMAL ± .03 THREE PLACE DECIMAL ± .015 FINISHED SURFACE RING ± 3 BREAK CORNERS IN OUT-REMOVE ALL BURRS	DO NOT SCALE THIS DRAWING	ISSUED FOR FDR	REV	DESCRIPTION	CHKD	DRWN	DATE	DECOR	SCALE	SHEET	REV
□	FLATNESS													
○	CYLINDRICITY													
∥	PARALLELISM													
⊥	PERPENDICULARITY													
∠	ANGULARITY													
⊕	TRUE POSITION													
⊙	CONCENTRICITY													

**PROCESS SYSTEMS INTERNATIONAL INC.**  
 20 WALUP DR. WESTBOROUGH, MASSACHUSETTS 01581 USA

**80K CRYO PUMP, SHORT GENERAL ARRANGEMENT LIGO VACUUM EQUIPMENT**

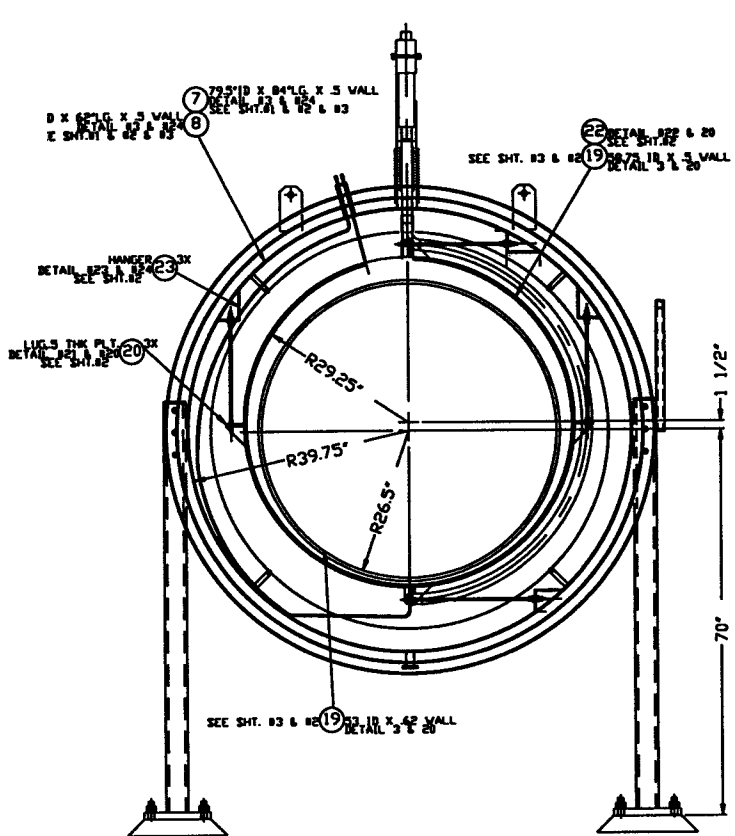
CAB FILE 49400551    SIZE D    DWG NO. V049-4-005    REV. 0

DATE 5/6/96    DECOR

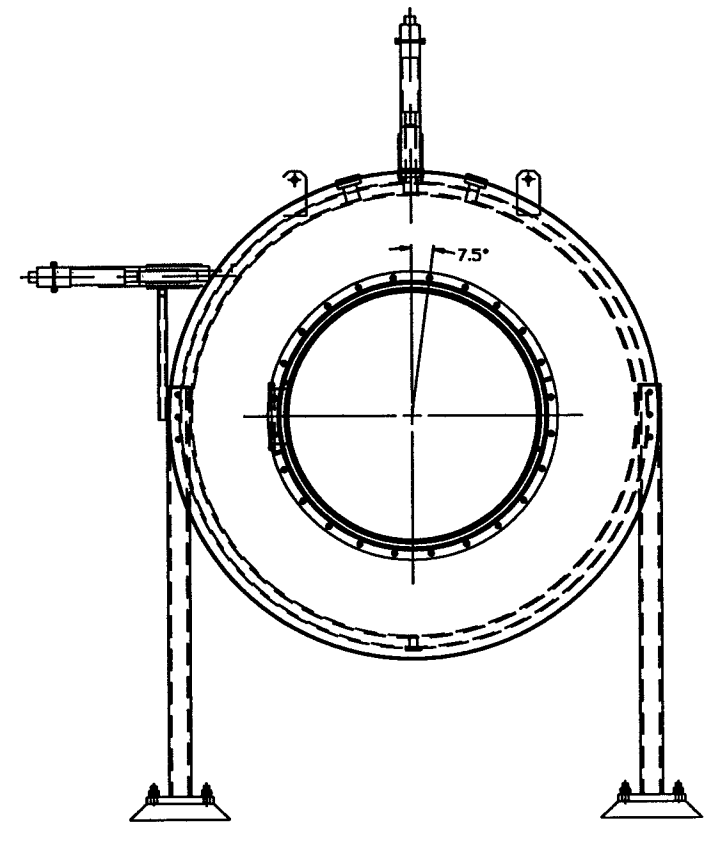
SCALE NONE    SHEET 1 OF 5

**UNCLASSIFIED AND CONFIDENTIAL**

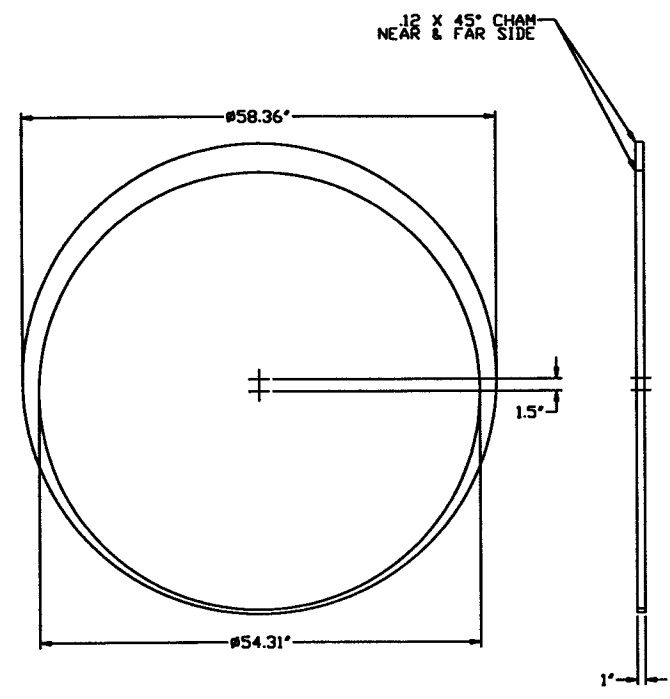
THIS DRAWING CONTAINS PROPRIETARY INFORMATION BELONGING TO PROCESS SYSTEMS INTERNATIONAL, INC. OR ITS COMPANIES AND SHALL BE USED ONLY FOR THE PURPOSE FOR WHICH IT WAS SUPPLIED. IT SHALL NOT BE COPIED, REPRODUCED OR OTHERWISE USED, NOR SHALL SUCH INFORMATION BE FURNISHED IN WHOLE OR IN PART TO OTHERS EXCEPT IN ACCORDANCE WITH THE TERMS OF ANY AGREEMENT UNDER WHICH IT WAS SUPPLIED OR WITH THE PRIOR WRITTEN CONSENT OF PROCESS SYSTEMS INTERNATIONAL, INC. AND SHALL BE RETURNED UPON REQUEST.



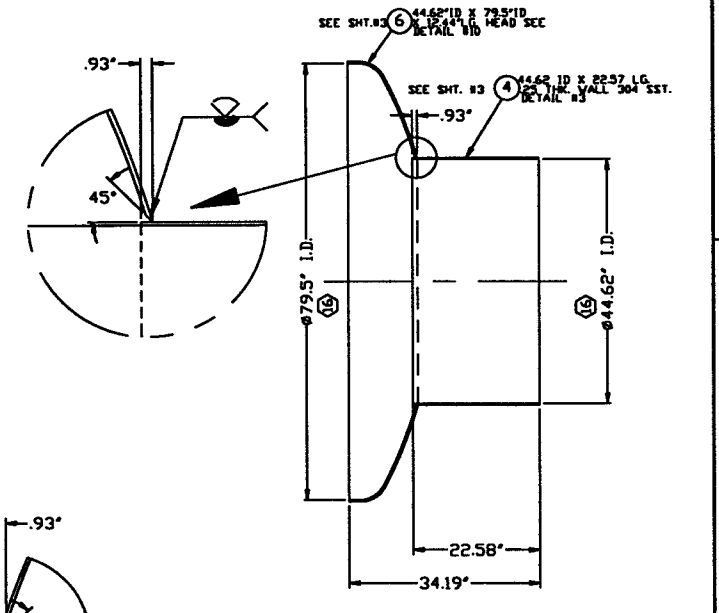
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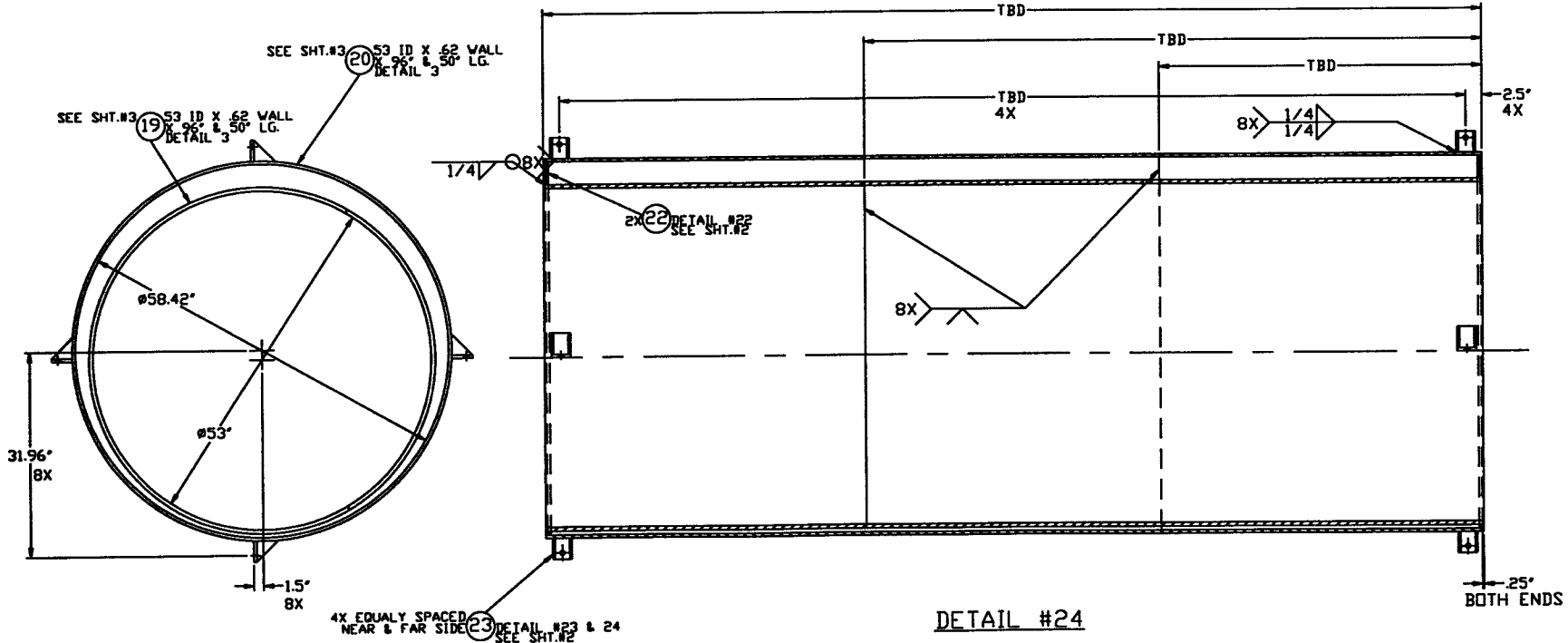
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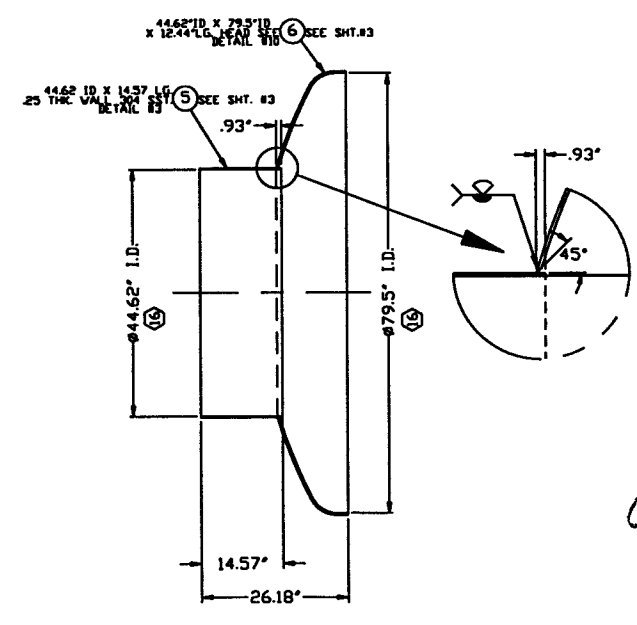
DETAIL #22  
RING SPACER  
EXC. ALU. 6061



DETAIL #8  
FROM SHT.#1



DETAIL #24



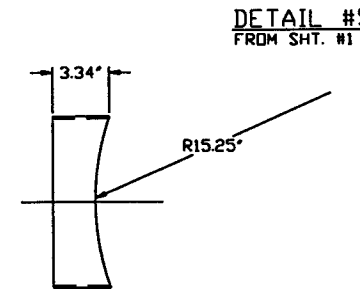
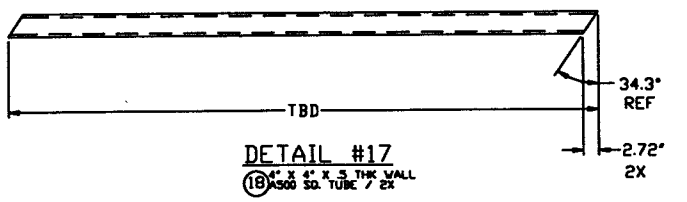
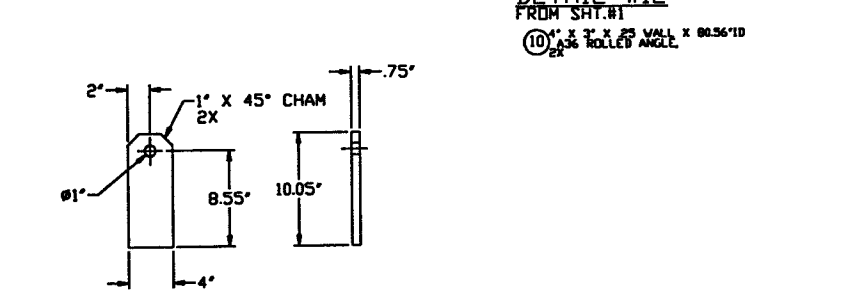
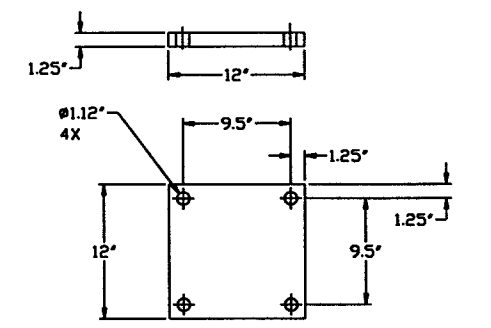
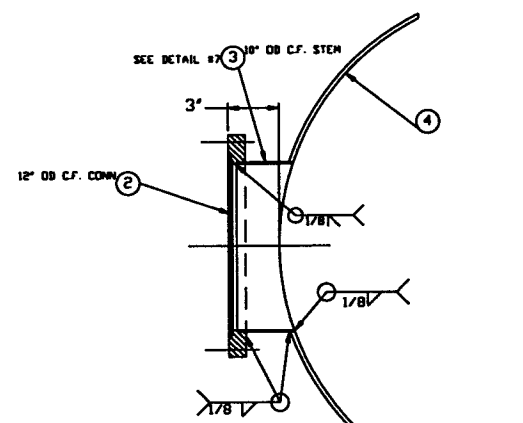
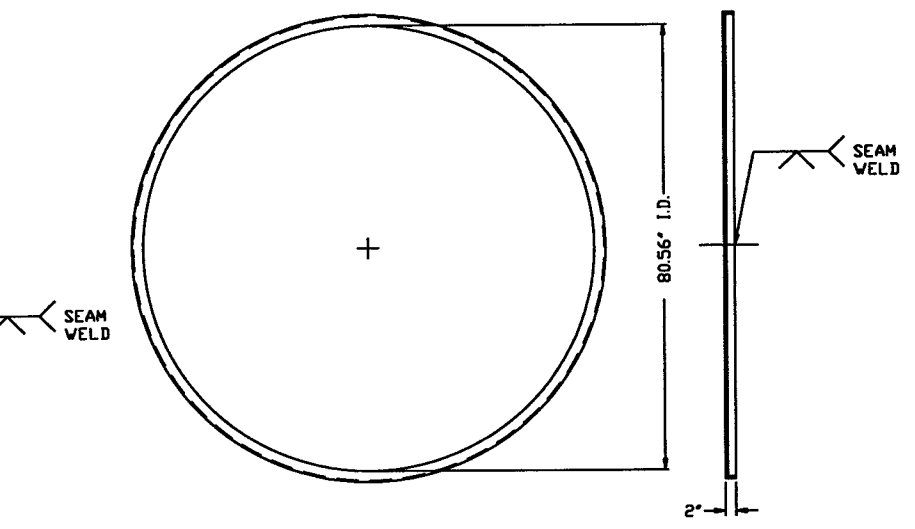
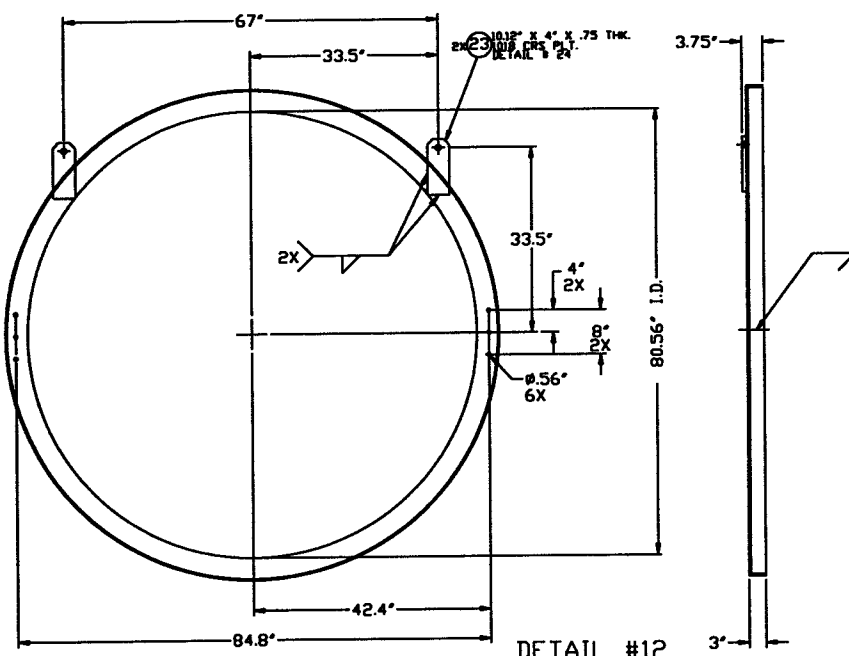
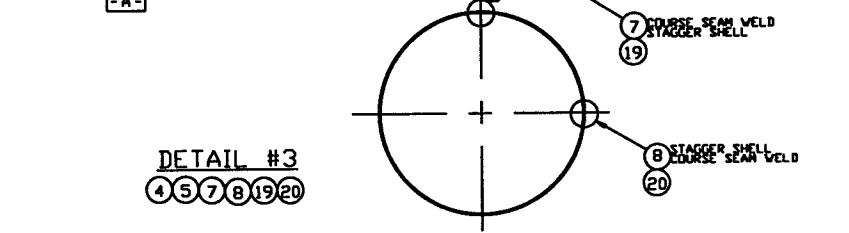
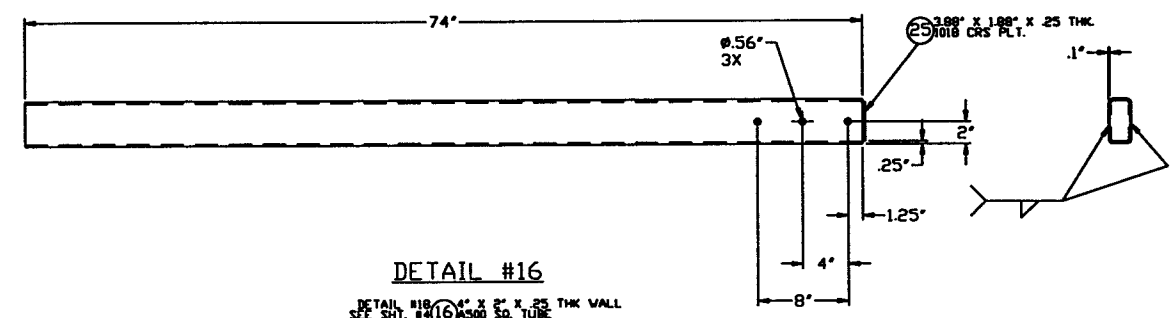
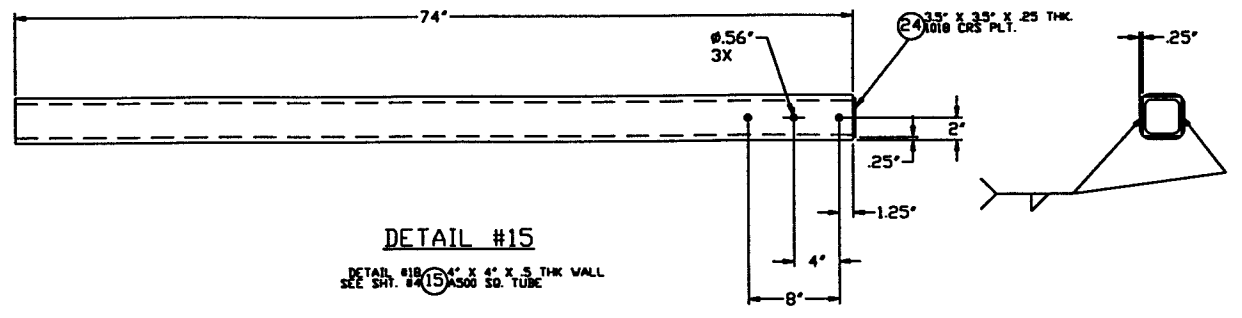
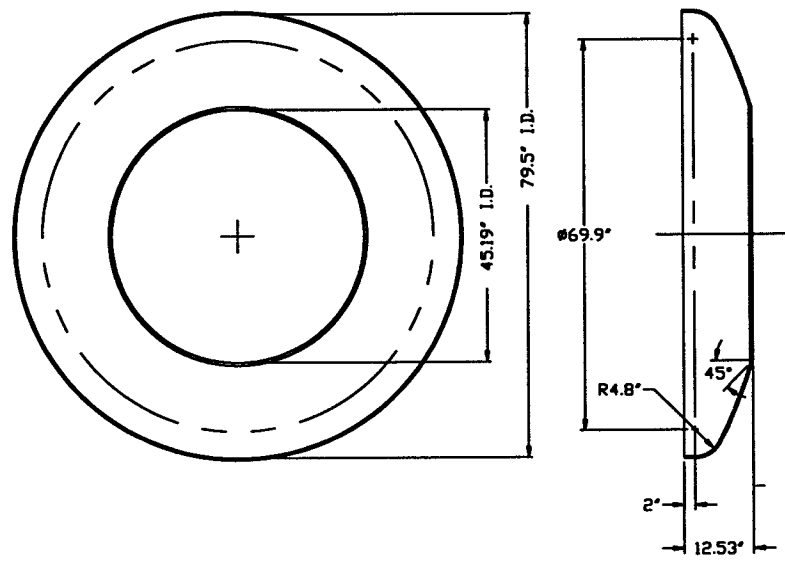
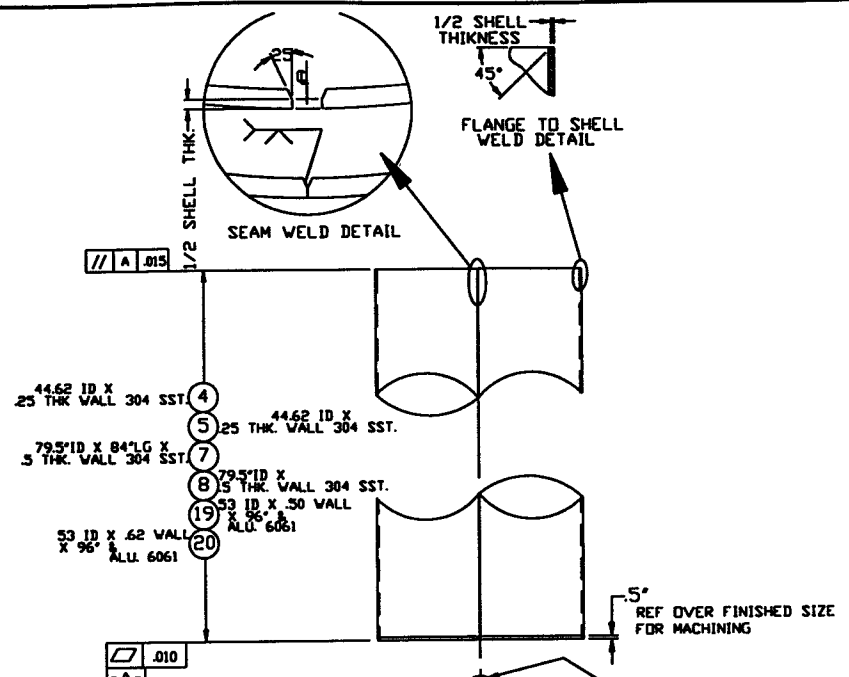
DETAIL #9  
FROM SHT.#1

**NOT FOR CONSTRUCTION**  
*Raymond D. Latta, PE*  
 5/7/96  
 LIGD 0961096-00-V  
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14060

<b>PROCESS SYSTEMS INTERNATIONAL INC.</b> 20 WALJUP DR. WESTBOROUGH, MASSACHUSETTS 01581 USA			
<b>80K CRYO PUMP, SHORT GENERAL ARRANGEMENT LIGD VACUUM EQUIPMENT</b>			
CAD FILE 494005S2	SIZE D	ENG. NO. V049-4-005	REV. 0
SCALE NONE	SHEET 2 OF 5		

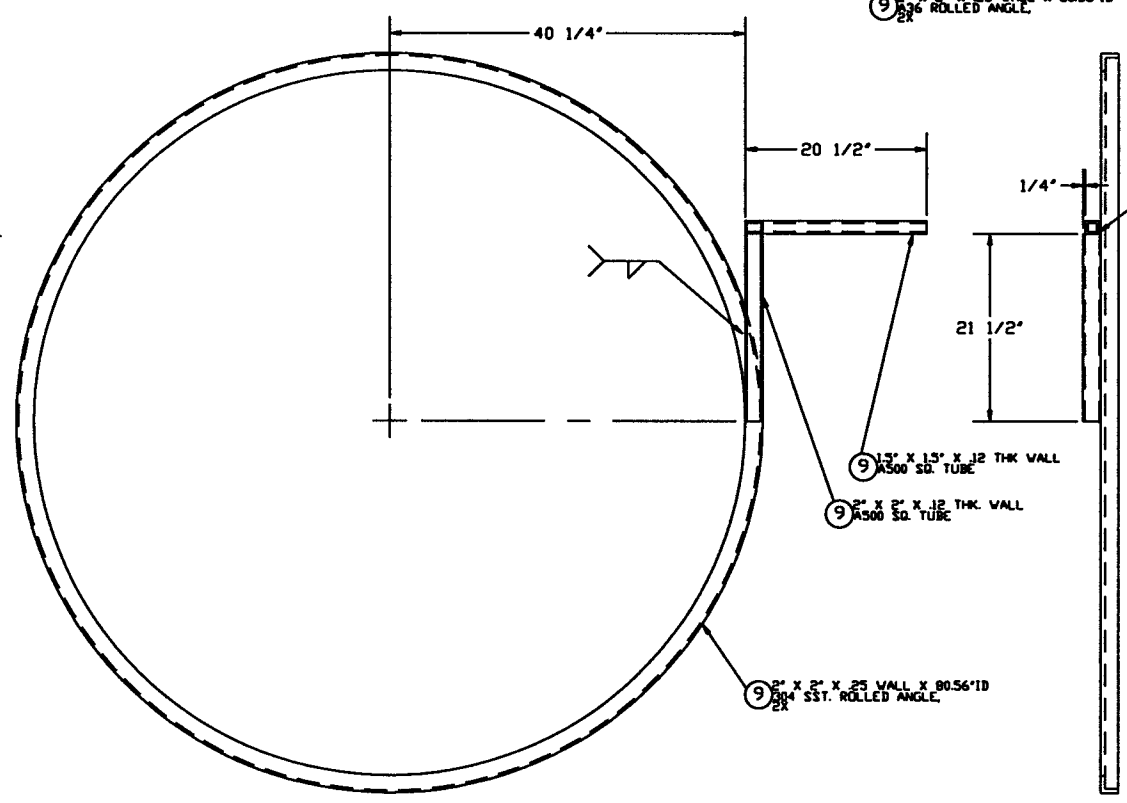
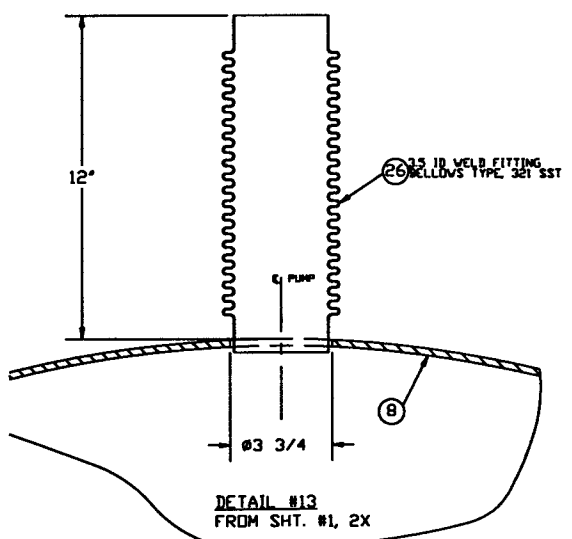
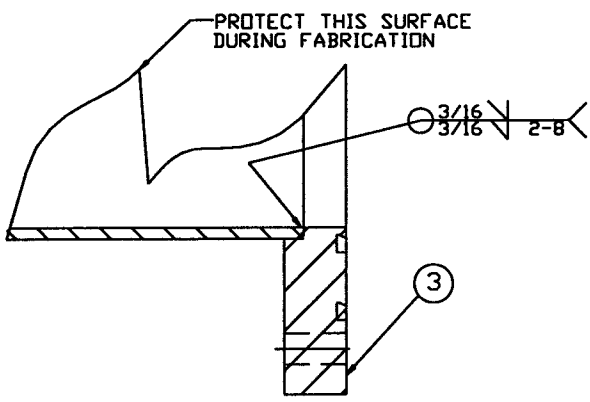
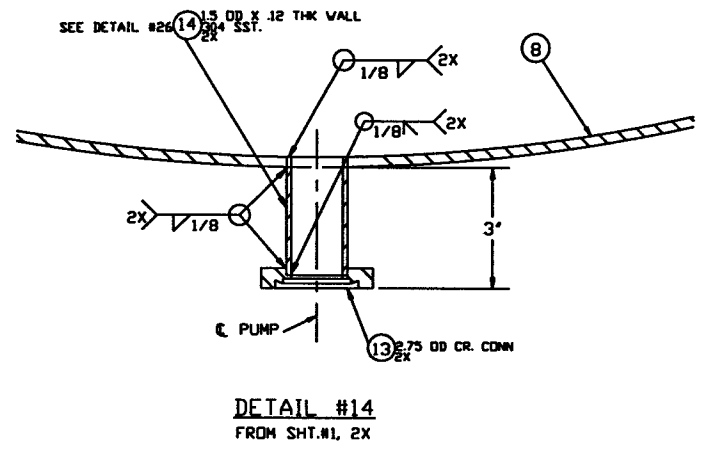
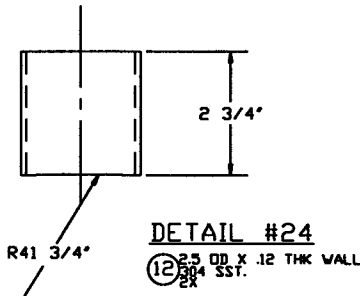
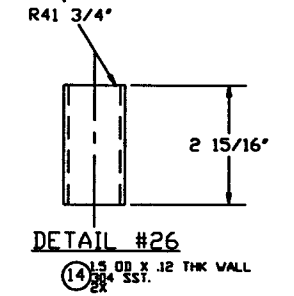
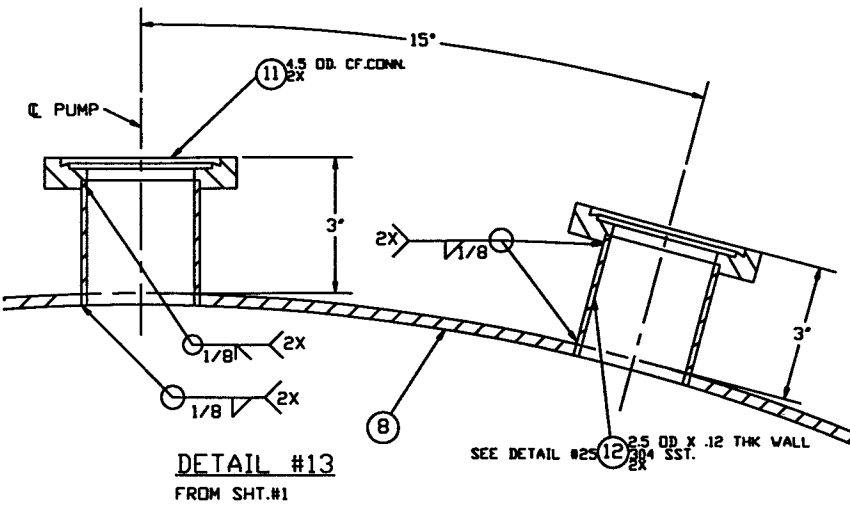
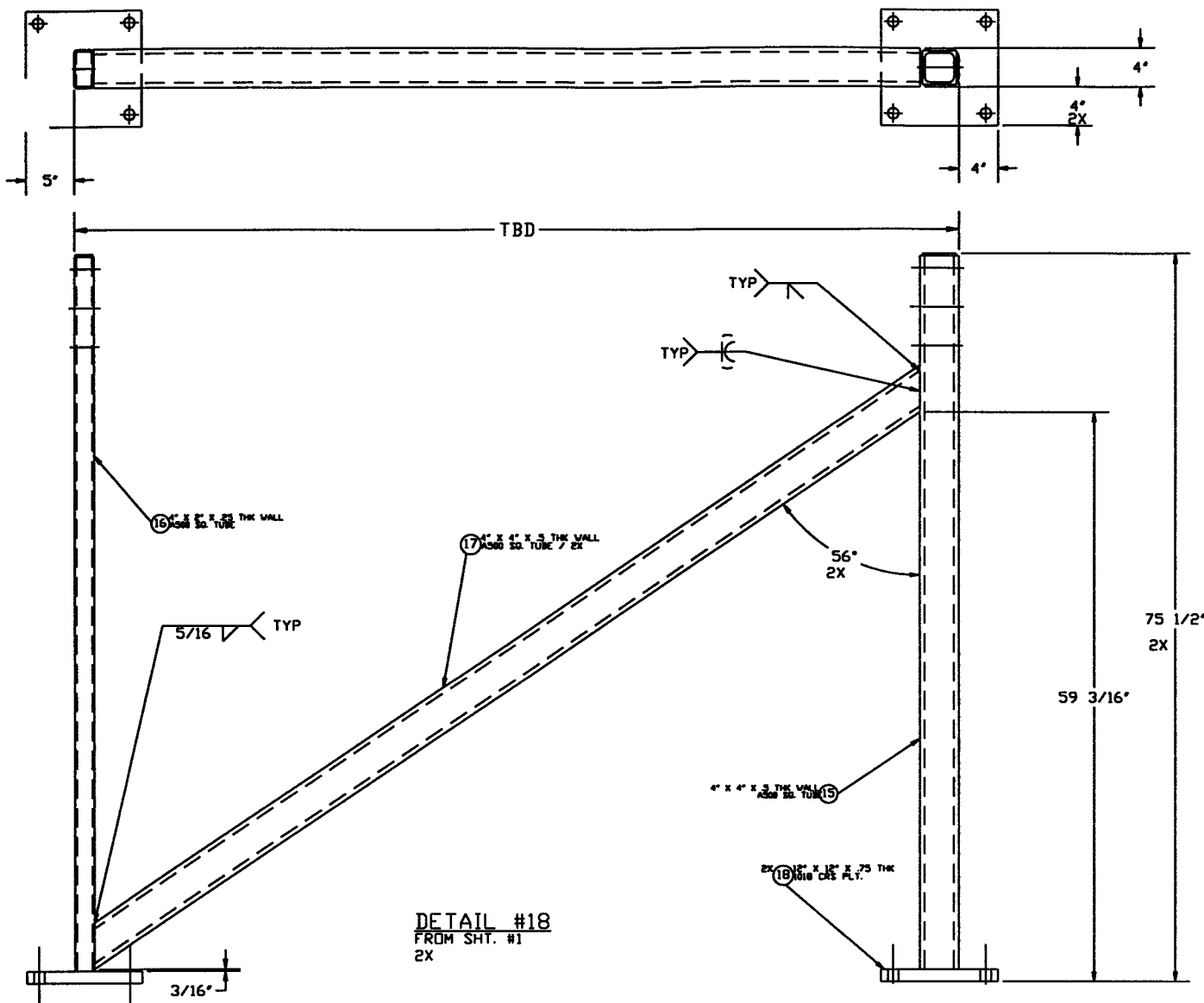
DEC 07, 1994 - 11:53:34



DETAIL #19  
 DETAIL #18 12" x 12" x .75 THK  
 SEE SHT. #4 1018 CRS PLT.  
*Raymond D. Gatto, PE*  
 5/7/96  
 170LD L100 D961096-00V  
 SEE SHEET 1 FOR REVISIONS

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PROCESS SYSTEMS INTERNATIONAL INC. 20 WALJUP DR. WESTBOROUGH, MASSACHUSETTS 01581 USA			
80K CRYO PUMP, SHORT GENERAL ARRANGEMENT LIGO VACUUM EQUIPMENT			
CAB FILE 4940053	SIZE D	ENG. NO. V049-4-005	REV. 0
SCALE NONE	SHEET 3 OF 5		

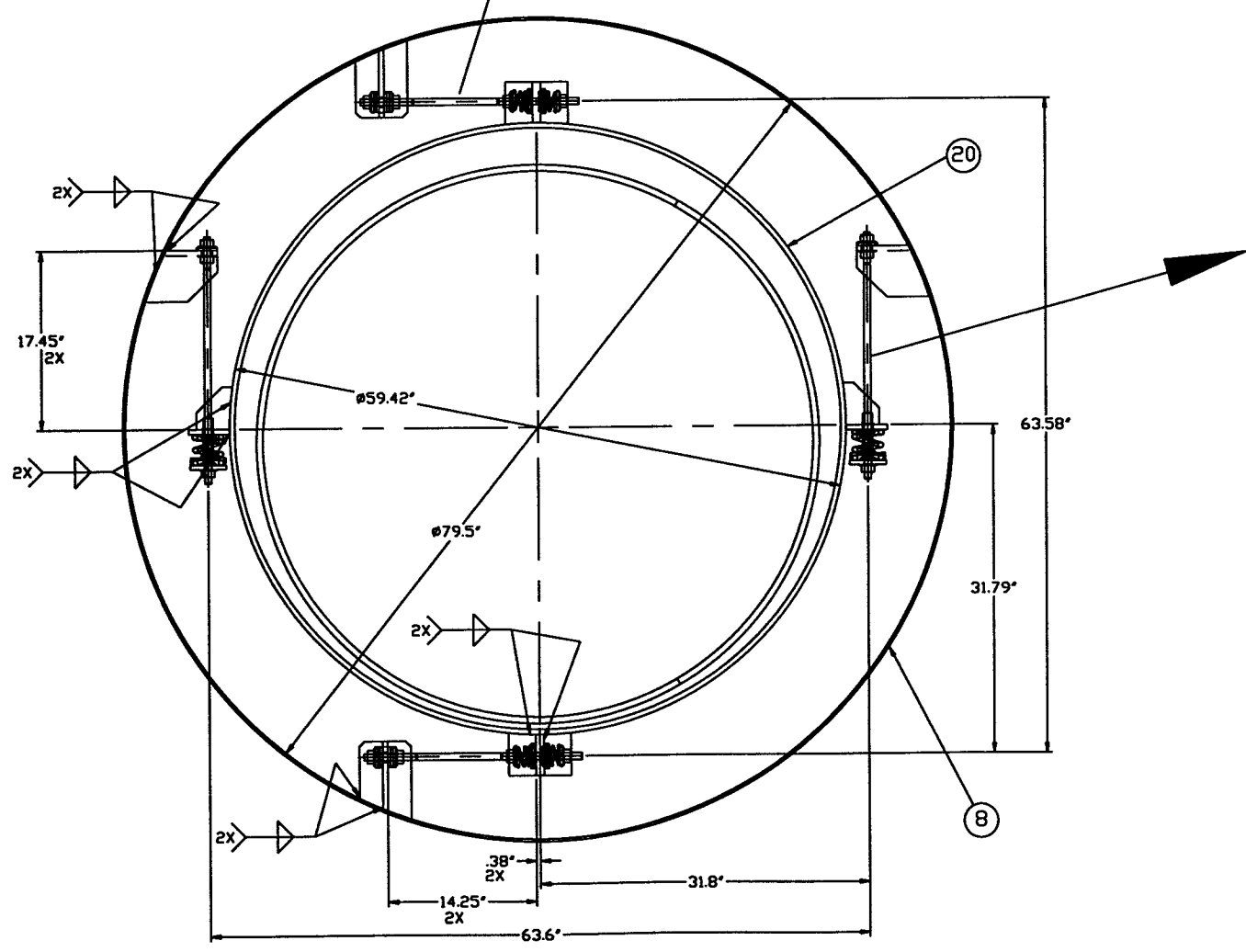
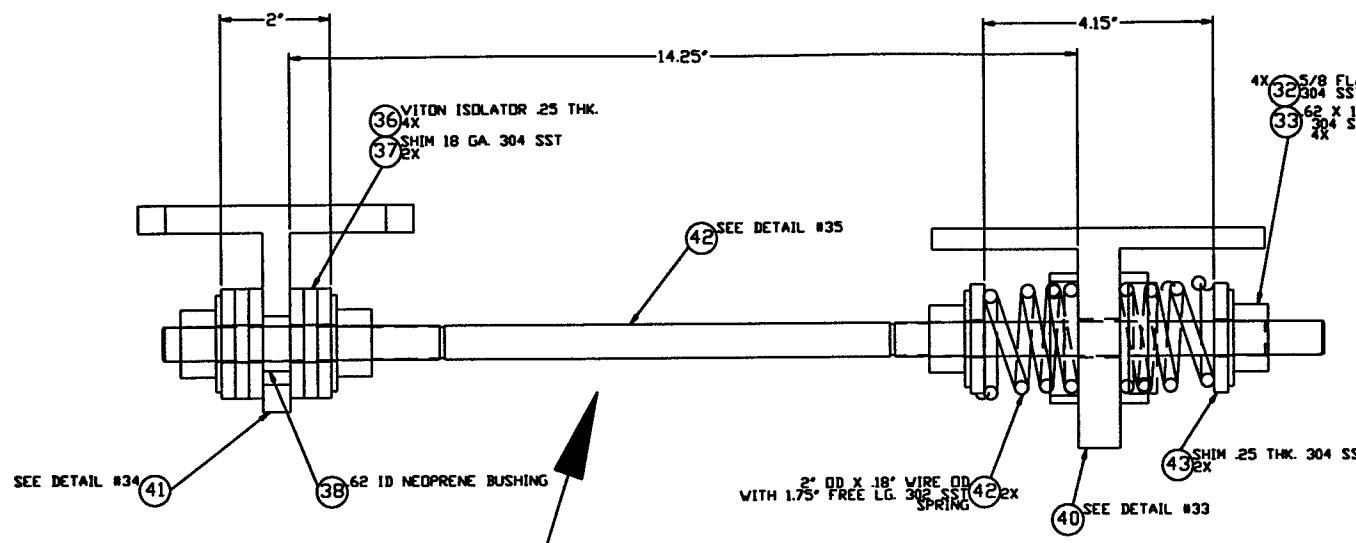


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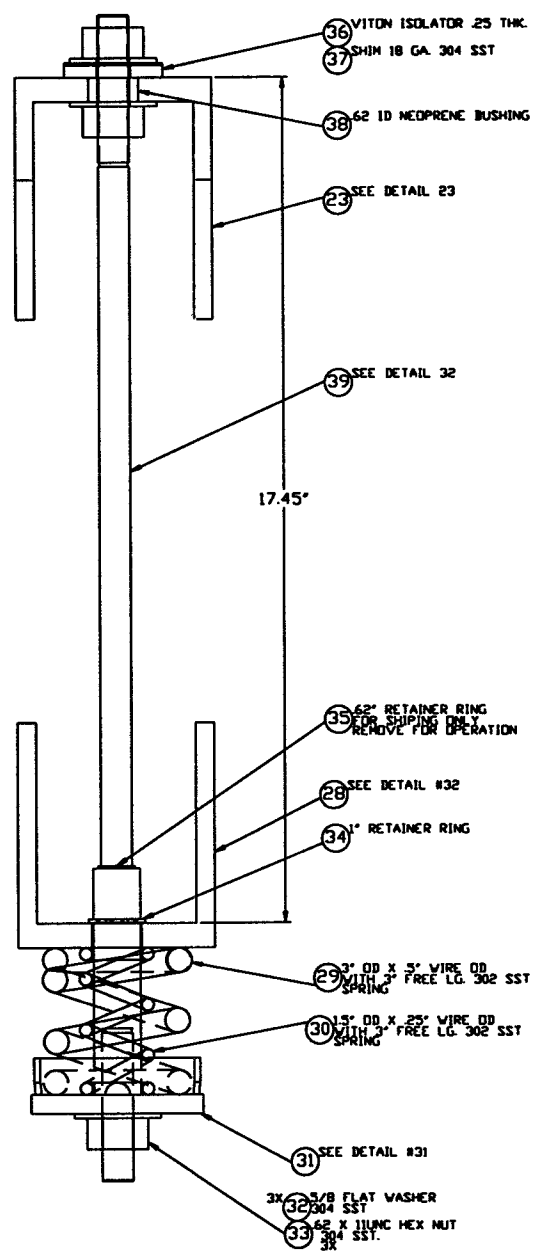
*Raymond O. Latta, PE*  
5/7/96  
HOLD  
LIGO 0961096-00-V  
SEE SHEET 1 FOR REVISIONS

<b>PROCESS SYSTEMS INTERNATIONAL, INC.</b> 20 WALRUP DR. WESTBOROUGH, MASSACHUSETTS 01581 USA			
<b>80K CRYO PUMP, SHORT GENERAL ARRANGEMENT LIGO VACUUM EQUIPMENT</b>			
CAD FILE 494005S4	SIZE D	FIG. NO. V049-4-005	REV. D
SCALE NONE	SHEET 4 OF 5		

DEC 07, 1994 - 1165034



DETAIL #30  
FROM SHT.#2, 2X



**NOT FOR  
CONSTRUCTION**

*Raymond S. Lutterbie*  
5/10/96

17000  
LIGO D96109-00-V  
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<b>PROCESS SYSTEMS INTERNATIONAL INC.</b> 20 WALKUP DR. WESTBOROUGH, MASSACHUSETTS 01581 USA			
<b>80K CRYO PUMP, SHORT GENERAL ARRANGEMENT LIGO VACUUM EQUIPMENT</b>			
CAD FILE 49400SS	SIZE D	FIG. NO. V049-4-005	REV 0
SCALE NONE	SHEET 5 OF 5		

DSC 07-1994 - 115634