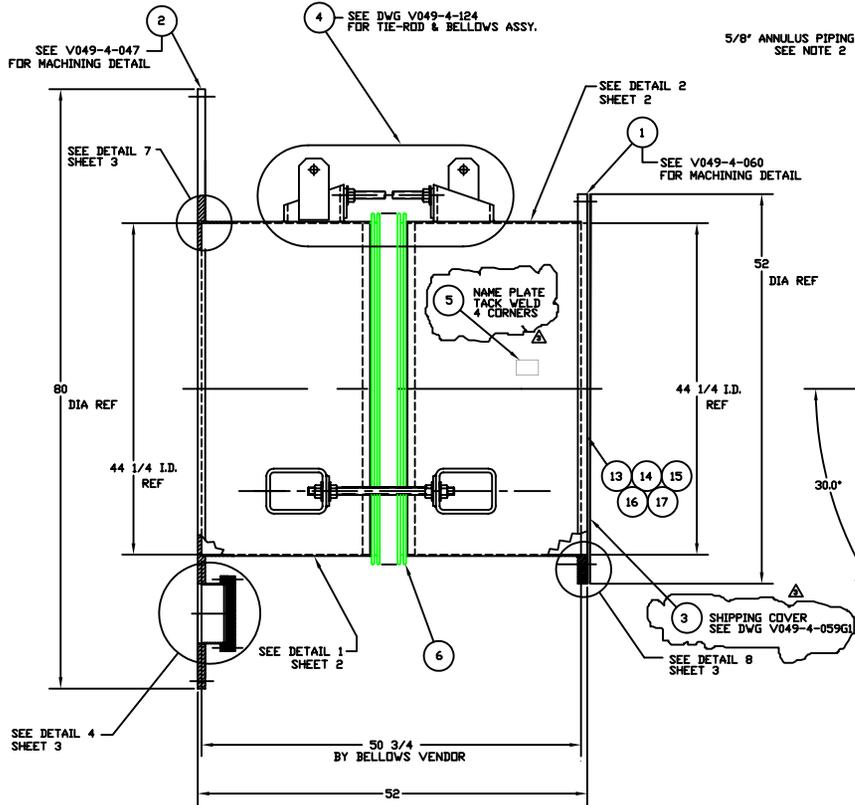


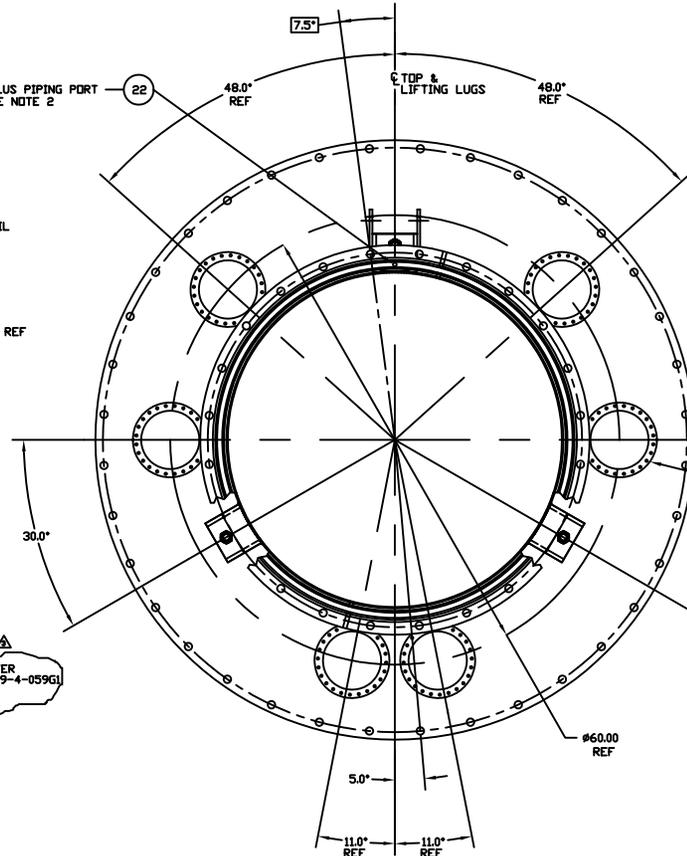
**ADVANCED LIGO VACUUM EQUIPMENT PROCUREMENT**

**TYPICAL SPOOL DRAWING PACKAGE**

**DRAWING: LIGO\_D0902633-v1**



5/8" ANNULUS PIPING PORT  
SEE NOTE 2



ITEM	PART NUMBER	SUFFIX	QTY	UM	DESCRIPTION
1	V0494060		1	EA	FLANGE, GROOVED, 44 1/4" ID X 52" O.D.
2	V0494047		1	EA	FLANGE, FLAT FACE, 44 1/4" ID X 80" OD
3	V0494059G1		1	EA	SHOPPING COVER ASSY
4	XXXX		3	EA	TIE-ROD ASSY. (PER V049-4-124)
5	V049W740		1	EA	PSI NAME PLATE, 2" X 3"
6	V0494A1P1		1	EA	BELLOWS ASSY. (PER V049-2-017)
7	V049N3E1		3	EA	HALF NIPPLE, SST 304L, CONFLAT, 10" OD X 8" OD TUBE
8					
9					
10	202667		3	EA	FLANGE, CONFLAT, BLANK 10" OD
11					
12					
13	202678		3	EA	BOLT, SA193 B7, HEX, 7/8-9 UNC X 4" LG.
14	202679		3	EA	NUT, SA194 B7, HEX, 7/8-9 UNC
15	202681		3	EA	WASHER, STL, 1 3/4" OD X 15/16" ID X 1/4" THK
16	V049W026		1	EA	O-RING, VITON (PER SPEC V049-2-045)
17	V049W027		1	EA	O-RING, VITON (PER SPEC V049-2-045)
18	202671		3	EA	GASKET, COP DPHC COFC, CONFLAT, 10" OD
19	V049W777		144	EA	BOLT, 18-8 SST, HEX HD, 5/16-18x2 1/2" LG.
20	V049W782		144	EA	NUT, SILICON BRZ, HEX 5/16-18
21	V049W785		288	EA	WASHER, 18-8 SST, FLAT 5/16
22	V049W061		1	EA	3/4" O.D. ELBOW X 2 3/4" O.D.C.F.

XXX ELECTROLESS NICKEL PLATED  
SUPPLIED BY BELLOWS VENDOR

ALL CONFLATS TO SHOW BOLT HOLES STRADDLING VERTICAL C/L SEE NOTE 15

- NOTES:
- CONFLAT LEAK CHECK SLOTS ARE TO BE POSITIONED ON VERTICAL CENTERLINE.
  - CONFLAT FLANGES ARE TO HAVE PROTECTIVE COVERS AT ALL TIMES DURING & AFTER MANUFACTURING.
  - PLATES PRIOR TO ROLLING MUST HAVE DIAGONAL CORNER TO CORNER DIMENSIONS WITHIN 1/16" OF EACH OTHER.
  - EACH FINISHED SHELL IS TO BE MARKED WITH A SEQUENTIAL PSI SERIAL NUMBER. THE NUMBER IS TO BE MADE FROM THE DRAWING PLUS THE SEQUENTIAL NUMBER. V0494A1-01, 02 ETC.
  - TIGHTEN TIE-ROD NUTS WITH BELLOWS IN "FREE" POSITION TO 100 FT-LB PRIOR TO LEAK TEST
  - LEAK TEST & METHOD PER PSI SPEC V049-2-014
  - CERTIFIED MANUFACTURER'S MATERIAL TEST REPORTS REQUIRED, AS NOTED.
  - BOLT HOLES OF ALL FLANGES TO STRADDLE VERTICAL CENTERLINE ±0.015.
  - CLEAN PER SPEC V049-2-015
  - DO NOT USE CARBON STEEL BRUSHES OR BRUSHES CONTAMINATED WITH CARBON STEEL ON STAINLESS OR ALUMINUM MATERIAL.
  - SPINDLE FABRICATION TO BE IN ACCORDANCE WITH SPEC. V049-2-097.
  - FOR FLANGE DETAILS SEE DWG. V049-4-047 & 060.
  - THIS FLANGE INCLUDES AN ANNULAR CHANNEL BETWEEN O-RINGS FOR A SINGLE PUMPOUT PORT, SEE DWG V049-4-061.
  - WDS NO'S. REFER TO WELD DATA SPEC. V049-2-084.

TAG NO'S: WA-1A, WA-1B, WA-1C, WA-1D, WA-1E, WA-1F  
LA-1A, LA-1B, LA-1C, LA-1D

APPROX. WEIGHT: 1849#

SYMBOL	CHARACTERISTIC	UNLESS OTHERWISE SPECIFIED	ISSUE DESCRIPTION
□	FLATNESS	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN DIMES TOLERANCES: ±.1	3 REISSUED FOR FAB/SHIPPING AS NOTED
○	CYLINDRICITY	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN DIMES TOLERANCES: ±.1	2 DESIGN UPDATE/ISSUED FOR FABRICATION
∥	PARALLELISM	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN DIMES TOLERANCES: ±.1	1 DESIGN UPDATE / FABRICATION (BELLOWS ASSY. ONLY)
⊥	PERPENDICULARITY	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN DIMES TOLERANCES: ±.1	0 ISSUED FOR FAB
∠	ANGULARITY	DO NOT SCALE THIS DRAWING	PI PRELIMINARY
⊙	TRUE POSITION	USED ON	REV DESCRIPTION
⊙	CONCENTRICITY	NEXT ASS'Y.	REV DESCRIPTION

DWG. NO.	DESCRIPTION	DWG. NO.	DESCRIPTION
8		7	REFERENCE DRAWINGS
6		5	
4		3	
2		1	

DATE	BY	CHKD	DRWN	DATE	DESB
5/9/97	SPIDER			4/13/96	MA
11/22/96	PV			4/27/96	DA
9/11/96	REC			9/11/96	DA
4/27/96	REC			4/27/96	DA

DATE	BY	CHKD	DRWN	DATE	DESB
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4/27/96	REC			4/27/96	DA

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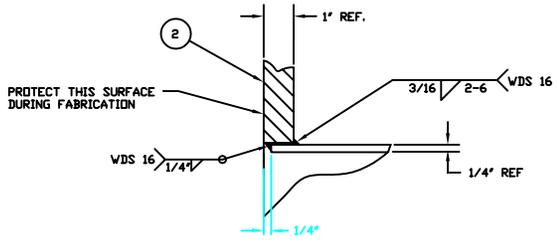
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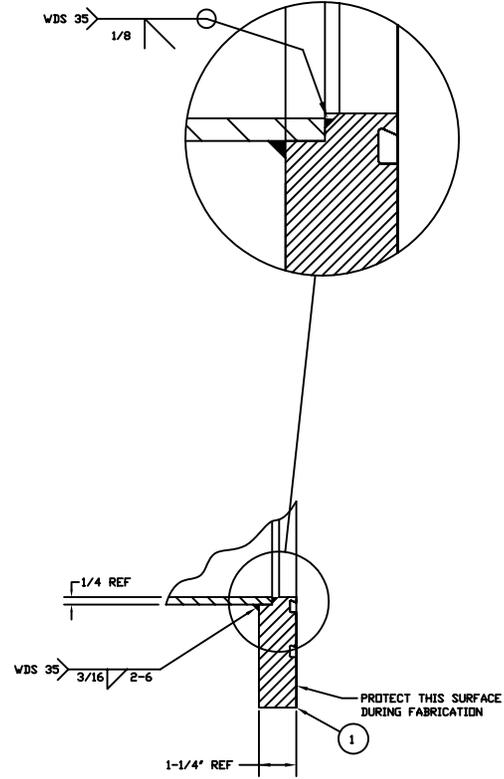
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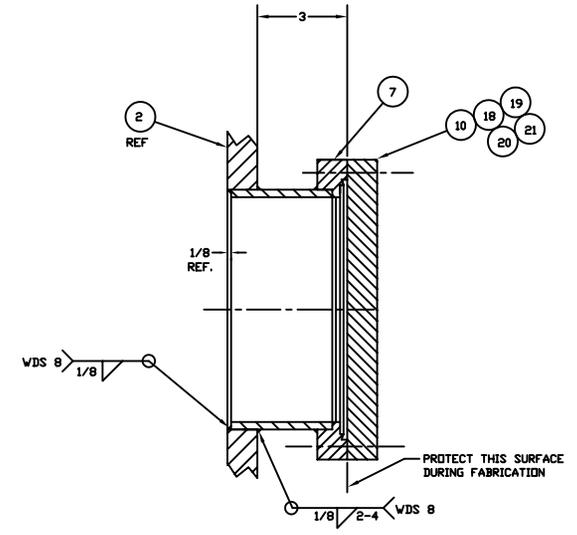
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DETAIL "7"

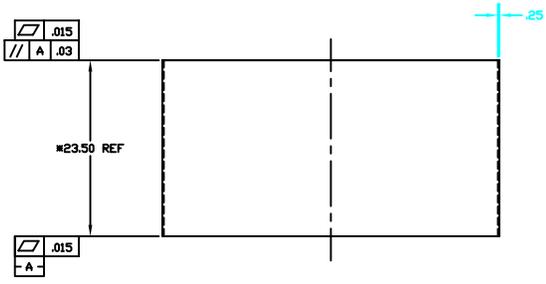


DETAIL "8"

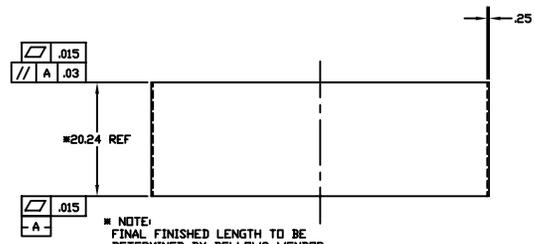


DETAIL 4  
6 PLCS.

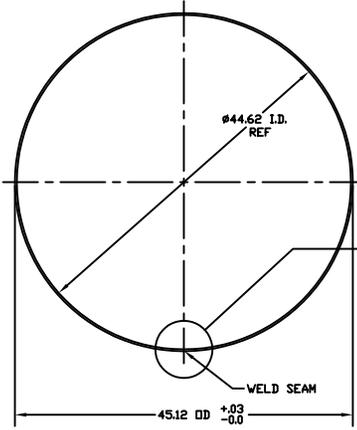
 <b>PROCESS SYSTEMS INTERNATIONAL INC.</b> 20 WALDEN DR. WESTBOROUGH, MASSACHUSETTS 01581 USA			
<b>ADAPTER A-1</b> 44 5/8 I.D. X 72 1/4 I.D. LIQD VACUUM EQUIPMENT			
G&P FILE 4A153	SIZE D	ENGR. NO. V049-4-A1	REV. 3
SCALE AS NOTED	SHEET 1	3 OF 3	



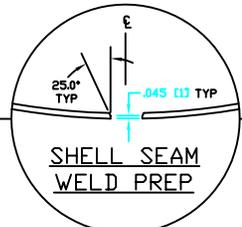
\* NOTE:  
FINAL FINISHED LENGTH TO BE  
DETERMINED BY BELLOWS VENDOR.



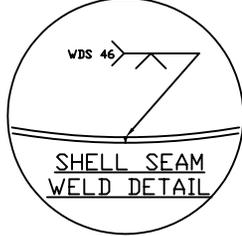
\* NOTE:  
FINAL FINISHED LENGTH TO BE  
DETERMINED BY BELLOWS VENDOR.



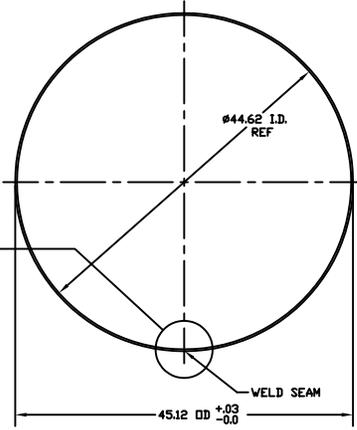
**DETAIL 1**  
QTY: 1  
MAKE FROM V049M159-1



SHELL SEAM  
WELD PREP



SHELL SEAM  
WELD DETAIL



**DETAIL 2**  
QTY: 1  
MAKE FROM V049M159-1

<b>PROCESS SYSTEMS INTERNATIONAL INC.</b> 20 WALSH DR. WESTBOROUGH, MASSACHUSETTS 01581 USA			
ADAPTER A-1 44 5/8" I.D. X 72 1/4" I.D. LIGO VACUUM EQUIPMENT			
CDR FILE 4A152	SIZE D	DWG. NO. V049-4-A1	REV. 3
SCALE AS NOTED	SHEET 1	2 OF 3	