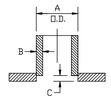
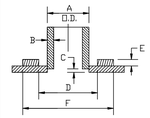
NOZZLE SCHEDULE						NOZZLE TYPE							WELD TYPE						
MARK	QTY	SIZE	RATING	TYPE	DESCRIPTION	TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	
A	2	84 1/4" I.D.		SEE NOTE 2,3	MAJOR ACCESS (SEE DWG. V049-4-127)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B	2	60 1/2" I.D.		SEE NOTE 2,3	LASER BEAM	SEE THIS SHEET													
C	1	14" O.D. TUBE ✱✱✱		16 1/2"O.D. CONFLAT W/ BLIND FLANGE	AIR SHOWERS (SEE DWG. V049-4-142)	I	14.0	.120	1/4				1	1/8"	SEE V049-4-128 SEE DETAIL #9 SHEET #1				
D	8	10" O.D. TUBE ✱✱✱		12"O.D. CONFLAT W/ BLIND FLANGE	ELEC./INSTR. FEEDTHROUGHS, UTILITY	I	10.0	.120	1/4				1	1/8"	SEE V049-4-128 SEE DETAIL #9 SHEET #1				
E	4	12" O.D. TUBE		14"O.D. CONFLAT W/ BLIND FLANGE	SUPPORT BEAM	I	12.0	.120	1/4				1	1/8"	SEE V049-4-128 SEE DETAIL #9 SHEET #1				
F	10	8" O.D. TUBE ✱✱✱		10"O.D. CONFLAT W/ BLIND FLANGE	OBSERVATION PICKOFFS (DWG. V049-4-127)	I	8.0	.250	3/16				1	3/16	SEE V049-4-127 SEE DETAIL #26 SHEET #1				
G	1	2 1/2" O.D. TUBE		4 1/2" O.D. CONFLAT W/ BLIND FLANGE	ANNULUS AUX. TURBO PUMPOUT PORT (SEE DWG. V049-4-054)														

NOZZLE DATA

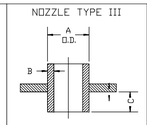
NOZZLE TYPE I



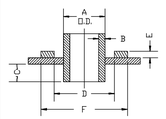
NOZZLE TYPE II



NOZZLE TYPE III

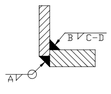


NOZZLE TYPE IV

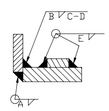


WELD DATA

WELD TYPE 1

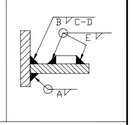


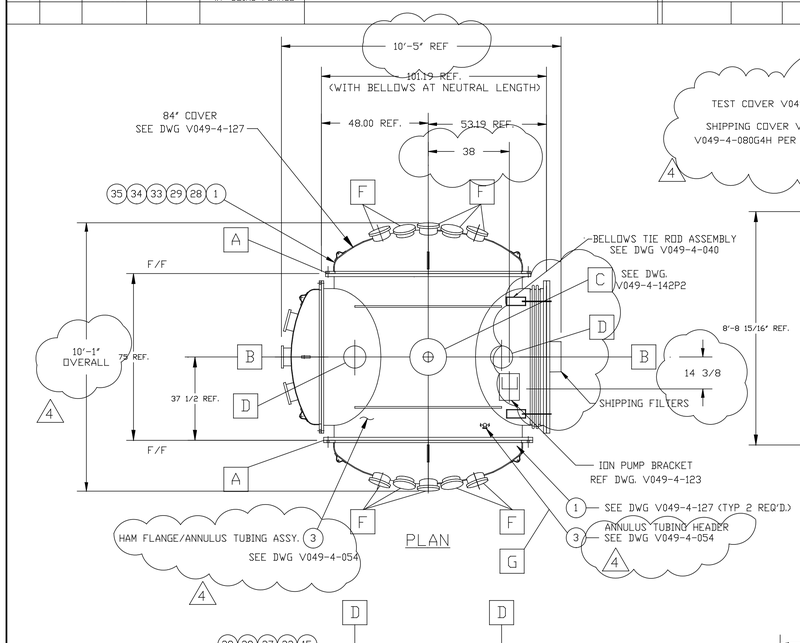
WELD TYPE 2

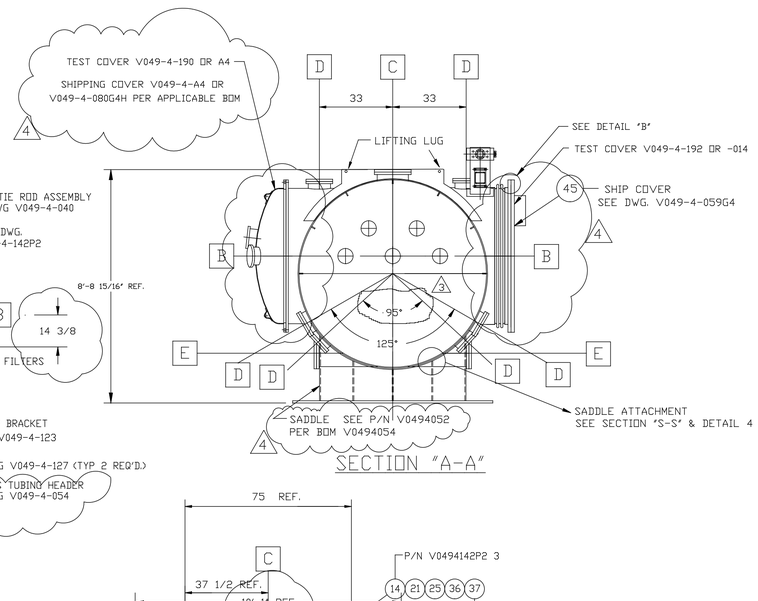


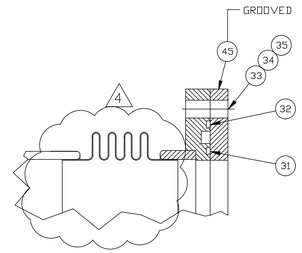
WELD TYPE 3

WELD TYPE 4



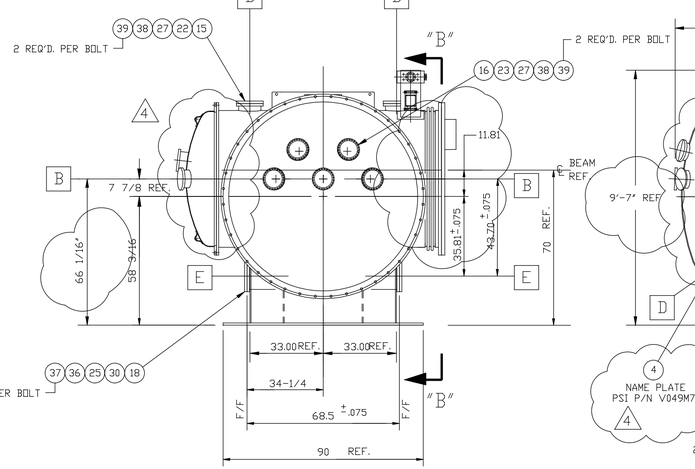


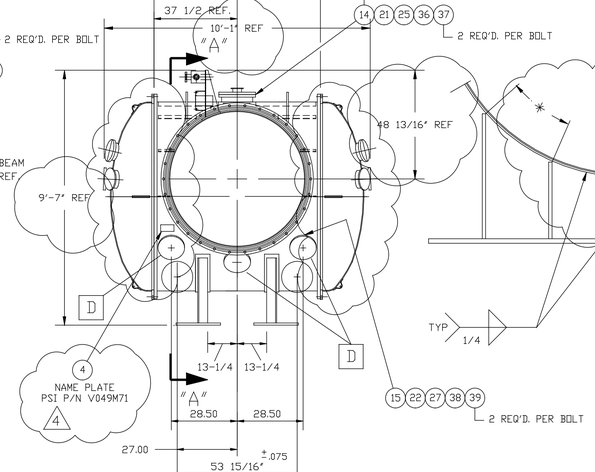


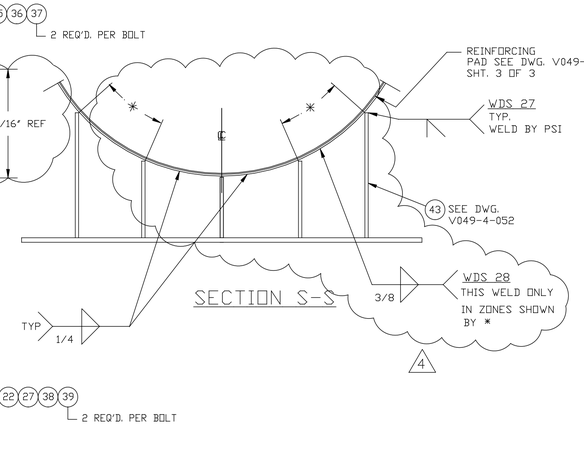


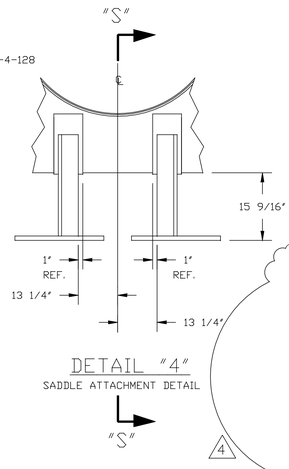
DETAIL "B"
O-RINGS & FLANGE BOLTING
NOT TO SCALE

DESIGN DATA	
2 PSIG AT 120°/UHV AT 400° F	
CORROSION ALLOWANCE: 0	
POSTWELD HEAT TREATMENT: YES-SEE NOTE 15.	
FIREPROOFING:	N.A.
RADIOGRAPHING	NONE
MATERIALS	
HEADS:	SA 240-304L
SHELL:	SA 240-304, 304L
FLANGES:	SA 182 GRADE F, 304L
PIPE NECKS:	304L
REINFORCING: EXTERNAL	SA 240-304
BOLTS & NUTS:	SA 193-B7
WEIGHTS	
EMPTY:	5,000 LBS
SHIPPING:	









NOTES

15. STRESS RELIEVE PER SPEC. V049-2-046.
14. WDS NO'S. REFER TO WELD DATA-SPEC V049-2-084
✱✱✱13. THESE FLANGE SURFACES ARE TO BE TANGENT TO THE SHELL O.D.
12. LEAK TEST & METHOD PER PSI SPEC: V049-2-014, BY PSI.
11. CERTIFIED MANUFACTURER'S MATERIAL TEST REPORTS REQUIRED, EXCEPT AS NOTED ON B.O.M.
10. FLANGE BOLT HOLES TO STRADDLE NATURAL CENTERLINES OF VESSEL. UNLESS NOTED.
9. CLEAN PER SPEC: V049-2-015
8. ALL CONFLAT NOZZLES TO BE CONTOURED TO MEDIAN SHELL DIA., UNLESS OTHERWISE NOTED.
7. 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.
6. MACHINING & ROLLING TO BE IN ACCORDANCE WITH SPEC. V049-2-136.
5. HEADS ARE ASME F&D.
4. CHAMBER FABRICATION TO BE IN ACCORDANCE WITH SPEC. V049-2-078. CHAMBER FABRICATION PLAN TO BE IN ACCORDANCE WITH SPEC. V049-2-081. CHAMBER QUALITY PLAN TO BE IN ACCORDANCE WITH SPEC. V049-2-087.
3. FOR FLANGE DETAILS SEE DWG. V049-4-021, V049-4-027 & V049-4-031.
2. THESE FLANGES EACH INCLUDE AN ANNULAR CHANNEL BETWEEN O-RINGS, MANIFOLD TO A SINGLE PUMPOUT PORT ON EACH CHAMBER, SEE DWG. V049-4-054
1. USE THIS DWG WITH THE FOLLOWING BOM'S:
V0494009 HAM TEST/BAKE ASSY, (WITH A4 COVER)
V0494309 HAM SHIPPING ASSY, (WITH A4 COVER)
V0494013 HAM TEST/BAKE ASSY, (WITHOUT A4 COVER)
V0494313 HAM SHIPPING ASSY, (WITHOUT A4 COVER)
V0494054 HAM FLANGE/ANNULUS TUBING ASSY.

NOTE: THIS DRAWING IS USED WITH MULTIPLE BOM'S,SEE NOTE 1. ABOVE

DWG. NO.	DESCRIPTION	DWG. NO.	DESCRIPTION
		V049-4-A4	60" ACCESS PORT COVER-END UNITS
		V049-4-054	HAM FLANGE/ANNULUS TUBING ASSEMBLY
V049-0-100	DRAWING TREE / BOM STRUCTURE	V049-4-053	60" EXPANSION JOINT
V049-4-128	HAM WELDMENT	V049-4-052	HAM VESSEL SUPPORT
V049-4-127	84 1/4 ID ACCESS COVER	V049-4-040	HAM BELLOWS TIE ROD ASSEMBLY
V049-4-123	HAM-75 ION PUMP SUPPORT	1101010	LIGO HORIZONTAL ACCESS MODULE (HAM)

REFERENCE DRAWINGS

SYMBOL	CHARACTERISTIC
▱	FLATNESS
⌭	CYLINDRICITY
//	PARALELLISM
⊥	PERPENDICULARITY
∠	ANGULARITY
⌖	TRUE POSITION
◎	CONCENTRICITY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± .1
ANGULARMACH ±0°-30' BEND ±2°
TWO PLACE DECIMAL ± .03
THREE PLACE DECIMAL ± .015
FINISHED SURFACE RMS 63
BREAK CORNERS IN- OUT:
REMOVE ALL BURRS

DO NOT SCALE THIS DRAWING

USED ON:

NEXT ASS'Y: V049-4-009/013

REV	DESCRIPTION									
P3	UPDATE FOR QUOTES						DA	04-05-96	0112	
0	ISSUED FOR FDR				DMW	REC	PV	5/1/96	0118	
1	DESIGN UPDATE FOR QUOTES				DMW	REC	PV	6/21/96	0208	
2	ISSUED FOR FABRICATION	REB	PEF	RDC	DMW	REC	PV	7/11/96	0200	
3	REISSUED FOR FABRICATION AS NOTED	GS	PEF	RDC	DMW	REC	PV	9/27/96	0278	
4	REISSUED FOR FABRICATION AS NOTED						DA	6/6/97	0470	
ISSUE DESCRIPTION						CHKD	DRWN	DATE	DEC#	

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

HAM ASSEMBLY

LIGO VACUUM EQUIPMENT

CAD FILE	SIZE	DWG. NO.	REV.
V0494002/4002S1	D	V049-4-002	4
SCALE 3/8"=1'-0"		SHEET 1 OF 1	

Jun 18, 1997 - 09:33:53

8 7 6 5 4 3 2 1