NOZZLE SCHEDULE

MARK	QTY	SIZE	RATING	TYPE	DESCRIPTION
A	1	104 1/2' I.D.		SEE NOTES 2, & 3	MAJOR ACCESS
B	2	60 1/2' I.D.		SEE NOTES 2, & 3	LASER BEAM, ACCESS
C	2	60 1/2' I.D.		SEE NOTES 2, & 3	ACCESS
D	4	14' O.D. TUBE		16 1/2' O.D. CONFLAT W/ BLIND FLANGE	SUPPORT BEAMS,
E	8	14' O.D. TUBE ***		16 1/2' O.D. CONFLAT W/ BLIND FLANGE	AIR SHWR. ROUGING & ION PUMPS, UTILITY
F	6	10' O.D. TUBE ***		12' O.D. CONFLAT W/ BLIND FLANGE	ELECTRICAL FEEDTHROUGHS
G	12	8' O.D. TUBE ***		10' O.D. CONFLAT W/ BLIND FLANGE	OBSERVATION, BEAM PICK-OFFS
H	1	2 1/2"O.D. TUBE		4 1/2' CONFLAT W/ BLIND FLANGE	ANNULUS PUMPOUT CONN.

NOZZLE TYPE

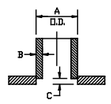
TYPE	A	B	C	D	E	F
NA	NA	NA	NA	NA	NA	NA
SEE DETAIL #3 SHEET #1, DWG V049-4-003						
SEE DETAIL #3 SHEET #1, DWG V049-4-003						
I	14'	.120	1/4			
I	14'	.120	SEE DETAIL 5 & 2			
I	10'	.120	1/4			
I	8.0	.25	1/4			
SEE DWG. V049-4-025						

WELD TYPE

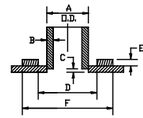
TYPE	A	B	C	D	E
NA	NA	NA	NA	NA	
*					
*					
I	1/8'	SEE PORT DETAIL #3 SHEET #1 DWG V049-4-003			
I	1/8'	SEE PORT DETAIL #3 SHEET #1 DWG V049-4-003			
I	1/8'	SEE PORT DETAIL #3 SHEET #1 DWG V049-4-003			
I	1/8'	SEE PORT DETAIL #3 SHEET #1 DWG V049-4-003			

NOZZLE DATA

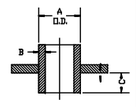
NOZZLE TYPE I



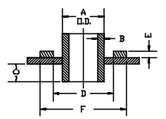
NOZZLE TYPE II



NOZZLE TYPE III

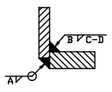


NOZZLE TYPE IV

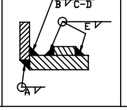


WELD DATA

WELD TYPE 1

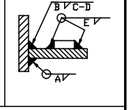


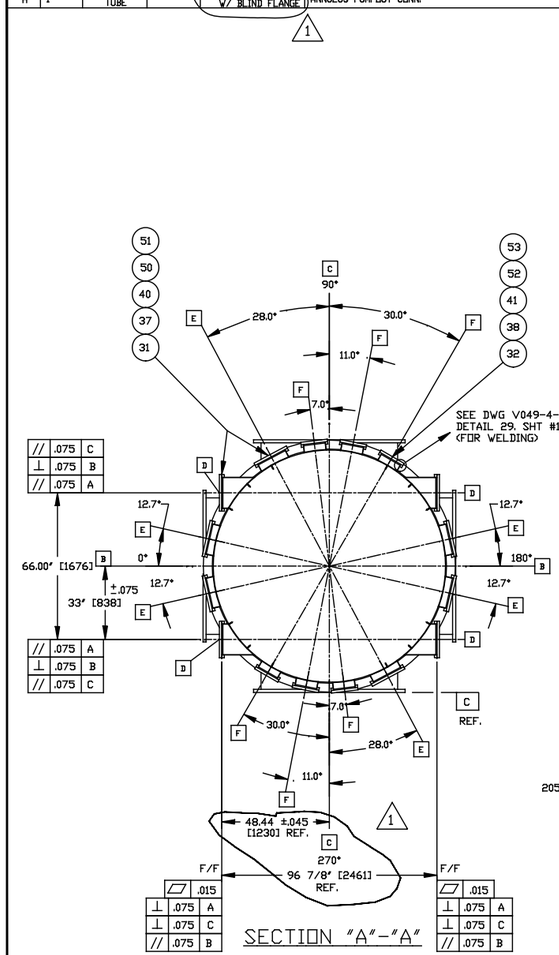
WELD TYPE 2



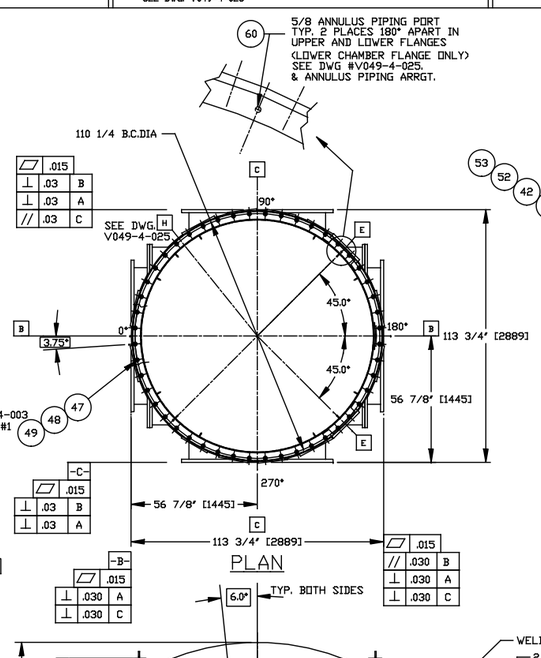
WELD TYPE 3

WELD TYPE 4

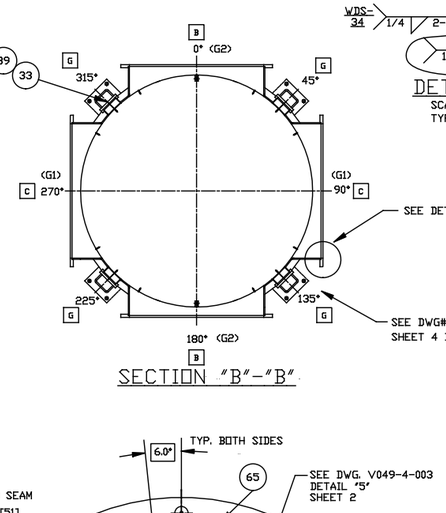




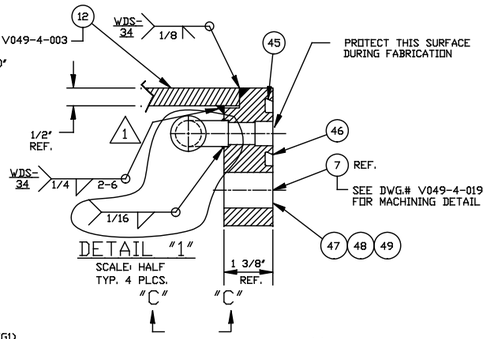
SECTION "A"–"A"



PLAN

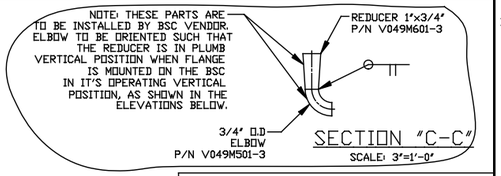


SECTION "B"–"B"



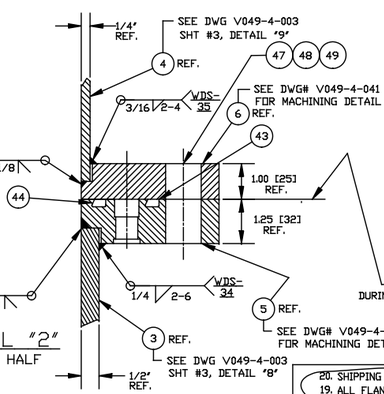
DETAIL "1"

SCALE: HALF
TYP. 4 PLCS.



SECTION "C-C"

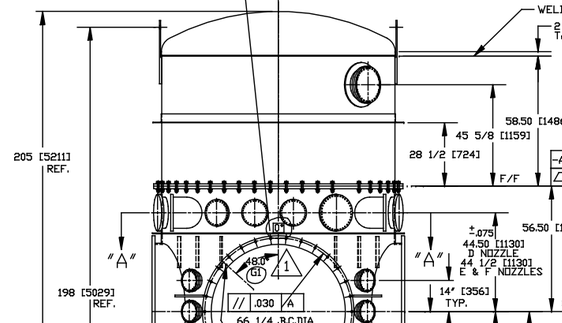
SCALE: 3"=1'-0"



DETAIL "2"

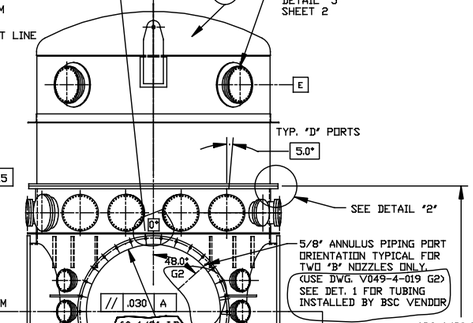
SCALE: HALF

PROTECT THESE SURFACES DURING FABRICATION AND SHIPPING WITH 1/8' THK. x 4" WIDE 1100 ALUMINUM SEGMENTS (VENDOR TO PROVIDE)

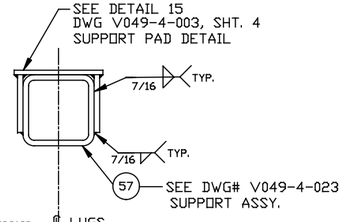


ELEVATION 270° SIDE

5/8 ANNULUS PIPING PORT ORIENTATION TYP. FOR 2 'C' NOZZLES ONLY (USE DWG. V049-4-019 G1) SEE DET. 1 FOR TUBING INSTALLED BY BSC VENDOR



ELEVATION 180° SIDE



℄ LUGS LOCATE ON 'G' AXIS AT (45°, 135°, & 315°)±.06 SEE SHEET 1

DETAIL "3"

SCALE: 1 1/2"=1'-0"
TYPICAL 4 PLACES

DESIGN DATA

2 PSIG @ 120°F / UHV @ 400°F	
SPECIFICATION:	
CORROSION ALLOWANCE: 0	
POSTWELD HEAT TREATMENT: YES SEE NOTE 15	
INSULATION: 2" REMOVEABLE BAKE OUT BLANKETS.	
FIREPROOFING:	N.A.
RADIOGRAPHING	NONE
MATERIALS:	
HEADS:	SA 240-304/304L
SHELL:	SA 240-304/304L
FLANGES:	SA 182 GRF/304L
PIPE NECKS:	304L
REINFORCING:	EXTERNAL SA 240-304
BOLTS & NUTS:	SA 193-B7
GASKETS:	(SEE NOTES)
WEIGHTS	
FABRICATED:	
EMPTY:	14,500 LBS
OPERATING:	
TEST:	

NOTES

20. SHIPPING & HANDLING TO BE IN ACCORDANCE WITH SPEC V049-2-123.
19. ALL FLANGES ARE TO BE PROTECTED WITH COVERS DURING AND AFTER MANUFACTURING.
18. WDS NUMBERS REFER TO SPEC. V049-2-084.
17. EACH ASSEMBLY TO BE MARKED WITH A SEQUENTIAL SERIAL NUMBER. TOP & BOTTOM SHELLS TO HAVE THE SAME NUMBER.
16. SEE SPEC V049-2-136 FOR ROLLING AND MACHINING REQUIREMENTS.
15. STRESS RELIEVE PER SPEC. V049-2-046 LOWER SHELL ONLY.
14. DO NOT GRIND WELDS FLUSH 1/16' MAX. CROWN ON ALL WELDS.
13. .045 LANDS ON WELD PREPS DO NOT HAVE TO BE MACHINED.
12. HEADS ARE ASME F&D.
*** 11. THESE FLANGES ARE TO BE TANGENT TO THE SHELL O.D.
10. LEAK TEST & METHOD PER PSI SPEC: V049-2-014, BY PSI.
9. CERTIFIED MANUFACTURER'S MATERIAL TEST REPORTS REQUIRED.
8. BOLT HOLES TO STRADDLE CENTERLINES OF VESSEL AS SHOWN. CONFLAT LEAK CHECK SLOTS ARE TO BE POSITIONED ON VERTICAL CENTERLINE.
7. CLEAN PER SPEC: V049-2-015
6. GRINDING TO INTERNAL VACUUM BOUNDARY SURFACES IS NOT ALLOWED. DO NOT USE CARBON STEEL BRUSHES OR BRUSHES CONTAMINATED WITH CARBON STEEL ON STAINLESS OR ALUMINUM MATERIAL.
5. DIMENSIONS SHOWN IN PARENTHESES ARE IN MILLIMETERS.
4. CHAMBER FABRICATION TO BE IN ACCORDANCE WITH SPEC. V049-2-117. CHAMBER FABRICATION PLAN TO BE IN ACCORDANCE WITH SPEC. V049-2-080. CHAMBER QUALITY PLAN TO BE IN ACCORDANCE WITH SPEC. V049-2-048.
3. FOR FLANGE DETAILS SEE DWG. V049-4-019, 022 & 041.
2. THESE FLANGES EACH INCLUDE AN ANNULAR CHANNEL BETWEEN O-RINGS, MANIFOLD TO A SINGLE PUMPOUT PORT ON EACH CHAMBER, SEE DWG V049-4-025.

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION	DWG. NO.	DESCRIPTION
		V049-4-077	75 L/S ION PUMP
		V049-4-023	BSC SUPPORT ASSEMBLY
		V049-4-014	60' COVER TYPE I
		V049-4-036	BSC FLOOR ASSY.
V049-4-003	BSC WELDMENT	V049-4-025	BSC ANNULUS PIPING ARRGT.
V049-4-122	BSC-75 ION PUMP SUPPORT	1101009	LIGO BEAM SPLITTER CHAMBER

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:

REV	DESCRIPTION						CHKD	DRWN	DATE	DEC#
1	ISSUED FOR FABRICATION							PV	1/27/97	0421
0	ISSUED FOR FABRICATION		REB			PEF	RDC	REC	DA	8/28/96	0203

ISSUE DESCRIPTION

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

BSC OVERALL ASSEMBLY LIGO VACUUM EQUIPMENT

CAD FILE	SIZE	DWG. NO.	REV.
V0494101	D	V049-4-101	1

SCALE 3/8"-1'-0" SHEET 1 OF 1

Jan 28, 1997 - 083412

8 7 6 5 4 3 2 1