

DESIGN DATA	
CODE	DESIGN CODE: ASME VIII-1 2013 ED.
	SEISMIC CODE: NBC 2015 (OTTAWA-KANATA)
DESIGN CONDITIONS	WIND CODE: N/A
	MAWP: 200 PSI @ 450°F (1379 kPa @ 232°C)
	MAEWP: 15 PSI @ 450°F (103 kPa @ 232°C)
	MDMT: 32°F @ 200 PSI (0°C @ 1379 kPa)
	CORROSION ALLOWANCE: 0.0787" (0 MM)
EXAMINATION	IMPACT TESTING: EXEMPT PER UG-20(F) & UCS-66(B)
	RADIOGRAPHY: RT-1
	PWHT: NONE
	HYDROTEST: 260 PSI @ 70°F (1793 kPa @ 21°C)
SERVICE	FLUID: -
	CAPACITY: 301.4 CU. FT. (8.53 M ³)
	WEIGHT - EMPTY: 32,000 LB (14,515 KG)
	WEIGHT - OPERATING: 68,344 LB (31,000 KG)

BILL OF MATERIALS			
ITEM	QTY	DESCRIPTION	MATERIAL
100	1	SPOOL 1 ASSEMBLY	-
200	1	SPOOL 2 ASSEMBLY	-
300	1	SPOOL 3 ASSEMBLY	-
400	1	SPOOL 4 ASSEMBLY	-
500	1	SPOOL 5 ASSEMBLY	-
600A	1	TOP BLIND FLANGE ASSEMBLY	-
600B	1	BOTTOM BLIND FLANGE ASSEMBLY	-
701	192	STUD, 2-8UN, 19.5 LG	SA-193 B7
702	6	GASKET, SPIRAL WOUND WITH FLEXIBLE GRAPHITE CS OUT/IN RING	CS
703	384	HEAVY HEX NUT, 2-8UN	SA-194 2H

NOTES

1. ALL DIMENSIONS IN INCHES.
2. REFER TO DRAWING 22498-1-1-01 THRU 019 FOR EXISTING NOZZLE WELD DETAILS.
3. MT = MAGNETIC PARTICLE INSPECTION
4. PT = DYE PENETRANT INSPECTION

ALTERNATION ACTIONS

1. ASSEMBLE SPOOL AND COVERS PLATES AS SHOWN
2. HYDROTEST PER DESIGN CONDITIONS

WEIGHT SUMMARY (LB)	
TOP FLANGE	4,028
SPOOL 5	3,907
SPOOL 4	4,591
SPOOL 3	4,469
SPOOL 2	6,710
SPOOL 1	5,084
BOTTOM FLANGE	4454

REVISION				
REV	DESCRIPTION	DATE	DRW	CHK
0	RELEASE	2022-12-06	BTV	CBM
1	UPDATE PER CLIENT NOTES	2023-01-19	BTV	BTV
2	UPDATE SPOOL 2 ALTERATION ACTIONS	2023-01-19	BTV	BTV

PV ENG
COMPLEX MADE SIMPLE

Pressure Vessel Engineering
1-1440 KING ST. N. PO BOX 112
ST. JACOBS, ON, CANADA, N0B 2N0

TITLE **REACTOR VESSEL ALTERATION**

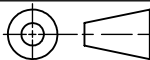
SIZE	JOB ID	DRAWING NO.	REVISION
C	PVENG# 19133	19133-000	2

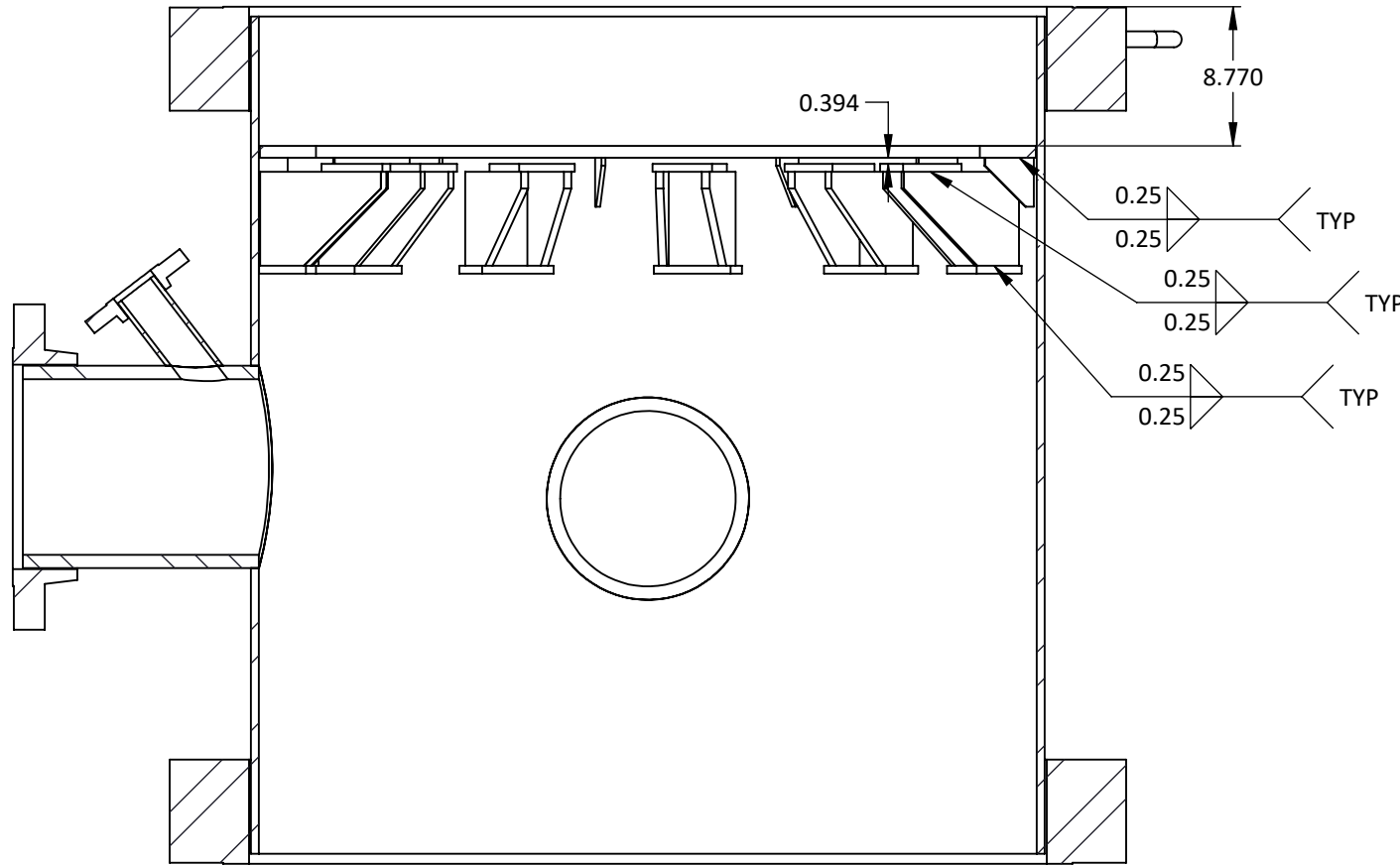
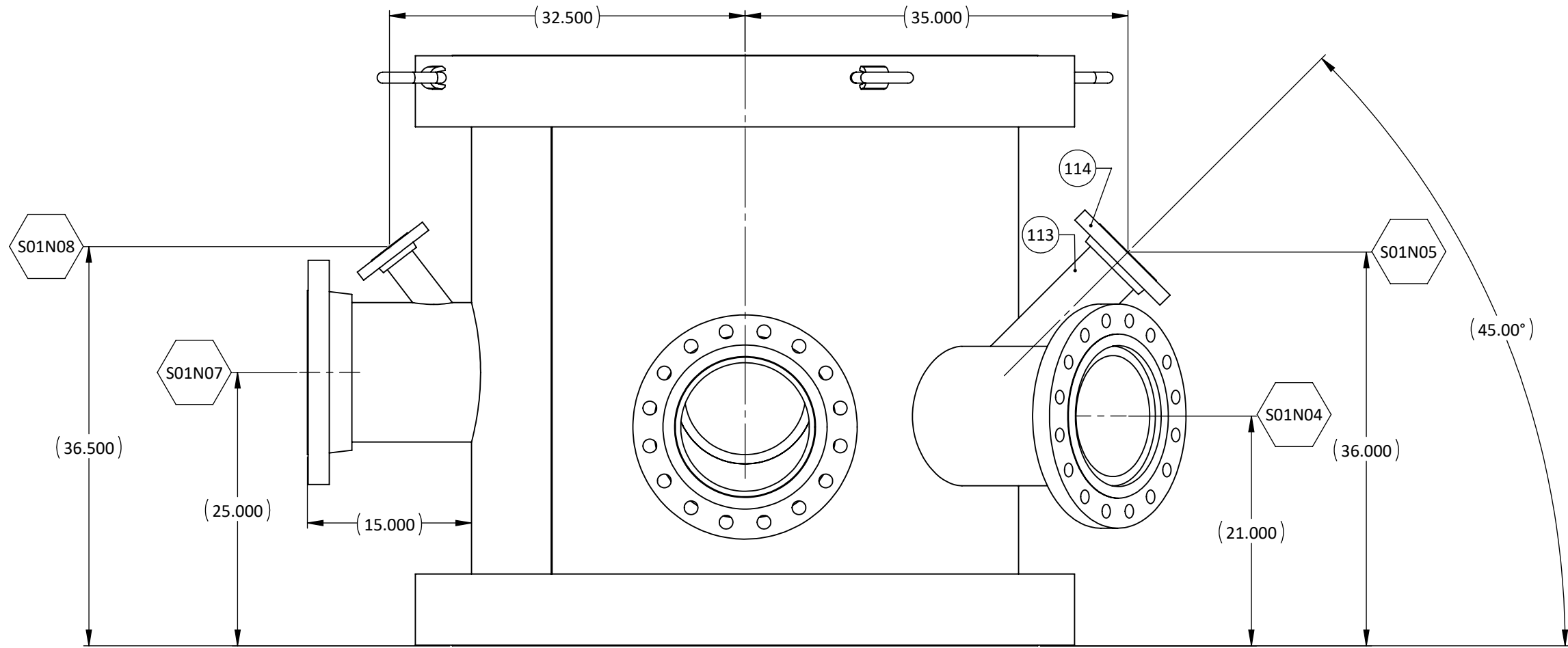
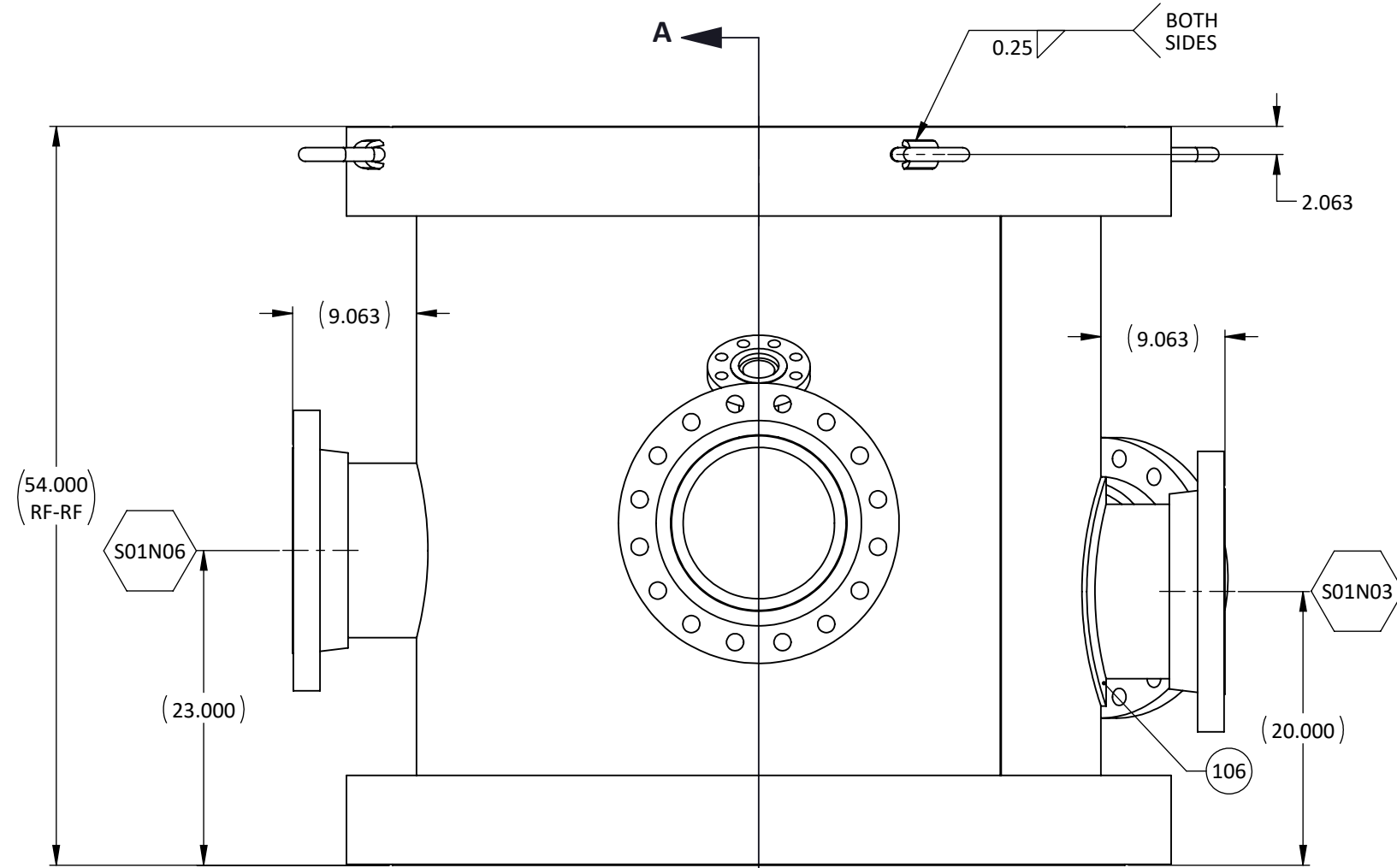
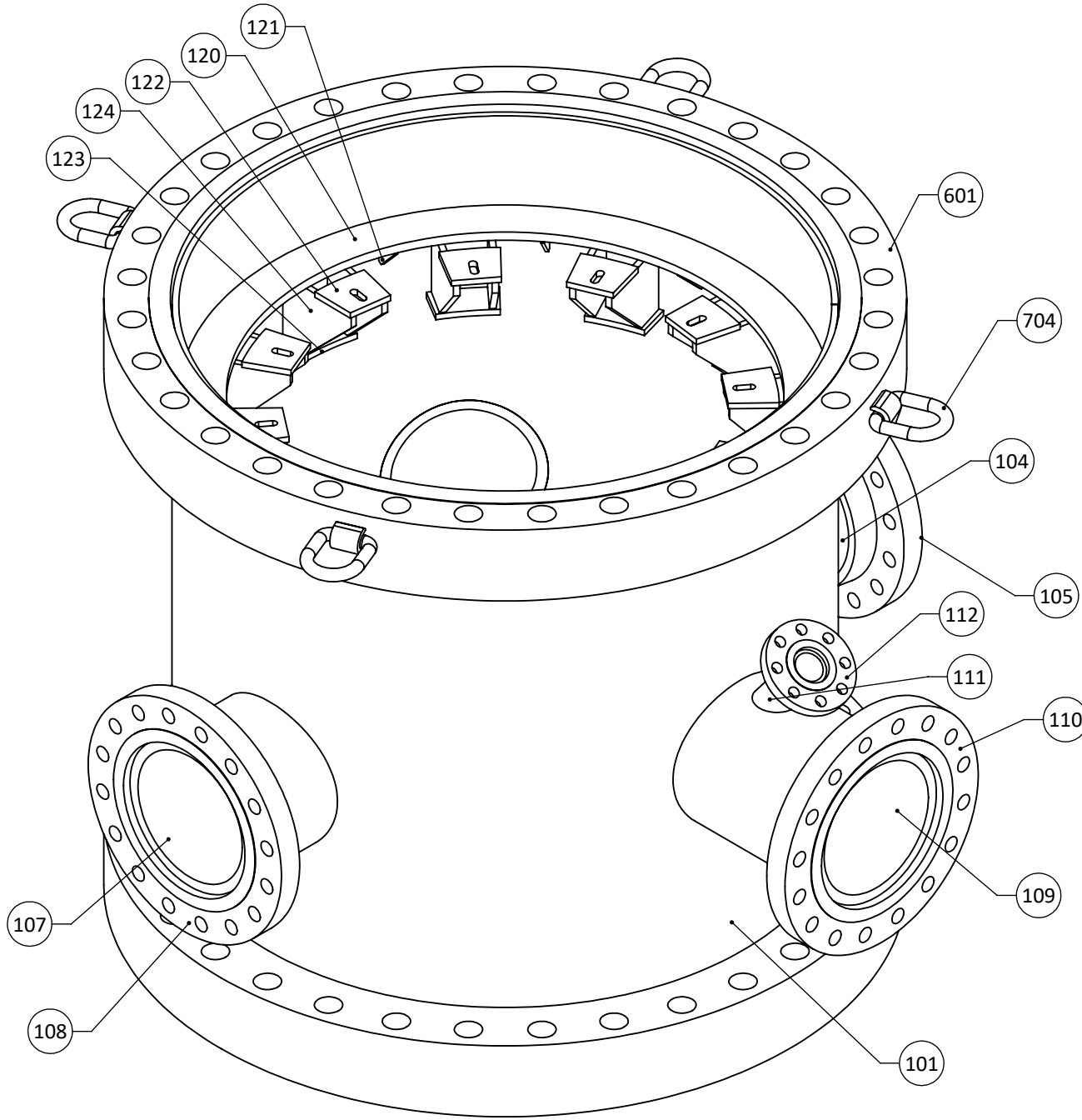
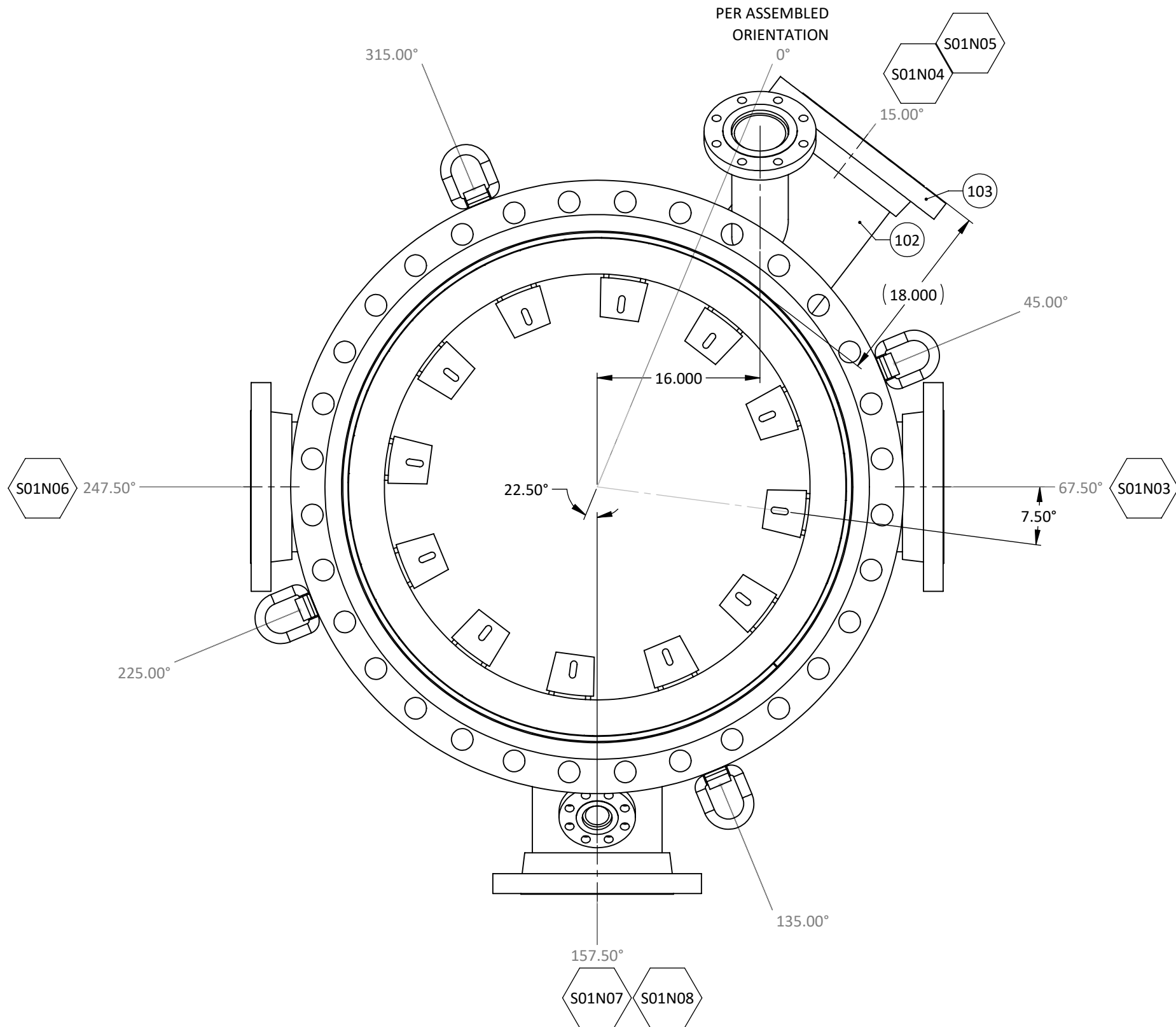
THIS DRAWING AND THE INFORMATION HEREIN IS CONFIDENTIAL, AND MUST NOT BE REPRODUCED OR USED IN ANY WAY WITHOUT THE WRITTEN PERMISSION OF PRESSURE VESSEL ENGINEERING LTD

TOLERANCE

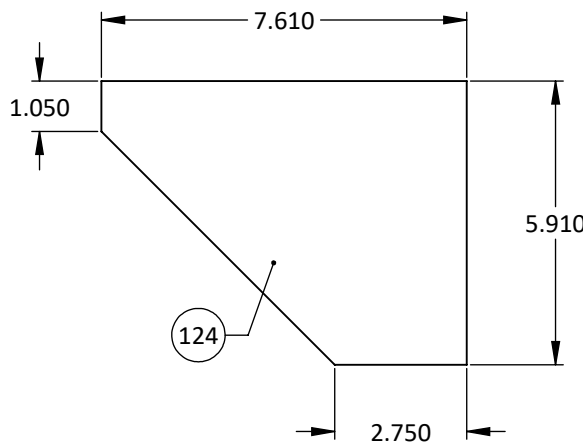
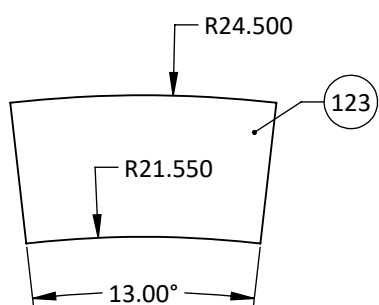
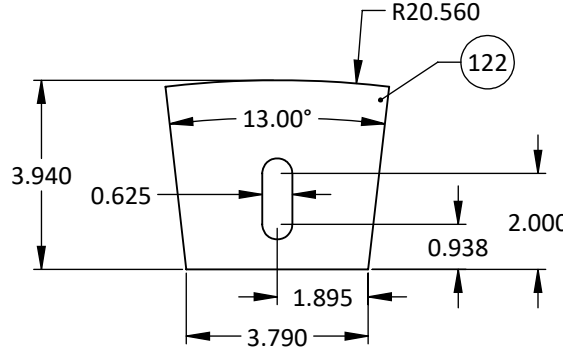
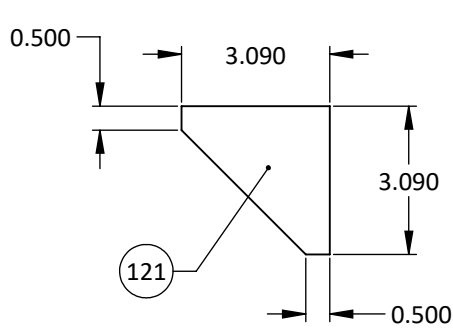
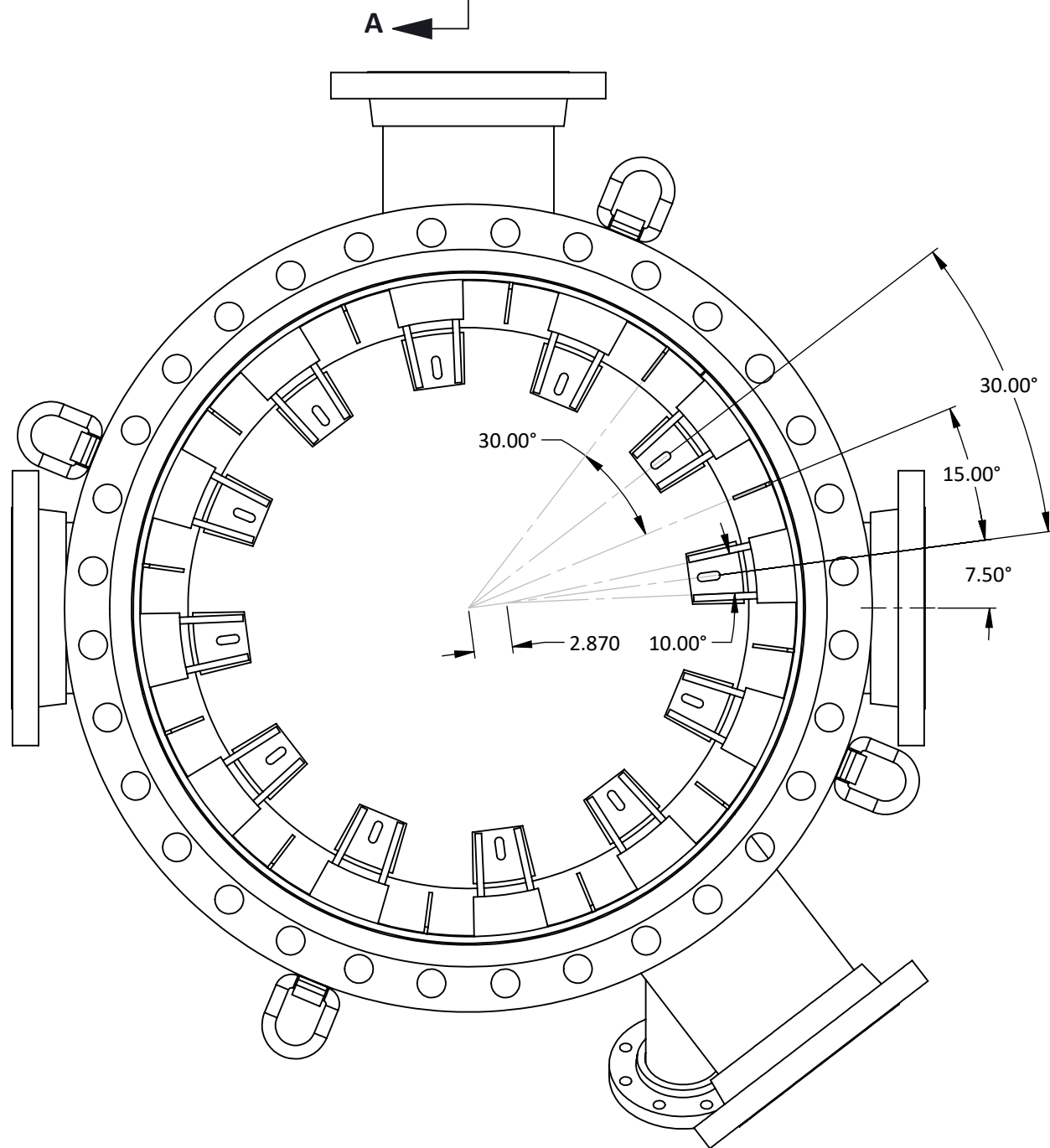
ANGLES: ± 0.5
 .X: ± 0.02
 .XX: ± 0.01
 .XXX: ± 0.005

THIRD ANGLE PROJECTION





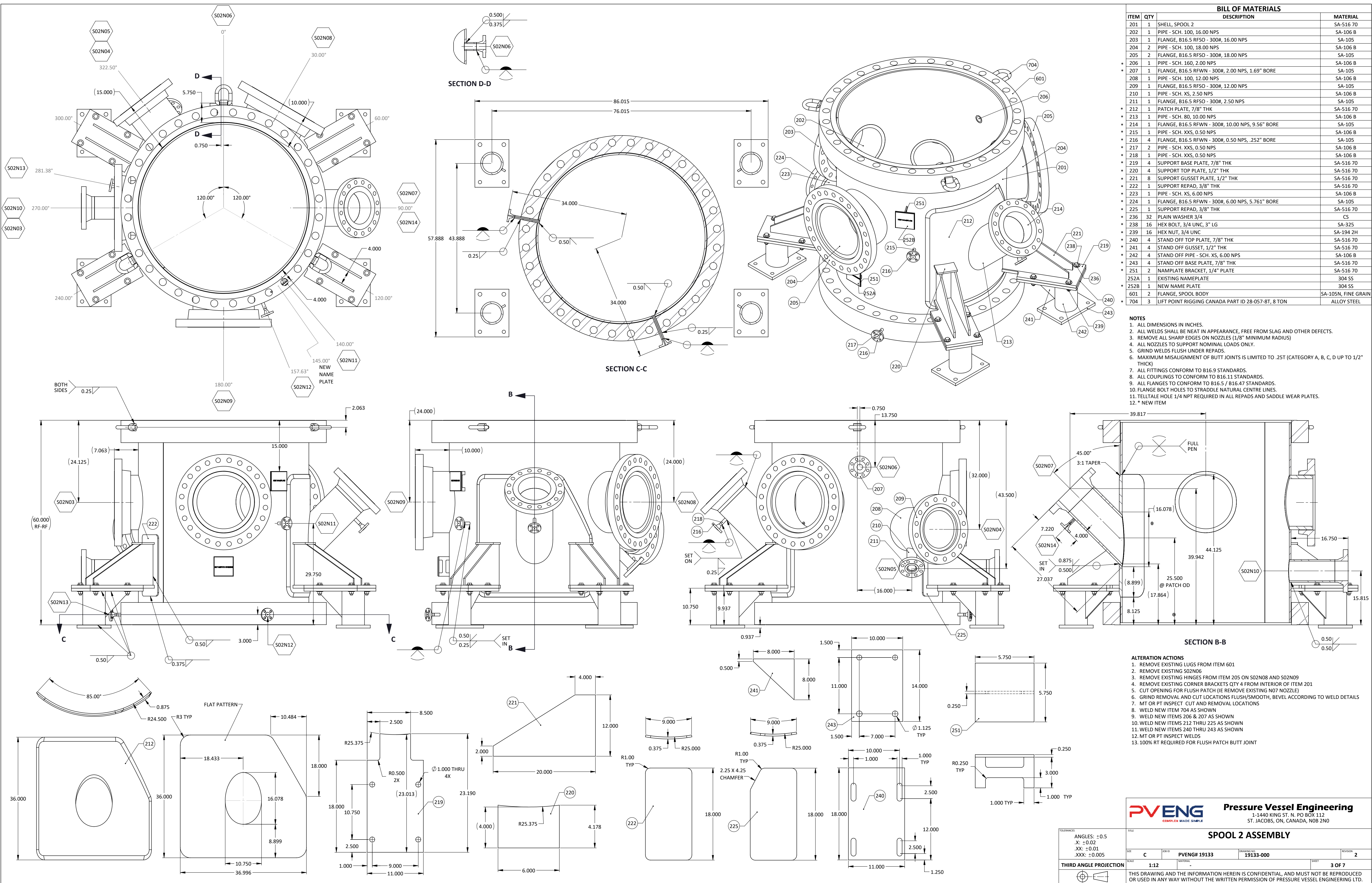
SECTION A-A

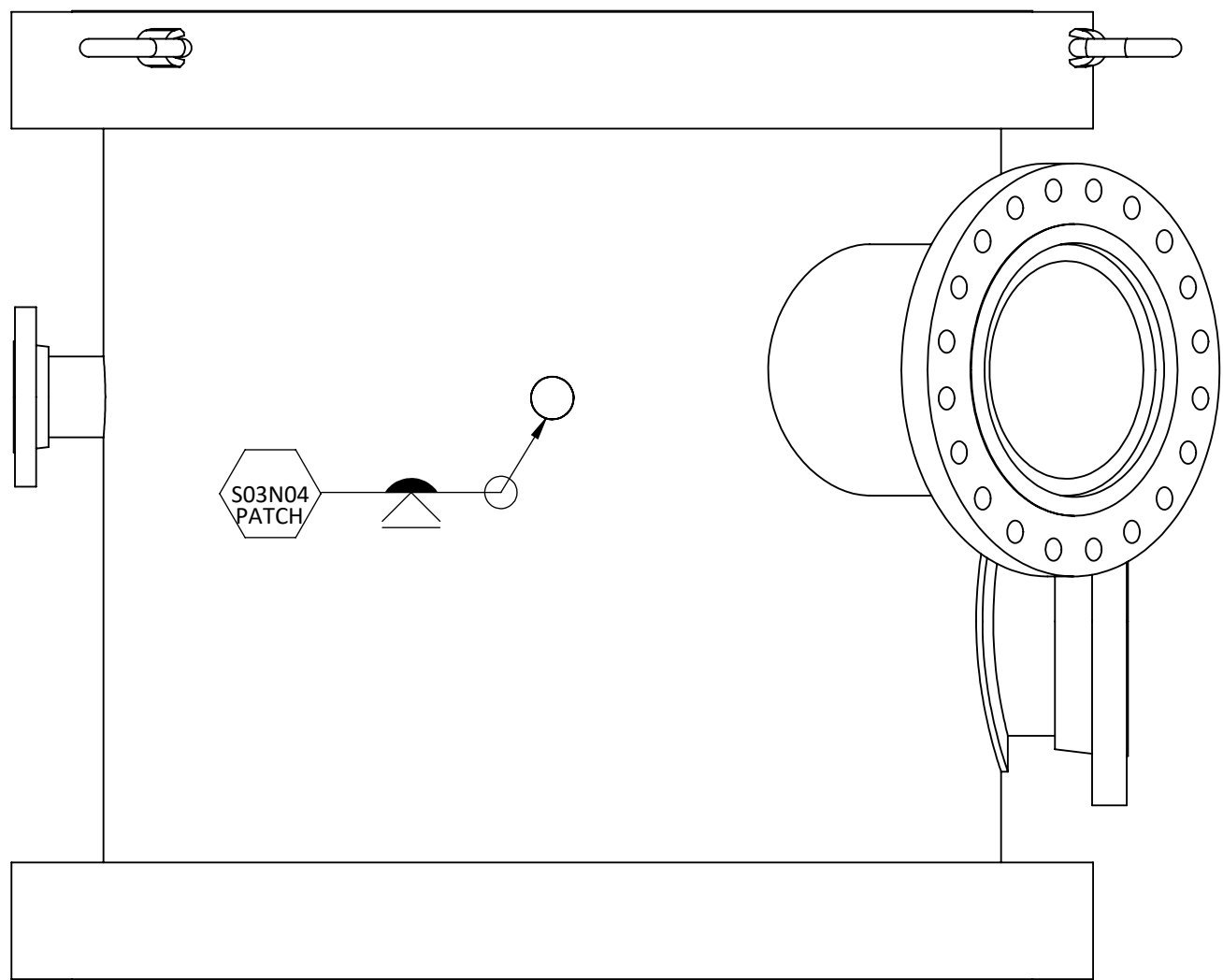
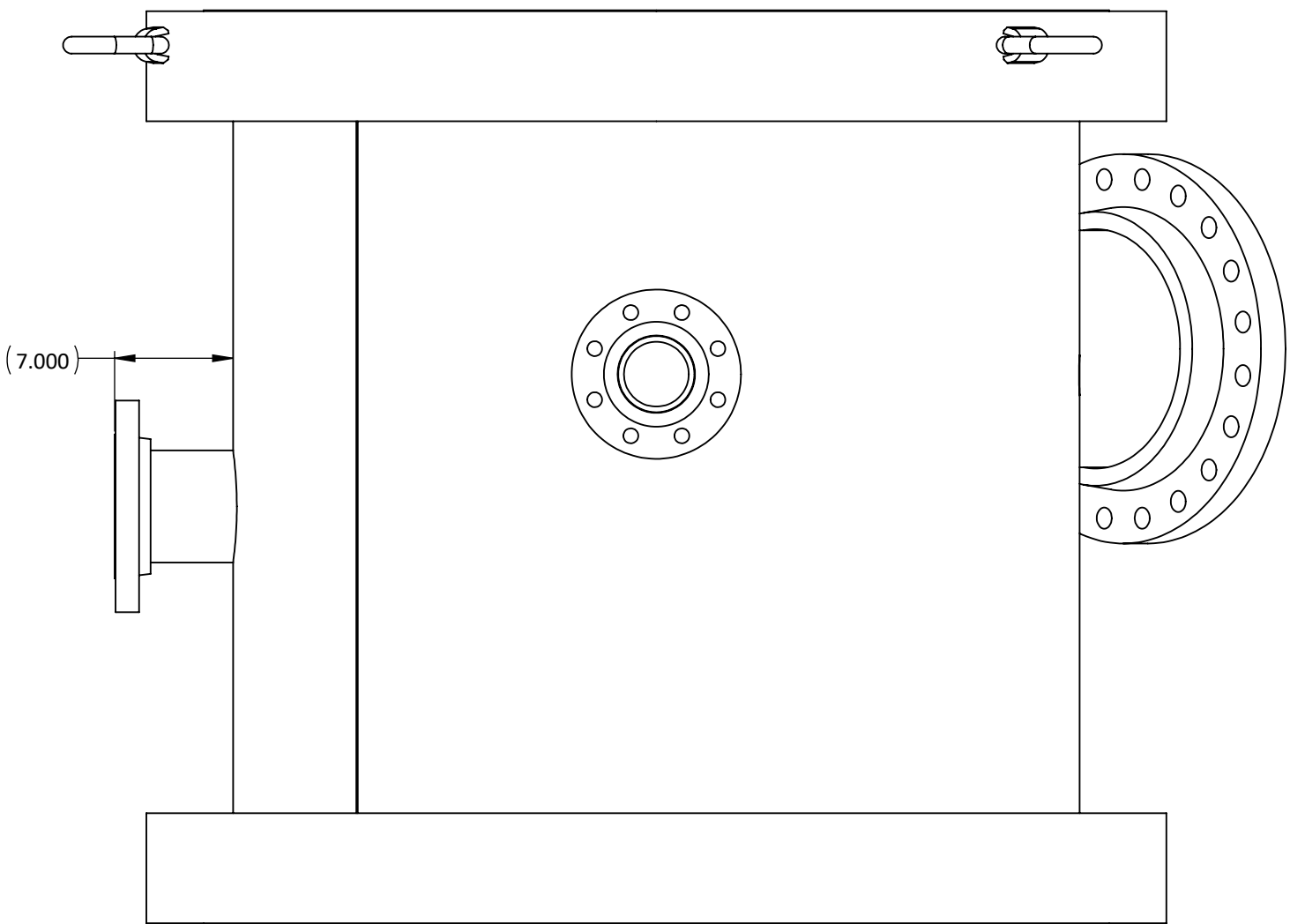
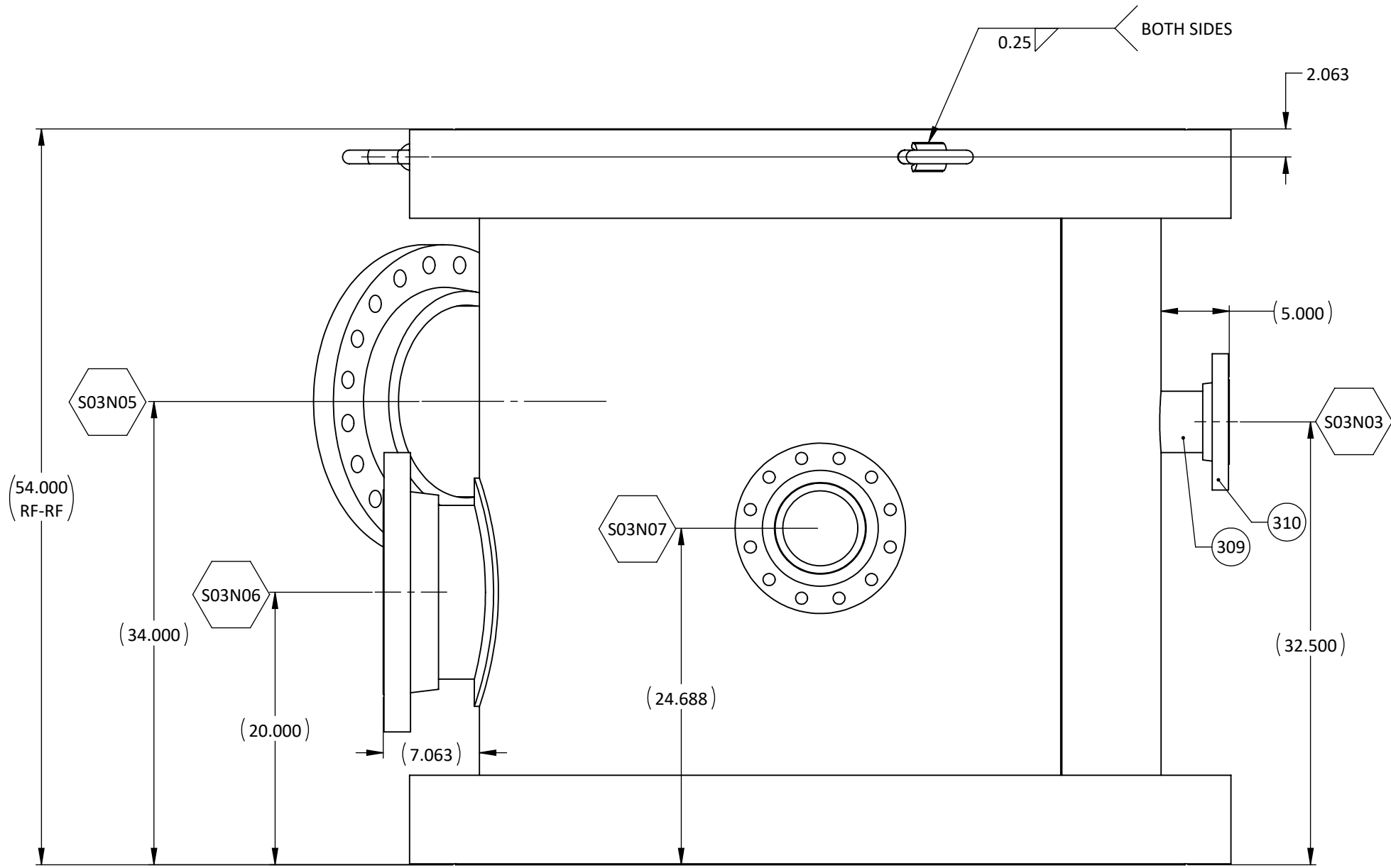
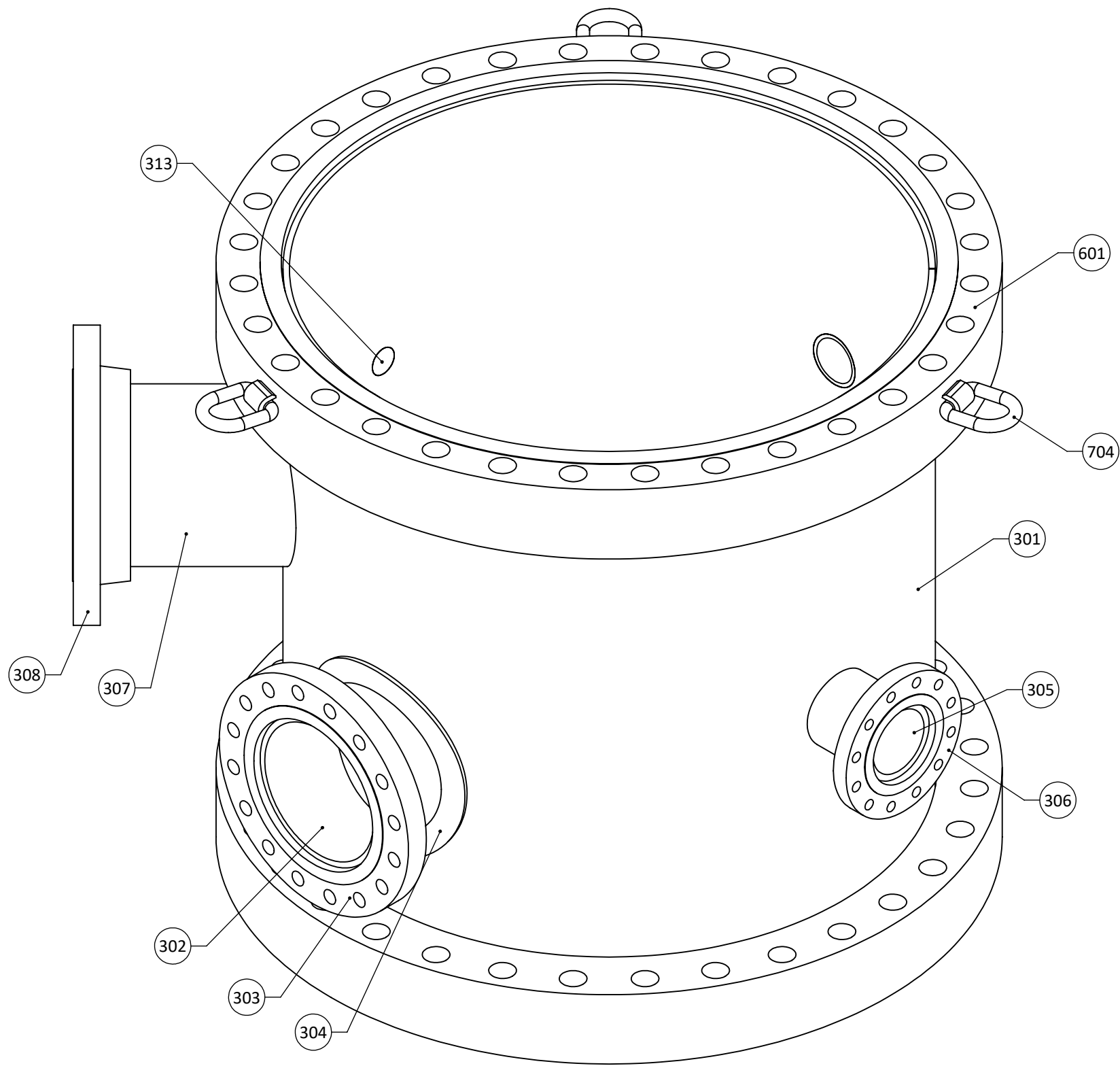
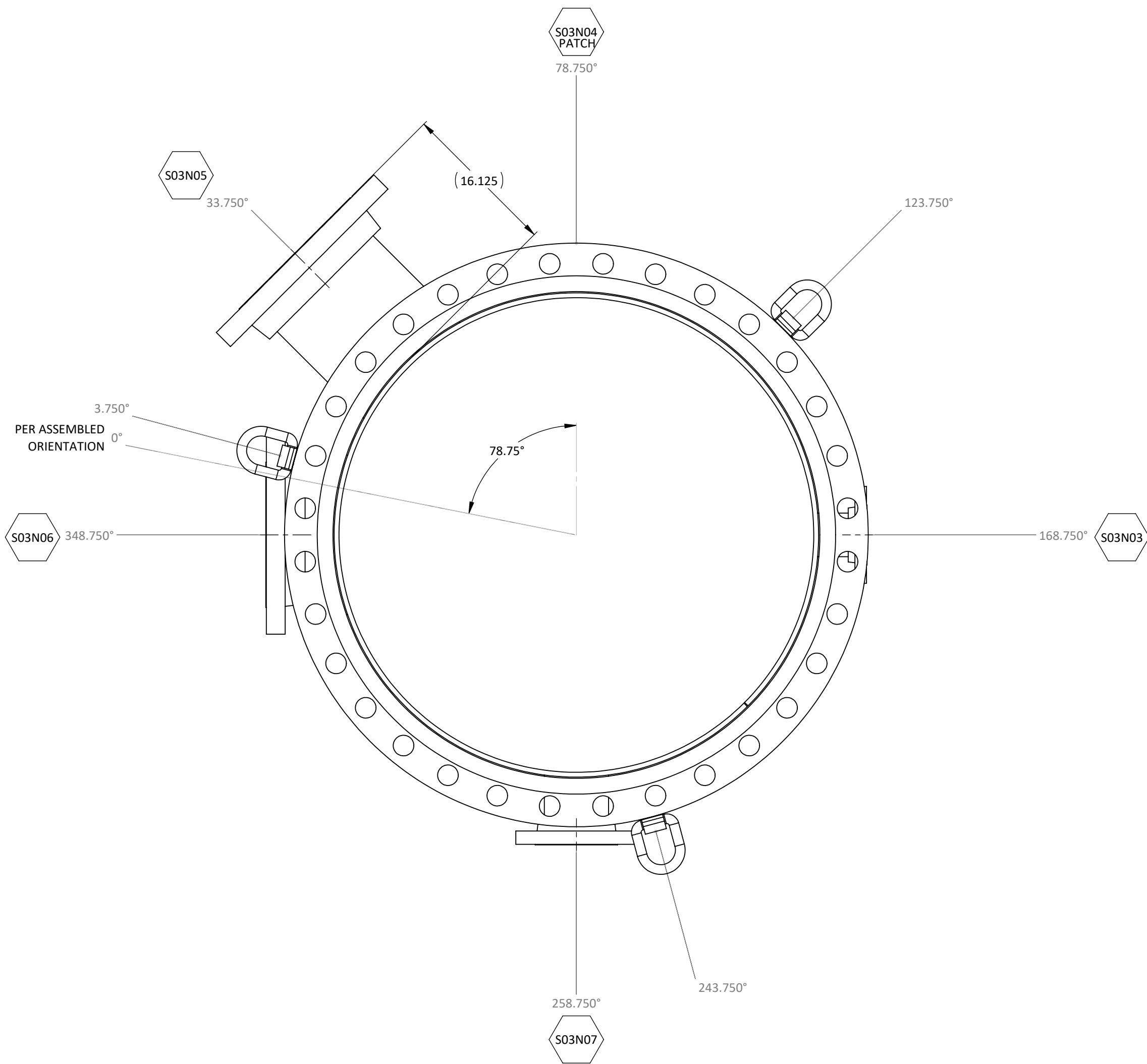


BILL OF MATERIALS			
ITEM	QTY	DESCRIPTION	MATERIAL
101	1	SHELL, SPOOL 1	SA-516 70
102	1	PIPE - SCH. 100, 12.00 NPS	SA-106 B
103	1	FLANGE, B16.5 RFSO - 300#, 12.00 NPS	SA-105
104	1	PIPE - SCH. XS, 12.00 NPS	SA-106 B
105	1	FLANGE, B16.5 RFSO - 300#, 12.00 NPS	SA-105
106	1	REPAD, 16.75" OD, 3/8" THK	SA-516 70
107	1	PIPE - SCH. 100, 12.00 NPS	SA-106 B
108	1	FLANGE, B16.5 RFSO - 300#, 12.00 NPS	SA-105
109	1	PIPE - SCH. 100, 12.00 NPS	SA-106 B
110	1	FLANGE, B16.5 RFSO - 300#, 12.00 NPS	SA-105
111	1	PIPE - SCH. XS, 2.50 NPS	SA-106 B
112	1	FLANGE, B16.5 RFSO - 300#, 2.50 NPS	SA-105
113	1	PIPE - SCH. STD., 5.00 NPS	SA-106 B
114	1	FLANGE, B16.5 RFSO - 300#, 5.00 NPS	SA-105
*	120	1 SHELF RING, 48.88" OD, 41.83" ID, 3/4" THK	SA-516 70
*	121	12 SHELF STIFFENER, 1/4" THK	SA-516 70
*	122	12 SUPPORT TOP PLATE, 1/2" THK	SA-240 316
*	123	12 SUPPORT BOTTOM PLATE, 1/2" THK	SA-240 316
*	124	24 SUPPORT GUSSET, 1/2" THK	SA-240 316
601	2	FLANGE, SPOOL BODY	SA-105N, FINE GRAIN
*	704	4 LIFT POINT RIGGING CANADA PART ID 28-057-8T, 8 TON	ALLOY STEEL

- NOTES
1. ALL DIMENSIONS IN INCHES.
 2. ALL WELDS SHALL BE NEAT IN APPEARANCE, FREE FROM SLAG AND OTHER DEFECTS.
 3. REMOVE ALL SHARP EDGES ON NOZZLES (1/8" MINIMUM RADIUS)
 4. ALL NOZZLES TO SUPPORT NOMINAL LOADS ONLY.
 5. GRIND WELDS FLUSH UNDER REPADS.
 6. MAXIMUM MISALIGNMENT OF BUTT JOINTS IS LIMITED TO .25T (CATEGORY A, B, C, D UP TO 1/2" THICK)
 7. ALL FITTINGS CONFORM TO B16.9 STANDARDS.
 8. ALL COUPLINGS TO CONFORM TO B16.11 STANDARDS.
 9. ALL FLANGES TO CONFORM TO B16.5 / B16.47 STANDARDS.
 10. FLANGE BOLT HOLES TO STRADDLE NATURAL CENTRE LINES.
 11. TELLTALE HOLE 1/4 NPT REQUIRED IN ALL REPADS AND SADDLE WEAR PLATES.
 12. * NEW ITEM

- ALTERATION ACTIONS
1. REMOVE EXISTING LUGS FROM ITEM 601
 2. GRIND LOCATIONS FLUSH
 3. MT OR PT INSPECT LOCATIONS
 4. WELD NEW ITEM 704 AS SHOWN
 5. MT OR PT INSPECT WELDS
 6. WELD NEW ITEMS 120 THRU 124 AS SHOWN

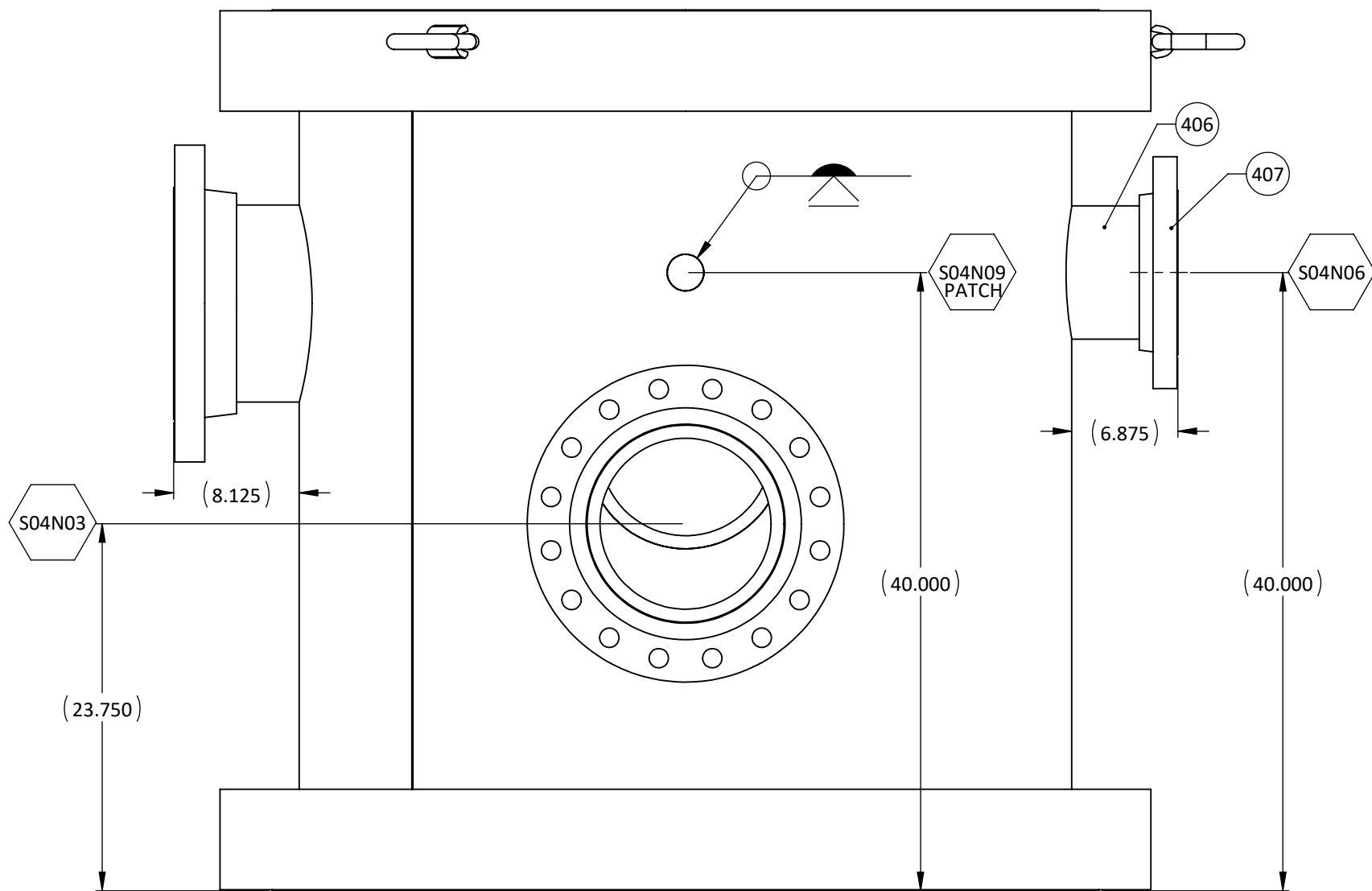
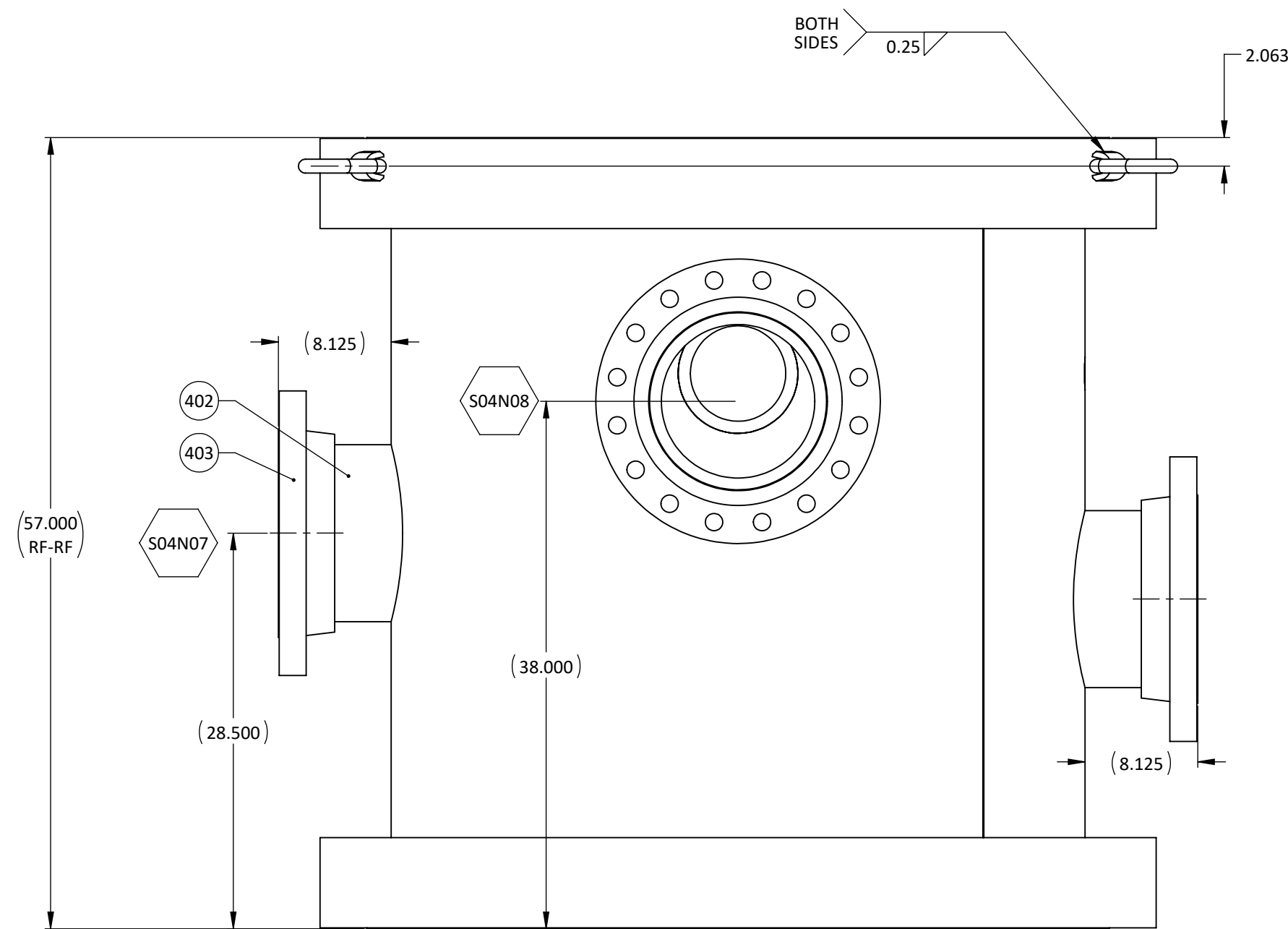
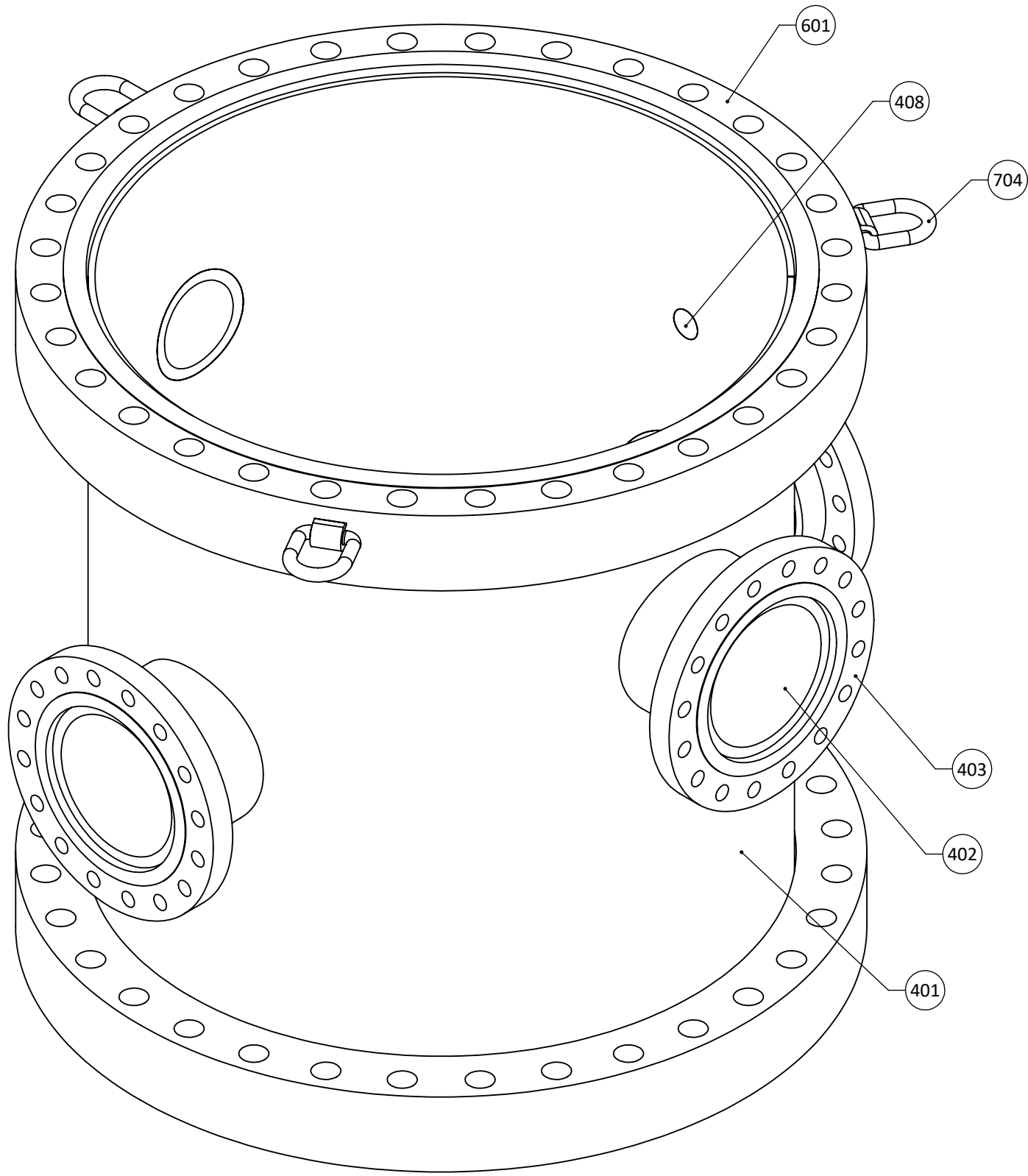
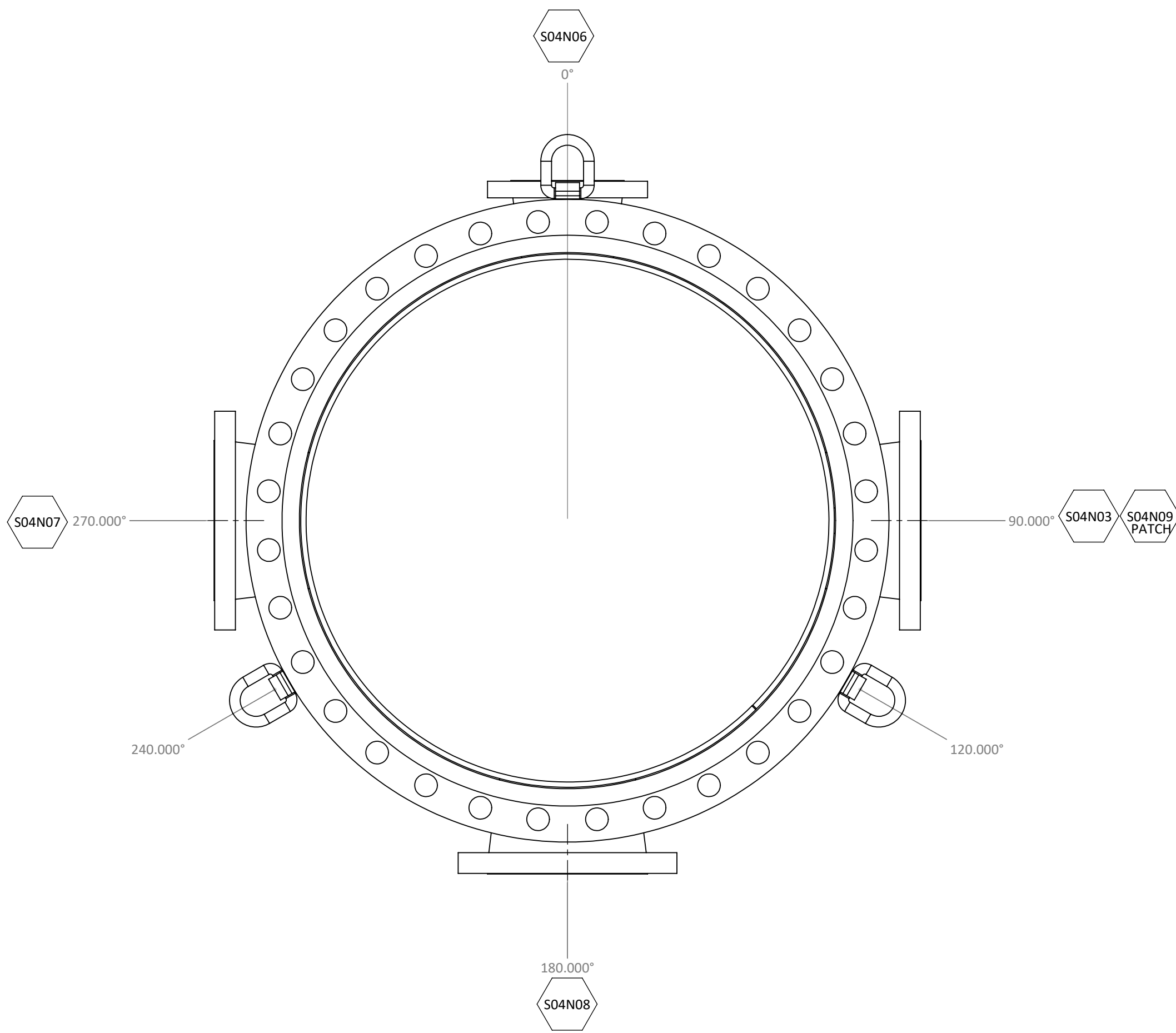




BILL OF MATERIALS		
ITEM	QTY	DESCRIPTION
301	1	SHELL, SPOOL 3
302	1	PIPE - SCH. XS, 12.00 NPS
303	1	FLANGE, B16.5 RFSO - 300#, 12.00 NPS
304	1	REPAD, 16.75" OD, 3/8" THK
305	1	PIPE - SCH. 120, 6.00 NPS
306	1	FLANGE, B16.5 RFSO - 300#, 6.00 NPS
307	1	PIPE - SCH. 100, 14.00 NPS
308	1	FLANGE, B16.5 RFSO - 300#, 14.00 NPS
309	1	PIPE - SCH. XS, 4.00 NPS
310	1	FLANGE, B16.5 RFSO - 300#, 4.00 NPS
313	1	PATCH PLATE, 3" OD, 1/2" THK, ROLL TO 24.5" INSIDE RADIUS
601	2	FLANGE, SPOOL BODY
704	3	LIFT POINT RIGGING CANADA PART ID 28-057-8T, 8 TON
		MATERIAL
		SA-516 70
		SA-106 B
		SA-105
		SA-516 70
		SA-106 B
		SA-105
		SA-106 B
		SA-105
		SA-106 B
		SA-105
		SA-516 70
		SA-105N, FINE GRAIN
		ALLOY STEEL

- NOTES**
1. ALL DIMENSIONS IN INCHES.
 2. ALL WELDS SHALL BE NEAT IN APPEARANCE, FREE FROM SLAG AND OTHER DEFECTS.
 3. REMOVE ALL SHARP EDGES ON NOZZLES (1/8" MINIMUM RADIUS)
 4. ALL NOZZLES TO SUPPORT NOMINAL LOADS ONLY.
 5. GRIND WELDS FLUSH UNDER REPADS.
 6. MAXIMUM MISALIGNMENT OF BUTT JOINTS IS LIMITED TO .25T (CATEGORY A, B, C, D UP TO 1/2" THICK)
 7. ALL FITTINGS CONFORM TO B16.9 STANDARDS.
 8. ALL COUPLINGS TO CONFORM TO B16.11 STANDARDS.
 9. ALL FLANGES TO CONFORM TO B16.5 / B16.47 STANDARDS.
 10. FLANGE BOLT HOLES TO STRADDLE NATURAL CENTRE LINES.
 11. TELLTALE HOLE 1/4 NPT REQUIRED IN ALL REPADS AND SADDLE WEAR PLATES.
 12. * NEW ITEM


- ALTERATION ACTIONS**
1. REMOVE EXISTING LUGS FROM ITEM 601
 2. REMOVE EXISTING SUPPORT LEGS FROM ITEM 301
 3. REMOVE EXISTING S03N04
 4. GRIND LOCATIONS FLUSH/SMOOTH, BEVEL AS REQUIRED
 5. MT OR PT INSPECT ALL GRIND LOCATIONS
 6. WELD NEW ITEM 704 AS SHOWN
 7. WELD NEW ITEM 313 AS SHOWN
 8. MT OR PT INSPECT WELDS



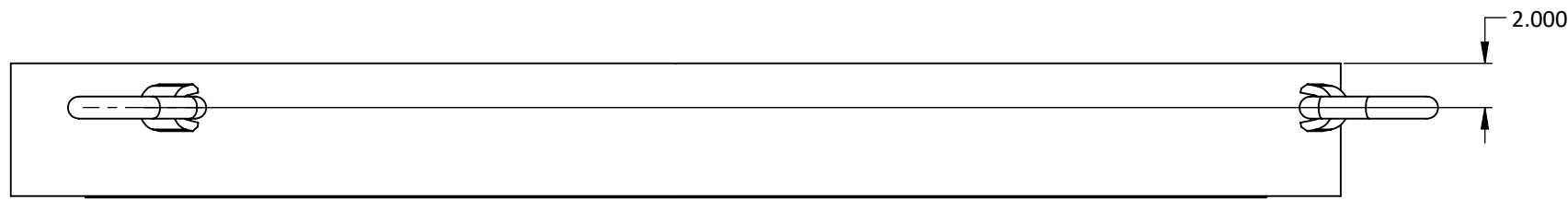
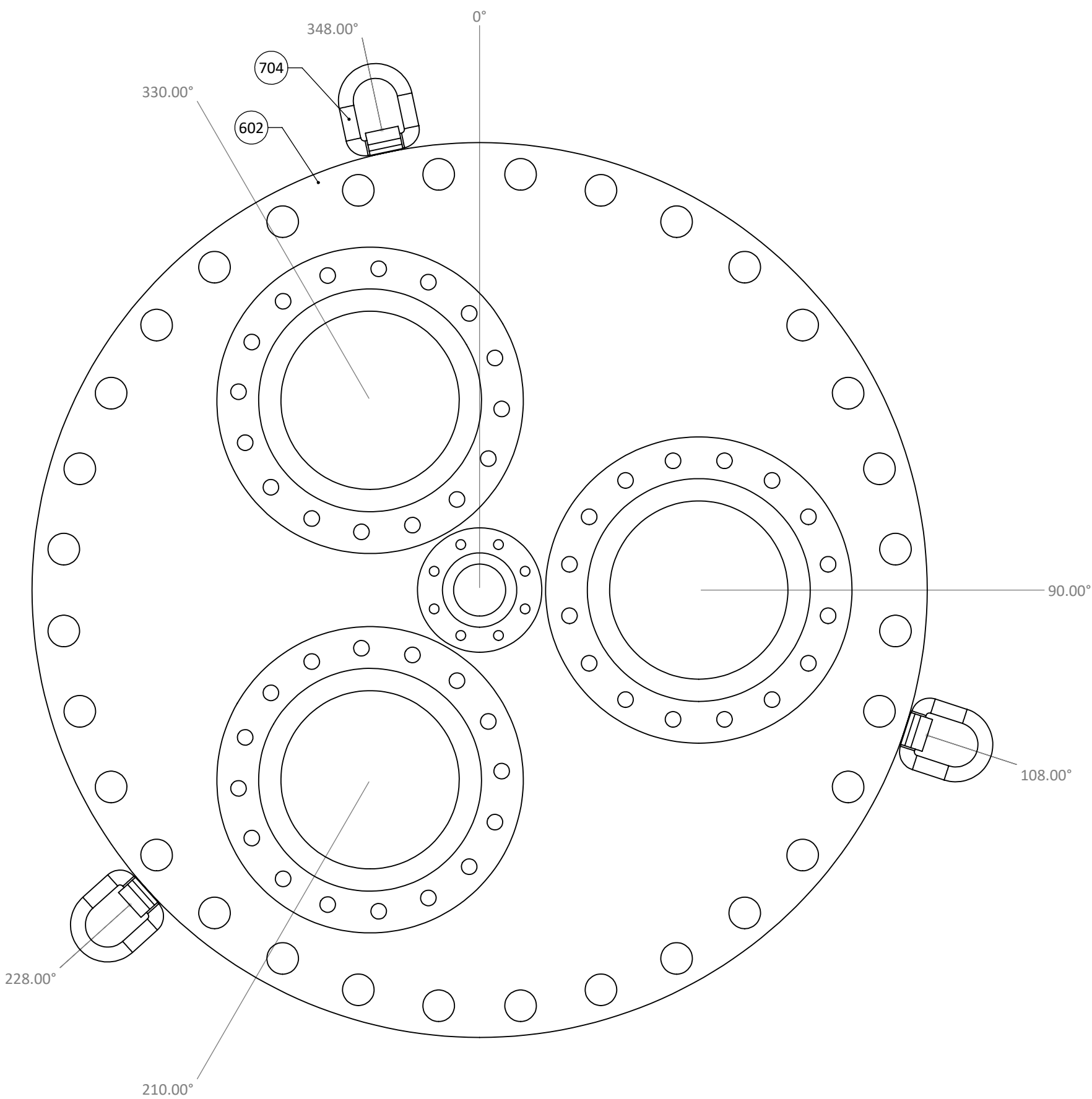
BILL OF MATERIALS			
ITEM	QTY	DESCRIPTION	MATERIAL
401	1	SHELL, SPOOL 4	SA-516 70
402	3	PIPE - SCH. 100, 12.00 NPS	SA-106 B
403	3	FLANGE, B16.5 RF50 - 300#, 12.00 NPS	SA-105
406	1	PIPE - SCH. XXS, 8.00 NPS	SA-106 B
407	1	FLANGE, B16.5 RF50 - 300#, 8.00 NPS	SA-105
408	1	PATCH PLATE, 3" OD, 1/2" THK, ROLL TO 24.5" INSIDE RADIUS	SA-516 70
601	2	FLANGE, SPOOL BODY	SA-105N, FINE GRAIN
704	3	LIFT POINT RIGGING CANADA PART ID 28-057-8T, 8 TON	ALLOY STEEL

- NOTES**
1. ALL DIMENSIONS IN INCHES.
 2. ALL WELDS SHALL BE NEAT IN APPEARANCE, FREE FROM SLAG AND OTHER DEFECTS.
 3. REMOVE ALL SHARP EDGES ON NOZZLES (1/8" MINIMUM RADIUS)
 4. ALL NOZZLES TO SUPPORT NOMINAL LOADS ONLY.
 5. GRIND WELDS FLUSH UNDER REPADS.
 6. MAXIMUM MISALIGNMENT OF BUTT JOINTS IS LIMITED TO .25T (CATEGORY A, B, C, D UP TO 1/2" THICK)
 7. ALL FITTINGS CONFORM TO B16.9 STANDARDS.
 8. ALL COUPLINGS TO CONFORM TO B16.11 STANDARDS.
 9. ALL FLANGES TO CONFORM TO B16.5 / B16.47 STANDARDS.
 10. FLANGE BOLT HOLES TO STRADDLE NATURAL CENTRE LINES.
 11. TELLTALE HOLE 1/4 NPT REQUIRED IN ALL REPADS AND SADDLE WEAR PLATES.
 12. * NEW ITEM

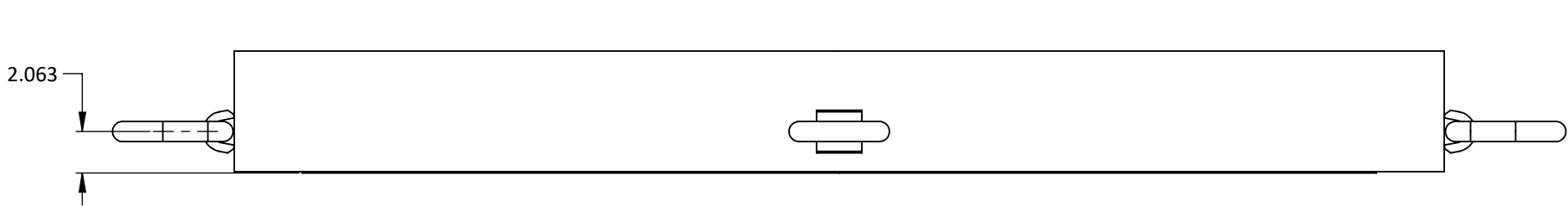
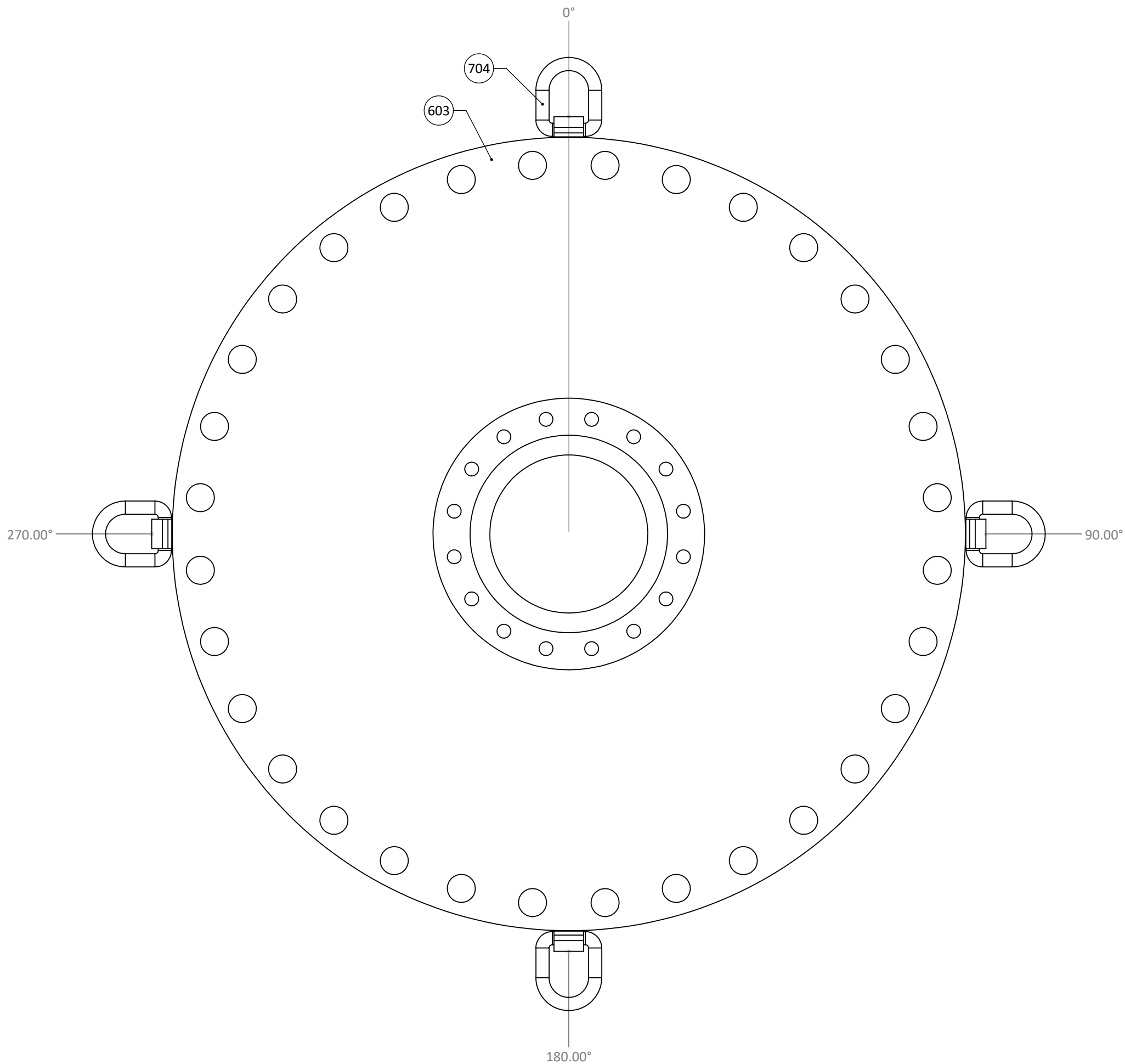
- ALTERATION ACTIONS**
1. REMOVE EXISTING LUGS FROM ITEM 601
 2. REMOVE EXISTING S04N09
 3. GRIND LOCATIONS FLUSH/SMOOTH, BEVEL AS REQUIRED
 4. MT OR PT INSPECT LOCATIONS
 5. WELD NEW ITEM 704 AS SHOWN
 6. WELD NEW ITEM 408 AS SHOWN
 7. MT OR PT INSPECT WELDS

		Pressure Vessel Engineering 1-1440 KING ST. N. PO BOX 112 ST. JACOBS, ON, CANADA, N0B 2N0	
TITLE SPOOL 4 ASSEMBLY			
DATE C	JOB ID PVENG# 19133	DRAWING NO. 19133-000	REVISION 2
SCALE 1:10	MATERIAL -	SHEET 5 OF 7	
THIS DRAWING AND THE INFORMATION HEREIN IS CONFIDENTIAL, AND MUST NOT BE REPRODUCED OR USED IN ANY WAY WITHOUT THE WRITTEN PERMISSION OF PRESSURE VESSEL ENGINEERING LTD.			

BILL OF MATERIALS			
ITEM	QTY	DESCRIPTION	MATERIAL
602	1	EXISITING TOP FLANGE	SA-105
* 704	3	LIFT POINT RIGGING CANADA PART ID 28-057-8T, 8 TON	ALLOY STEEL



BILL OF MATERIALS			
ITEM	QTY	DESCRIPTION	MATERIAL
603	1	EXISITING BOTTOM FLANGE	SA-105
* 704	4	LIFT POINT RIGGING CANADA PART ID 28-057-8T, 8 TON	ALLOY STEEL



- NOTES**
1. ALL DIMENSIONS IN INCHES.
 2. ALL WELDS SHALL BE NEAT IN APPEARANCE, FREE FROM SLAG AND OTHER DEFECTS.
 3. FLANGE BOLT HOLES TO STRADDLE NATURAL CENTRE LINES.
 4. * NEW ITEM

- ALTERATION ACTIONS**
1. REMOVE EXISTING LUGS FROM ITEM 602 & 603
 2. GRIND LOCATIONS FLUSH
 3. MT OR PT INSPECT LOCATIONS
 4. WELD NEW ITEM 704 AS SHOWN
 5. MT OR PT INSPECT WELDS