

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	09/17/2021	RJ
B	REVISED DESIGN TEMP & SEISMIC/WIND VALUES	9/22/2021	RJ

APPROVAL DRAWING

APPROVED

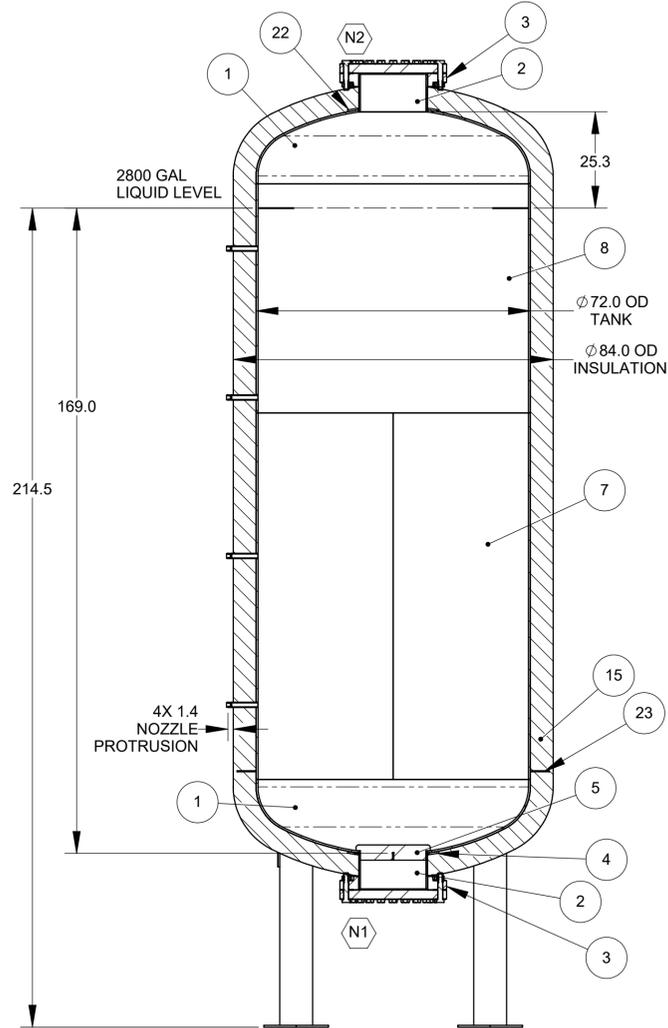
APPROVED AS NOTED

REVISE AS NOTED AND RE-SUBMIT

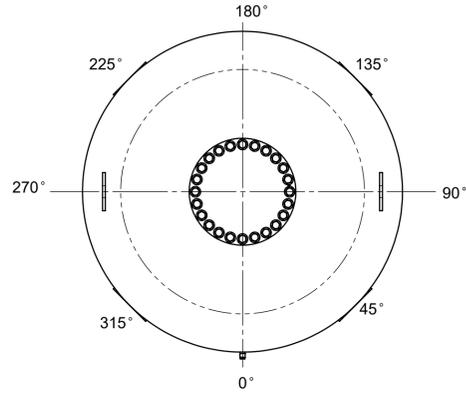
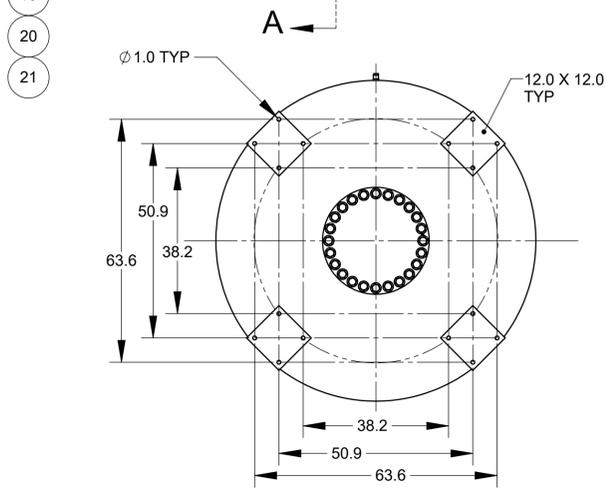
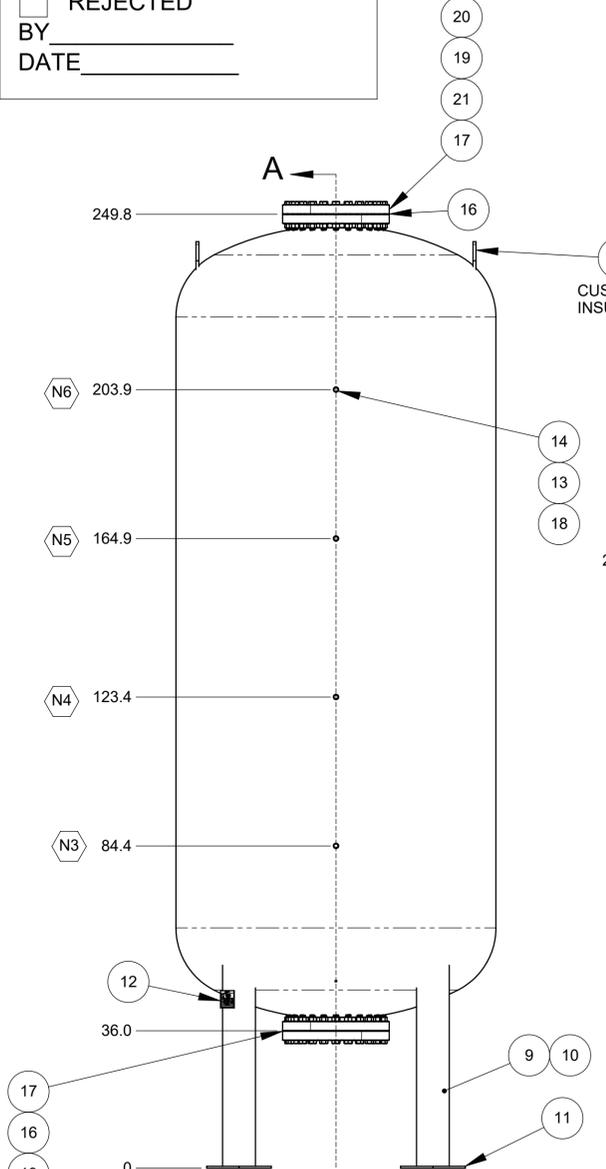
REJECTED

BY _____

DATE _____



SECTION A-A
SCALE 1 : 24



NOZZLE ID	ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	MATERIAL
	24	2	TBD	LIFTING POINT	TBD
	23	4	21-259A-109	INSULATION SHELF	SA-240-304L-PLT-.250
	22	1	21-259A-203	NOZZLE REPAD	SA-240-304L-PLT-.500
	21	48	92198A272	HEX HEAD SCREW, 1.25"-7 UNC X 7" LG	18-8 SS
	20	48	91845A040	HEX NUT, 1.25"-7 UNC	AISI 304
	19	96	92141A040	FLAT WASHER, 1-1/4" SCREW	18-8 SS
	18	4	4464K335	PLUG, 3/4" NPT, 3000#	AISI 304
	17	2	18-300-BLIND-RF-FLANGE	18", 300#, RAISED FACE BLIND	SA-105
	16	2	55YW10	18" FULL FACE GASKET,	ARAMID / BUNA-N
	15	1	TBD	6" INSULATION WITH SHELL	FOAMGLAS & AL
N3, N4, N5, N6	14	4	45525K575	HALF COUPLING, 3/4" NPT, 3000#	304 SS
	13	4	21-259A-108	HALF COUPLING PIPE EXTENSION	SA-312-TP304-S-PPE-1-.133
	12	1	21-260A-106	ASME CERTIFICATION PLATE	SA-240-304L-SHT-12GA
	11	4	21-260A-105	MOUNT PLATE	SA-240-304L-PLT-.500
	10	4	21-259A-104	LEG CAP	SA-240-304L-SHT-10GA
	9	4	21-259A-103	8" SCH 40 PIPE LEG	SA-312-TP304-S-PPE-8-.322
	8	1	21-259A-102	SHELL TOP HALF	SA-240-304L-PLT-.500
	7	1	21-259A-101	SHELL BOTTOM HALF	SA-240-304L-PLT-.500
	5	1	21-260A-400	VORTEX BREAKER	SA-240-304L-PLT-.250
	4	1	21-259A-301	NOZZLE REPAD	SA-240-304L-PLT-.375
N1, N2	3	2	18-300-SLIP-ON-RF-FLANGE	18", 300#, RSFO FLANGE	AISI 304
	2	2	21-259A-202	NOZZLE NECK	SA-312-TP304-S-PPE-18-.375
	1	2	21-259A-201	HEAD, ASME 2:1 SEMI-ELLIPTICAL	SA-240-304L-PLT-.500

BILL OF MATERIALS

- NOTES:
- VESSEL AND/OR HEAT TRANSFER SURFACE DESIGNED IN ACCORDANCE WITH THE LATEST EDITION OF THE "ASME BOILER AND PRESSURE VESSEL CODE, SECTION VIII, DIVISION 1, 2019 AND ADDENDA.
 - SPS, INC. SHALL NOT BE RESPONSIBLE FOR THE CORROSION RESISTANCE OF EQUIPMENT OR ANY RESULTING DAMAGES. IT IS THE PURCHASER'S RESPONSIBILITY TO SPECIFY THE INTENDED APPLICATION(S), CONSULTATION WITH QUALIFIED PERSONNEL IN MATERIAL SELECTIONS IS HIGHLY RECOMMENDED.
 - ALL WELDING TO BE DONE BY ASME QUALIFIED WELDERS IN ACCORDANCE WITH UW-28.
 - WELDS SHALL BE NEAT IN APPEARANCE, FREE OF SLAG, UNDERCUT & OTHER DEFECTS.
 - INTERIOR WELDS TO BE GROUND SMOOTH AND FLUSH EXCEPT FOR THE LAST CIRCUMFERENTIAL WELD ON THE TOP HEAD AND NOZZLE; EXTERIOR WELDS TO BE AS WELDED.
 - ASME CODE JURISDICTION ENDS AT THE FIRST SEALING SURFACE EXCLUDING MANWAY.
 - SUITABLE PRESSURE AND/OR VACUUM RELIEF DEVICES MUST BE INSTALLED BY CUSTOMER FOR OPERATION OF VESSEL AND/OR HEAT TRANSFER SURFACE.
 - ALL CUSTOMER SUPPLIED COMPONENTS MUST HAVE PROPER IDENTIFICATION, APPLICABLE CODE/STD INFORMATION (EX: PARTIAL DATA), AND MILL TEST REPORTS BEFORE BEING WELDED TO VESSEL.
 - VESSEL TO BE HYDROSTATICALLY TESTED PER UG-99. CHECK FOR DEFECTS, REPAIR AND RETEST IF NECESSARY.
 - VESSEL TO BE SHIPPED UNDER 3-5 PSI NITROGEN.
 - NO INSPECTION PORT. USE Ø18" FOR INTERNAL INSPECTION.
 - SPS TO PERFORM THE FOLLOWING TESTS AND PROCEDURES AND/OR HAVE CERTIFICATIONS.
 - HYDROSTATIC PRESSURE TEST
 - ELECTROPOLISHING AND PASSIVATION
 - BPE CIP COVERAGE TEST
 - BPE DRAINAGE TEST
 - CITRIC ACID PASSIVATION PER SPS SOP
 - BPE SURFACE FINISH TEST
 - MATERIAL CERTS REQUIRED FOR THE FOLLOWING:
 - PRESSURE VESSEL COMPONENTS
 - REMOVABLE ACCESSORIES/WETTED PARTS
 - AGITATOR SEALS
 - ELASTOMERS FOR FERRULES OR VALVE SEATS
 - PRESSURE RELIEF OVERFLOW TUBES TO BE 10.00 IN ABOVE THE FLOOR.
 - GASKET MATERIAL, IF APPLICABLE:
 - BUNA EPDM VITON PTFE
 - AS SUPPLIED USP, CLASS VI
 - CURE: Pt PEROXIDE OTHER
 - SEISMIC DESIGN ASSUMES SUPPORTS ARE ANCHORED TO FLOOR.
 - FINISH TO BE: EXTERIOR-180 GRIT JITTERBUG; INTERIOR-120 GRIT JITTERBUG.
 - COMPLETED VESSEL TO BE PASSIVATED PER ASTM A967, AMS 2700.
 - COMPLETED TANK TO BE OXYGEN CLEANED PER ASTM-G-93 INSIDE ONLY.
 - INSTALLATION AT THE CUSTOMER SITE BY OTHERS.

VESSEL DESIGN DATA	
CUSTOMER	ASTRA
P.O. NUMBER	21-259A
DESIGN CODE	ASME SECTION VIII, DIV 1, 2019
MAX ALLOWABLE WORKING PRES - INTERNAL (MAWP)	200 PSI
MAX DESIGN TEMPERATURE (°F)	100 °F
OPERATING PRESSURE	200 PSI
OPERATING TEMPERATURE	100 °F
VACUUM DESIGN (MMHG)	N/A
MIN DESIGN METAL TEMP (MDMT) (°F)	-320 °F
CORROSION ALLOWANCE (IN)	0 IN
SERVICE	NON-LETHAL
APPLICABLE LOADINGS	UG-22(a), (b), &(l)
IMPACT TEST EXEMPTED AS PER	UG-20(f)
HYDROTEST PRESSURE (PSI)	260 PSI
HYDROTEST TEMPERATURE (°F)	50-120 °F
HYDROTEST POSITION	HORIZONTAL
JOINT EFFICIENCY	0.85 EXCEPT BOTTOM HEAD 1.00
WIND PRESSURE	SEE BELOW
SEISMIC ZONE	SEE BELOW
POST WELD HEAT TREATMENT (PWHT)	NONE
VESSEL DIMENSIONAL DATA	
CYLINDRICAL	72" OD X 193.6" LG
EMPTY WEIGHT	11,400 LBS
OPERATING WEIGHT	
FULL FLOODED WEIGHT	
HEAT TRANSFER SURFACE DATA	
DIMPLE JACKET	NO
AREA	N/A
DIMPLE PATTERN TYPE	N/A
HEATING MEDIUM	N/A
COOLING MEDIUM	N/A
MAX DESIGN PRESSURE (MAWP)	N/A
MIN DESIGN METAL TEMP (MDMT) (°F)	N/A
JACKET FLOW RATING	N/A
INSULATION DATA	
CHLORIDE FREE	N/A
INSULATED SURFACES TO RECEIVE A 5 MIL. COATING OF THERMALOX	
<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NONE
NON-DESTRUCTIVE EXAMINATION	
TOP HEAD	NONE
TOP HEAD TO SHELL	NONE
SHELL LONG SEAM	NONE
BOTTOM HEAD	NONE
BTM HEAD TO SHELL	NONE
PRODUCT DATA	
PROCESS LIQUID	UNKNOWN
VISCOSITY	N/A
SPECIFIC GRAVITY	N/A

SEISMIC CODE VALUES:
ASCE 7-16 ATWATER, CA

SITE CLASS D
Ie = 1.5
Ss = 60%
S1 = 24.6%
R = 2.5
Fv = 2
TL = 12
rho = 1
RISK CATEGORY 3

WINDAGE CODE VALUES:
ASCE 7-16 ATWATER, CA

Cf = 0.54
I15 MPH
Kd = 0.95
Kz1 = 1
RISK CATEGORY 3

N3 2254	
CERTIFIED BY	
SPS STAINLESS PROCESS SYSTEMS	
U	SHELL MAWP 200 PSI AT 150 °F
	MDMT -320 °F AT 200 PSI
	JACKET MAWP N/A PSI AT N/A °F
	MDMT N/A °F AT N/A PSI
SER. NO. 21-259A-01 YR BLT. 2021	
LIQUID OXYGEN RUN TANK	
2800 GAL CAPACITY	
RT4	

MARK	LOC	DESCRIPTION	SERVICE
N6	SIDE	3/4" NPT-3000# HALF COUPLING	THERMOWELL
N5	SIDE	3/4" NPT-3000# HALF COUPLING	THERMOWELL
N4	SIDE	3/4" NPT-3000# HALF COUPLING	THERMOWELL
N3	SIDE	3/4" NPT-3000# HALF COUPLING	THERMOWELL
N2	TOP	18"-300# RFSO FLANGE	INLET
N1	BOT	18"-300# RFSO FLANGE	OUTLET

NOZZLE SCHEDULE

PROPRIETARY AND CONFIDENTIAL

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UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL = 1/32 ANG. MACH = 1" BEND ± 1" XX ± .03 XXX ± .020 XXXX ± .010 STOCK SIZE: SEE BOM MATERIAL: SEE BOM FINISH: 180 GRIT JITTERBUG

DRAWN: R. JOHNSON 9/16/2021
CHECKED: M. HYMAN
ENG APP: M. HYMAN
MFG APP:
G.A. PROJECT

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TITLE: 2800 GAL LIQUID OXYGEN RUN TANK CUSTOMER SIGN-OFF

SIZE DWG. NO: D 21-259A-01 REV B
SCALE: NONE WEIGHT: SHEET 1 OF 1