

















MECHANICAL DRAWING INDEX

DWG NO.	DRAWING DESCRIPTION
PL-00742-01-01	TRAILER LAYOUT
PL-00742-01-02	HYDROGEN & NITROGEN RACK (3 SHEETS)
PL-00742-02-01	HAZARDOUS AREA DRAWING
PL-00742-03-01	PROCESS FLOW DIAGRAM
PL-00742-04-01	PROCESS AND INSTRUMENTATION DIAGRAM
PL-00742-04-02	DETAILED PROCESS AND INSTRUMENTATION DIAGRAM
PL-00742-04-03	MECHANICAL BILL OF MATERIALS

P&ID SYMBOLS


	NEEDLE VALVE (NV)		FILTER
	AIR ACTUATED VALVE (AV)		TEE
	BALL VALVE (BV)		CROSS
	CHECK VALVE (CV)		TEMPERATURE TRANSDUCER
	3-WAY BALL VALVE		PRESSURE TRANSDUCER
	PRESSURE REDUCING REGULATOR (PR)		PRESSURE INDICATOR (GAUGE)
	RUPTURE DISK (RD)		
	PRESSURE RELIEF VALVE (PRV)		
	THERMAL PRESSURE RELIEF DEVICE (TPRD)		
	HOSE (HS)		

NO.	REMARKS	DATE	DRAWN	CHECKED	APPROVED	NO.	REMARKS	DATE	AUTHOR	REF#	VERSION
0	AS-BUILT	18OCT2015	LQ	LQ	BW						
REVISIONS						REFERENCE DRAWINGS/DOCUMENTS					

PROJECT NUMBER:
PL-00742

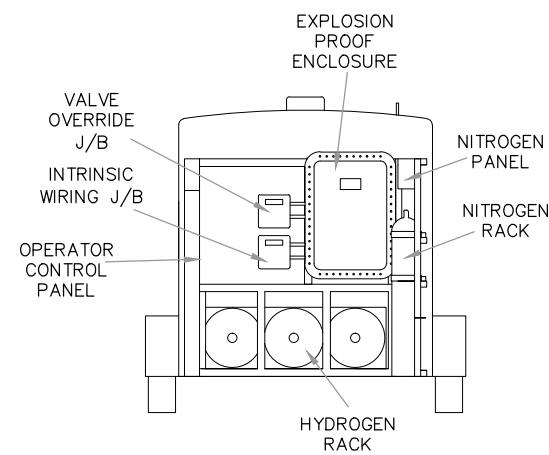
DRAWING NUMBER:
PL-00742-01-00

SHEET:
1 OF 1

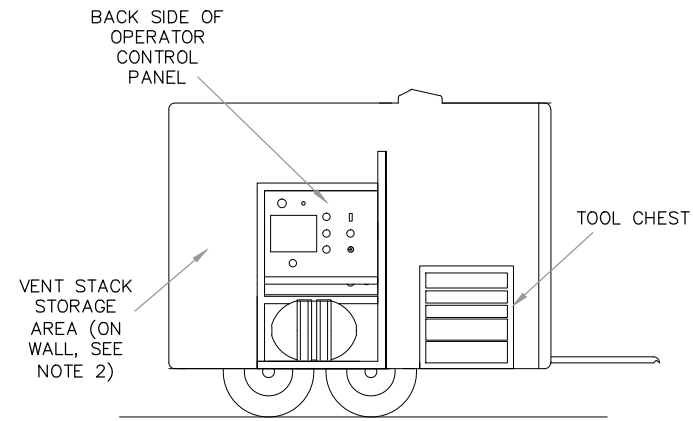
Powertech 

PROJECT TITLE:
HYDROGEN STATION TESTING DEVICE

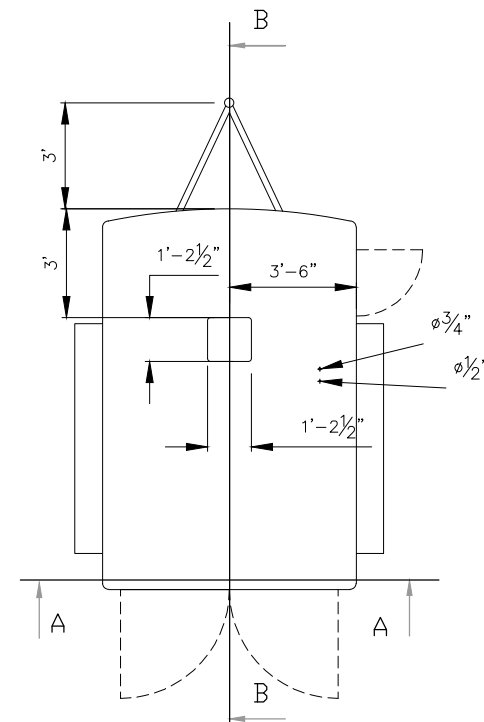
DRAWING TITLE:
MECHANICAL DRAWING INDEX



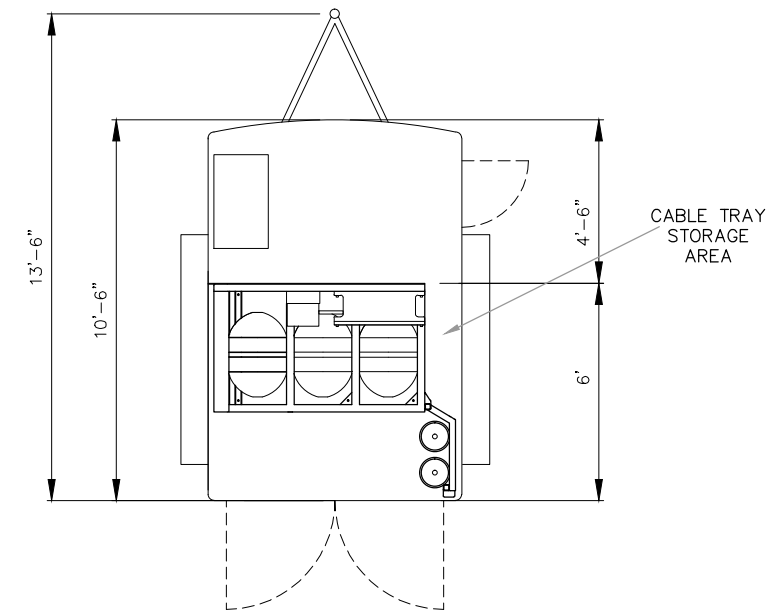
SECTION VIEW A-A



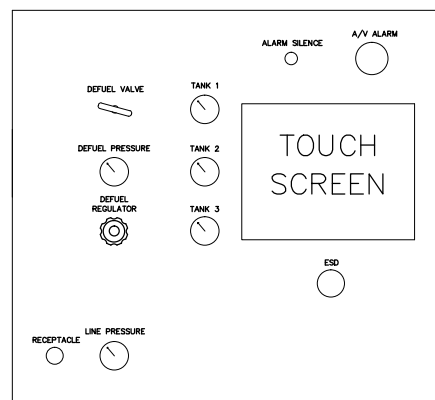
SECTION VIEW B-B



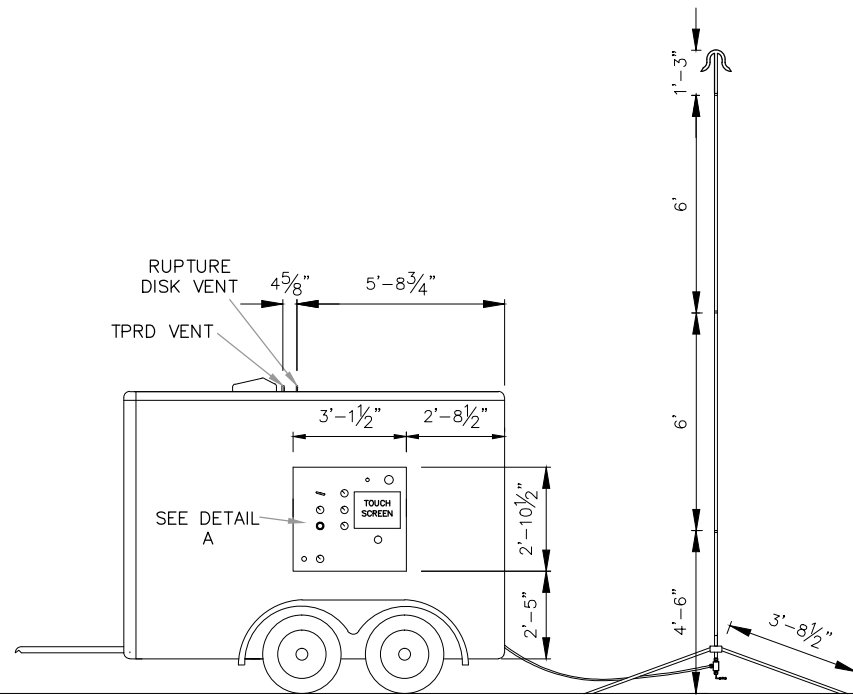
TOP VIEW



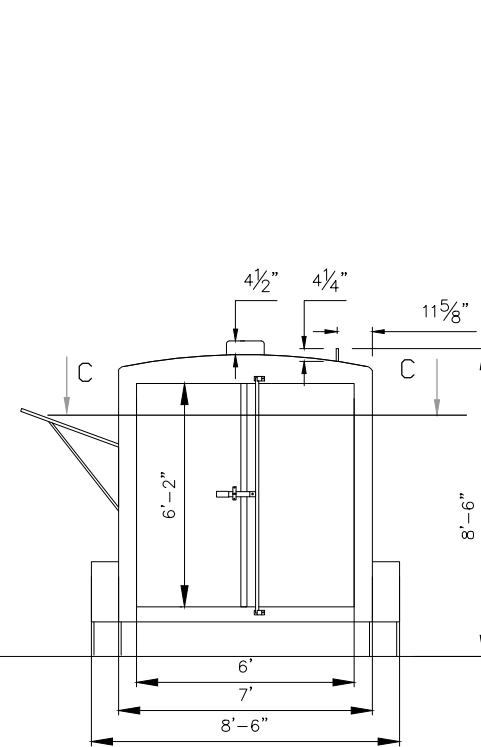
SECTION VIEW C-C



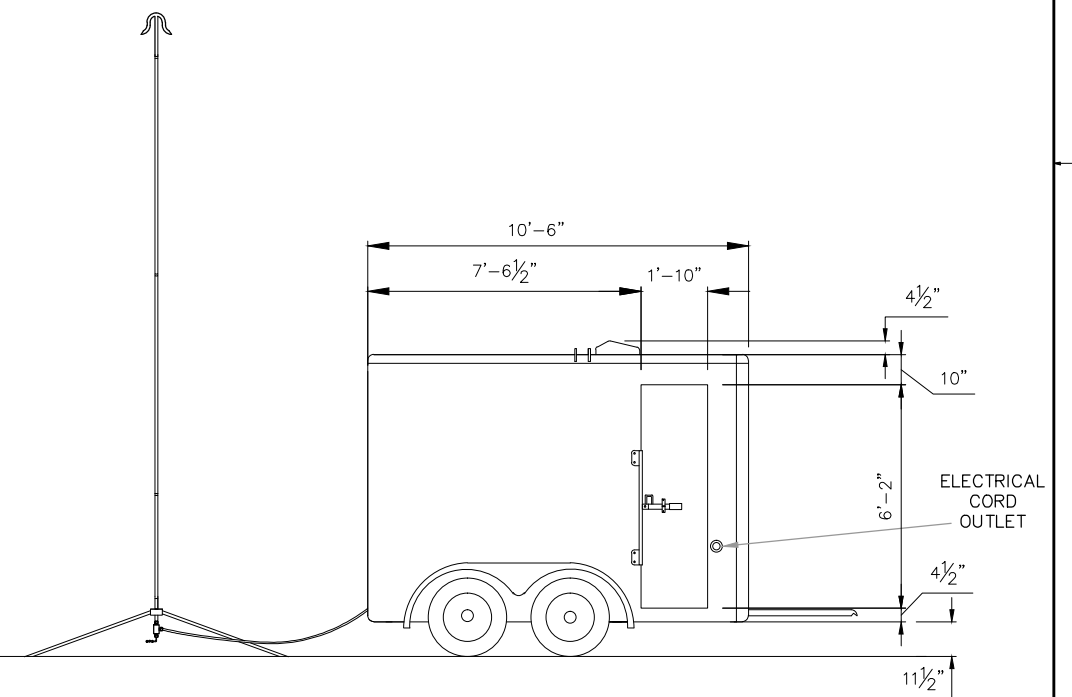
DETAIL A: CONTROL PANEL LAYOUT (NTS)



LEFT SIDE VIEW



BACK VIEW



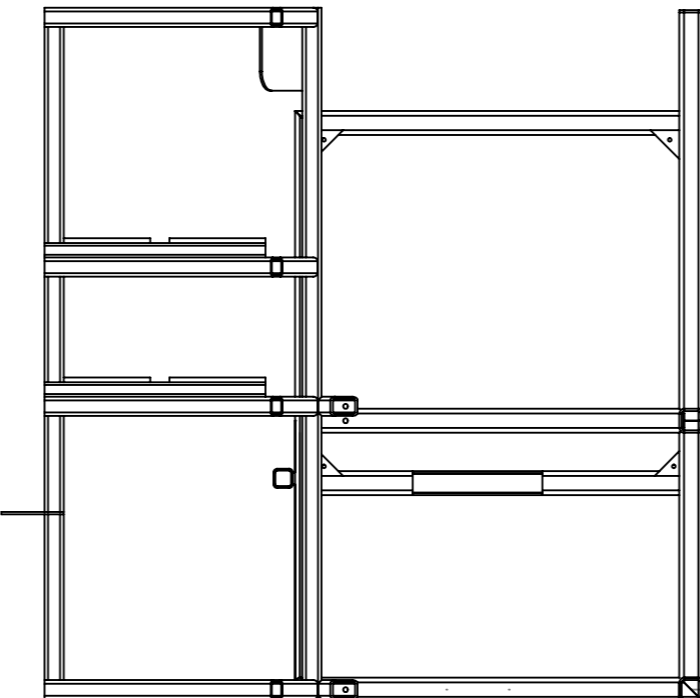
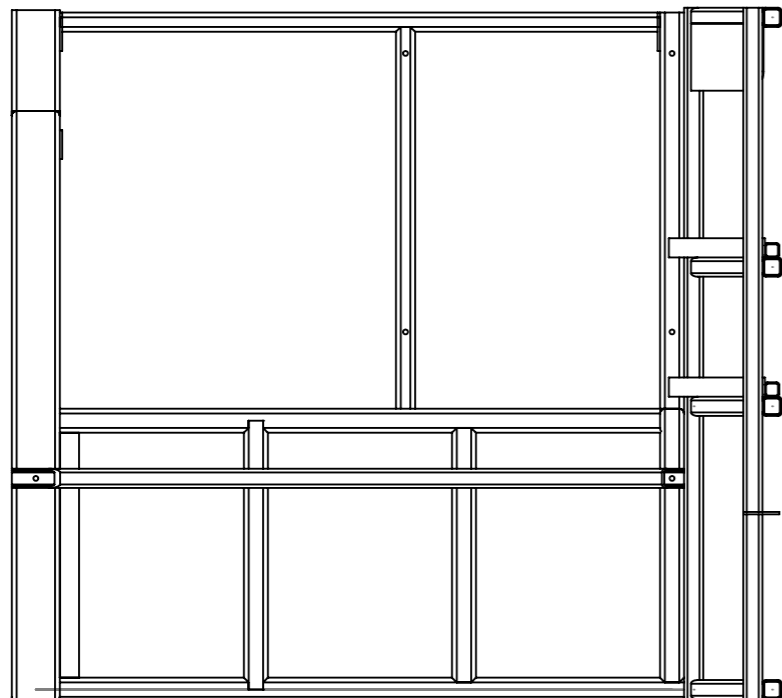
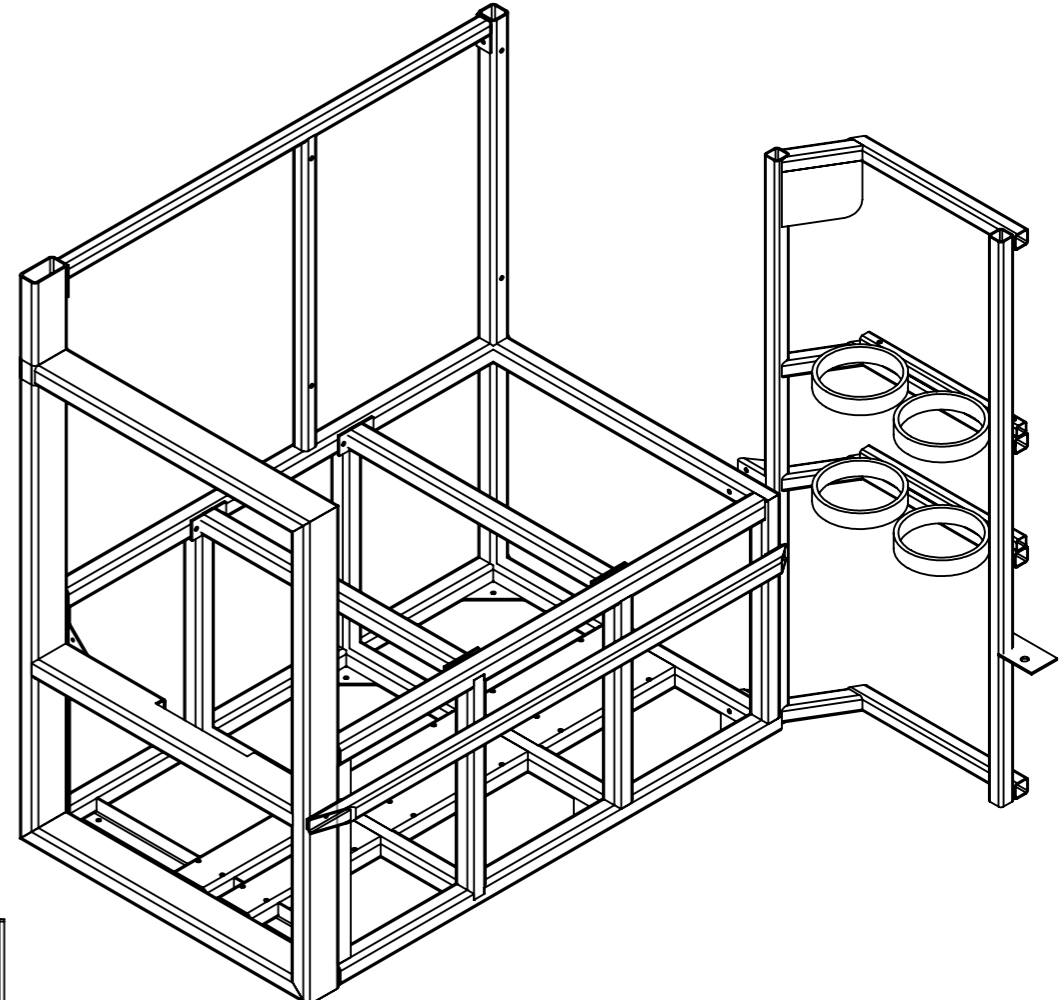
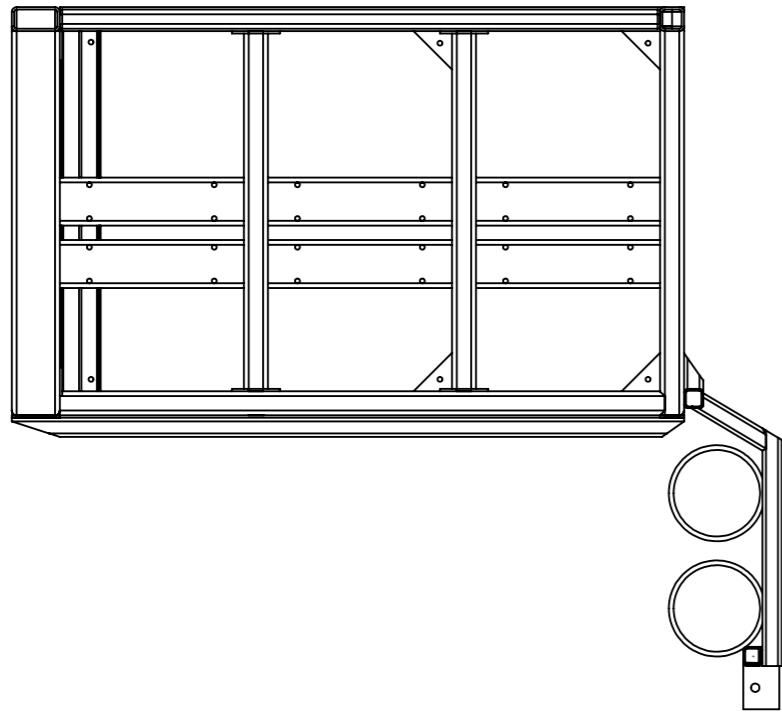
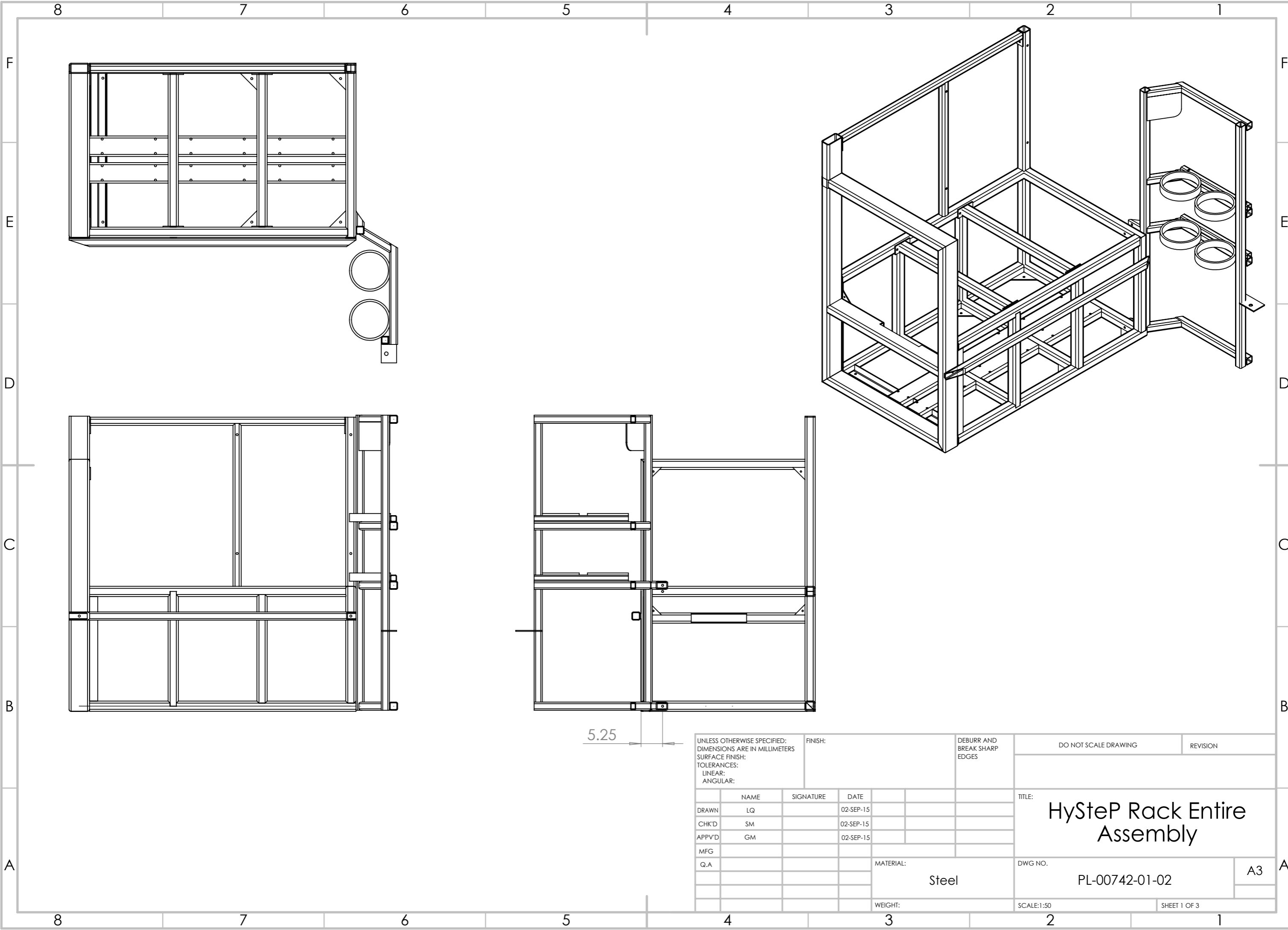
RIGHT SIDE VIEW

NOTES:

1. SEE DRAWING PL-00742-01-02 FOR HYDROGEN AND NITROGEN RACK DETAILS
2. FOR SIMPLICITY, BRACKETS FOR VENT STACK STORAGE, SPARE TIRE, AND TRAILER TONGUE DETAILS ARE NOT SHOWN ON DRAWING

0	DRAWING CREATED. ISSUED FOR PRELIMINARY REVIEW	30JAN2015	LQ	BW	GM	1	NFPA 2 - HYDROGEN TECHNOLOGY	JUL 2014	NFPA	N/A	2014
1	DRAWING UPDATED WITH VENT STACK, COMPONENT DETAILS, ETC.	04FEB2015	LQ	BW	GM						
2	ISSUED FOR DESIGN REVIEW	16MAR2015	LQ	BW	GM						
3	AS-BUILT	16OCT2015	LQ	LQ	BW						
NO.	REMARKS	DATE	DRAWN	CHECKED	APPROVED	NO.	REMARKS	DATE	AUTHOR	REF#	VERSION
REVISIONS							REFERENCE DRAWINGS/DOCUMENTS				

PROJECT NUMBER: PL-00742	
DRAWING NUMBER: PL-00742-01-01	
SHEET: 1 OF 1	PROJECT TITLE: HYDROGEN STATION TESTING DEVICE
	DRAWING TITLE: TRAILER LAYOUT



5.25

UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN MILLIMETERS
 SURFACE FINISH:
 TOLERANCES:
 LINEAR:
 ANGULAR:

FINISH:

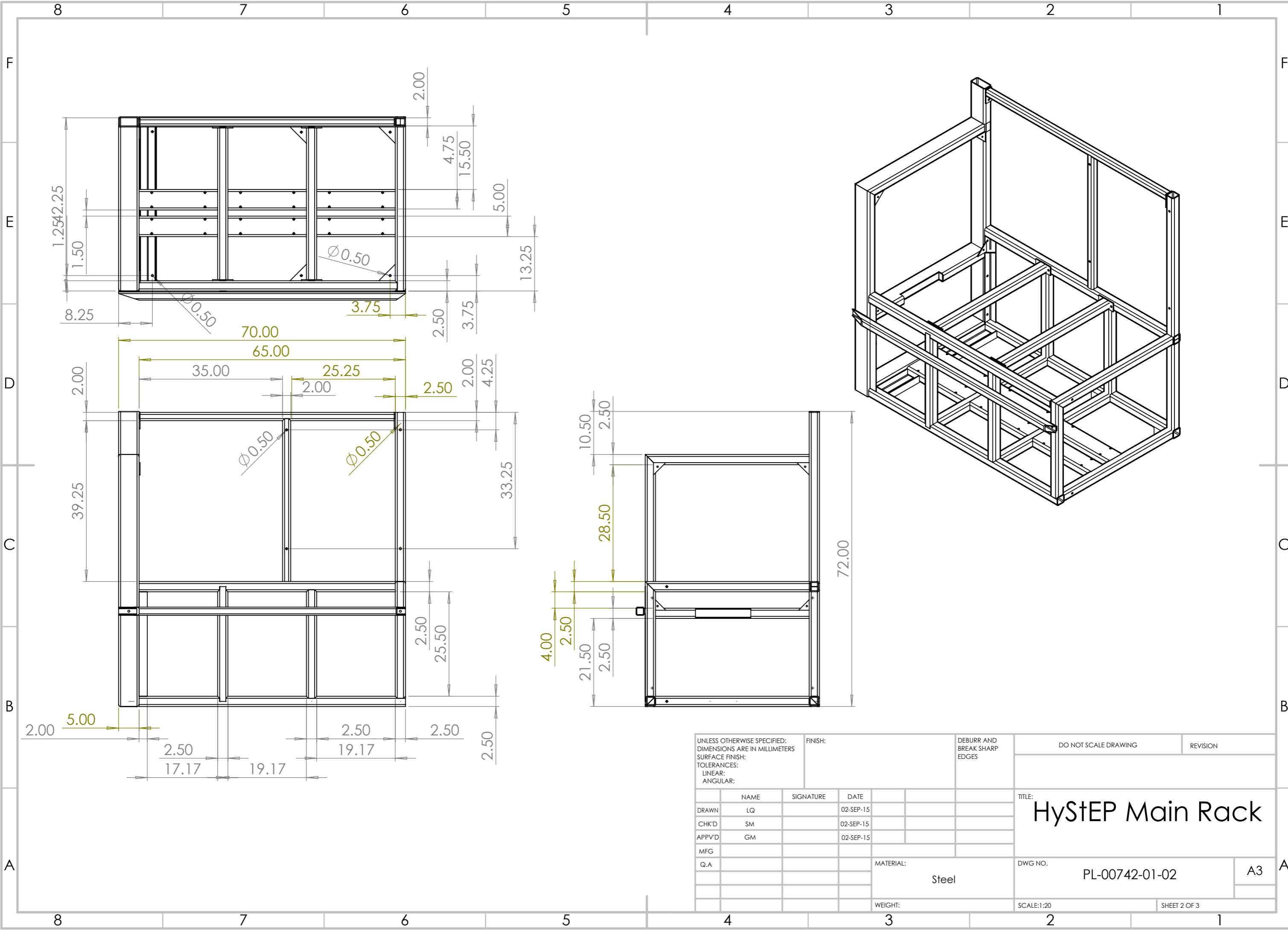
DEBURR AND
 BREAK SHARP
 EDGES

DO NOT SCALE DRAWING

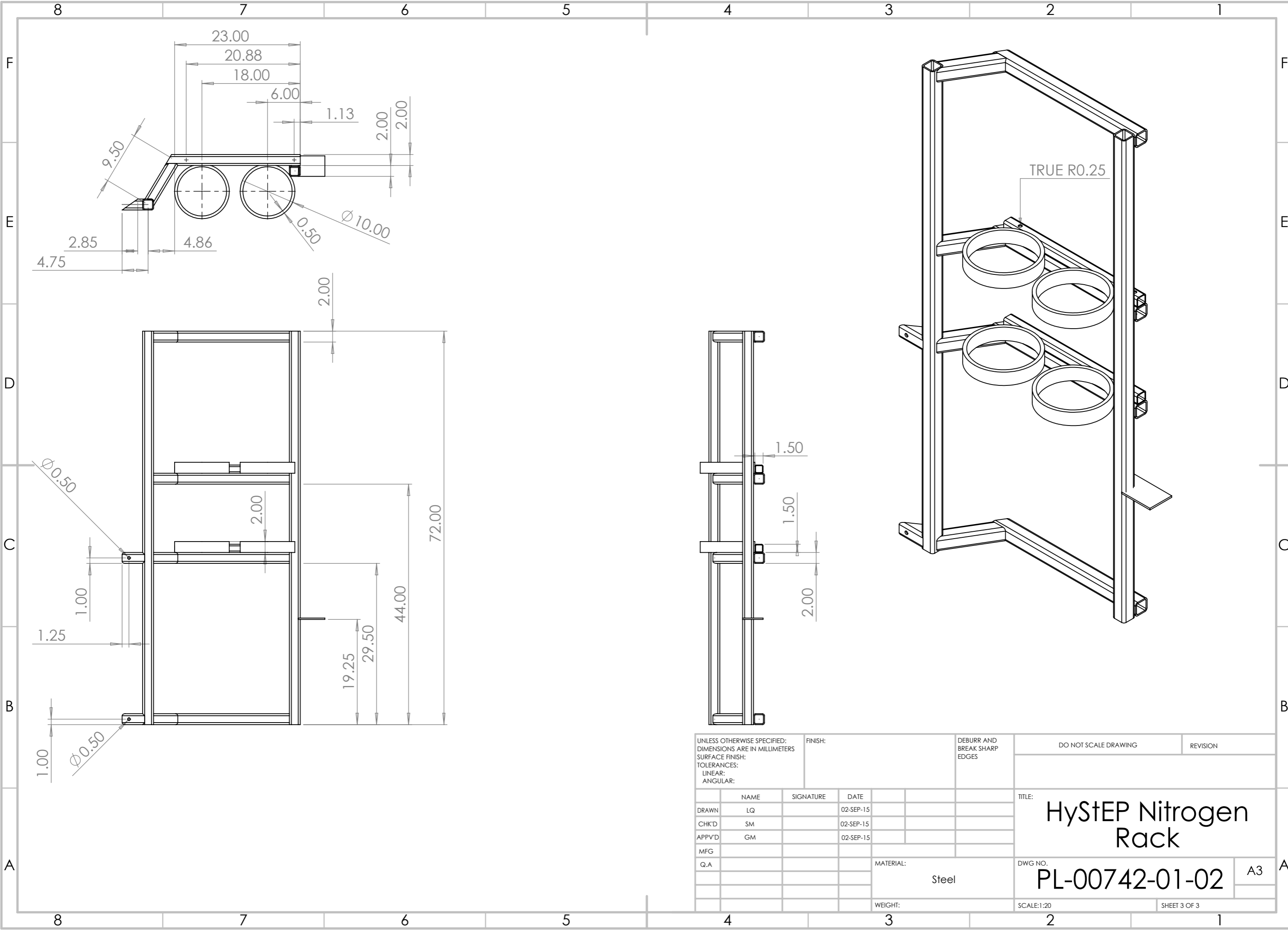
REVISION

	NAME	SIGNATURE	DATE		
DRAWN	LQ		02-SEP-15		
CHK'D	SM		02-SEP-15		
APPV'D	GM		02-SEP-15		
MFG					
Q.A					
				MATERIAL:	
				Steel	
				WEIGHT:	

TITLE: HySteP Rack Entire Assembly		DWG NO. PL-00742-01-02	A3
SCALE:1:50		SHEET 1 OF 3	



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:			FINISH:	DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
DRAWN	LQ	SIGNATURE	DATE		TITLE: HySTEP Main Rack	
CHK'D	SM		02-SEP-15			
APPV'D	GM		02-SEP-15			
MFG						
Q.A				MATERIAL: Steel	DWG NO. PL-00742-01-02	A3
				WEIGHT:	SCALE:1:20	SHEET 2 OF 3



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:			FINISH:		DEBURR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING		REVISION		
DRAWN			NAME		SIGNATURE		DATE		TITLE:		
CHK'D			LQ				02-SEP-15		HyStEP Nitrogen Rack		
APPV'D			SM				02-SEP-15				
MFG			GM				02-SEP-15				
Q.A											
							MATERIAL:		DWG NO.		
							Steel		PL-00742-01-02		
							WEIGHT:		SCALE:1:20		
									SHEET 3 OF 3		

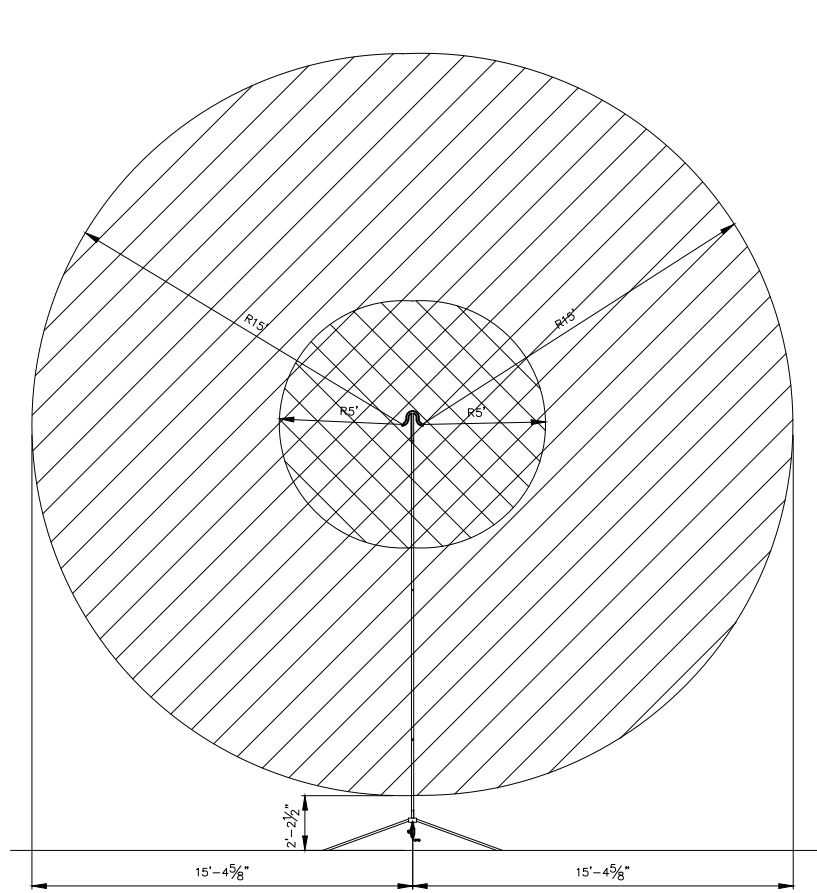
HyStEP Nitrogen Rack

DWG NO. PL-00742-01-02

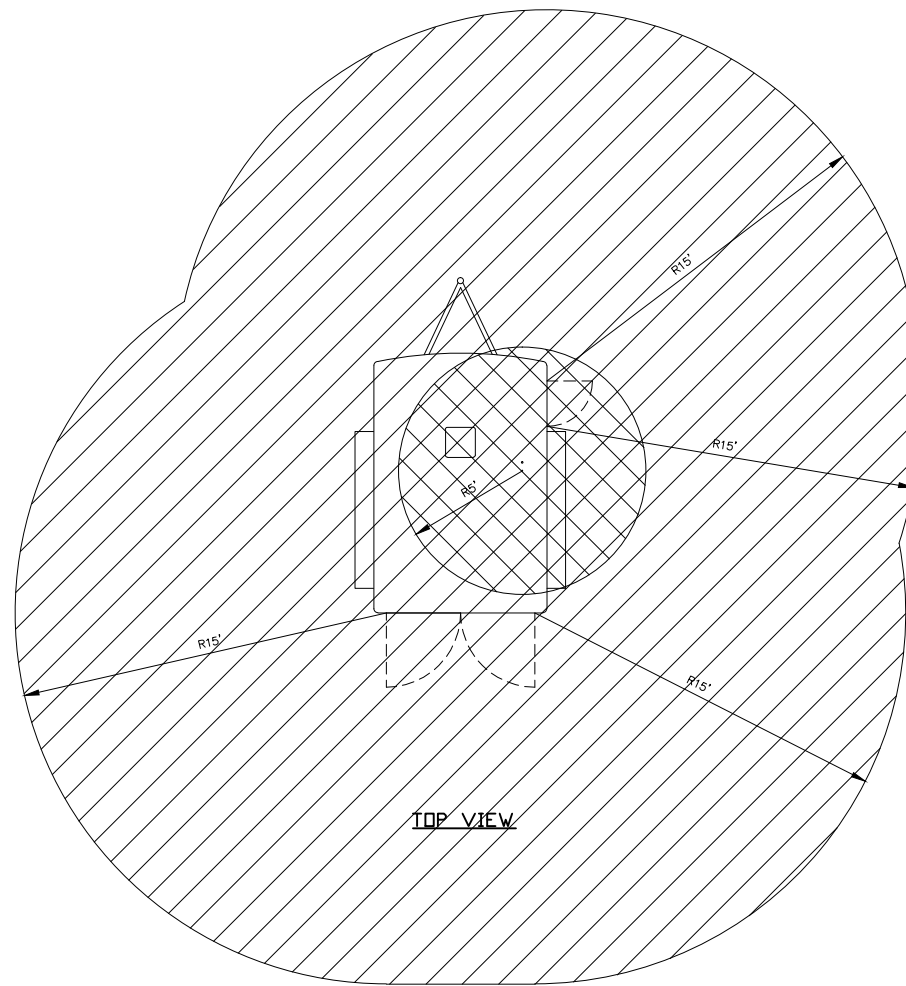
A3

SCALE:1:20



SHEET 3 OF 3

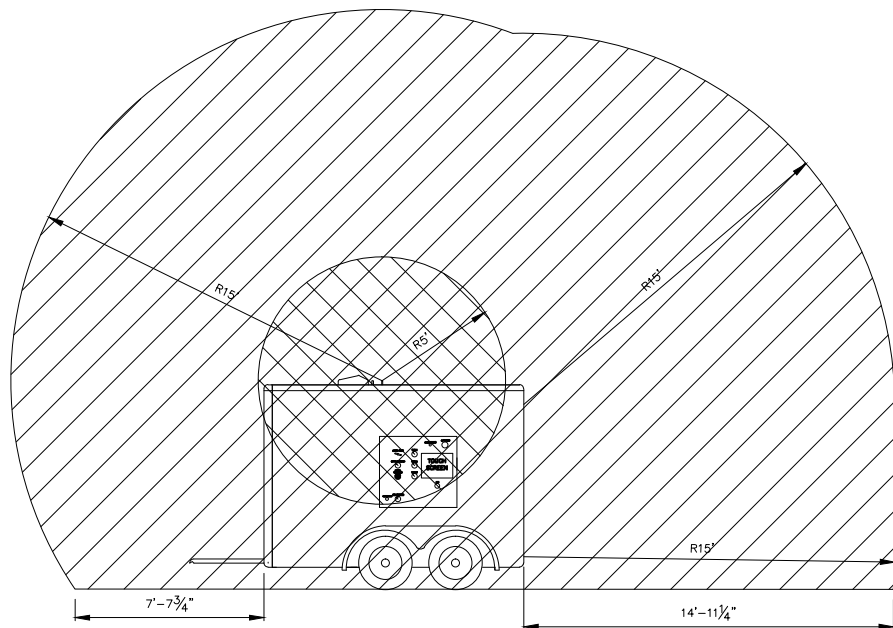


VENT STACK

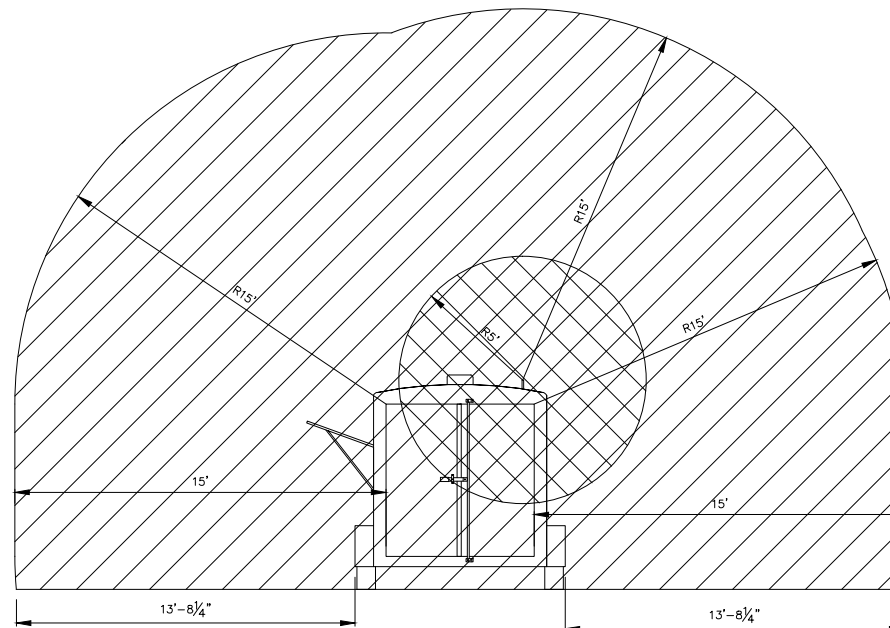


TOP VIEW

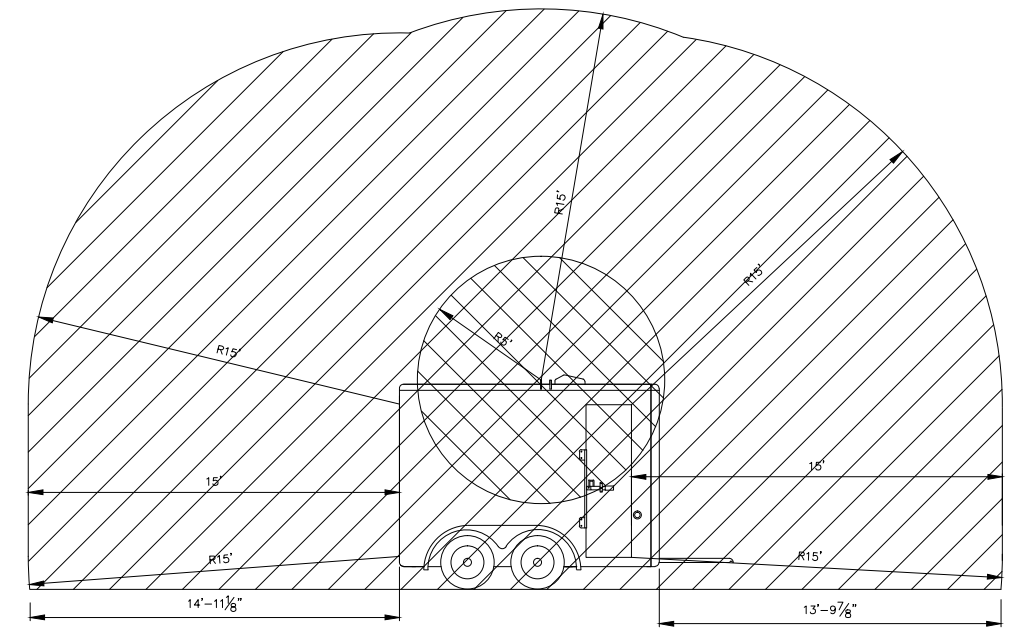
-  CLASS 1, DIV 1
-  CLASS 1, DIV 2



LEFT SIDE VIEW




BACK VIEW



RIGHT SIDE VIEW

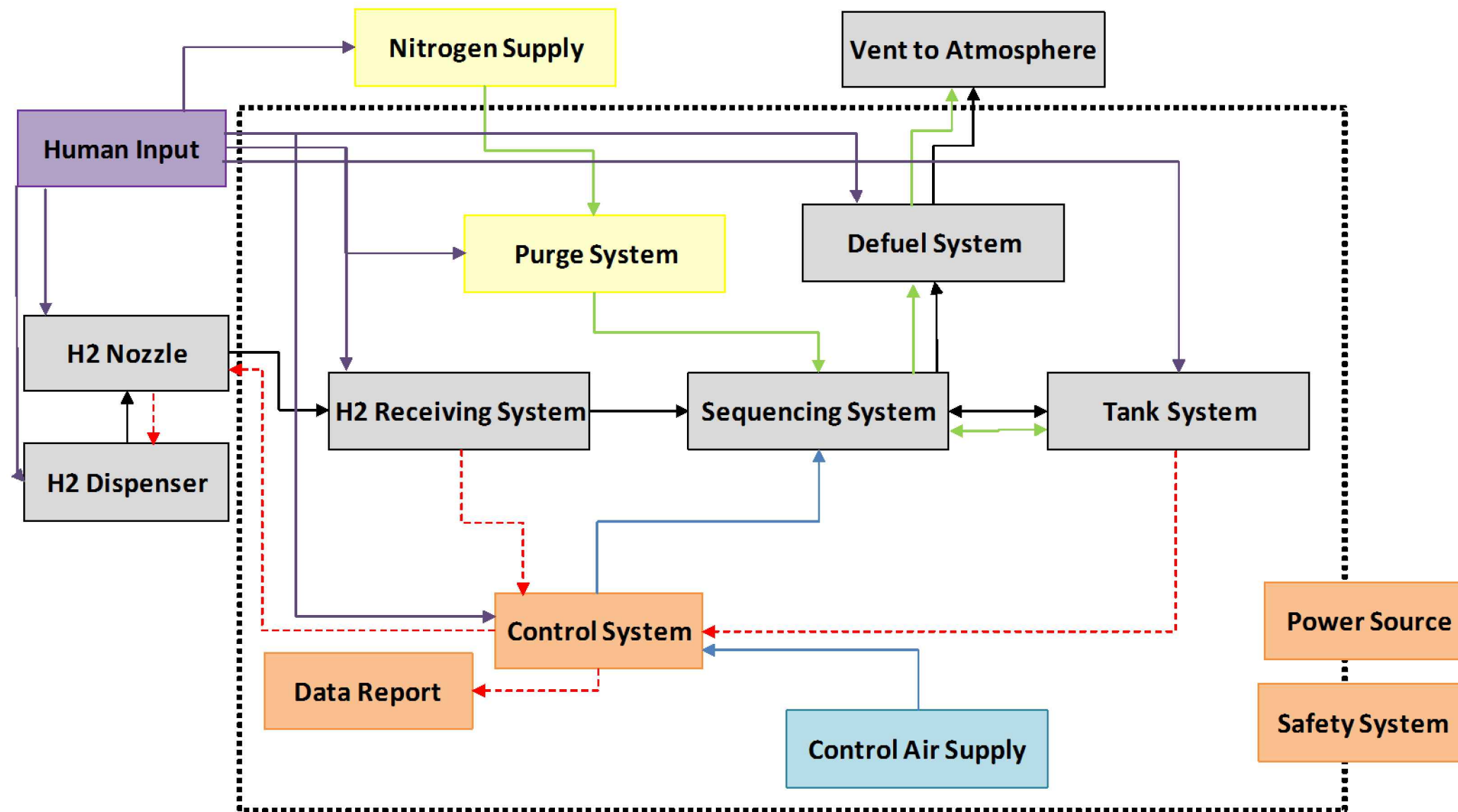
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1	AS-BUILT	18OCT2015	LQ	LQ	BW	2	NFPA 70 - NATIONAL ELECTRICAL CODE	NOV 2011	NFPA	N/A	2011
NO.	REMARKS	DATE	DRAWN	CHECKED	APPROVED	NO.	REMARKS	DATE	AUTHOR	REF#	VERSION
REVISIONS							REFERENCE DRAWINGS/DOCUMENTS				

PROJECT NUMBER: PL-00742
DRAWING NUMBER: PL-00742-02-01
SHEET: 1 OF 1

Powertech 

PROJECT TITLE:
HYDROGEN STATION TESTING DEVICE

DRAWING TITLE:
HAZARDOUS AREA CLASSIFICATION



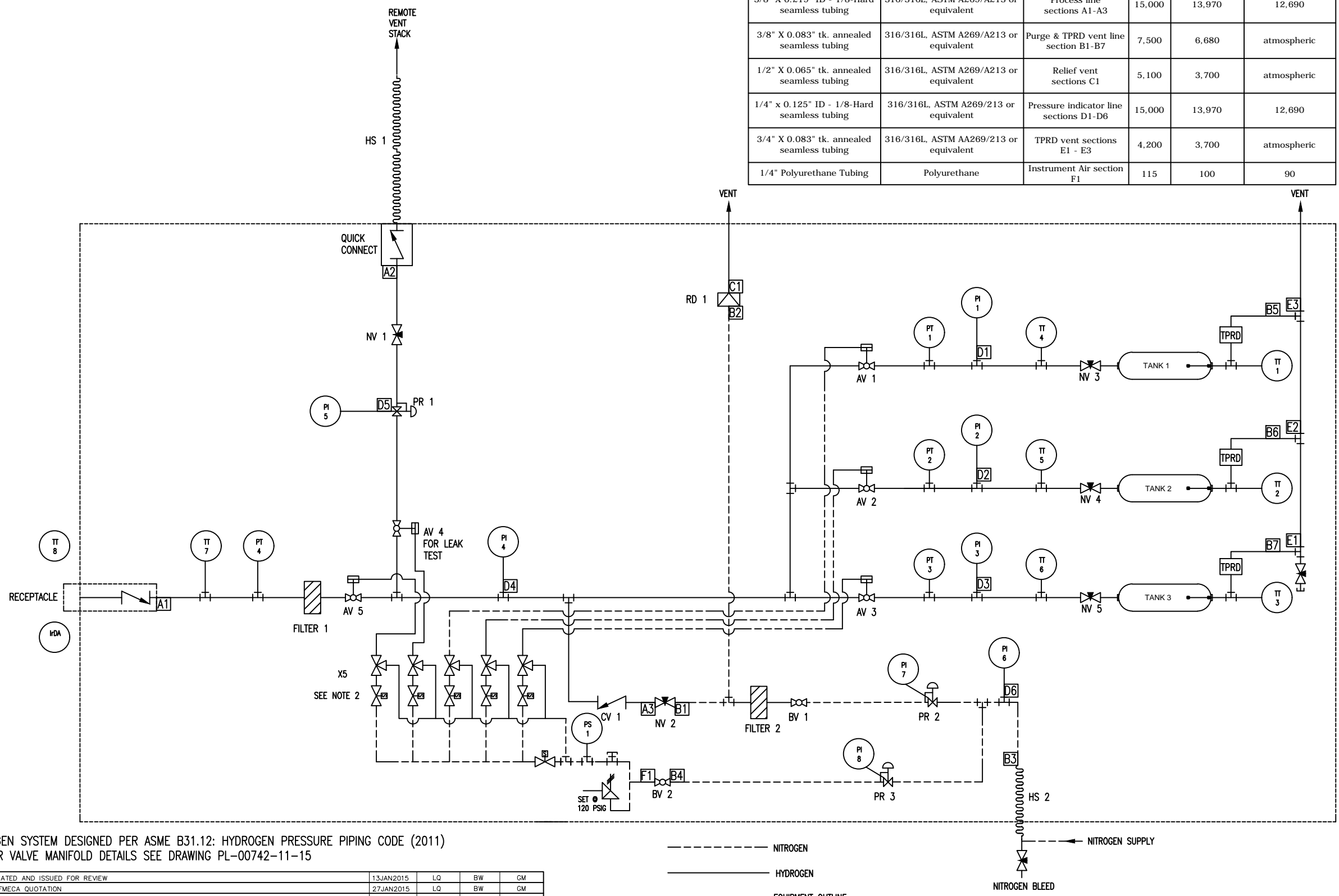
Main Functions

H2 Receiving System = Receive hydrogen from dispenser
 Sequencing System = Direct gas flow
 Tank System = Store H2 during fueling tests
 Defuel System = Controlled release of stored H2 to atmosphere
 Purge System = Introduce inert gas for transportation
 Control System = Monitor/record sensors and control valve positions
 Data Report = Process data into report format

Hydrogen Gas Line
 Purge Line
 Pneumatic Control Line
 Electrical Control

0	AS-BUILT	03SEPT2015	LQ	BW	GM	1	NFPA 2 - HYDROGEN TECHNOLOGY	JUL 2014	NFPA	N/A	2014	PROJECT NUMBER: PL-00742	Powertech
												DRAWING NUMBER: PL-00742-03-01	
NO.	REMARKS	DATE	DRAWN	CHECKED	APPROVED	NO.	REMARKS	DATE	AUTHOR	REF#	VERSION	SHEET: 1 OF 1	DRAWING TITLE: PROCESS FLOW DIAGRAM
							REFERENCE DRAWINGS/DOCUMENTS						

TUBING SPECIFICATION					
DESCRIPTION	MATERIAL	LOCATION	MAWP	DESIGN PRESSURE (PSIG)	OPERATING PRESSURE (PSIG)
3/8" X 0.219" ID - 1/8-Hard seamless tubing	316/316L, ASTM A269/A213 or equivalent	Process line sections A1-A3	15,000	13,970	12,690
3/8" X 0.083" tk. annealed seamless tubing	316/316L, ASTM A269/A213 or equivalent	Purge & TPRD vent line section B1-B7	7,500	6,680	atmospheric
1/2" X 0.065" tk. annealed seamless tubing	316/316L, ASTM A269/A213 or equivalent	Relief vent sections C1	5,100	3,700	atmospheric
1/4" x 0.125" ID - 1/8-Hard seamless tubing	316/316L, ASTM A269/A213 or equivalent	Pressure indicator line sections D1-D6	15,000	13,970	12,690
3/4" X 0.083" tk. annealed seamless tubing	316/316L, ASTM A269/A213 or equivalent	TPRD vent sections E1 - E3	4,200	3,700	atmospheric
1/4" Polyurethane Tubing	Polyurethane	Instrument Air section F1	115	100	90



BV 99 DENOTES UNIQUE DEVICE TAG NUMBER FOR EACH COMPONENT

- NOTES:
 1. HYDROGEN SYSTEM DESIGNED PER ASME B31.12: HYDROGEN PRESSURE PIPING CODE (2011)
 2. FOR AIR VALVE MANIFOLD DETAILS SEE DRAWING PL-00742-11-15

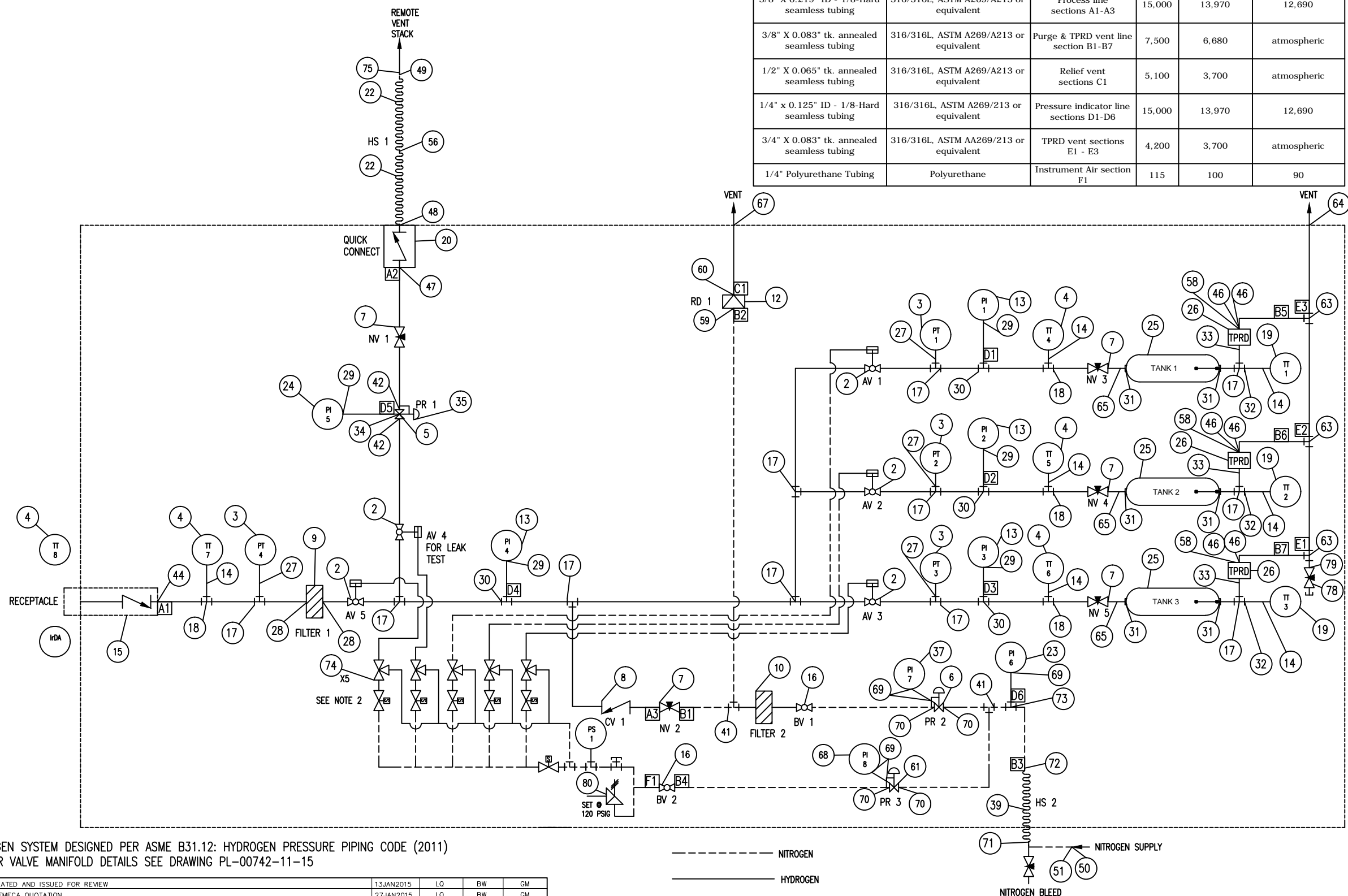
----- NITROGEN
 _____ HYDROGEN
 - - - - - EQUIPMENT OUTLINE

NO.	REMARKS	DATE	DRAWN	CHECKED	APPROVED	NO.
0	DRAWING CREATED AND ISSUED FOR REVIEW	13JAN2015	LQ	BW	GM	
1	ISSUED FOR FMECA QUOTATION	27JAN2015	LQ	BW	GM	
2	UPDATED NITROGEN LINES AND ADDED TT'S AT TANKS	29JAN2015	LQ	BW	GM	
3	UPDATED BOM, CHANGED PURGE VALVE FROM BALL VALVE TO NEEDLE VALVE, ISSUED FOR COMPONENT QUOTE	11FEB2015	LQ	BW	GM	
4	ADDED INSTRUMENT AIR, VENT HOSE, VENT LINE PRV, AND RE-LOCATED TPRD	23FEB2015	LQ	BW	GM	1
5	ISSUED FOR DESIGN REVIEW	16MAR2015	LQ	BW	GM	
6	UPDATED WITH DESIGN REVIEW RECOMMENDATIONS	23MAR2015	LQ	BW	GM	
7	MODIFICATIONS TO AIR VALVE CONTROL ADDED	09APR2015	LQ	BW	GM	
8	PRV REMOVED	22APR2015	LQ	BW	GM	
9	NITROGEN SYSTEM MODIFICATION ADDED, TUBING INFO FOR VENT SYSTEMS ADDED	10JUL2015	LQ	BW	GM	
10	AS-BUILT	16OCT2015	LQ	LQ	BW	

NO.	REMARKS	DATE	AUTHOR	REF#	VERSION
1	NFPA 2 - HYDROGEN TECHNOLOGY	JUL 2014	NFPA	N/A	2014

PROJECT NUMBER: PL-00742	
DRAWING NUMBER: PL-00742-04-01	
SHEET: 1 OF 1	PROJECT TITLE: HYDROGEN STATION TESTING DEVICE
	DRAWING TITLE: PROCESS AND INSTRUMENTATION DIAGRAM

TUBING SPECIFICATION					
DESCRIPTION	MATERIAL	LOCATION	MAWP	DESIGN PRESSURE (PSIG)	OPERATING PRESSURE (PSIG)
3/8" X 0.219" ID - 1/8-Hard seamless tubing	316/316L, ASTM A269/A213 or equivalent	Process line sections A1-A3	15,000	13,970	12,690
3/8" X 0.083" tk. annealed seamless tubing	316/316L, ASTM A269/A213 or equivalent	Purge & TPRD vent line section B1-B7	7,500	6,680	atmospheric
1/2" X 0.065" tk. annealed seamless tubing	316/316L, ASTM A269/A213 or equivalent	Relief vent sections C1	5,100	3,700	atmospheric
1/4" x 0.125" ID - 1/8-Hard seamless tubing	316/316L, ASTM A269/A213 or equivalent	Pressure indicator line sections D1-D6	15,000	13,970	12,690
3/4" X 0.083" tk. annealed seamless tubing	316/316L, ASTM A269/A213 or equivalent	TPRD vent sections E1 - E3	4,200	3,700	atmospheric
1/4" Polyurethane Tubing	Polyurethane	Instrument Air section F1	115	100	90



DENOTES COMPONENT ID NUMBER REFER TO BOM FOR COMPONENT DETAILS

BV 99 DENOTES UNIQUE DEVICE TAG NUMBER FOR EACH COMPONENT

NOTES:
 1. HYDROGEN SYSTEM DESIGNED PER ASME B31.12: HYDROGEN PRESSURE PIPING CODE (2011)
 2. FOR AIR VALVE MANIFOLD DETAILS SEE DRAWING PL-00742-11-15

----- NITROGEN
 _____ HYDROGEN
 - - - - - EQUIPMENT OUTLINE

NO.	REMARKS	DATE	DRAWN	CHECKED	APPROVED	NO.
0	DRAWING CREATED AND ISSUED FOR REVIEW	13JAN2015	LQ	BW	GM	
1	ISSUED FOR FMECA QUOTATION	27JAN2015	LQ	BW	GM	
2	UPDATED NITROGEN LINES AND ADDED TT'S AT TANKS	29JAN2015	LQ	BW	GM	
3	UPDATED BOM, CHANGED PURGE VALVE FROM BALL VALVE TO NEEDLE VALVE, ISSUED FOR COMPONENT QUOTE	11FEB2015	LQ	BW	GM	
4	ADDED INSTRUMENT AIR, VENT HOSE, VENT LINE PRV, AND RE-LOCATED TPRD	23FEB2015	LQ	BW	GM	
5	ISSUED FOR DESIGN REVIEW	16MAR2015	LQ	BW	GM	
6	UPDATED WITH DESIGN REVIEW RECOMMENDATIONS	23MAR2015	LQ	BW	GM	
7	MODIFICATIONS TO AIR VALVE CONTROL ADDED	09APR2015	LQ	BW	GM	
8	PRV REMOVED	22APR2015	LQ	BW	GM	
9	NITROGEN SYSTEM MODIFICATION ADDED, TUBING INFO FOR VENT SYSTEMS ADDED	10JUL2015	LQ	BW	GM	
10	AS-BUILT	16OCT2015	LQ	LQ	BW	

NO.	REMARKS	DATE	AUTHOR	REF#	VERSION
1	NFPA 2 - HYDROGEN TECHNOLOGY	JUL 2014	NFPA	N/A	2014

PROJECT NUMBER: PL-00742	
DRAWING NUMBER: PL-00742-04-02	
SHEET: 1 OF 1	DRAWING TITLE: HYDROGEN STATION TESTING DEVICE PROCESS AND INSTRUMENTATION DIAGRAM


Device Tag #	ID	System	Component Name	Specification	Manufacturer	Part/Model #
AV 1,2,3,4,5	2	H2	Valve	Air actuated on/off needle valve, Autoclave, 3/8" MPI Ends 316SS, angled, Cv 1.12, rated to -100F (cryo-trim)	Parker Autoclave	6MP7-MANAB-TSS-01S-B
PT 1,2,3,4	3	H2	Pressure Transducer	15,000psig, 4-20 mAmp, rated for HAZ, 9/16-18 UNF connections	Stellar Technology	GT2250-15000G-400
TT 4,5,6,7	4	H2	Temperature Transducer	Thermocouple T type, Grounded 1/8" OD 316 sheath, 120" cable teflon/SS overbraid	Sandelius Instruments	2T-125T316-G-31/2-T1-120
PR1	5	H2	Regulator	1/4" FNPT, max inlet pressure 15,000psi, Outlet Pressure 5-500 psig, captured vent, spring activated, SS	Tescom	26-2097D44S275
PR2	6	N2	Regulator	1/4" FNPT, Max inlet pressure 6,000 psig, Outlet Pressure 0-1,500 psig, Spring activated, no vent port but 2 gauge ports	Tescom	44-186124
NV1, NV2, NV3, NV4, NV5	7	H2	Valve	Needle Valve, 3/8" MPI ends, SS, regulating tip	Parker	6MP7-MANLR-TSS
CV 1, CV2	8	H2	Valve	Check Valve, 3/8" MPI ends, SS body, 5psi spring, ball check	Parker	6MP7-MPCBL-5SS
Filter 1	9a	H2	Filter	Filter, 1/4" FNPT x 1/4" FNPT, Drain size 1/4" FNPT	Headline Filters	681-122HHP
Filter 1	9b	H2	Filter Element	Stainless Steel Particulate Filter Element 3um	Headline Filters	SS-12-57-03T
Filter 2	10a	N2	Filter	TF Series Filter 2um	Swagelok	SS-6TF-4K-2
Filter 2	10b	N2	Filter Element	TF Series Filter Element Kit	Swagelok	SS-8F-K4-2
RD 1	12	N2	PRD	1/2" Rupture Disk, Style B, Screw Type, 316SS, 3,000 psig rupture pressure @ 60F	BS&B	0
RD 1	12	N2	PRD	1/2" Safety Head, 303SS	BS&B	SA-10
PI 1, PI 2, PI 3, PI 4	13	H2	Pressure Gauge	2 1/2" dia. Pressure gauge, 0 - 100 Mpa (1-15,000 PSI), center back mount, 1/4" MNPT, Silicone Filled (-40-140F), with Panel Mount Clamp	Swagelok	PGI-63C-MG100-CA03-F
0	14	H2	Fitting	Adapter, 1/8" thermocouple, 1/4" MNPT connection	HIP	15-21AF2NMB-T
0	15	H2	Receptacle	TN1 P70 Receptacle with UNF 7/16-20 Female connections, 20um filter and no IR device	WEH	C1-87745
BV 1, BV2	16	N2	Ball Valve	Ball valve, 3/8" tube fittings, 1.5 Cv	Swagelok	SS-43GS6
0	17	H2	Fitting	Tee, 3/8" MPI union	Parker	6-6-6 JBMP7-SS
0	18	H2	Fitting	Tee, 3/8" MPI run x 1/4" FNPT branch	Parker	6-6-4 OBMP7-SS
TT 1,2,3	19	H2	Temperature Transducer	Thermocouple T type, 1/8" OD, Copper Conductor, 316SS Sheath, Grounded Junction Dual Element, 22" long with readings at tip and 6" back from tip, 120" cable teflon/SS overbraid	Sandelius Instruments	HPU0811V
0	20	H2	Fitting	Quick Disconnect Female Coupler with Check Valve x 1/2" NPT Male	Spir-Star	SPC600-0-NM8
HS 1	22	H2	Hose	Hose 6/2W c/w Type MSS e/e. Pin prick and loctite for hydrogen service	Spir-Star	H62W-025F-TMS-SS

Device Tag #	ID	System	Component Name	Specification	Manufacturer	Part/Model #
P6	23	N2	Pressure Gauge	2 1/2" dia. Pressure gauge, Pressure range 0-4,000psi, center back mount, 1/4" male adapter	Swagelok	PGI-63C-PG4000-CAOX-F
PI 5	24	H2	Pressure Gauge	2 1/2" dia. Pressure gauge, Pressure range 0-4MPa, Center back mount, 1/4" male adapter, Silicone Filled (-40-140F), with Panel Mount Clamp	Swagelok	PGI-63C-MG4-CA03-F
Cyl 1, Cyl 2, Cyl 3	25	H2	Cylinder	70 Mpa, Type 4 tank for hydrogen service, 76L	Quantum	116636
TPRD 1, TPRD 2, TPRD 3	26	H2	TPRD	Thermal Pressure Relief Valve	Luxfer	PRD-700-02-0
0	27	H2	Fitting	Adapter, 1/4" High Pressure fitting (9/16"-18 thread) to 3/8" Tube Stub,	Parker	4-6 X41HT7-SS
0	28	H2	Fitting	Adapter, 3/8" MPI x 1/4" MNPT	Parker	6-4 FBMP7-SS
0	29	H2	Fitting	Adapter, 1/4" MPI x 1/4 FNPT	Parker	4-4 GBMP7-SS
0	30	H2	Fitting	Tee, 3/8" MPI, 1/4" MPI Branch	Parker	6-6-4 JBMP7-SS
0	31	H2	Fitting	Adapter, 9/16" MP (13/16-16 thread) x 3/8" tube stub	Parker	9-6 X42HT7-SS
0	32	H2	Fitting	Adapter, 3/8" MPI male thread x 1/4" Female NPT thread	Parker	6-4 GM7-SS
0	33	H2	Fitting	Adapter 3/8" tube stub x 1/4" SAE Male	Parker	6-4 T7HOA-SS
0	34	H2	Fitting	Adapter 1/4" MPI x 1/4 NPT	Parker	4-4 FBMP7-SS
0	35	H2	Fitting	Plug, 1/4" MNPT	HIP	15-7NMB
0	36	H2	Fitting	Adapter 3/8" MPI x 1/2" MPT	Parker	6-8 FBMP7-SS
PI 7	37	H2	Pressure Gauge	2 1/2" dia. Pressure gauge, Pressure range 0-2,000 psig, Center back mount, 1/4" male adapter	Swagelok	PGI-63C-PG2000-CAOX-F
HS2	39a	N2	Hose	Natural Gas Thermoplastic Hose, 3/8", 3/8" stub, 2 ft long	Swagelok	SS-NGS6-T6T6-24
HS2	39b	N2	Hose	Natural Gas Thermoplastic Hose, 3/8", 3/8" stub, 120 ft long	Swagelok	SS-NGS6-T6T6-120
0	41	H2	Fitting	Tee, 3/8" tube union	Swagelok	SS-600-3
0	42	H2	Fitting	Adapter, 1/4" High Pressure fitting (9/16-18 thread) to 3/8" MPI	Parker	4-6 X41HBMP7-SS
0	43	H2	Fitting	3/8" MPI Union Cross	Parker	6 KBMP7-SS
0	44	H2	Fitting	Adapter, 1/4" Medium Pressure to 3/8" MPI	Parker	4-6 X42HBMP7-SS
46	H2	Fitting	Adapter 3/8" MPI x 1/4" SAE Male	Parker	6-4 MP7HBA-SS	

Device Tag #	ID	System	Component Name	Specification	Manufacturer	Part/Model #
47	H2	Fitting	Bulkhead Fitting 3/8" MPI x 1/2" FNPT	Parker	6-8 GH2BMP7-SS	
48	H2	Fitting	Quick Disconnect Male Nipple without check valve x 9/16"-18 Type M coupling (attaches to hose)	Spir-Star	SPC600-1-M9	
49	H2	Fitting	Adapter, 9/16"-18 Type M hose connection x 1/4" MNPT	Spir-Star	M9-NM4	
50	N2	Fitting	CGA Inlet Connection nipple, CGA 580, 1/4" MNPT end connection	Parker	44800070	
51	N2	Fitting	CGA Inlet Connection nut	Parker	44800027	
56	H2	Fitting	Coupling, Type M 9/16-18	Spir-Star	M9-M9	
57	H2	Fitting	Adapter, 9/16" Medium Pressure x 3/8" MPI	Parker	9-6 X42HBMP7-SS	
58	H2	Fitting	Plug, MPI, 3/8"	Parker	6FNMP7-SS	
59	N2	Fitting	Adapter, 3/8" Tube Fitting x 1/2" FNPT	Swagelok	SS-600-7-8	
60	N2	Fitting	Adapter, 1/2" FNPT x 1/2" Tube Fitting	Swagelok	SS-810-7-8	
61	N2	Regulator	Spring Operated Regulator, 316SS body, 3,500 psi max inlet, 0-100 psi outlet pressure, 1/4" FNPT connections, Cv = 0.06	Tescom	44-2262-241-010	
62	N2	Fitting	Panel mounting nut for 44-2200 series regulator	Tescom	8686-1	
63	H2	Fitting	Tee, 3/8" Branch, 3/4" Run,	Swagelok	SS-1210-3-12-6	
64	H2	Fitting	Bulkhead Union, 3/4" x 3/4" Tube Fittings	Swagelok	SS-1210-C	
65	H2	Fitting	Elbow, 3/8" MPI	Parker	6-6 EBMP7-SS	
66	H2	Fitting	Union, 1/4" MPI	Parker	0	
67	H2	Fitting	Bulkhead Union, 1/2" x 1/2" Tube Fittings	Swagelok	SS-810-61	
68	N2	Pressure Gauge	0-200 psi, center back connection, panel mount	Swagelok	PGI-63C-PG200-CAOX-F	
69	N2	Fitting	Adapter, 1/4" MNPT x 1/4" Tube Fitting	Swagelok	SS-400-8-4	
70	N2	Fitting	Adapter, 1/4" MNPT x 3/8" Tube Fitting	Swagelok	SS-600-1-4	
71	N2	Fitting	1/4" FNPT x 3/8" tube adapter	Swagelok	SS-6-TA-7-4	
72	N2	Fitting	3/8" Tube Fitting Bulkhead Union	Swagelok	SS-600-61	

Device Tag #	ID	System	Component Name	Specification	Manufacturer	Part/Model #
73	N2	Fitting	Tee, 3/8" x 3/8" x 1/4" tube fitting	Swagelok	SS-600-3-6-4	
74	N2	Valve	1 Piece 3 way valve, 1/8" FNPT, 0.3 Cv	Swagelok	SS-42-GXF2	
75	H2	Quick Connect	Quick Connect female end, 1.7 Cv, 1/4" FNPT	Swagelok	SS-QF4-B-4PF	
76	H2	Quick Connect	Quick Connect male end, 2.8 Cv, 3/8" Swagelok tube fitting	Swagelok	SS-QF4-S-600	
77	H2	Fitting	1" X 1" x 3/8" Tee	Swagelok	SS-1610-3-16-6	
78	H2	Valve	SS Integral Bonnet Needle Valve, 1/4" Tube Fittings, 0.21 Cv	Swagelok	SS-20VS4	
79	H2	Fitting	Reducing Union 3/4" x 1/4"	Swagelok	SS-1210-6-4	
80	N2	PRD	SRV 250, 1/4" NPT, 125psi, 112 SCFM	R Conrader	SRV 250 CAN0063912C	

NO.	REMARKS	DATE	DRAWN	CHECKED	APPROVED	NO.	REMARKS	DATE	AUTHOR	REF#	VERSION
0	ISSUED FOR PRELIMINARY REVIEW OF MAJOR COMPONENTS	02MAR2015	LQ	BW	GM	1	NFPA 2 - HYDROGEN TECHNOLOGY	JUL 2014	NFPA	N/A	2014
1	ISSUED FOR DESIGN REVIEW	16MAR2015	LQ	BW	GM	2	NFPA 70 - NATIONAL ELECTRICAL CODE	NOV 2011	NFPA	N/A	2011
2	BOM UPDATED	09APRIL2015	LQ	BW	GM						
3	BOM UPDATED WITH NITROGEN SYSTEM COMPONENTS	10JULY2015	LQ	BW	GM						
4	BOM UPDATED WITH NITROGEN SYSTEM COMPONENTS	10JULY2015	LQ	BW	GM						
5	AS-BUILT	18OCT2015	LQ	LQ	BW						

PROJECT NUMBER: PL-00742	
DRAWING NUMBER: PL-00742-04-03	
SHEET: 1 OF 1	PROJECT TITLE: HYDROGEN STATION TESTING DEVICE
	DRAWING TITLE: MECHANICAL BILL OF MATERIALS