

Project:	Mobile Hydrogen Generation Unit, Gen. 2
Last Updated:	6/30/2020
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MHGU GENERATION 2 BILL OF MATERIALS

PN	P&ID Tag	Make/buy	Status	Description	Manufacturer	Model #	Qty	Cost Per Unit(\$)	Total Unit(s) Cost(\$)	Web Link	Company contact	Specifications
00 Documents												
0 Misc												
MHGU00-0-0001	N/A	MAKE	NEEDS SIGNATURE	BILL OF MATERIALS	HYPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MHGU00-0-0002	N/A	MAKE	NEEDS APPROVAL	CONCEPT, CAGE REV.1	HYPER	N/A	N/A	N/A	N/A	N/A	Sean Dimmer (425) 246-1128	N/A
MHGU00-0-0003	N/A	MAKE	NEEDS APPROVAL	CONCEPT, FLOORPLAN, REV.1	HYPER	N/A	N/A	N/A	N/A	N/A	Sean Dimmer, Andy Mei (425) 246-1128	N/A
MHGU00-0-0004	N/A	MAKE	UNDER REVISION	CONCEPT, VENT STACK, REV.1	HYPER	N/A	N/A	N/A	N/A	N/A	Sean Dimmer (425) 246-1128	N/A
MHGU00-0-0005	N/A	MAKE	NEEDS SIGNATURE	TEMPLATE, ENGINEERING REPORT, REV.1	HYPER	N/A	N/A	N/A	N/A	N/A	Hannah Gardner	N/A
MHGU00-0-0006	N/A	MAKE	NEEDS APPROVAL	CONCEPT, PLUMBING PLAN REV.1	HYPER	N/A	N/A	N/A	N/A	N/A	Sean Dimmer (425) 246-1128	N/A
1 Electrical Schematics												
2 Control Documentation												
3 HVAC Documentation												
MHGU00-3-0001	N/A	MAKE	NEEDS APPROVAL	CONCEPT, Air Flow HVAC Gen2	HYPER	N/A	N/A	N/A	N/A	N/A	Luis Dominguez, Marcelo Ruiz	N/A
4 Quotes												
01 Piping												
0 Assemblies												
MHGU01-0-0001	N/A	MAKE	IN PROGRESS (CAD)	LAYOUT, CONTROL MANIFOLD, REV.1	HYPER	N/A	N/A	N/A	N/A	N/A	Sean Dimmer (425) 246-1128	N/A
MHGU01-0-0002	N/A	MAKE	IN PROGRESS (CAD)	PIPING, CONTROL MANIFOLD, REV.1	HYPER	N/A	N/A	N/A	N/A	N/A	Sean Dimmer (425) 246-1128	N/A
MHGU01-0-0003	N/A	MAKE	IN PROGRESS (CAD)	CASE, CONTROL MANIFOLD, REV.1	HYPER	N/A	N/A	N/A	N/A	N/A	Sean Dimmer (425) 246-1128	N/A
1 Equipment												
2 Steel Tube Sections												
MHGU01-2-0001	N/A	MAKE	IN PROGRESS (CAD)	TUBE, 0.5 IN, STRAIGHT 21.96								
MHGU01-2-0002	N/A	MAKE	IN PROGRESS (CAD)	TUBE, 0.5 IN, STRAIGHT 7.79								
MHGU01-2-0003	N/A	MAKE	IN PROGRESS (CAD)	TUBE, 0.5 IN, STRAIGHT 2.38								
MHGU01-2-0004	N/A	MAKE	IN PROGRESS (CAD)	TUBE, 0.5 IN, 90 BEND, 1.19 x 2.75								
MHGU01-2-0005	N/A	MAKE	IN PROGRESS (CAD)	TUBE, 0.5 IN, BENDS								
MHGU01-2-0006	N/A			OPEN (0.5 in. tube section TBD)								
				TUBE, 0.5 IN, BENDS								
				TUBE, 0.5 IN, STRAIGHT								
MHGU01-2-0007	N/A	MAKE	IN PROGRESS (CAD)	TUBE, 0.25, STRAIGHT 1.63								
MHGU01-2-0008	N/A	MAKE	IN PROGRESS (CAD)	TUBE, 0.25, STRAIGHT 4.29								
MHGU01-2-0009												
MHGU01-2-0010												
MHGU01-2-0011												
MHGU01-2-0012												
MHGU01-2-0013												
MHGU01-2-0014	N/A	MAKE	IN PROGRESS (CAD)									
MHGU01-2-0015	N/A	MAKE	IN PROGRESS (CAD)									
3 Instruments												
MHGU01-3-0001	TBD	BUY	TBD	PRESSURE GAUGE, 160 PSI	McMaster Carr	2201T29	1	\$ 31.11	\$ 31.11	https://www	N/A	Pressure Gauge with Rubber Cover and Bottom Connection, 1/4 NPT Male, Plastic Case, 3-1/2" Dial, 0-160 PSI
MHGU01-3-0002	TBD	BUY	TBD	PRESSURE GAUGE, 300 PSI	McMaster Carr	2201T29	1	\$ 31.11	\$ 31.11	https://www	N/A	Pressure Gauge with Rubber Cover and Bottom Connection, 1/4 NPT Male, Plastic Case, 3-1/2" Dial, 0-300 PSI
4 Valves												
MHGU01-4-0001	TBD	BUY	TBD	BALL VALVE, 0.25 IN	Swagelok	SS-43GS4	TBD	\$ 102.88		https://www	N/A	Stainless Steel 1-Piece 40G Series Ball Valve, 1.4 Cv, 1/4 in. Swagelok Tube Fitting, 3000 PSIG @ 100°F
MHGU01-4-0002	TBD	BUY	TBD	CHECK VALVE, 0.5 IN	Swagelok	SS-8C-1	TBD	\$ 115.40		https://www	N/A	Stainless Steel Poppet Check Valve, Fixed Pressure, 1/2 in. Swagelok Tube Fitting, 1 psig (0.07 bar), 3000 PSIG @ 100°F

MHGU01-4-0003	TBD	BUY	TBD	CHECK VALVE, 0.25 IN	Swagelok	SS-4C-1	TBD	\$	54.03	https://www	N/A	Stainless Steel Poppet Check Valve, Fixed Pressure, 1/4 in. Swagelok Tube Fitting, 1 psig (0.07 bar), 3000 PSIG @ 100°F		
5 Flexible Tubing														
6 Fittings														
MHGU01-6-0001	N/A	BUY	TBD	TUBE TEE, 0.25 IN	Swagelok	SS-400-3	TBD	\$	25.77	https://www	N/A	Stainless Steel Swagelok Tube Fitting, Union Tee, 1/4 in. Tube OD, 316 SS, MAWP is tubing working pressure		
MHGU01-6-0002	N/A	BUY	TBD	TUBE TEE, 0.5 IN	Swagelok	SS-810-3	TBD	\$	51.23	https://www	N/A	Stainless Steel Swagelok Tube Fitting, Union Tee, 1/2 in. Tube OD, 316 SS, MAWP is tubing working pressure		
MHGU01-6-0003	N/A	BUY	TBD	TUBE CROSS, 0.25 IN	Swagelok	SS-400-4	TBD	\$	46.89	https://www	N/A	Stainless Steel Swagelok Tube Fitting, Union Cross, 1/4 in. Tube OD, 316 SS, MAWP is tubing working pressure		
MHGU01-6-0004	N/A	BUY	TBD	TUBE CROSS, 0.5 IN	Swagelok	SS-810-4	TBD	\$	67.48	https://www	N/A	Stainless Steel Swagelok Tube Fitting, Union Cross, 1/2 in. Tube OD, 316 SS, MAWP is tubing working pressure		
MHGU01-6-0005	N/A	BUY	TBD	TUBE RED, 0.5 OD 0.25 TUBE	Swagelok	SS-810-R-4	TBD	\$	12.32	https://www	N/A			
MHGU01-6-0006	N/A	BUY	TBD	BRANCH TEE, 0.25 IN	Swagelok	SS-400-3-4TTF	TBD	\$	37.26	https://www	N/A	Stainless Steel Swagelok Tube Fitting, Female Branch Tee, 1/4 in. Tube OD x 1/4 in. Tube OD x 1/4 in. Female NPT		
MHGU01-6-0007	N/A	BUY	TBD	ADAPTER, 0.25 TUBE x 0.25 FNPT	Swagelok	SS-400-7-4	TBD	\$	13.35	https://www	N/A	Stainless Steel Swagelok Tube Fitting, Female Connector, 1/4 in. Tube OD x 1/4 in. Female NPT		
02 Electrical														
0 Assemblies														
1 Equipment														
MHGU02-1-0001	N/A	BUY	PURCHASED	UPS, ELECTROLYZER	Toshiba	H3BG2L140C6	1							
2 Wiring														
3 Conduit														
4 Enclosures														
5 Switches														
6 Recepticles														
03 Thermal systems														
0 Assemblies														
1 Equipment														
MGHU03-1-0001	N/A	BUY	NEEDS APPROVAL	Stationary Intake Louvers Drainable w/ Flange	DAYTON	20UA40	1	\$	354.00	\$	354.00	https://www	N/A	N/A
MGHU03-1-0002	N/A	BUY	NEEDS APPROVAL	Stationary Intake Louvers Drainable w/ Flange kit	DAYTON	20UA08	1	\$	319.00	\$	319.00	https://www	N/A	N/A
MGHU03-1-0003	N/A	BUY	NEEDS APPROVAL	8" Exhaust fan 360 CFM explosion proof	CANARM	SD08-XPFF	2	\$	549.20	\$	1,098.40	https://www	N/A	N/A
MGHU03-1-0004	N/A	BUY	NEEDS APPROVAL	10" Exhaust fan 620 CFM explosion proof	CANARM	SD10-XPFF	2	\$	569.10	\$	1,138.20	https://www	N/A	N/A
MGHU03-1-0005	N/A	BUY	IN PROGRESS (CAD)	Cryocooler Compressor Model	Sumitomo	CSA-71A	1							
04 Liquefaction														
0 Assemblies														
1 Equipment														
05 Structural														
0 Assemblies														
MHGU05-0-0001		MAKE	IN PROGRESS (CAD)	PLATFORM, CLASSIFIED SIDE								Currently mocked up for preliminary design review (subject to change)		
MHGU05-0-0002		MAKE	IN PROGRESS (CAD)	PLATFORM, UNCLASSIFIED SIDE								Currently mocked up for preliminary design review (subject to change)		
MHGU05-0-0003		MAKE	IN PROGRESS (CAD)	LAYOUT, PLATFORM, CLASSIFIED SIDE										
MHGU05-0-0004		MAKE	IN PROGRESS (CAD)	LAYOUT, PLATFORM, UNCLASSIFIED SIDE										
MHGU05-0-0005		MAKE	IN PROGRESS (CAD)	FULL ASSEMBLY										
1 Equipment														
MHGU05-1-0001	N/A	BUY	PURCHASED	CONTAINER, ISU 90 4 DOOR	AARCorp	56X02-000	1			https://www	Eddie Hughes Eddie.Hughes@aarcorp.com			
2 Piping Hardware														
MHGU05-2-0001	N/A	BUY	TBD	PEGBOARD, 21.5 x 45.5	McMaster-Carr	1928A41	1	\$	145.88	https://www	N/A	Dull Stainless Steel, 9/32" Diameter Holes, 21-1/2" High x 45-1/2" Wide		
MHGU05-2-0002	N/A	BUY	TBD	RAIL CLAMP, 0.25 IN	Swagelok	SS-TBC4	TBD	\$	4.35	https://www	N/A	Stainless Steel Cushioned Clamp Tube Support, 1/4 in. Tube Size		
MHGU05-2-0003	N/A	BUY	TBD	RAIL CLAMP, 0.5 IN	Swagelok	SS-TBC8	TBD	\$	4.45	https://www	N/A	Stainless Steel Cushioned Clamp Tube Support, 1/2 in. Tube Size		

MHGU05-2-0004	N/A	MAKE	TBD	LOW PROFILE STRUT, 20 IN			6						Cut from MHGU05-5-0001	
MHGU05-2-0005	N/A	MAKE	TBD	LOW PROFILE STRUT, 8 IN			1						Cut from MHGU05-5-0001	
MHGU05-2-0006	N/A	MAKE	TBD	LOW PROFILE STRUT, 4 IN			1						Cut from MHGU05-5-0001	
MHGU05-2-0007	N/A	MAKE	TBD	BOSCH 45 x 45 MM, 91.77 IN									Cut from MHGU05-5-0002	
MHGU05-2-0008	N/A	MAKE	TBD	BOSCH 45 x 45 MM, 32.23 IN									Cut from MHGU05-5-0002	
MHGU05-2-0009	N/A	MAKE	TBD	BOSCH 45 x 45 MM, 76.23 IN									Cut from MHGU05-5-0002	
MHGU05-2-0010	N/A	MAKE	TBD	BOSCH 45 x 45 MM, 34.23 IN									Cut from MHGU05-5-0002	
MHGU05-2-0011	N/A	MAKE	TBD	BOSCH 45 x 45 MM, 44 IN									Cut from MHGU05-5-0002	
MHGU05-2-0011	N/A	BUY	TBD	WALL MOUNT, CYLINDER	McMaster-Carr	2283T11	4	\$	33.24	\$	132.96	https://www	N/A	Cylinder Rack, Wall-Mount, Plastic, 10-1/2" Wide x 4" High x 2-1/2" Deep Overall, 4-12" Diameter, OSHA and NFPA Code 1 Compliant
3 Electrical Hardware														
4 General Hardware														
MHGU05-4-0001	N/A	MAKE	IN PROGRESS (CAD)	FLOOR, CLASSIFIED SIDE										Currently mocked up for preliminary design review (subject to change)
MHGU05-4-0002	N/A	MAKE	IN PROGRESS (CAD)	FLOOR, UNCLASSIFIED SIDE										Currently mocked up for preliminary design review (subject to change)
5 Material Stock														
MHGU05-5-0001	N/A	BUY	TBD	STOCK, LOW PROFILE STRUT	McMaster-Carr	33085T94	TBD	\$	108.20			https://www	N/A	Strut Channel, Low-Profile, Slotted Hole, 316 Stainless Steel
MHGU05-5-0002	N/A	BUY	TBD	STOCK, BOSCH 45 x 45 MM, 20 FT	Bosch Rexroth									Material: AW 6063-T66
MHGU05-5-0003	N/A	BUY	TBD	STOCK, 0.25 x 0.035 x 240 IN TUBE	Swagelok									
MHGU05-5-0004	N/A	BUY	TBD	STOCK, 0.5 x 0.049 x 240 IN TUBE	Swagelok									
6 Fasteners														
06 Controls														
0 Assemblies														
1 Equipment														
MHGU06-1-0001		BUY		HY-ALERTA 1600	H2scan									CAD Model: Sean Dimmer (HYPER) (425) 246-1128 H2scan Contact:
07 Tools														