

List of parts to build one SV2 style MBARI pCO2 payload with MBARI pH and Wetlabs Ecopuck

	Material	Size	Length	Qty	Cost each	Total	Supplier	Part number	Notes
pCO2 Equilibrator parts									
Foil	Black ABS or equivalent	n/a	n/a	1	\$0.00	\$0.00	3D printed		
Equilibrator block	Black Delrin or equivalent	n/a	n/a	1	\$0.00	\$0.00	Machined		
Equilibrator legs	CuNi 90/10	3/8" Pipe		2	\$0.00	\$0.00	Machined		Pipe purchased from Alaskan Copper and Brass, 90/10 CuNi, machine 3/8" NPT pipe thread on one end
Equilibrator mast	UV Resistant UHMW	n/a	n/a	1	\$0.00	\$0.00	Machined		
Equilibrator mast cap	UV Resistant UHMW			1	\$0.00	\$0.00	Machined		
Equilibrator filter block	Non-porous acrylic or equivalent	n/a	n/a	1	\$0.00	\$0.00	3D printed		High resolution 3D print, non-porous to gas/water, ideally clear plastic.
Oring	Buna N, 70 Duro		-25	1	7.43	7.43	McMaster	9452K79	Oil-Resistant Buna-N O-Ring, 1/16 Fractional Width, Dash Number 025, pack of 100, one needed per pCO2 system
Plastic dish scrubber						\$0.00			Desparger for the Equilibrator Mast
Upchurch Adapter	PEEK	1/4" NPT		1	\$10.86	\$10.86	IDEX	U-500-01	NPT Adapter Body PEEK 1/4 NPT Male x 1/4-28 Female
Hardware	?					\$0.00			

pCO2 Air intake/vent mast parts									
Filter block	Black Delrin or equivalent	n/a	n/a	1		\$0.00	Machined		
Mast clamps	Black Delrin or equivalent	n/a	n/a	2		\$0.00	Machined		
Hardware	?					\$0.00			

pH sensor									
Honeywell Durafet II pH Electrode				1	\$479.52	\$479.52	Premier Safety	HW51205554-501	Phone number (800) 332-0435
Honeywell Cap Adapter				1	\$351.38	\$351.38	Premier Safety	51205965-002	Old price, not sure if Premier Safety has these?
pH housing	Black Delrin or equivalent			1		\$0.00	Machined		Might need modifications, for pH board?
pH housing lid	Black Delrin or equivalent			1		\$0.00	Machined		Might need modifications, for pH board?
pH plumbing manifold	Black Delrin or equivalent			1		\$0.00	Machined		
Oring for pH housing	Buna N 70 Duro		-151	1	\$11.34	\$11.34	McMaster	5018T22	Oil-Resistant Buna-N O-Ring, 3/32 Fractional Width, Dash Number 151, pack of 50, one needed per pH sensor, size might change with mods
Subconn bulkhead connector	Stainless Steel			1		\$0.00	Ocean Innovations	MCBH8M SS	
Tube adapter	Polyethylene	3/8"	n/a	1	\$13.92	\$13.92	McMaster	9675T74	Odor-Resistant Plastic Barbed Tube Fitting for Air and Water, Elbow, 3/8" Tube ID x 3/8 NPT Male, pack of 5, 2 needed per pCO2 system
Tube fitting	Polyethylene	3/8"	n/a	1	\$10.74	\$10.74	McMaster	9675T27	Odor-Resistant Plastic Barbed Tube Fitting for Air and Water, 90 Degree Elbow for 3/8" Tube ID, pack of 5, ~5 needed per pCO2 system
Tube	Polyethylene	3/8"	1ft	5	\$14.40	\$72.00	McMaster	9334T64	Odor-Resistant Polyethylene Tubing for Water, 3/8" ID, 1/2" OD
Subconn cable	PU		1 m	1			Ocean Innovations		MCIL8M to MCIL8F
MBARI pH PCB				1		\$0.00	MBARI		
AA Battery holder		AA		1	\$0.89	\$0.89	Battery Space	BC2AA	Battery holder: 2 x "AA" Battery Holder With 6" 26AWG Wire Leads (2P) - RoHS Compliance (BC2AA)
AA Lithium cell 3.6 V		AA		2	\$3.83	\$7.66	Battery Space	LM-ER14505	Primary Lithium thionyl chloride Battery: AA Size 3.6V 2400 mAh (ER14505, non-Rechargeable, 8.64Wh, 100mA rate) - UN 38.3 Passed
Cgrid 3 pin plug				1	\$0.23	\$0.23	Digikey	WM2901-ND	CONN HOUSING 3POS .100 W/LATCH
Cgrid 3 pin receptacle				1	\$0.60	\$0.60	Digikey	WM2534-ND	CONN HOUSING MALE 3POS .100
Cgrid 4 pin plug				1	\$0.26	\$0.26	Digikey	WM2902-ND	CONN HOUSING 4POS .100 W/LATCH
Cgrid 5 pin plug				1	\$0.36	\$0.36	Digikey	WM2903-ND	CONN HOUSING 5POS .100 W/LATCH

pCO2 payload box									
Payload box	TBD			1		\$0.00	Liquid Robotics		
PIB				1		\$0.00	Liquid Robotics	No longer produced	
PCOMM				1		\$0.00	Liquid Robotics	No longer produced	
MBARI pCO2 controller				1		\$0.00	MBARI		
Licor CO2 Gas Analyzer				1	\$4,268.00	\$4,268.00	Licor	LI-850	
MBARI pCO2 Valve Block intake side	Black Delrin or equivalent			1		\$0.00	Machined		
MBARI pCO2 Valve Block exhaust side	Black Delrin or equivalent			1		\$0.00	Machined		
Valve block oring	Buna N 70 Durometer		-217	1	\$15.22	\$15.22	McMaster	4679T254	Oil-Resistant Mil. Spec. Buna-N O-Ring, 1/8 Fractional Width, Dash No. 217,-65° to 275°F, pack of 25, one needed per pCO2 system
Valve				4	\$47.39	\$189.56	Pneumadyne	S15MML-30-12-2B	Normally Closed Latching Solenoid Valves
Standard valve				1	\$26.82	\$26.82	Pneumadyne	S15MM-30-12W-2E	2V DC 3-Way Solenoid
Air Pump				1	\$59.00	\$59.00	TCS	D220BLZ-SN	
Voltage regulator				1	\$6.48	\$6.48	Digikey	102-1709-ND	Linear Regulator Replacement DC DC Converter 1 Output 5V 500mA 6.5V - 32V Input, also buy needed components see spec
1/8" tube push in fittings				6	\$2.76	\$16.56	McMaster	5779K241	Push-to-Connect Tube Fitting for Air, Straight Adapter, for 1/8" Tube OD x 10-32 Thread Male
1/4" tube push in fittings				2	\$2.76	\$5.52	McMaster	5779K246	Push-to-Connect Tube Fitting for Air, Straight Adapter, for 1/4" Tube OD x 10-32 Thread Male
1/8" tube push in fittings 90 deg angle				1	\$5.25	\$5.25	McMaster	5779K281	Push-to-Connect Tube Fitting for Air, 90 Degree Swivel Elbow, 1/8" Tube x 10-32 Thread Male Pipe
Standard Tank	316 Stainless Steel	150 cm3		1	\$179.70	\$179.70	Swagelok	316L-HDF4-150	
Check Valve	Stainless Steel			1	\$41.20	\$41.20	Swagelok	SS-4CP2-1	Check valve for fill side of std tank
Regulator	Brass			1	\$196.95	\$196.95	Beswick	PRD3HP-3N1-0-E	BRASS;0-5PSI EPDM W/KNOB&KNURL
Fittings	Stainless Steel?			1	\$15.00	\$15.00	Beswick	MCB-1018-1-1428-303-E	303,COMPRESSION FTG,EPDM
Tiny blue Tubing		1/16"		1	\$0.00	\$0.00	?	?	
Tubing adapters	Stainless Steel			2	\$21.29	\$42.58	Swagelok	SS-100-R-2	Tube Fitting, Reducer, 1/16 in. x 1/8 in. Tube OD
Metal tubing	Stainless steel	1/8"	1 ft	1	\$14.96	\$14.96	McMaster	89785K811	Smooth-Bore Seamless 316 Stainless Steel Tubing, 1/8" OD, 0.02" Wall Thickness
Swagelok 1/8" Tee	Stainless steel	1/8"		1	\$48.48	\$48.48	Swagelok	SS-200-3TTF	1/8" tubing tee, with 1/8" Female NPT branch for the pressure gauge
Swagelok 1/8" Adapter	Stainless steel	1/8?		1	\$13.42	\$13.42	Swagelok	SS-200-1-4	1/8" tubing to 1/4" male NPT
Pressure Gauge	Brass	1/8"		1	\$12.93	\$12.93	McMaster	40565K52	Single Scale Pressure Gauge with 304 Stainless Steel Case, 1/8 NPT Male Center Back Connection, 1-1/2" Dial
Subconn bulkhead connector	Stainless Steel			1		\$0.00	Ocean Innovations	MCIL8FSS	pH bulkhead
Subconn bulkhead connector	Stainless Steel			1		\$0.00	Ocean Innovations	MCIL8FSS	pCO2 debug bulkhead
Payload gas connection/penetration						\$0.00			TBD, not sure what you will use?
Norprene Tubing	Neoprene	1/4" OD		1	\$48.10	\$48.10	Cole-Parmer	EW-06410-02	Cole-Parmer Tubing, 1/8"ID x 1/4"OD, 50 ft/pack, more than enough for multiple CO2 systems
Pushin Tee	Plastic	1/8"		1	\$5.66	\$5.66	McMaster	5779K31	Push-to-Connect Tube Fitting for Air, Tee Connector, for 1/8" Tube OD
Pushin Tee	Plastic	1/8"&1/4"		1	\$6.73	\$6.73	McMaster	5779K667	Push-to-Connect Tube Fitting for Air, Inline Tee Reducer, for 1/4" x 1/8" Tube OD

Lure lok fittings	PP	3/16"		1	\$17.40	\$17.40	Cole Parmer	EW-45518-08	Pack of \$25
Syringe filters	PTFE	25mm		1	\$228.50	\$228.50	Cole Parmer	EW-02915-20	Box of 100 filters, 7 needed per pCO2 system
Soda Lime				1	\$116.00	\$116.00	Alfa Asesar	44786-36	44786 Soda lime, indicating, this is enough volume for many pCO2 systems
Molecular Sieve				1	\$89.50	\$89.50	Alfa Asesar	L05454-0B	L05454 Molecular sieves, 4A, -8+12 (ca 2mm) beads, this is enough volume for many pCO2 systems
Drying chamber	Plastic	TBD				\$0.00			NEMA Size TBD
Nafion Tubing						\$0.00			6" long with luerlock female on both ends, length could be longer depending on size of drying chamber?
Pushin fittings		1/8" NPT		2	\$3.06	\$6.12	McMaster	5779K102	Push-to-Connect Tube Fitting for Air, Straight Adapter, for 1/8" Tube OD x 1/8 NPT Male
Lure lok fittings	Plastic	1/8" NPT		1	\$30.10	\$30.10	Cole-Parmer	EW-45505-86	Two needed for drying chamber? Package of 25
Hose clamps	Plastic Nylon	1/4"		1	\$4.39	\$4.39	McMaster	5246K52	Easy-Install Single Snap-Grip Clamp for Firm Hose and Tube, 15/64" - 17/64" ID
Cgrid 2 pin connector	Plastic			2	\$0.27	\$0.54	Digikey	WM2900-ND	CONN HOUSING 2POS .100 W/LATCH
Cgrid 3 pin connector	Plastic			7	\$0.23	\$1.61	Digikey	WM2901-ND	CONN HOUSING 3POS .100 W/LATCH
Cgrid 4 pin connector	Plastic			4	\$0.26	\$1.04	Digikey	WM2902-ND	CONN HOUSING 4POS .100 W/LATCH

Eco Puck parts									
Fluorometer	Plastic with copper Faceplate			1	\$9,782.43	\$9,782.43	Wetlabs	FAS-015057	BB2FL-MBC (470,650,CHL)(5,5,50)
Eco Puck clamp	Plastic			1	\$0.00	\$0.00	3D printed		3D print out of black, tough, strong, durable plastic
Eco Puck clamp nut	Plastic			1	\$0.00	\$0.00	3D printed		3D print out of black, tough, strong, durable plastic
Hose Clamp	316 Stainless Steel			1	0	0	McMaster		Size TBD
Copper foil tape	Cu	2"	18 feet	1	33.88	33.88	McMaster	76555A725	Conductive Copper Foil Electrical Tape, Nonconductive Adhesive, 2" Wide, 18 Feet Long. Only 12" needed per Ecopuck.
Bulkhead connector	Stainless steel			1	\$0.00	0	Subconn	MCBH8FSS	MCBH8FSS for science payload
Eco Puck cable	PU			1	\$0.00	\$0.00	Subconn		2m long, MCIL8M to MCIL6F

Solar Panel Spacers									
Solar Panel Spacer FWD	Black Delrin or equivalent	1/2" thick		1		\$0.00	Water Jetted and post machined		Will require some additional drilling and tapping of holes during install
Solar Panel Spacer AFT	Black Delrin or equivalent	1/2" thick		1		\$0.00	Water Jetted and post machined		Will require some additional drilling and tapping of holes during install

Misc Parts									
Tubing	Green PTFE	1/8" OD	12 ft	1	\$22.90	\$22.90	Cole-Parmer	EW-96130-42	
Tubing	Red PTFE	1/8" OD	12 ft	1	\$24.40	\$24.40	Cole-Parmer	EW-96130-02	
Tubing	Blue PTFE	1/8" OD	12 ft	1	\$26.00	\$26.00	Cole-Parmer	EW-96130-22	
Tubing	Clear PTFE	1/8" OD	25 ft	1	\$46.20	\$46.20	Cole-Parmer	EW-06605-27	
Screw in hydrophobic filters	Polyamide			7	\$6.11	\$42.77	Gore	PMF100320	GORE PROTECTIVE VENT
Upchurch fittings	PEEK			9	\$7.46	\$67.14	IDEX	XP-348	Flangeless Fitting Natural, Short, PEEK, 1/4-28 Flat-Bottom, for 1/8" OD
1/8" tube union	Nylon	1/8"		4	\$12.55	\$50.20	Swagelok	NY-200-6	Might be needed depending on gas connection?
Molex cgrid contact pins male				100	\$0.26	\$25.95	Digikey	WM2515-ND	CONN PIN 22-24AWG CRIMP GOLD
Molex cgrid contact pins female				250	\$0.10	\$25.42	Digikey	WM2512-ND	CONN SOCKET 22-24AWG CRIMP GOLD

Total **\$16,827.80** Note: this does not include the price of the machined, 3D printed parts or parts with unknown cost.

=Expected long lead items