



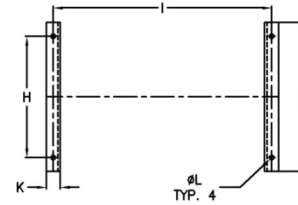
Submittal Sheet

Multi Circuit Sample Cooler

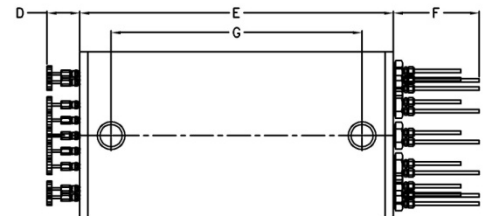
High Pressure Liquid Sampling
Horizontal Orientation
Single Wall Tubing Construction

Standard Product Features:

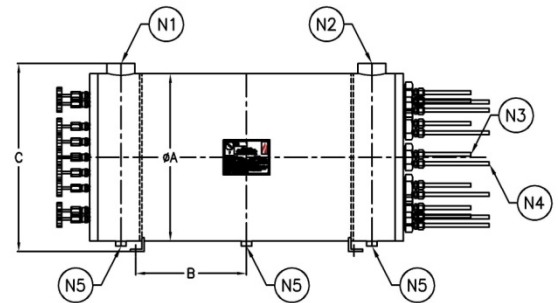
1. Designed, manufactured, tested and stamped in accordance with the ASME Code, Section VIII, Division 1, current Edition
2. **ASME** Code Stamped tubes up to 4,830 PSIG at 550°F (standard – higher pressure and temperature available upon request)
3. **ASME** Code Stamped shell 150 PSIG at 350°F (standard – higher pressure and temperature available upon request)
4. Stamped with a National Board Number in accordance with the National Board of Boiler and Pressure Vessel Inspectors
5. Type 316/L seamless stainless steel tube construction
6. Type 316/L stainless steel compression fittings
7. Pressure vessel quality carbon steel shell construction
8. Individual circuits are removable for replacement as needed
9. Sample cooling for multiple boilers, surface, bottom and feedwater
10. Each circuit housing is capable of being cleaned while the other circuits are in service
11. One coiling water supply/return connection for all circuits
12. Counterflow cooling provides effective heat transfer.
13. Fine adjustment needle valves provided for precise cooling water flow



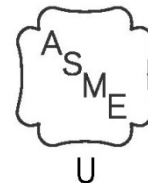
SADDLE "FOOTPRINT"



PLAN VIEW



ELEVATION VIEW



Multi **C**ircuit **19** Circuits **19** Circuit Openings **3** Tube Size **3** Circuit Size

Sales Rep: _____ Model Number: _____

Job Name: _____ To Cool: _____ LB/hr

Location: _____ From: _____ °F To _____ °F

Notes: _____ Using: _____ GPM of Cooling Water

From: _____ °F To _____ °F



Dimensions (inches)														
Model Number	A	B	C	D	E	F	G	H	I	J	K	L	Circuits	Weight (E/O)
MC-1-1-3-3	3.50	12.00	5.75	3.50	33.75	9.25	27.00	2.25	23.50	3.50	1.50	0.50	1	48/58
MC-2-2-3-3	6.63	12.00	8.88	3.50	33.75	9.25	27.00	3.00	23.50	4.63	1.50	0.50	2	102/140
MC-3-3-3-3	8.63	12.00	10.88	3.50	33.75	9.25	27.00	3.63	23.50	6.63	1.50	0.50	3	138/200
MC-4-4-3-3	8.63	12.00	10.88	3.50	33.75	9.25	27.00	3.63	23.50	6.63	1.50	0.50	4	147/309
MC-5-5-3-3	10.75	12.00	13.00	3.50	33.75	9.25	27.00	5.75	23.50	8.75	1.50	0.50	5	267/369
MC-6-6-3-3	10.75	12.00	13.00	3.50	33.75	9.25	27.00	5.75	23.50	8.75	1.50	0.50	6	276/378
MC-7-7-3-3	10.75	12.00	13.00	3.50	33.75	9.25	27.00	5.75	23.50	8.75	1.50	0.50	7	285/387
MC-8-8-3-3	12.75	12.00	15.00	3.50	33.75	9.25	27.00	7.75	23.50	10.75	1.50	0.50	8	325/500
MC-9-9-3-3	12.75	12.00	15.00	3.50	33.75	9.25	27.00	7.75	23.50	10.75	1.50	0.50	9	334/509
MC-10-10-3-3	12.75	12.00	15.00	3.50	33.75	9.25	27.00	7.75	23.50	10.75	1.50	0.50	10	343/518
MC-11-11-3-3	14.00	12.00	16.25	3.50	33.75	9.25	27.00	9.00	23.50	12.00	1.50	0.50	11	389/566
MC-12-12-3-3	14.00	12.00	16.25	3.50	33.75	9.25	27.00	9.00	23.50	12.00	1.50	0.50	12	397/565
MC-13-13-3-3	16.00	12.00	18.25	3.50	33.75	9.25	27.00	11.00	23.50	14.00	1.50	0.50	13	543/783
MC-14-14-3-3	16.00	12.00	18.25	3.50	33.75	9.25	27.00	11.00	23.50	14.00	1.50	0.50	14	552/792
MC-15-15-3-3	16.00	12.00	18.25	3.50	33.75	9.25	27.00	11.00	23.50	14.00	1.50	0.50	15	561/801
MC-16-16-3-3	18.00	12.00	20.25	3.50	33.75	9.25	27.00	13.00	23.50	16.00	1.50	0.50	16	607/910
MC-17-17-3-3	18.00	12.00	20.25	3.50	33.75	9.25	27.00	13.00	23.50	16.00	1.50	0.50	17	616/919
MC-18-18-3-3	18.00	12.00	20.25	3.50	33.75	9.25	27.00	13.00	23.50	16.00	1.50	0.50	18	625/928
MC-19-19-3-3	18.00	12.00	20.25	3.50	33.75	9.25	27.00	13.00	23.50	16.00	1.50	0.50	19	634/937
Nozzle Schedule														
All Models	Cooling Water Inlet			Cooling Water Outlet			Sample Outlet		Sample Inlet		Drain			
	N1			N2			N3		N4		N5			
	2"-3000# Coupling			2"-3000# Coupling			3/8" OD x 0.065" Wall		3/8" OD x 0.065" Wall		1/2"-3000# Coupling			

* more sizes available upon request

** additional nozzle configurations available on request

Benefits of Howard's Engineering Multi Circuit Sample Coolers:

1. The only sample cooler available with ASME Code stamped construction.
2. The only sample cooler with multiple circuits for bottom blowdown, surface blowdown and water sampling.
3. Individual circuits for easy, fast replacement without breaking fixed connections.
4. Replacement coils stocked for quick shipment.
5. Industrial quality and commercial price.
6. Increased efficiency for your system.
7. Peace of mind knowing that you will be receiving the most highly engineered heat exchanger available.

Specifications:

1. Multi circuit sample cooler shall be Howard's Engineering MCSC series
2. Multi circuit sample cooler shall be ASME Code Stamped for 150 PSI at 350°F on the shell and 4,800 PSI at 550°F for the tubes and registered with the National Board of Boiler and pressure vessel inspectors
3. Multi circuit sample cooler shell to be made of pressure vessel quality carbon steel
4. Multi circuit sample cooler tubes to be made of type 316/L seamless stainless steel tubing, 0.375" outside diameter x 0.065" wall thickness
5. Manufacturer to provide cooling water throttling valve

** complete construction specifications available upon request.



Performance Table – Boiler Water (for reference only)															
Sample Flowrate (Gallons/Minute)	Cooling Water Flowrate (50 gallons/minute, 60°F Inlet)					Cooling Water Flowrate (100 gallons/minute, 60°F Inlet)					Cooling Water Flowrate (150 gallons/minute, 60°F Inlet)				
	Boiler Temperature (°F)														
	250	300	350	400	450	250	300	350	400	450	250	300	350	400	450
0.50	80	80	85	85	85	70	70	70	75	75	65	65	70	70	70
0.75	82	82	87	87	87	72	72	72	77	77	67	67	72	72	72
1.00	84	84	89	89	89	74	74	74	79	79	69	69	74	74	74
1.25	86	86	91	91	91	76	76	76	81	81	71	71	76	76	76
1.50	88	88	93	93	93	78	78	78	83	83	73	73	78	78	78
1.75	90	90	95	95	95	80	80	80	85	85	75	75	80	80	80
2.00	92	92	97	97	97	82	82	82	87	87	77	77	82	82	82
2.25	94	94	99	99	99	84	84	84	89	89	79	79	84	84	84
2.50	96	96	101	101	101	86	86	86	91	91	81	81	86	86	86

Performance Table – Steam (for reference only)															
Sample Flowrate (Pounds/Hour)	Cooling Water Flowrate (50 gallons/minute, 60°F Inlet)					Cooling Water Flowrate (100 gallons/minute, 60°F Inlet)					Cooling Water Flowrate (150 gallons/minute, 60°F Inlet)				
	Boiler Pressure (PSIG)														
	15	50	100	150	300	15	50	100	150	300	15	50	100	150	300
245	70	69	69	68	67	65	65	65	64	64	61	61	61	61	61
490	79	78	78	77	76	69	68	68	67	67	63	63	63	63	63
980	97	96	95	95	95	79	79	78	78	77	65	65	65	65	65
1,470	115	114	114	113	112	88	87	86	86	86	67	67	67	67	67
1,960	134	132	132	131	130	97	96	96	95	94	69	69	69	69	69