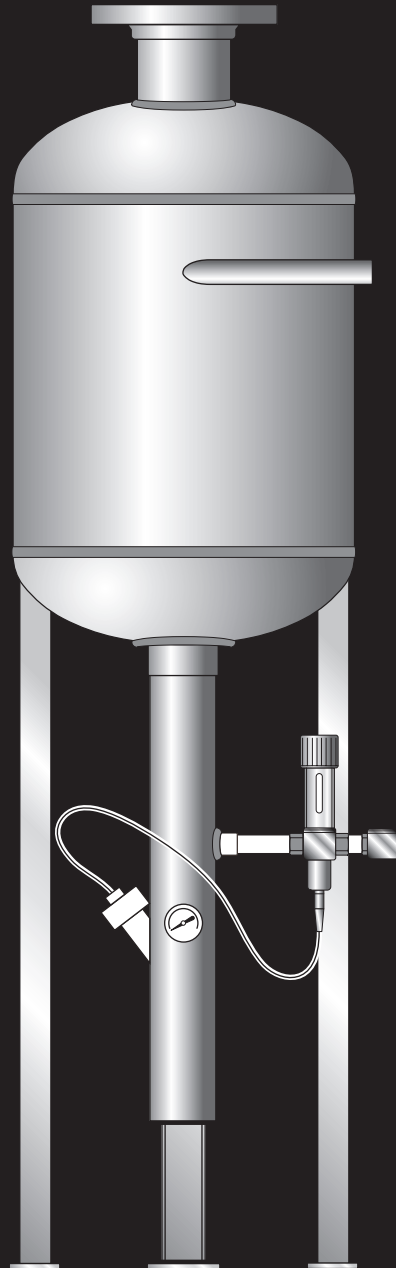


CBO Series



Centrifugal Boiler Blow Off *Condensate Cooler*



CEMLINE CORPORATION

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Cemline® Centrifugal Boiler Blow Off/Condensate Cooler

Dimensions

The dimensions shown are adequate for most applications. Other vessel sizes or change in opening sizes are available. Consult factory or local representative.

CBO Series

Cemline Blowdown / Condensate Coolers are designed to receive blowdown from a steam boiler, flash the blowdown to steam, and cool the condensate going to drain.

Standard Features

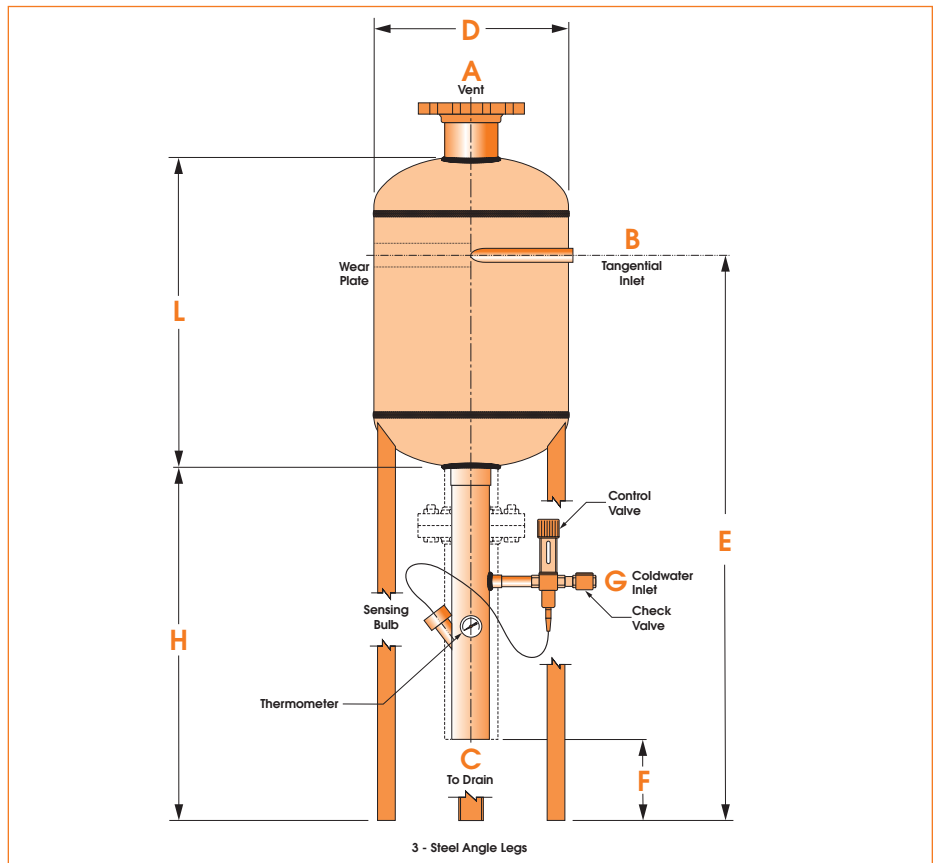
A.S.M.E. Code Constructed and National Board Registered Vessel

- Tangential Inlet
- 316 stainless steel wear plate
- Vent
- Drain

Condensate Cool Leg Assembly*

- Check Valve
- Control Valve
- Thermometer

*Note: On CBO Models 1 through 5 the cooling leg is threaded into the bottom of the vessel. On CBO Models 5 through 10 the cooling leg is attached to the tank by a flange connection.



MODEL NUMBER	D	L	H	A VENT	B BLOWOFF	C DRAIN	G COLDWATER	E	F
CBO-1	12"	24"	24"	2-1/2" N.P.T.	1/2" M.N.P.T.	2-1/2" M.N.P.T.	1/2" N.P.T.	40"	6"
CBO-2	12"	24"	24"	3" N.P.T.	1/2" M.N.P.T.	2-1/2" M.N.P.T.	1/2" N.P.T.	40"	6"
CBO-3	16"	26"	24"	2-1/2" N.P.T.	3/4" M.N.P.T.	2-1/2" M.N.P.T.	1/2" N.P.T.	42"	6"
CBO-4	16"	26"	26"	3" N.P.T.	3/4" M.N.P.T.	3" M.N.P.T.	1/2" N.P.T.	42"	8"
CBO-5	16"	26"	26"	4"-150# FLANGE	1" M.N.P.T.	3" M.N.P.T.	1/2" N.P.T.	44"	8"
CBO-6	16"	26"	28"	6"-150# FLANGE	1-1/4" M.N.P.T.	4" M.N.P.T.	3/4" N.P.T.	46"	8"
CBO-7	16"	26"	28"	6"-150# FLANGE	1-1/2" M.N.P.T.	4" M.N.P.T.	3/4" N.P.T.	45"	8"
CBO-8	16"	26"	28"	6"-150# FLANGE	2" M.N.P.T.	4" M.N.P.T.	3/4" N.P.T.	45"	8"
CBO-9	24"	48"	30"	8"-150# FLANGE	2" M.N.P.T.	6" PIPE	1" N.P.T.	67"	9"
CBO-10	24"	48"	30"	8"-150# FLANGE	2-1/2" M.N.P.T.	6" PIPE	1" N.P.T.	67"	10"

Cemline CBO

Sizing

Cemline CBO boiler blow off condensate coolers are normally sized based upon the size of the blow off line from the boiler to the blow off tank. Below is the flow rate of blow off and total flow rate to achieve a 140° water temperature to the sewer.

		1/2" BLOWDOWN CBO-1 CBO-2		3/4" BLOWDOWN CBO-3 CBO-4		1" BLOWDOWN CBO-5		1" BLOWDOWN CBO-6	
STEAM PRESSURE PSI	% FLASH	BLOWDOWN GPM	TOTAL FLOW GPM	BLOWDOWN GPM	TOTAL FLOW GPM	BLOWDOWN GPM	TOTAL FLOW GPM	BLOWDOWN GPM	TOTAL FLOW GPM
0	0%	3	5	4	7	6	10	10	17
5	2%	4	7	4	7	7	12	12	21
10	3%	4	7	5	9	8	14	15	26
15	4%	4	7	6	10	10	17	17	29
25	6%	5	9	8	14	13	22	22	38
50	9%	7	12	13	22	20	34	34	58
75	11%	10	17	17	29	27	46	46	79
100	13%	10	17	18	31	28	48	47	81
150	16%	11	19	20	34	33	57	59	101

		1 1/2" BLOWDOWN CBO-7		2" BLOWDOWN CBO-8 CBO-9		2 1/2" BLOWDOWN CBO-10	
STEAM PRESSURE PSI	% FLASH	BLOWDOWN GPM	TOTAL FLOW GPM	BLOWDOWN GPM	TOTAL FLOW GPM	BLOWDOWN GPM	TOTAL FLOW GPM
0	0%	15	26	24	41	38	65
5	2%	17	29	28	48	44	76
10	3%	20	34	32	55	48	83
15	4%	23	40	38	65	55	95
25	6%	30	52	50	86	70	120
50	9%	47	81	77	132	109	187
75	11%	62	107	103	177	148	255
100	13%	68	117	115	198	172	296
150	16%	82	141	137	236	197	339

The above information is based upon flashing blowdown to 212° (100°C) cooling water is assumed at 50°F.

To calculate amount of cooling water flow, subtract blowdown GPM from total GPM. Where two sizes are shown, select smaller size for boiler operating at 150 PSI or less, larger sizes for boiler operating at 151 PSI or more.

Construction of CBO Series Specifications



Cemline Blowdown / Condensate Coolers are designed to receive blowdown from a steam boiler, flash the blowdown to steam, and cool the condensate going to drain.

Cemline Blowdown/ Condensate Coolers are A.S.M.E. code constructed and stamped for 150 PSI working pressure. Minimum steel thickness is 3/16". Where conditions require these vessels can be constructed with 1/4", 3/8", or 1/2" steel thickness.

The blowdown enters the tangential inlet where it meets a 90 degree stainless steel wear plate. The wear plate will prevent erosion of the side wall of the vessel. The tangential blowdown entry causes the blowdown to swirl around the circumference of the vessel where part of the liquid will flash to steam and the balance will settle to the bottom of the vessel.

The internal flash will go through the vent to atmosphere and the hot condensate and sludge will fall to the bottom of the vessel where it will activate the thermal control valve which will feed cold water into the drain leg where the cold water and hot condensate will mix. This results in drained liquid temperature which is acceptable for municipal sewage.

The blowdown vessel can be provided without the condensate cooling leg.

Specification

Centrifugal boiler blow off tank shall be model _____ as manufactured by Cemline Corporation. Tank shall be A.S.M.E. Code constructed and stamped for 150 psi working pressure and shall be registered with The National Board of Boiler and Pressure Vessel Inspectors. Vessel shall be furnished with a tangential inlet and a 90 degree 1/8" minimum thickness type 316 stainless steel wear plate. Vessel shall have vent opening and inspection openings as required by the A.S.M.E. Code. Tank shall have a blacksteel interior with a red oxide prime exterior. Vessel shall be mounted on angle legs and shall be factory supplied with an integral adjustable water cooling control valve, check valve, and thermometer built into a factory fabricated drain leg which shall cool the condensate.



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