

# GAS/LIQUID SEPARATION &

## Eaton Gas/Liquid Separators Applications

### Steam

Eaton Gas/Liquid Separators are often installed ahead of steam turbines to protect the turbine blades from the erosive action of wet steam, pipe scale and other damage causing entrained solids. They are also installed in steam distribution lines to assure clean, dry steam entering heat exchangers, pressure reducing valves, temperature regulators, meters and other process equipment.

### Compressed Air

Compressed air lines have Eaton Gas/Liquid Separators installed following intercoolers and aftercoolers to remove entrained moisture which would otherwise cause damage in successive stages of

compression or to subsequent processes. They are also used for entrainment removal in primary air lines leading to air using equipment such as air chucks, air nozzles and paint spray equipment. They are particularly suitable for long runs of pipe and where wide temperature differentials are found. The units are highly efficient for moisture separation of refrigerated air dryer packages.

### Compressed Gas

Eaton Gas/Liquid Separators are often used in conjunction with intercooler and aftercooler equipment installed on gas compressors. They are very effective in the removal of oil, tar, water and other unwanted entrainment.

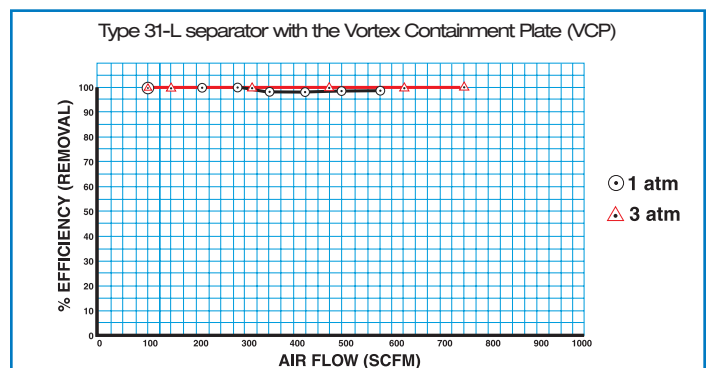
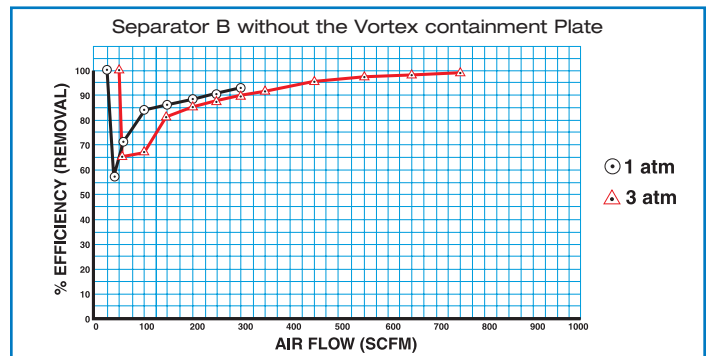
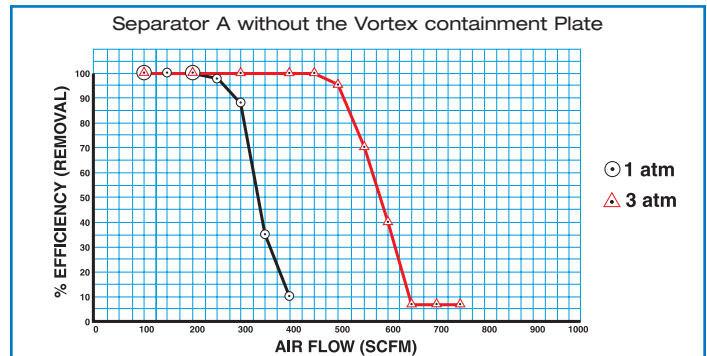
## The Exclusive Eaton Vortex Containment Plate (VCP)



In the past, separators have often operated at less than peak efficiency due to the re-entrainment of separated liquid at normal or high flow rates. The Eaton VCP solves this problem. The VCP utilizes carefully placed rings that shield the separated liquid from the vortex action inside the separator and directs it to the separator drain.

The turbulence of the swirling gas or air flow is sheltered from the liquid and cannot be re-entrained after separation. The VCP features extremely heavy duty construction of stainless steel – unlike the delicate baffles used by other systems. And the Eaton VCP is completely maintenance free.

The charts at right graphically show the high efficiency of Eaton's exclusive Vortex Containment Plate. They show the percent efficiency vs. air flow when the separator is operated at 1 and 3 atm with a water input rate of 150 pounds per hour. Two typical 3" gas/liquid separators that do not contain the Eaton Vortex Containment Plate are compared to a Type 31L Eaton Separator. The performance standard was the removal of all liquid and solid entrainment where particle sizes exceeded 10 microns.



# TYPE T GAS/LIQUID SEPARATORS

Sizes 3/4" to 4" • Iron, Carbon Steel or Stainless Steel • Threaded, Flanged or Socket Weld

The Industry  
Standard Gas/Liquid  
Separator



## FEATURES

- Cast Construction
- High Efficiency Over Wide Flow Range
- No Required Maintenance
- Economical Choice for Most Applications
- Removes 99% of Liquid and Solid Entrainment Particles Larger Than 10 Micron
- Gas, Steam or Air Applications

## OPTIONS

- Integral Trap
- Trap Heating Element
- ASME UM or U Code Stamp
- Water Gauge Tap
- Thermometer Tap
- Larger Drain Size

### High Efficiency - No Maintenance

The Eaton Type T Gas/Liquid Separator automatically removes 99% of all liquid and solid entrainment particles 10 microns in size or larger from air, gas, and steam processes. And they do it with no moving parts to wear out and with no required maintenance. The Type T, with its cost effective design, is the separator of choice for most applications that require clean, dry air, gas or steam.

### Exclusive Design

Moisture laden gas enters the inlet of the separator where it is deflected in a centrifugal downward motion. The entrained solids and moisture droplets are separated out by a reduction in velocity. Separated liquid and solids fall into a reservoir where the exclusive Vortex Containment Plate (VCP) ensures that they cannot be re-entrained. The clean, dry flow is then directed to the outlet by the Vortex Containment Plate. The VCP eliminates the need for expensive, delicate baffles used in ordinary separators.

### Application Flexibility

The basic Type T Gas/Liquid Separator's straight forward, time proven design fits most applications without options. For more specialized applications the Type T is available as the Type ST with an integral trap as part of its design. The trap mechanism is a fool-proof design which automatically ejects the condensate, without loss of line pressure, when it reaches a predetermined level. The Type ST is compact, easily installed and can be supported by the line. Removal of the bottom flange releases the trap mechanism for inspection. The internal trap components are rust-proof stainless steel and include a nonmagnetic 18-8 stain-

less steel valve and seat. For applications below freezing the Type ST Separator can be ordered as the Type STH that includes a heater for the trap. The heater is rated at 50W and is for 110 volt service. The self limiting heating element will keep fluid above freezing and does not add to the line temperature. The heater can be easily removed for inspection.

### Choose Cast or Fabricated Construction

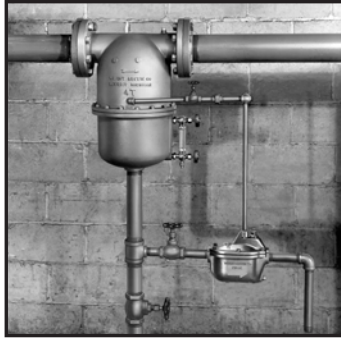
Type T Gas /Liquid Separators are available in sizes up to 4" in cast iron and up to 2" in cast carbon steel or cast stainless steel with standard configurations. Cast construction separators are readily available but are not easy or cost effective to modify to conform to special application requirements. For these applications see page 10 for Fabricated Type T Separators made of carbon or stainless steel in sizes up to 24". Because they are constructed to specification they can be easily modified to suit unique applications such as those that require radially rotated inlet and outlet connections. Fabricated separators are not as heavy as cast ones, an important consideration in applications where weight is a concern. Cast or fabricated Eaton Type T Gas/Liquid Separators let you choose the best one for your application.

### We Can Help

Choosing the right gas/liquid separator can present unique problems not encountered in choosing other pipeline components. Why not take advantage of our over 100 years of application experience with gas/liquid separators? Application specialists are available to help you every step of the way...from initial selection, to installation and through start-up...just contact us.

# CAST CONSTRUCTION

Typical Installation

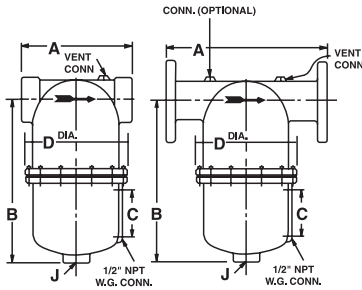


Selection Table

Pipe Size (in)	Material	Connection	Rating
3/4 to 3	Cast Iron	Threaded	250 psi @ 450°F
2 to 4	Cast Iron	Flg 125# FF	150 psi @ 353°F 125 PSI @ 450°F
1 to 2	Cast CS	Thd or Skt Weld	1000 psi @ 650°F
1 to 2	Cast SS	Thd or Skt Weld	500 psi @ 300°F
1 to 24	Fabricated CS	Flg 150# RF Flg 300# RF	150 psi @ 450°F 500 psi @ 650°F
1 to 24	Fabricated SS	Flg 150# RF Flg 300# RF	150 psi @ 300°F 500 psi @ 300°F



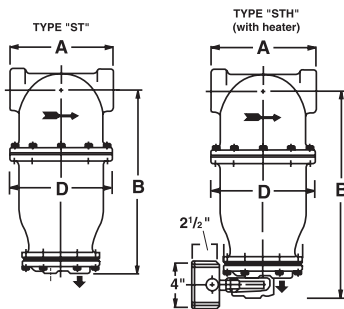
Dimensions - Type T (Cast Iron) - (in/mm)



Pipe Size	A	B	C	D	J - NPT Drains		NPT Vent	Weight Wt (lb/kg)
					Regular	Opt'l		
Threaded	3/4	5.50 / 40	9.19 / 233	-	5.75 / 146	3/4	-	1/4 / 22 / 10
	1	6.00 / 152	9.00 / 229	-	6.75 / 171	1	1-1/4	1/4 / 25 / 11.4
	1-1/4	6.00 / 152	9.13 / 232	-	7.00 / 178	1	1-1/4	1/4 / 28 / 12.7
	1-1/2	7.25 / 184	11.69 / 297	-	8.13 / 207	1	1-1/2	1/4 / 44 / 20
	2	8.13 / 206	13.69 / 348	-	8.50 / 216	1	2	1/4 / 47 / 21.3
	2-1/2	12.00 / 305	15.94 / 405	3.50 / 89	11.38 / 289	1-1/4	2	1/4 / 94 / 42.7
Flanged	3	11.00 / 281	15.94 / 405	3.50 / 89	11.38 / 289	1-1/4	2-1/2	1/4 / 90 / 41
	2	10.50 / 267	13.75 / 349	-	8.50 / 216	1	2	1/4 / 47 / 21.3
	3	14.00 / 356	16.00 / 406	3.50 / 89	11.38 / 289	1-1/4	2-1/2	1/4 / 90 / 40.9
	4	15.88 / 403	19.38 / 492	5.00 / 127	14.06 / 357	1-1/4	2-1/2	1/4 / 195 / 88.6

Note: Threaded ends, NPT, Material ASTM A-278. Flanged ends, 125 lb ANSI flat face and drilling, Material ASTM A-278

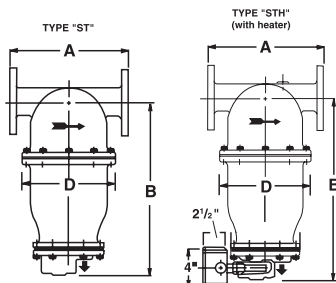
Dimensions - Type ST & STH - Threaded Inlet & Outlet (in/mm)



Pipe Size	A	B (ST)	D	Drain NPT	Vent NPT	Wt (lb/kg) ST	STH
3/4	5.5 / 40	11.69 / 297	6.75 / 171	3/4	1/4	31 / 14.1	34 / 15
1	6.0 / 152	10.25 / 260	6.75 / 171	3/4	1/4	39 / 17.7	41 / 18.7
1-1/4	6.0 / 152	12.25 / 311	7.00 / 178	3/4	1/4	47 / 21.3	50 / 22.3
1-1/2	7.25 / 184	14.06 / 357	8.13 / 207	3/4	1/4	53 / 24	56 / 25
2	8.13 / 206	14.94 / 380	8.50 / 216	3/4	1/4	58 / 26.3	61 / 27.3
2-1/2	12.00 / 305	20.44 / 520	11.38 / 289	3/4	1/4	109 / 29.5	112 / 50.5
3	11.00 / 280	20.44 / 520	11.38 / 289	3/4	1/4	105 / 47.7	108 / 48.7

Note: For steam service use hard valve seat only

Dimensions - Type ST & STH - 125# Flanged Inlet & Outlet (in/mm)



Pipe Size	A	B (ST)	D	Drain NPT	Vent NPT	Wt (lb/kg) ST	STH
2	10.50 / 267	15.31 / 389	8.50 / 216	3/4	1/4	51 / 23.2	54 / 24.2
3	14.00 / 356	20.44 / 519	11.38 / 289	3/4	1/4	100 / 45.5	103 / 46.5
4	15.88 / 403	23.50 / 597	14.06 / 357	3/4	1/4	225 / 102.3	228 / 103.3