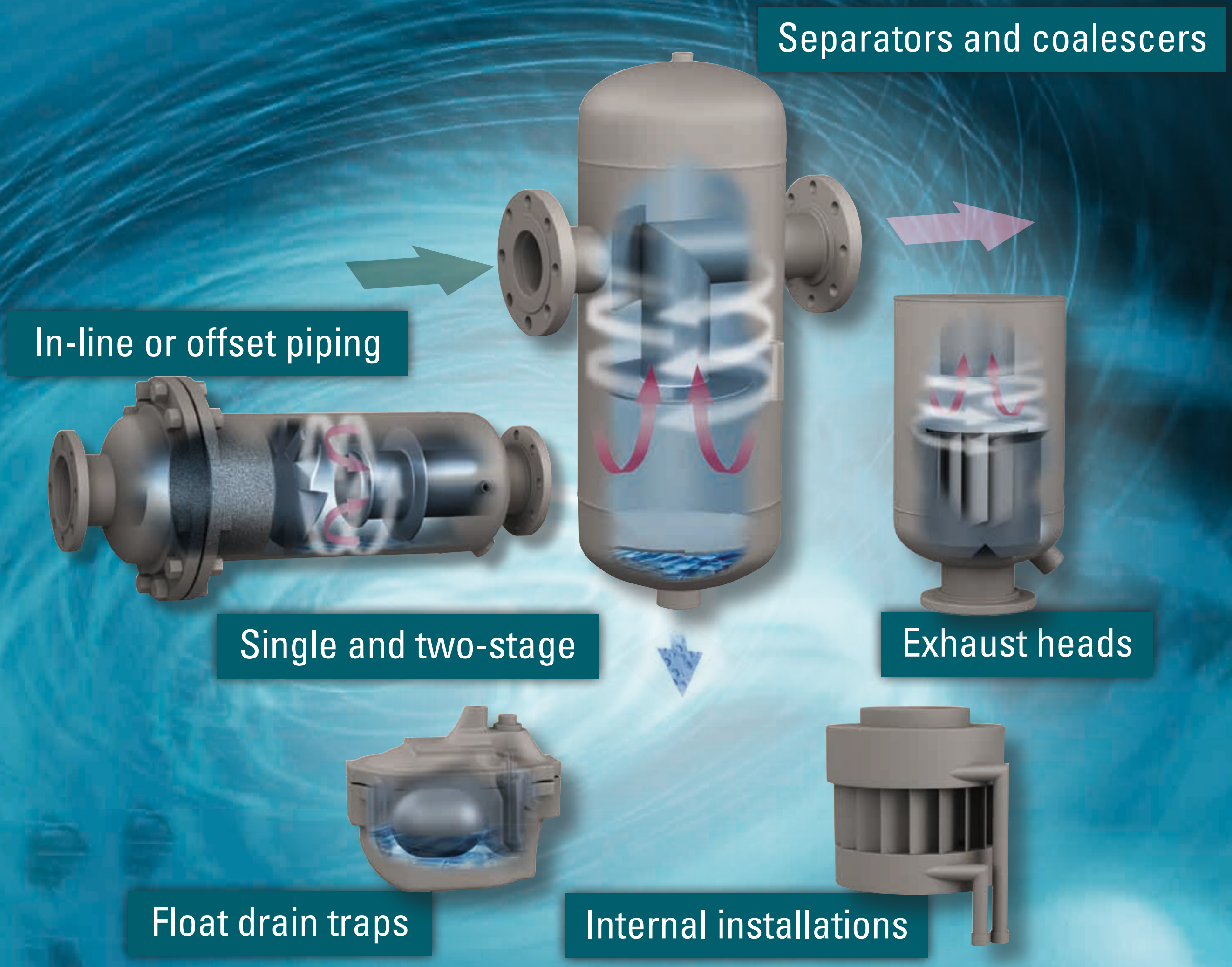
Filtration Products



Gas/Liquid Separators

Smart technology for cleaner, dryer air, gas, and steam

EATON
Powering Business Worldwide

Removes up to 99% of all liquid and solid entrainment particles ≥ 10 µm

Special types also offer smaller retention rates

Choosing the right Gas/Liquid Separator can present unique challenges.

Eaton's application specialists are available to help every step of the way from initial selection through installation and start-up.

Steam

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

Compressed air

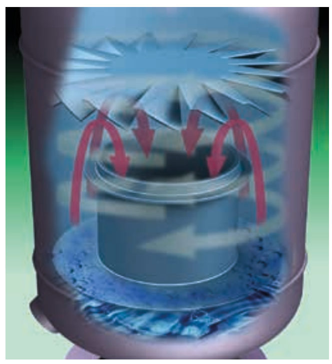
An Eaton Gas/Liquid Separator installed following an intercooler or aftercooler removes entrained moisture, which would otherwise cause damage in successive stages of compression or to subsequent processes. Separators are often used to remove damage-causing entrainment in primary air lines leading to such equipment as air chucks, air nozzles and paint spray equipment. They are perfect for long runs of pipe and where wide temperature differentials are found. The separators are also very efficient in moisture separation of refrigerated air dryer packages.

Compressed gas

Eaton Gas/Liquid Separators installed in conjunction with intercooler and aftercooler equipment are especially efficient in the removal of oil, tar, water and other damage-causing entrainment.

Unique vortex containment plate (VCP) improves separator efficiency—only from Eaton

Ordinary separators often operate at less than peak efficiency due to the re-entrainment of separated liquid at normal and high-end flow rates. Eaton's unique vortex containment plate prevents, that already separated liquid and particles, even at high flow rates, cannot be entrained again by the gas flow. The VCP is made up of carefully placed rings that shield the separated liquid from the vortex action inside the separator and also directs the liquid 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. This prevents recontamination after separation. The VCP features extremely heavy-duty construction and is virtually maintenance free.



Choose the best Eaton Gas/Liquid Separator for any application

Type T

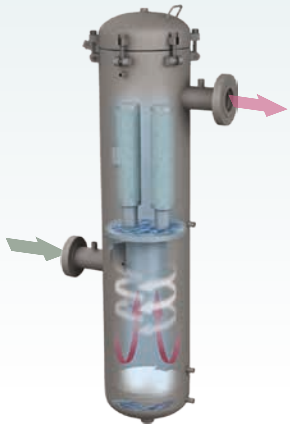
The popular choice for most applications

Type TS

For applications with greater than average liquid loading

Type TF and 31-LSF

Two-stage system separates liquid particles larger than 0.3 µm

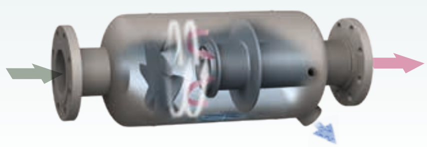


Type R

Handles applications with liquid slugs

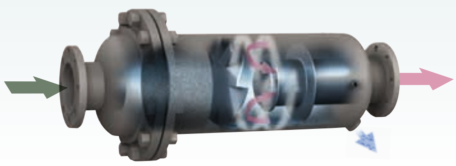
Type L

Ten different piping configurations fit most applications



Type CLC

Removes entrainment down to 4 microns, twice as efficient as other separators

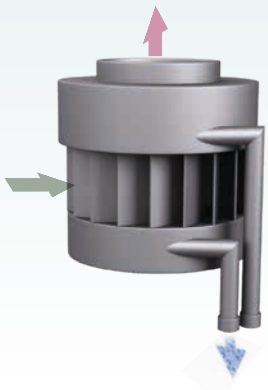


Type DTL

For applications with greater than average solids loading

Type I

Can be installed into receivers, steam drums or other vessels



Type 40

Removes water and oil from exhaust gases, reduces roof maintenance and saves boiler condensate

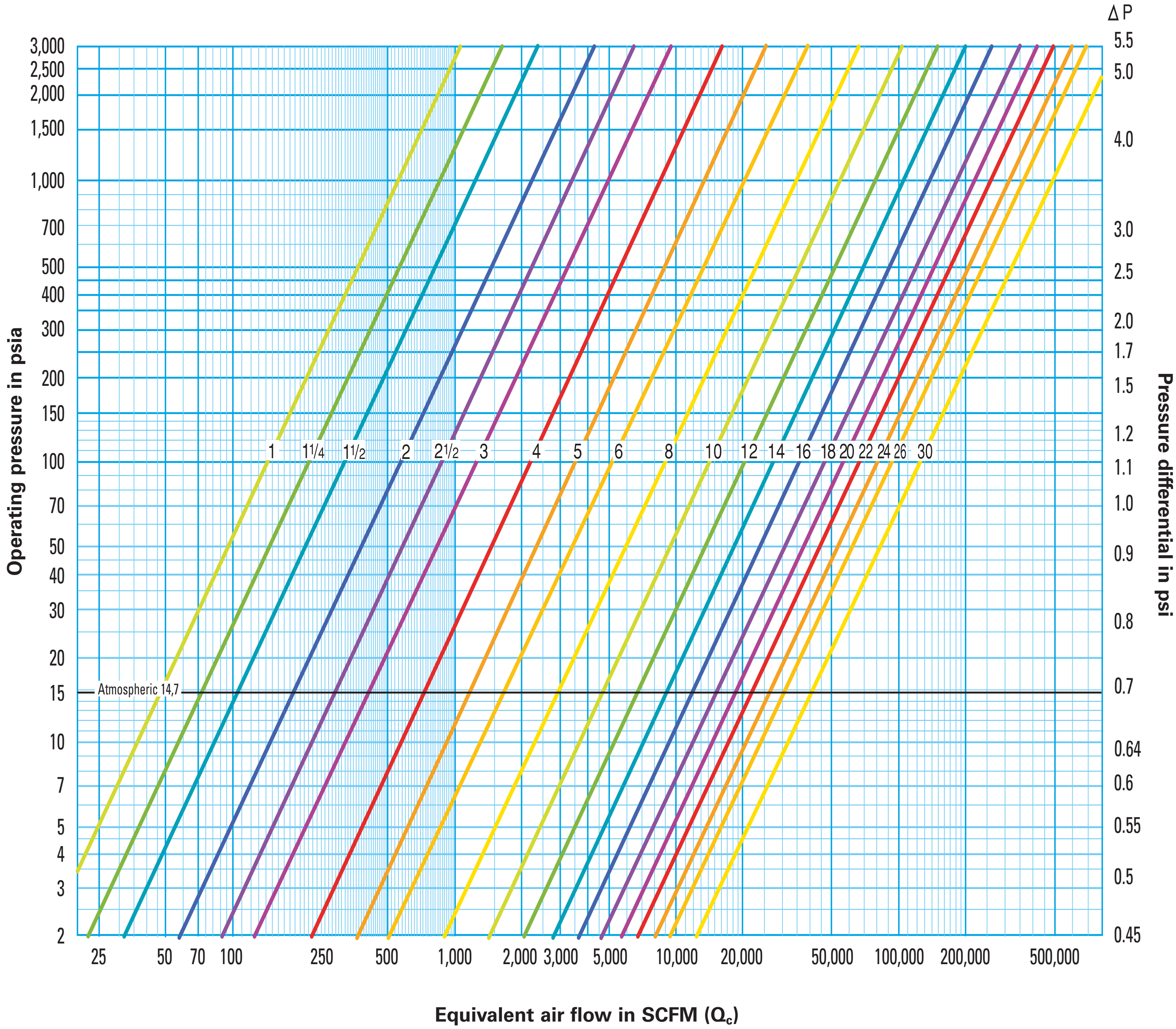
Type AC/ACN

Float drain tap designed especially for separators; all stainless steel internals

Air Flow Capacity Chart

The values on the chart represent maximum recommended air flow in standard cubic feet per minute through standard separators.

The chart is based on SCFM (cubic feet per minute of air measured at standard conditions of 0 psi and 60°F).
If any of the operating conditions are varied from these, consult Eaton.



$$\text{Actual pressure drop} = \left[\frac{\text{Application's equivalent air flow SCFM } (Q_c)}{\text{Separator's maximum rated air flow SCFM}}\right]^2 \times \text{Rated pressure drop}$$

(obtain from scale at the right side of this chart)

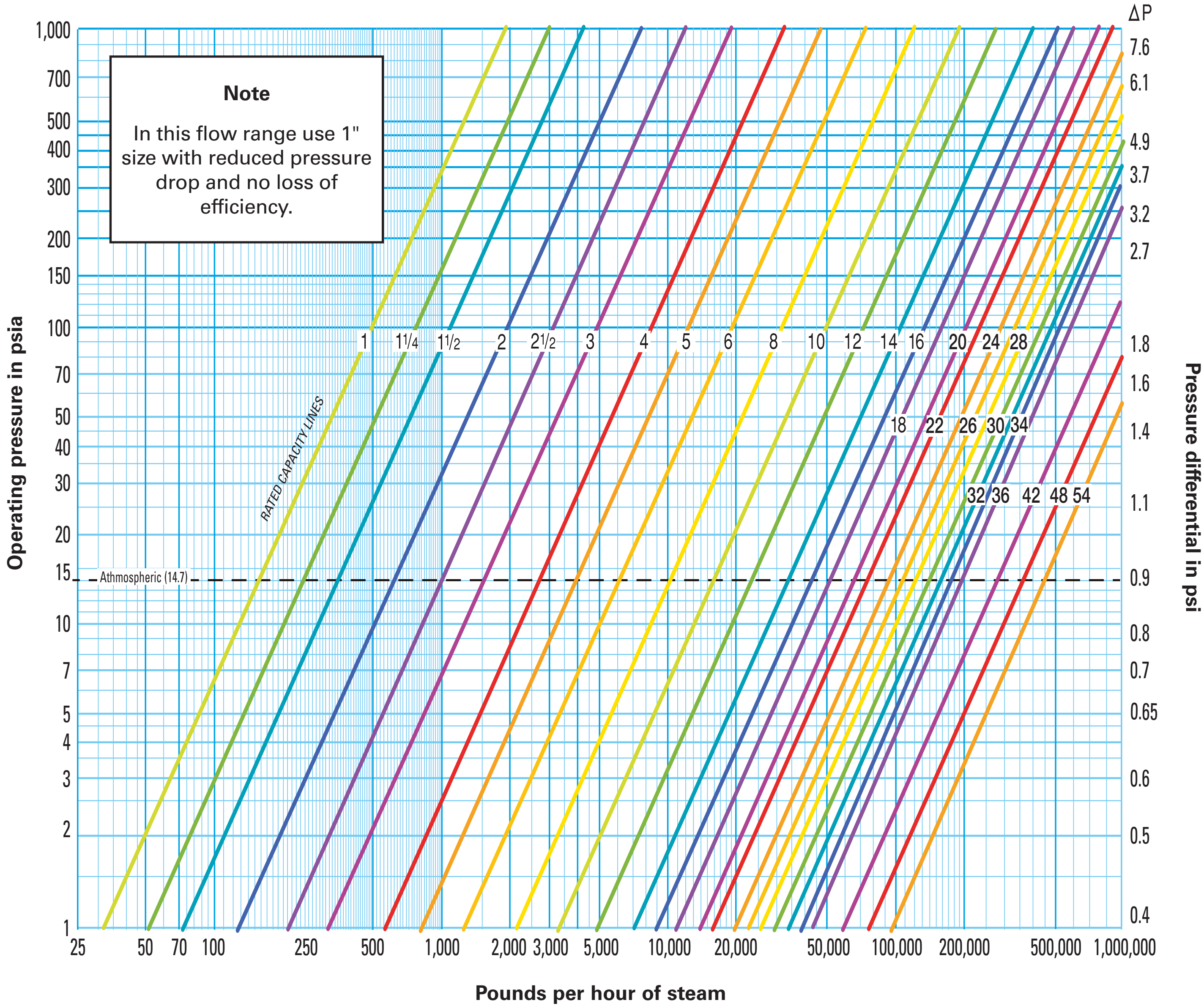
Conversion factors:

1 SCFM = 1.7 m³/h
1 psi = 0.069 bar

Saturated Steam Flow Capacity Chart

The values on the chart represent maximum recommended saturated steam flow in pounds per hour through standard separators.

The chart is based on SCFM (cubic feet per minute of air measured at standard conditions of 0 psi and 60°F). If any of the operating conditions are varied from these, consult Eaton.



$$\text{Actual pressure drop} = \left[\frac{\text{Actual steam flow}}{\text{Rated steam flow}}\right]^2 \times \text{Rated pressure drop}$$

(obtain from scale at the right side of this chart)

Conversion factors:

1 SCFM = 1.7 m³/h

1 psi = 0.069 bar

1 Pfund = 0.45 kg

Temperature Correction Factor

Temp. °F (°C)	Factor
-20 (-28.9)	0.904
-10 (-23.3)	0.917
0 (-17.8)	0.929
10 (-12.2)	0.941
20 (-6.7)	0.953
30 (-1.1)	0.965
40 (4.4)	0.977
50 (10.0)	0.989
60 (15.6)	1.000
70 (21.1)	1.012
80 (26.7)	1.023
90 (32.2)	1.034
95 (35.0)	1.040
100 (37.8)	1.046
105 (40.6)	1.051
110 (43.3)	1.057
120 (48.9)	1.068
130 (54.4)	1.079
140 (60.0)	1.090
150 (65.6)	1.101
160 (71.1)	1.112
170 (76.7)	1.121
180 (82.7)	1.133
190 (87.8)	1.143
200 (93.3)	1.154
250 (121.1)	1.206
300 (148.9)	1.256
400 (204.4)	1.353
500 (260.0)	1.445
550 (287.8)	1.490
600 (315.6)	1.533
700 (371.1)	1.618
800 (426.7)	1.701
900 (482.2)	1.780
1000 (537.8)	1.858

Specific Gravity Correction Factors

Gas	Symbol	M.W.	G	F_g
Hydrogen	H_2	2.0	0.069	0.344
Helium	He	4.0	0.138	0.452
Synthesis	75% H_2 25% N_2	8.5	0.295	0.611
Coke Oven	-	11.0	0.379	0.679
Methane*	CH_4	16.0	0.551	0.788
Ammonia	NH_3	17.0	0.586	0.808
Steam (Water Vapor)	H_2O	18.0	0.621	0.826
Natural Gas*	75% CH_4 25% N_2	-	-	-
Acetylene	C_2H_2	26.0	0.897	0.957
Nitrogen	N_2	28.0	0.950	0.986
Carbon Monoxide	CO	28.0	0.950	0.986
Air	-	29.0	1.00	1.00
Flue Gas	81% N_2 19% CO_2	31.0	1.08	1.027
Oxygen	O_2	32.0	1.10	1.039
Argon	A	39.9	1.38	1.136
Propane	C_3H_8	44.1	1.52	1.182
Carbon Dioxide*	CO_2	44.0	1.52	1.181
Nitrous Oxide	N_2O	44.0	1.52	1.181
Butadiene	C_4H_6	54.1	1.86	1.284
Sulfur Dioxide	SO_2	64.1	2.21	1.374
Chlorine	Cl_2	70.9	2.45	1.431
Freon 12	CCl_2F_2	120.9	4.17	1.770

*For applications involving gases (above 34 bar at 93°C), contact Eaton to determine whether there is an additional correction factor for compressibility.

Symbol Key

F_g = Correction factor for specific gravity

F_t = Correction factor for temperature (See table on the inside page)

G = Specific gravity

MMSCFD = Million standard cubic feet per day

MW = Molecular weight

P_a = Pressure (psia) at which volume is measured

Q_a = Rate of flow-standard cubic feet per minute (ACFM)

Q_c = Rate of flow-standard cubic feet per minute of equivalent air

Q_{sg} = Rate of flow-standard cubic feet per minute

T = Operating temp. (°F/°C)

T_a = Temperature (°F/°C) at which volume is measured

W = Rate of flow-pounds per hour

The Eaton Flow Charts on the previous pages are based on SCFM (cubic feet per minute of air measured at standard conditions of 0 psi and 60°F) or pounds of steam per hour. If any of the operating conditions are varied from the above, then correction factors must be applied.

To use the Air Flow Chart for applications involving other gases or other than standard conditions, the following equation must be solved for Q_c:

$$Q_c = Q_{sg} \times F_g \times F_t$$

In the event that Qsg is not provided in the proper form, any of the following equations may be used to arrive at the correct flow rate to insert in the above equation:

$$Q_{sg} = \frac{6{,}3 \times W}{MW}$$

$$Q_{sg} = \frac{35{,}7 \times Q_a \times P_a}{460 + T_a}$$

$$Q_{sg}\ (\text{air only}) = 0{,}218 \times W$$

$$Q_{sg} = \frac{MMSCFD}{1440}$$

$$W = (\text{pounds mols/hour}) \times MW$$

Application Data Sheet

Name: ______________________ Date: ______________________

Title: ______________________

Company: ______________________

Address: ______________________

City: ______________ State: ______________ Zip: ______________

Phone: ______________ Fax: ______________

E-Mail: ______________________

Product(s) of Interest

☐ Type T ☐ Type I ☐ Type R

☐ Type TS ☐ Type TF ☐ Type DTL ☐ Type 31-LSF

☐ Type L ☐ Type CLC ☐ Type 40 ☐ Type AC/ACN

Application Parameters

Pipe Size: __________ in __________ mm

Flow Medium: ☐ Air ☐ Steam ☐ Natural Gas ☐ Other ______________

Volumetric Flow: __________ SCFM __________ m^3/h __________ Nm^3/h

Weight Flow: __________ kg/h

Average Molecular Weight: ______________________

Minimum Operating Pressure: __________barg

Maximum Operating Temperature: __________°C

Flow Configuration Preference: ☐ Vertical Flow ☐ Horizontal Flow

Design Pressure of Vessel: __________ barg

Design Temperature of Vessel: __________°C

Maximum Entrained Liquid: __________ kg/h

End Connections Required: ☐ Threaded ☐ Flanged ☐ Socket Weld

☐ PN10 / 125# PN16 / 150# ☐ PN40 / 300# ☐ Other ______________

Materials of Construction: ☐ Cast Iron ☐ Carbon Steel ☐ Stainless Steel

☐ Other ______________________

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06-2023

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