TECHNICAL INFORMATION
Gas/Liquid Separators

WRIGHT-AUSTIN 1894

MONARCH INDUSTRIAL PRODUCTS

Temperature Correction Factor

Temp °F	Factor
-20	0.904
-10	0.917
0	0.929
10	0.941
20	0.953
30	0.965
40	0.977
50	0.989
60	1.000
70	1.012
80	1.023
90	1.034
95	1.040
100	1.046
105	1.051
110	1.057
120	1.068
130	1.079
140	1.090
150	1.101
160	1.112
170	1.121
180	1.133
190	1.143
200	1.154
250	1.206
300	1.256
400	1.353
500	1.445
550	1.490
600	1.533
700	1.618
800	1.701
900	1.780
1000	1.858

Specific Gravity Correction Factors

GAS	Symbol	M.W.	G	Fg
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 500 psi at 200 °F) so marked, contact Eaton to determine whether there is an additional correction factor for compressibility

1 psi = 2.036" Hg
1" Hg = .4912 psi
1 psi = 27.71" H_2O
1" H_2O = .03613 psi

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)

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

W = Rate of flow-pounds per hour

The Eaton Air Flow Chart on the next page is based on SCFM (cubic feet per minute of air measured at standard conditions of 14.7 psia and 60 °F). 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 Q_{sg} 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:

$$Q_{sg} = \frac{6.3 \times W}{MW}$$

$$Q_{sg} = \frac{35.7 \times Q_a \times P_a}{460 + T_a}$$

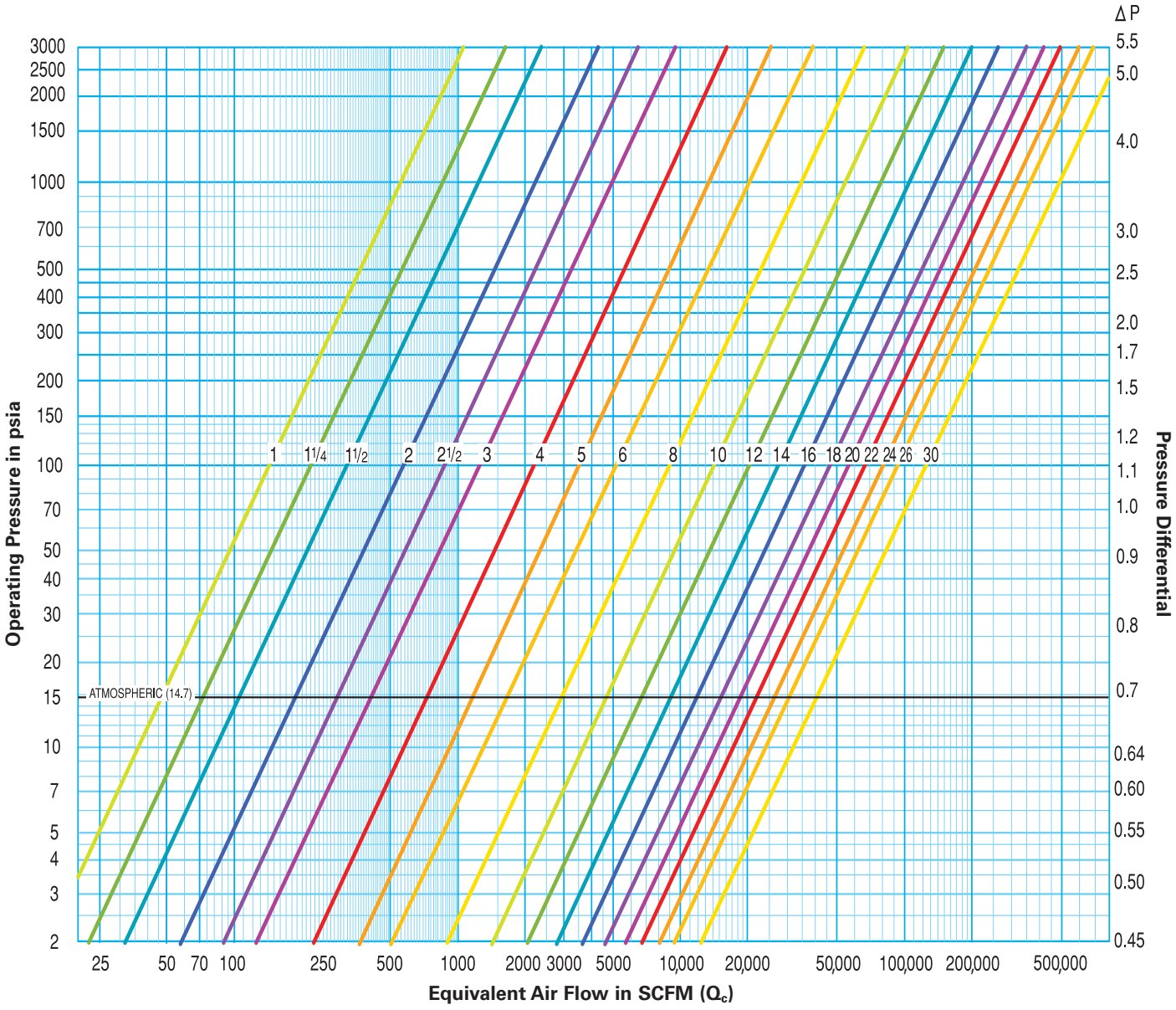
$$Q_{sg} \text{ (air only)} = .218 \times W$$

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

W = (pounds mols/hour) × MW

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 14.7 psia and 60 °F). If any of the operating conditions are varied from these, consult Eaton.

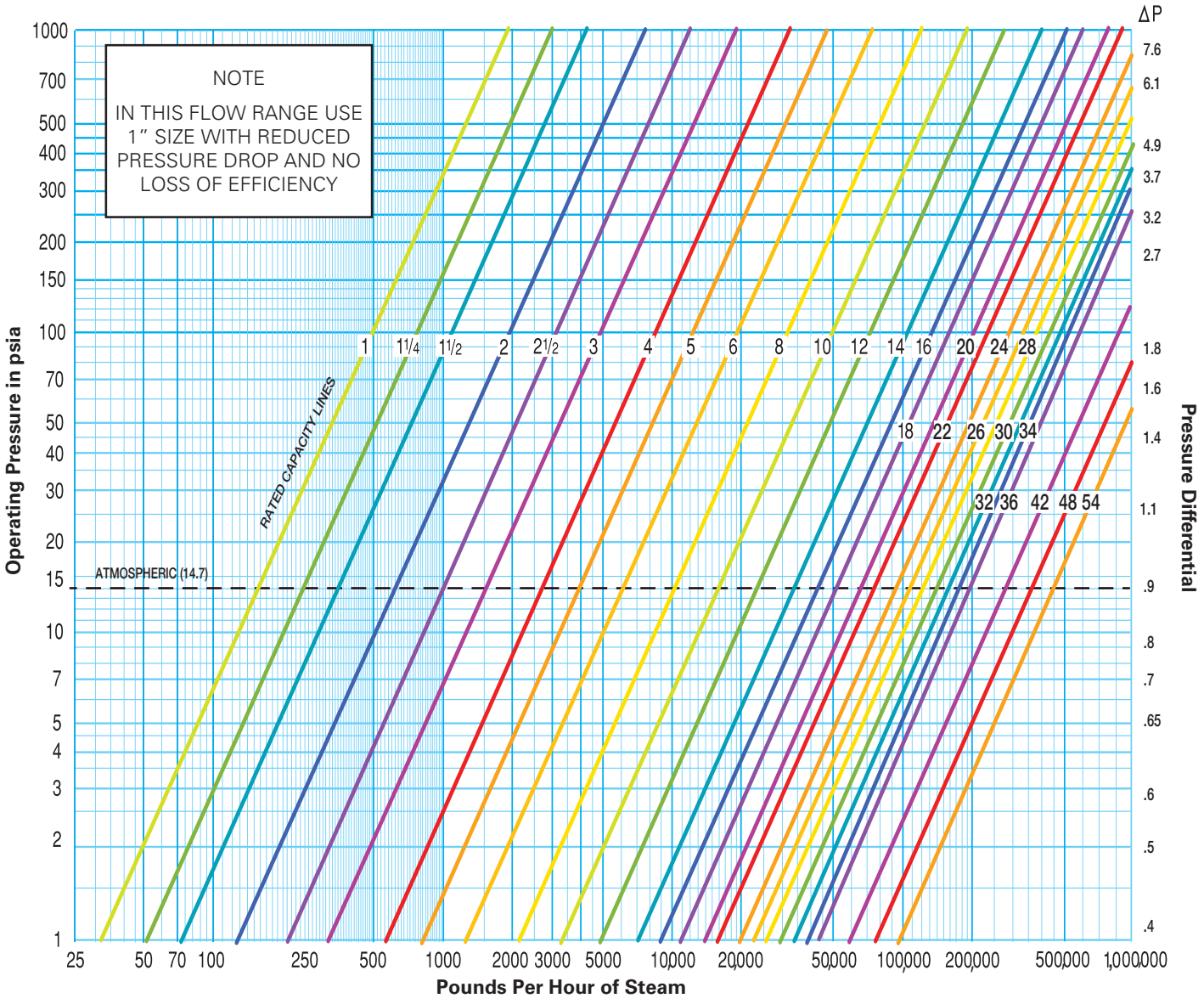


$$\text{Actual Pressure Drop} = \left[\frac{\text{Application's Equivalent Air Flow SCFM } (Q_c)}{\text{Separator's Maximum Rated Air Flow SCFM}}\right]^2 \times \text{Rated Pressure Drop}$$

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

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 14.7 psia 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)

MONARCH INDUSTRIAL PRODUCTS

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ENGINEERING SPECIFICATIONS
Gas/Liquid Separators

Type T, ST or STH Gas/Liquid Separators

All gas/liquid separators shall be constructed of (iron, carbon steel, stainless steel or other alloy) with threaded, flanged, or socket weld connections for pipe size___. Construction shall be (cast, fabricated). Separators will remove 99% of entrained liquid or particulate matter 10 micron in size or larger when properly installed. Re-entrainment of separated material will be prevented by a Vortex Containment Plate. Options required are (integral trap, trap heating element, ASME UM or U Code Stamp, water gauge tap, thermometer tap, larger drain size). Separators shall be Eaton Type (T, ST, STH).

Type 30L Series Gas/Liquid Separators

All gas/liquid separators shall be of fabricated (carbon steel, stainless steel or other alloy) with flanged connections for pipe size___. Separators will remove 99% of entrained liquid or particulate matter 10 micron in size or larger when properly installed. Separator design shall incorporate a Cenpellar™ for efficient operation. Re-entrainment of separated material will be prevented by a Vortex Containment Plate. Options required are (oversize inlet connections, reduced size inlet and outlet connections, specified flow pattern, integral sump, ASME code stamp). Separators shall be Eaton Type 30L Series.

Type 31L-ST Gas/Liquid Separators

All gas/liquid separators shall be cast iron construction with (threaded or flanged) piping connections for pipe size ___. Separators will remove 99% of all entrained liquid or particulate matter 10 micron in size or larger when properly installed. Separators to incorporate a Cenpellar™ for efficient operation and a Vortex Containment Plate to prevent re-entrainment of separated material. All separators shall have an integral trap to save space and shall be capable of automatically ejecting the condensate at predetermined levels without loss of line pressure. Required options include (trap heater, ASME Code Stamp). Separators shall be Eaton Type 31L-ST.

Type 10-R Series Gas/Liquid Separators

All gas liquid separators shall be fabricated (carbon steel or other alloy) construction with flanged connections for pipe size ___. Separators will remove 99% of all entrained liquid or particulate matter 10 micron in size or larger when properly installed. Separators shall have a two-stage design for separating large volumes of liquid and be capable of handling liquid slugs. Re-entrainment of separated material will be prevented by a Vortex Containment Plate. All separators will have an ASME Code Stamp. Required options are (support stand, multiple inlets/outlets). Separators shall be Eaton Type 10-R Series standard or compact.

Type CLC Coalescer/ Separators

All gas/liquid separators shall be of fabricated (carbon steel or other alloy) construction with flanged connections for pipe size___. Separators will have a two-stage coalescer/separator design and remove 99% of all liquid and particulate matter 4 micron in size or larger when properly installed. Separators to incorporate a de-mister pad and a Cenpellar™ for efficient operation as well as a Vortex Containment Plate to prevent re-entrainment of separated material. Required options are (ASME Code Stamp). All Coalescer/Separators shall be Eaton Type CLC, 31, 35 or 36.

Type DTL Gas/Liquid Separators

All gas/liquid separators shall be fabricated (carbon steel, stainless steel or other alloy) construction with flanged connections for pipe size___. Separators will remove 99% of all liquid or entrained particulate matter 10 micron in size or larger when properly installed. Separators to be specially designed to handle larger than normal solid loads and have a conical shaped sump to better collect solids. Separators shall have a Vortex Containment Plate to prevent re-entrainment of separated material. All separators shall be Eaton Type T-DTL, 33L-DTL, or 31L-DTL.

Exhaust Heads

All exhaust heads shall be (cast iron), (fabricated carbon steel, stainless steel or other alloy) construction with (threaded or flanged) piping connections for pipe size___. Exhaust heads will remove 99% of all entrained liquid or particulate matter 10 micron in size or larger when properly installed. All exhaust heads will be designed so that there will be no required maintenance and have a Vortex Containment Plate to prevent the re-entrainment of separated material. Exhaust heads shall be Eaton Type 40EHC or Type 40EHMF.

Float Drain Traps

All float drain traps shall be cast (iron or stainless steel) with stainless steel internal parts and threaded connections for pipe size ___. Traps to require no priming and all internal parts should be attached to and removable with the cover without disconnection the trap from the line. All traps shall have corrosion resistant stainless steel, nonmagnetic valves and seats. Traps to be Eaton Model 90AC, 95AC, 230AC or 350AC.

Type 60-I and 70-I Internal Separators

All gas/liquid separators shall be of the internal design type and fabricated of (carbon steel, stainless steel or other alloy) with Type 304L stainless steel blades. Separators shall remove 99% of all entrained liquid or particulate matter 10 micron in size or larger when properly installed. Separators shall have an (upflow, down-flow) design configuration. Separators to be Eaton Type 60-I or 70-I.

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