



VENTURI Media Conversion Factors

Capacity curves are for water at +70°F. Most other media can be converted to equivalent GPM water at +70°F by the use of an appropriate formula with the following constants:

Constants:

1.0 GPM water at +70°F is approximately equal to:

Air (C_a) = 3.8 SCFM at 0 PSIG & +70°F

Steam (C_s) = 12.25 PPH at 0 PSIG saturated (+212°F)

Gas (C_g) = $\frac{3.8}{\sqrt{S_g}}$ SCFM at 0 PSIG & +70°F.

| Legend | |
|----------|---|
| Q_1 | given quantity of fluid |
| Q_2 | sizing quantity equivalent GPM +70°F water. |
| F_{pa} | pressure correction factor for air. |
| F_{ta} | temperature correction factor for air. |
| F_{ps} | pressure correction factor for steam. |
| SCFM | a cubic foot of air at 14.7 PSIA and +70°F water. |
| S_g | specific gravity of gas relative to air. |
| PPH | pounds per hour. |

1. Water

Read directly from capacity curves which are designed to read GPM water at +70°F.

For other temperatures see correction factors.

2. Air

To find the equivalent GPM water at +70°F use the following:

$$Q_2 = \frac{Q_1}{C_a} \times F_{pa} \times F_{ta}$$

Example: 500 SCFM Air at 100 PSIG and +150°F.

$$Q_2 = \frac{500}{3.8} \times .36 \times 1.07 = 50.7 \text{ GPM}$$

Solution: Use 2"-685 to read 12.5" ΔP

3. Steam

Use the following formula:

$$Q_2 = \frac{Q_1}{C_s} \times F_{ps}$$

Example: 5000 PPH at 100 PSIG

$$Q_2 = \frac{5000}{12.25} \times .38 = 155 \text{ GPM}$$

Solution: Use 4"-555 to read 23" ΔP

4. Other Liquids

Use the following formula:

$$Q_2 = Q_1 \sqrt{S_g}$$

Ex: 100 GPM, specific gravity 1.21, viscosity 1.0 centistokes

$$Q_2 = 100 \times 1.1 = 110 \text{ GPM}$$

Solution: Use 3"-623 to read 33" ΔP

5. Gas

Use the following:

$$Q_2 = \frac{Q_1}{C_g} \times F_{pa} \times F_{ta}$$

Example: 24,000 SCFM natural gas with specific gravity of .6 and measured at 15 PSIG and +70°F.

$$Q_2 = 24,000 \div \frac{3.8}{\sqrt{0.6}} \times .70 \times 1.0 = 3424 \text{ GPM}$$

Solution: Use 16"-721 to read 24" ΔP

| Temperature | | Pressure | | |
|-------------|------------------------------|----------|---------------------------|------------------------------|
| Degrees F | Air/Gas Temperature F_{ta} | PSIG | Air/Gas Pressure F_{pa} | Sat. Steam Pressure F_{ps} |
| 0 | 0.932 | 0 | 1.000 | 1.000 |
| 2 | 0.933 | 2 | 0.938 | 0.934 |
| 4 | 0.936 | 4 | 0.886 | 0.887 |
| 6 | 0.938 | 6 | 0.843 | 0.846 |
| 8 | 0.940 | 8 | 0.805 | 0.811 |
| 10 | 0.942 | 10 | 0.771 | 0.780 |
| 12 | 0.944 | 12 | 0.742 | 0.752 |
| 14 | 0.946 | 14 | 0.716 | 0.727 |
| 16 | 0.948 | 16 | 0.692 | 0.715 |
| 18 | 0.950 | 18 | 0.670 | 0.685 |
| 20 | 0.952 | 20 | 0.651 | 0.666 |
| 25 | 0.956 | 25 | 0.608 | 0.626 |
| 30 | 0.961 | 30 | 0.573 | 0.592 |
| 35 | 0.966 | 35 | 0.544 | 0.564 |
| 40 | 0.971 | 40 | 0.518 | 0.539 |
| 50 | 0.981 | 50 | 0.477 | 0.498 |
| 60 | 0.990 | 60 | 0.443 | 0.466 |
| 70 | 1.000 | 70 | 0.416 | 0.439 |
| 80 | 1.009 | 80 | 0.394 | 0.416 |
| 90 | 1.019 | 90 | 0.375 | 0.397 |
| 100 | 1.028 | 100 | 0.358 | 0.380 |
| 120 | 1.046 | 120 | 0.330 | 0.352 |
| 140 | 1.064 | 140 | 0.308 | 0.331 |
| 160 | 1.081 | 160 | 0.290 | 0.312 |
| 180 | 1.099 | 180 | 0.275 | 0.296 |
| 200 | 1.116 | 200 | 0.261 | 0.282 |
| 225 | 1.137 | 225 | 0.247 | 0.267 |
| 250 | 1.157 | 250 | 0.235 | 0.255 |
| 275 | 1.177 | 275 | 0.225 | 0.244 |
| 300 | 1.197 | 300 | 0.216 | 0.234 |
| 325 | 1.217 | 325 | 0.208 | 0.226 |
| 350 | 1.236 | 350 | 0.201 | 0.218 |
| 375 | 1.255 | 375 | 0.194 | 0.211 |
| 400 | 1.274 | 400 | 0.188 | 0.204 |
| 425 | 1.292 | 425 | 0.183 | 0.198 |
| 450 | 1.310 | 450 | 0.178 | 0.193 |
| 475 | 1.328 | 475 | 0.173 | 0.188 |
| 500 | 1.346 | 500 | 0.169 | 0.183 |

