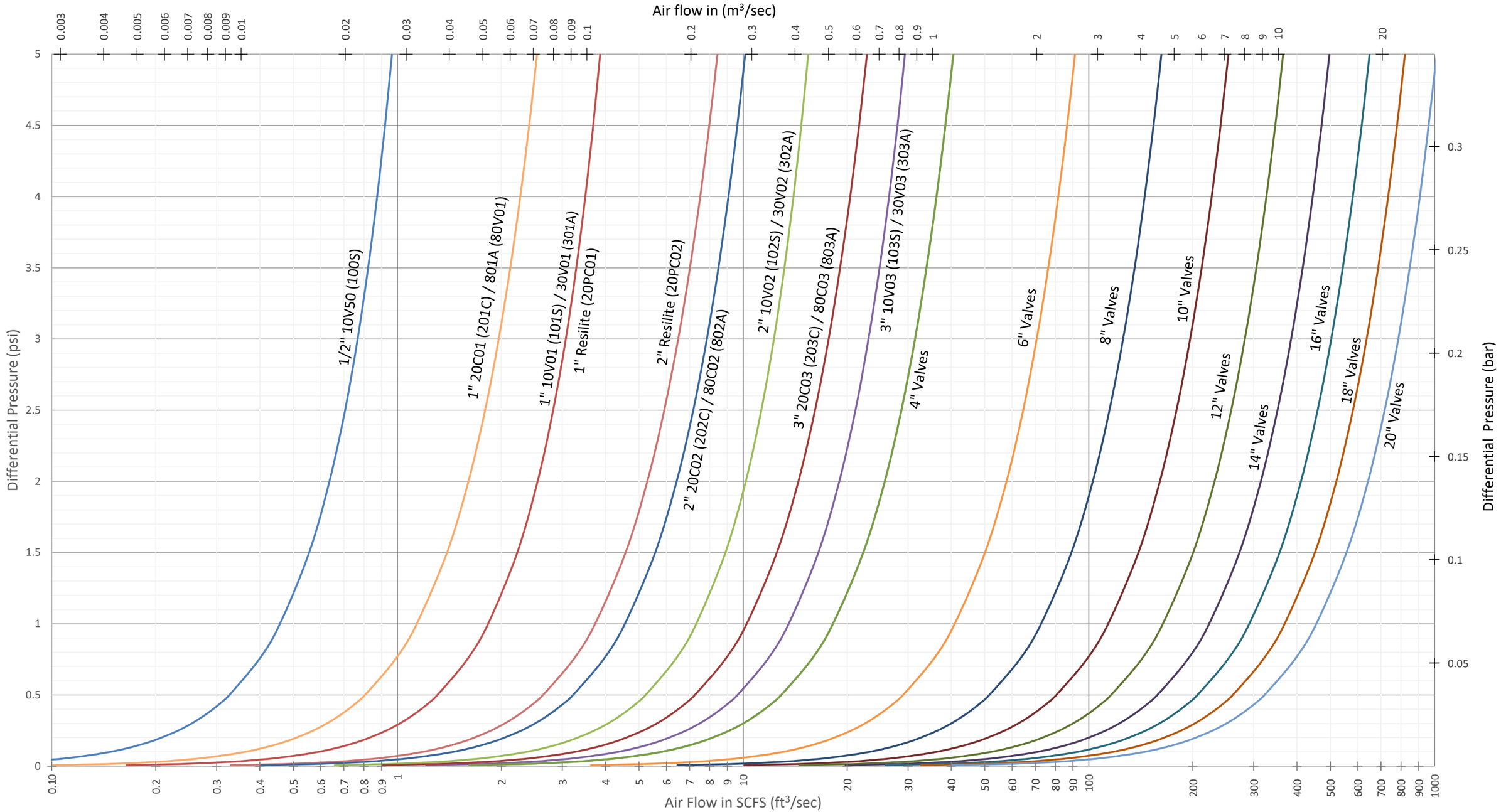
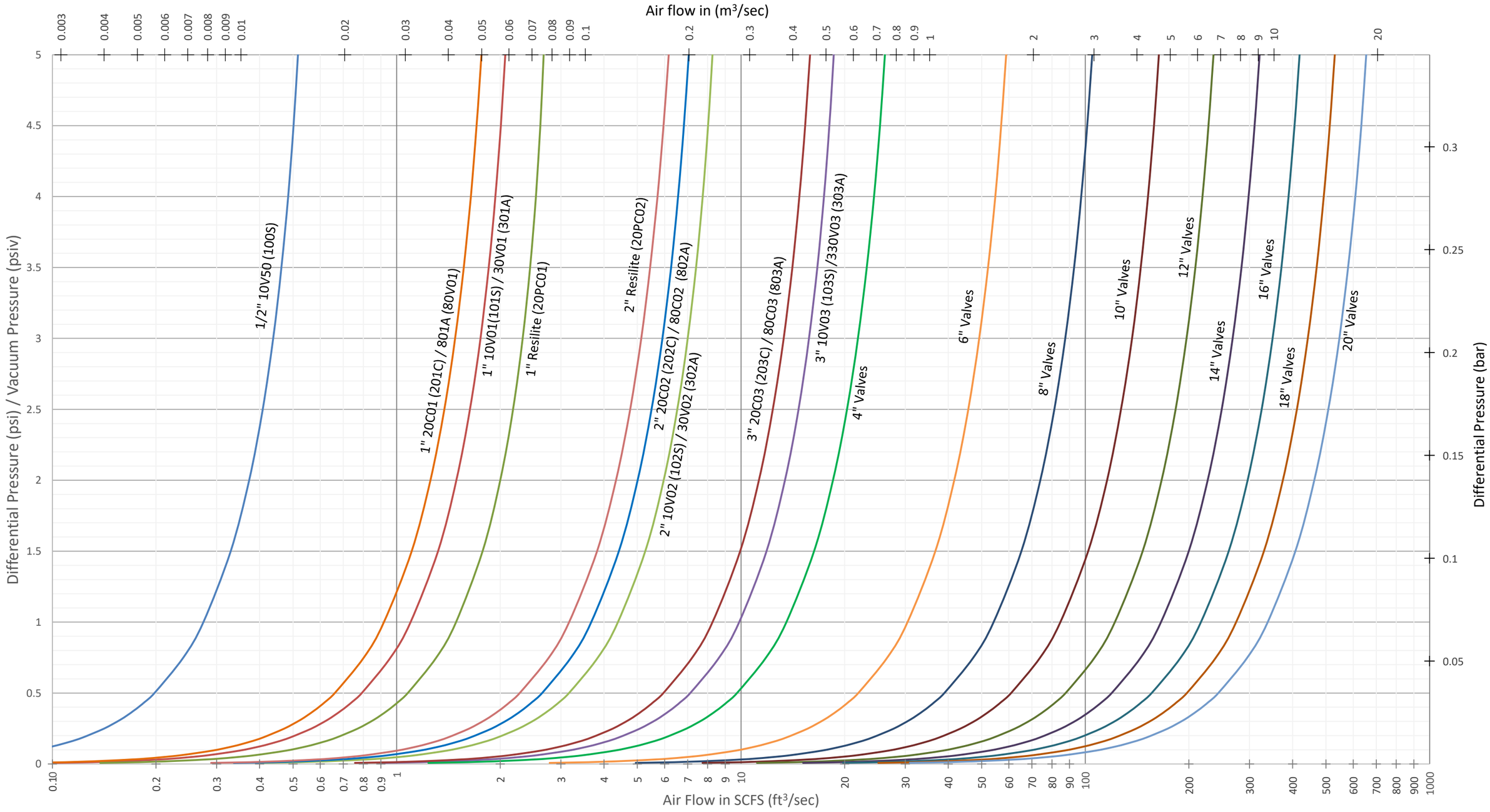
SS-4802 : Rev 3/6/25 : Large Orifice Air Valve Air Flow - Exhausting (Outflow to Atmosphere)



SS-4802 : Rev 3/6/25 : Large Orifice Air Valve Air Flow - Air Flow Intake (Inflow to Pipe)



Notes

1. The venting capacities in standard cubic feet per hour (scfh) are calculated from the following equation from Crane Technical Paper No. 410:

$$q'_h = 40700 * Y * d^2 * \sqrt{\frac{\Delta P * P'_1}{K * T_1 * S_g}} = 40700 * Y * d^2 * \sqrt{\frac{1}{K}} * \sqrt{\frac{\Delta P * P'_1}{T_1 * S_g}}$$

$$Let\ C = \sqrt{\frac{1}{K}}$$

$$q'_h = 40700 * Y * d^2 * C * \sqrt{\frac{\Delta P * P'_1}{T_1 * S_g}}$$

q'_h = Air flow in standard cubic feet per hour (scfh).
Y = Expansion factor (dimensionless)
d = Nominal orifice diameter (inch)
K = Valve resistance coefficient (dimensionless)
C = Valve flow coefficient (dimensionless)
ΔP = Differential pressure across valve (psi)
P'_1 = Upstream pressure in absolute pressure (psia)
T_1 = Temperature in Rankine (520R for 60°F)
S_g = Specific gravity of fluid (1 for air)

Explanations:
The air flows on the charts are plotted in standard cubic feet per second (scfs) at 14.7 psi atmospheric pressure and 60°F.

The expansion factor Y changes depending on the differential pressure which is a function of the upstream (P'_1), differential pressure (ΔP) and the valve K.

The upstream pressure (P'_1) is the pressure inside the piping system for outflow/exhausting and the ambient atmospheric pressure for inflow of air into the piping system.

A valve flow coefficient C is used here to have consistent form with AWWA Manual M51 and similar equations used for orifice flow. A value of C=0.6 is a good first approximation for many valves. However, some valves have asymmetric geometries for inflow and outflow, and the valve geometry varies depending on the design and type. The valve flow coefficients used in this document are based on CFD simulations. The CFD simulation was validated based on real world test data for a 1" flood safe valve and 8" regulated exhust device. The valve flow coefficient was calculated for both inflow and outflow of the valves.

2. The venting capacities are for standard threaded or flanged outlets. Hoods, screens, throttling devices, regulated exhaust devices and other accessories will affect the calculated air flow. The Resilte valve has an outlet elbow standard on the cover and this is accounted for in the valve flow coefficient.

VENTING CAPACITY OF LARGE ORIFICE AIR VALVES	DATE 3/6/2025
VAL-MATIC® VALVE AND MANUFACTURING CORP.	DRWG. NO **SS-4802**