Selection | 8631 Venturi

SELECTION from STANDARD 8631 OFFERING

The design of the standard series of North American 8631 Venturi Meters is based on several default parameter choices driven by its most common application - metering of low pressure combustion air for burner systems. The Venturi physical dimensions are defined by the pipe size and the choices made to allow a low permanent pressure loss (0.3"w.c. approx.) and a design pressure differential (2.5"w.c). to drive a 3"w.c.-range transmitter. The capacity chart shows the STP air flow rate for pressure differentials from 0.03"w.c. (the recommended minimum use point) to 3.0"w.c. (transmitter saturation point) across a range of pipe sizes from 10 to 40" ID.

The 2.5"w.c. recommended design pressure drop column is highlighted, and the 2.7"w.c. column indicates the suggested maximum flow used to avoid transmitter saturation (at 3"w.c.).

Venturi Selection Example:

Actual Use Conditions: Dry air, 1000' asl elevation (atmospheric pressure 14.146), venturi installed on inlet to blower with no inlet piping resistance, 250,000 scfh flow, 5:1 turndown (to 50,000 scfh) 100°F.

1. Correct the actual STP flow at application conditions to the STP flow at design conditions used in the capacity chart (60°F and 14.696 psia) using the formula:

Q1 =	STP flow at application conditions, scfh
Q2 =	STP flow at design conditions, scfh
T1 =	Application absolute temperature, R
T2 =	Design absolute temperature, R
P1 =	Application absolute pressure, psia
P2 =	Design absolute pressure, psia

$$Q2 = Q1 \sqrt{\left(\frac{T1}{T2}\right)\left(\frac{P2}{P1}\right)}$$

$$Q2 = 250{,}000 \sqrt{\left(\frac{459.67+100}{459.67+60}\right)\left(\frac{14.696}{14.146}\right)} = 264{,}438 \text{ scfh}$$

2. Select a venturi using the following sizing considerations:

- The 3"w.c. differential pressure (dp) column is maximum flow. The Venturi should not be sized at this point to avoid transmitter saturation.
- 2.5"w.c. dp is the 8631 Venturi's suggested design point for sizing - follow the 2.5"w.c. dp column to determine the appropriate size for the application.
- IMPORTANT: Include a sizing safety factor to avoid transmitter saturation. Always consider the maximum possible flow at given conditions when sizing. It is suggested that it does not exceed the capacities listed in the 2.7"w.c. dp column.
- Below 0.03"w.c. dp the accuracy number will be uncertain.
- After selecting the Venturi based on maximum flow, check that the minimum flow condition is within acceptable conditions with respect to the two points above.

3. Using the following Capacity Chart select an 8631 Venturi for 264,438 scfh air flow:

- Choose the 8631-16 which has a capacity of 272,100 scfh at the 2.5" design point.
- Check the dp at the minimum flow of 50,000 scfh – it is above the 29,180 scfh flow listed for the minimum dp of 0.03"w.c. and thus in the recommended range.