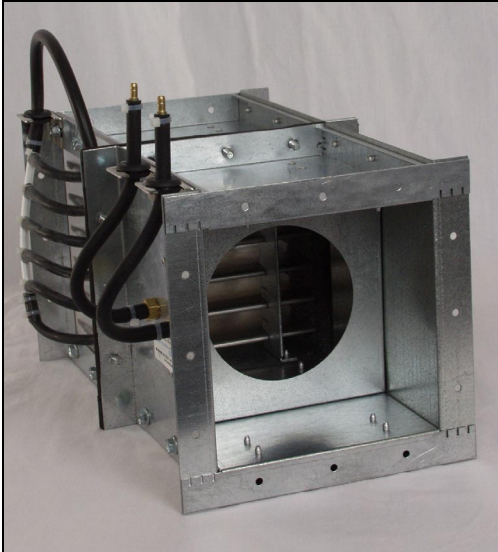


Air Flow Measuring Station ORIFICE Design

BULLETIN 865



Orifice in a Rectangular Casing

An orifice, when used as a flow measurement station, is a well researched, well understood, and commonly used method of measuring the flow of fluids – water, air, and gasses. It is chosen for its simplicity wide flow range and stable dependable representation of flow.

Basically, the pressure drop across the orifice is proportional to the flow through the orifice. This proportional number is often called a “K” factor and is used to relate the pressure drop (sense pressure) to the velocity and then to the flow rate.

BENEFITS

- Simple Construction
- Easy to Maintain
- Non-Clogging

ADVANTAGES

- Wide Flow Range
- Accurate
- Repeatable

The “K” factor is composed of several components – Among these are the ratio of small hole diameter to the conduit diameter (area), the approach velocity, as well as the coefficient of discharge of the orifice.

Other differential pressure airflow station designs include a pitot based design, amplified pressure, as well as a “fechheimer” design. All of these use the direction of the airstream to help represent flow. The orifice is the only design which is not directly related to the direction of airflow, and is therefore much more resistant to yaw or skewed flow. The orifice station is not subject to fouling or plugging.

The orifice is a simple device, easy to manufacture, and more cost effective than multiple probe designs.

PERFORMANCE CHARTS

Round Profile

Nominal Size	Max CFM	Min CFM
4"Ø	240	24
6"Ø	540	54
8"Ø	960	96
10"Ø	1500	150
12"Ø	2160	216
14"Ø	2940	294
16"Ø	3840	384
18"Ø	4860	486

Max CFM @ 2750fpm Sense $\Delta P = .839$

Min CFM @ 275fpm Sense $\Delta P = .008$

Rectangular Profile

Nominal Size	Max CFM	Min CFM
4 x 4	306	31
6 x 6	688	69
8 x 8	1222	122
10 x 10	1910	191
12 x 12	2750	275
14 x 14	3743	374
16 x 16	4889	489
18 x 18	6188	619

Max CFM @ 2750fpm Sense $\Delta P = .839$

Min CFM @ 275fpm Sense $\Delta P = .008$

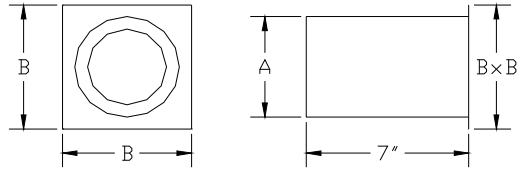
NOTES:

Sense Pressure = Pressure Drop Across Orifice

K = .750

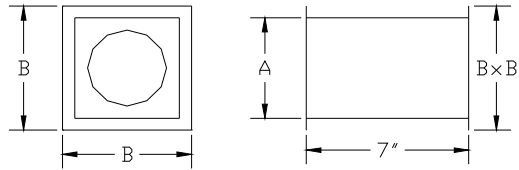
Both designs use the same orifice. The rectangular profile uses a larger duct area

DIMENSIONS



NOMINAL SIZE

NOMINAL SIZE	A	B
4	3 $\frac{7}{8}$	6
6	5 $\frac{7}{8}$	8
8	7 $\frac{7}{8}$	10
10	9 $\frac{7}{8}$	12
12	11 $\frac{7}{8}$	14
14	13 $\frac{7}{8}$	16
16	15 $\frac{7}{8}$	18
18	17 $\frac{7}{8}$	20



NOMINAL SIZE

NOMINAL SIZE	A	B
4x4	4	6
6x6	6	8
8x8	8	10
10x10	10	12
12x12	12	14
14x14	14	16
16x16	16	18
18x18	18	20



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