FABRIC DUCTING
DUCT CALCULATION METHODS

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To: Customer Engineering

From: *Bill Warner, General Manager*

Subject: Fabric duct calculations fundamentals

The basis for fabric duct calculations is based on an internal air flow velocity of **1,500 feet per minute (FPM) @ 0.5" Static Pressure. These two parameters determine the duct diameter**. *In the case of a 2,000 CFM duct, the nominal diameter is 15.6 inches. We would choose 16" diameter for the final design yielding and internal air flow velocity of 1,432 FPM.*

For applications such as an auditorium or church sanctuary, we would calculate a diameter based on an air flow velocity of 1,100 feet per minute. In the case of a 2,000 CFM supply, the duct would then have a diameter of 18.3 or 18 inches in diameter with an air flow of 1,132 FPM.

Linear venting width or air jet diameter calculations depend solely on the length of the duct and the inlet Static Pressure to distribute the total CFM. For example, a 24" diameter duct of 100 feet length @ 4,100 CFM will distribute 41 CFM per linear foot of duct. A 50 foot duct with the same CFM will distribute 82 CFM per linear foot and the total area of the venting will be twice the area of the 100 foot duct!

Venting takes into consideration that fabric Elbows do NOT have vents; neither do Tees or Reducers. Sometimes, the customer may NOT want venting in certain sections of a duct run. Sometimes they may want greater CFM distributed for a particular portion of a duct run. All these factors affect the vent width(s) or air jet diameter(s). Venting calculations must take into account that the duct must be completely inflated over its entire length in order to distribute the inlet CFM UNIFORMLY over the entire duct length.

Fabric duct air distribution is likened to a leaker-type garden hose. Since the air is uniformly distributed over the duct's length, there is rarely the need for a diameter reducer to build up the static pressure. The static pressure in a fabric duct increases only slightly from the air flow entry to the end cap of the duct, e.g., from 0.5" to 0.65".