The Series FLST Airflow Measurement Station consists of single or multiple airflow elements, factory mounted and pre-piped in a casing designed for flanged connection to the ductwork. Standard materials consist of a G90 galvanized casing and 6063-T5 anodized aluminum flow sensors, suitable for most HVAC applications.

The airflow averaging element, utilized in the FLST, is a head type device, which generates a differential (velocity) pressure signal similar to the orifice, venturi, and other head producing primary elements. The FLST is constructed so that strategically located sensing ports (based on duct size) continually sample the total and static pressures, when inserted normal to flow. The total pressures sensed by the upstream ports are continually averaged within the element in an isolated chamber. The static sensing ports (located where the influence of the velocity head is zero) are averaged in a second isolation chamber. Multiple elements are manifolded together for connection to a differential measurement device (gage, transmitter, etc.) for flow measurement and indication purposes.

SPECIFICATIONS

Accuracy: Within 2% of actual flow when installed in accordance with published recommendations.
Velocity Range: 100 to 10,000 fpm (0.51 to 51 m/s).
Wetted Material: Elements 6063-T5 anodized aluminum; Casings 16 ga G90 galvanized steel.
Temperature Limits: Galvanized Casings and Aluminum Elements 350°F (177°C) continuous operation (in air) 400°F (204°C) intermittent operation (in air).
Humidity: All Airflow Stations 0 to 100% non condensing.
Process Connections: 1/4” compression fittings.

DIMENSIONS

<table>
<thead>
<tr>
<th>STATION SIZE “D”</th>
<th>FLANGE THICKNESS</th>
<th>FLANGE SIZE “F”</th>
<th>CASING LENGTH “L”</th>
</tr>
</thead>
<tbody>
<tr>
<td>8” - 15”</td>
<td>.064”</td>
<td>1”</td>
<td>6”</td>
</tr>
<tr>
<td>16” - 44”</td>
<td>.064”</td>
<td>1-1/2”</td>
<td>6”</td>
</tr>
<tr>
<td>45” - 72”</td>
<td>.188”</td>
<td>1-1/2”</td>
<td>10”</td>
</tr>
<tr>
<td>73” &amp; OVER</td>
<td>.188”</td>
<td>2”</td>
<td>12”</td>
</tr>
</tbody>
</table>

NOTE: All oval flow stations without flange have a casing length of 5”.
Oval Stations
Standard oval airflow measuring stations include a 18 gage galvanized casing, 5 inches long between beads with 1-1/4 inch connecting sleeve on each end (7-1/2 inch overall length). Actual O.D. dimensions are 1/4 inch less than specified duct I.D. dimensions.

INSTALLATION
The elements may be installed in any duct configuration. However, the accuracy of the installation is dependent on the flow conditions in the duct. The minimum installation requirements for the elements based upon a uniform velocity profile approaching the duct disturbance for flow rates less than 2,500 fpm are shown below. Add one duct diameter to the installation requirements shown below for each additional flow rate of 1000 fpm. These are not ideal locations. It is always best to locate the elements as far as possible from all duct disturbances, with upstream disturbances being the most critical consideration.

<table>
<thead>
<tr>
<th>Circular Flange Dimensions</th>
<th>Oval Flange Dimensions (Optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station Size</td>
<td>Flange Thickness</td>
</tr>
<tr>
<td>6’ - 15’</td>
<td>0.064”</td>
</tr>
<tr>
<td>16’ - 44’</td>
<td>0.064”</td>
</tr>
<tr>
<td>45’ - 72’</td>
<td>0.188”</td>
</tr>
<tr>
<td>73’ &amp; Over</td>
<td>0.188”</td>
</tr>
<tr>
<td>Up to 48’</td>
<td>0.064”</td>
</tr>
<tr>
<td>Over 48’</td>
<td>0.188”</td>
</tr>
</tbody>
</table>

Circular Stations
Standard circular airflow measuring stations include a 16 gage galvanized casing with attached 90° connecting flanges as listed above.

Rectangular Stations
Standard rectangular airflow measuring stations include a 16 gage galvanized casing, 5 inches long, with formed integral 90° connecting flanges as listed above.

<table>
<thead>
<tr>
<th>Rectangular Flange Dimensions</th>
<th>Rectangular Ducts:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station Size</td>
<td>H = Duct height [ D = \frac{4HW}{\pi} ]</td>
</tr>
<tr>
<td>8’ - 72’</td>
<td>W = Duct width</td>
</tr>
<tr>
<td>73’ &amp; Over</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- Round Ducts:
  - \( D = \text{Duct diameter} \)
- Rectangular Ducts:
  - \( H = \text{Duct height} \)
  - \( W = \text{Duct width} \)
FLST SPECIFICATION GUIDE

1. Provide where indicated and/or scheduled airflow traverse elements capable of continuously monitoring the fan or duct air volumes they serve.

2. Each element shall be designed and built to comply with, and provide results in accordance with, accepted practice for duct system traversing as defined in the ASHRAE Handbook of Fundamentals, AMCA publication #203, as well as the Industrial Ventilation Handbook. The number of sensing ports on each element, and the quantity of elements utilized at each installation, shall comply with ASHRAE Standard #111 for equal area duct traversing.

3. Each airflow measuring element shall contain multiple total and static pressure sensing ports placed along the leading edge of the cylinder. The static pressure chamber shall incorporate dual offset static taps on opposing sides of the averaging chamber, so as to be insensitive to flow angle variations of as much as ±20 degrees in the approaching airstream.

4. The airflow traverse elements shall be capable of producing steady, non-pulsating signals of true total and static pressure, with an accuracy of 2% of actual flow for operating velocities as low as 100 feet per minute (fpm). Signal amplifying sensors requiring flow correction (K factors) for field calibration are not acceptable.

5. The airflow traverse elements shall not induce a measurable pressure drop, greater than 0.18 inch at 4,000 fpm. The units sound level within the duct shall not be amplified, nor shall additional sound be generated.

6. The probes shall be manifolded together in a 16 gauge galvanized steel duct section with 90 degree undrilled flanges, fabricated to the duct size, and shall contain multiple airflow traverse elements interconnected as herein before described.

7. Where primary flow elements are located outside of the manufacturer’s published installation guidelines the manufacturer shall be consulted, and approve of any special configurations, such as air equalizers and/or additional and strategically placed measuring points, as may be required.

8. Where the stations are installed in insulated ducts, the airflow passage of the station shall be the same size as the inside airflow dimension of the duct. Station flanges shall be sized to facilitate matching connecting ductwork.

Installation Considerations

1. Primary flow elements shall be installed in strict accordance with the manufactures published requirements and with ASME guidelines affecting non-standard approach conditions. These elements serve as the primary signals for the airflow systems; it shall be the responsibility of the contractor to verify correct installation to assure that accurate primary signals are obtained.

2. An identification label shall be placed on each unit casing listing model number, size, area, and specified airflow capacity.
### Engineering Reference Table

#### Velocity Versus Velocity Pressure

|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|---

Above $P_v$ Values are Based on Standard Air Density of 0.075 lbm ft$^{-3}$ which is Air at 68°F, 50% Relative Humidity, and 29.92” Hg. The equation for converting air volume (Q) into velocity (V) and velocity pressure ($P_v$) is:

$$V = Q / A$$

$$P_v = V^2 / C \times P$$

**Maintenance**

Since the sensing elements have no moving parts, only periodic cleaning may be required. The sensing elements should be inspected for fouling of the sensing holes as part of an annual preventative maintenance program. Installations having viscous airborne particulate may require more frequent inspection. If the sensing holes on the elements have become fouled or plugged, the following procedure is recommended. **Caution**, all instruments must be isolated (removed) from the sensing lines prior to performing the following cleaning procedure.

**Backpurging:** Connect clean/dry compressed air, set at a maximum pressure of 25 psi, to the open air pressure ports (total and/or static) of the sensing element being cleaned. While purging the sensing element, wipe the surface of the cylinder with a cloth or brush to loosen and remove all contaminates buildup.

**Cleaning:** in applications where the sensing elements are subject to viscous contaminants it is recommended that the surface be washed with a cleaning agent. The cleaning agent used must be suitable for use on the type of material the sensing element is constructed of (i.e., aluminum, stainless steel, etc.).

The Series FLST Duct Mounted Airflow Measurement Station is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

---

** DWYER INSTRUMENTS, INC. **

P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A.

Phone: 219/879-8000  Fax: 219/872-9057
e-mail: info@dwyer-inst.com

©Copyright 2009 Dwyer Instruments, Inc.  Printed in U.S.A. 1/9

F# R1-443414-00 A Rev. 1