Laboratory Exhaust Systems
Vektor Sure-Aire™ Flow Measuring System

• Accurate Flow Measurement • Reduces Fan Energy and Fan Noise
• Eliminates Flow Measuring Probe Corrosion and Fouling
Laboratory Exhaust Airflow Measuring System

Quantifying the laboratory facility exhaust flow is critical in maintaining room containment, ensuring researcher and student safety, and safe exhaust effluent dispersion. In addition, measuring exhaust flow expedites facility commissioning and validates the integrity of the laboratory exhaust control system.

System Static Pressure Effect

Traditional flow probes create a system static pressure effect. In the past, measuring and monitoring the exhaust flow of laboratories has been difficult, not only because of the challenges of locating the flow measurement probes, but also of probe corrosion concerns. The primary problem with flow measurement probes is that they are invasive to the flow, obstructing the flow area of a fan. This obstruction, when applied to fan inlets, adds a system static pressure effect (see Figure 1) that must be added to the operating static of the fan.

This additional system static pressure effect must be compensated for by increasing the fan RPM and horsepower, resulting in greater energy consumption and greater fan noise. The magnitude of this additional system effect depends on the fan inlet flow, fan size, and the size and type of the probes. These increased static pressures can range from approximately 0.5 in. wg to greater than 3.0 in. wg (Table 1).

Benefits of the Vektor Sure-Aire™ System

- No system effect or resistance to airflow
- No additional pressure drop
- No increase in RPM, sound, or brake horsepower
- No additional energy cost for the building owner
- No probe corrosion to cause fan failure

Vektor Sure-Aire™ Operation

The Greenheck Vektor Sure-Aire™ airflow measuring system utilizes a noninvasive measuring system by using the inlet venturi of the fan as a calibrated nozzle (orifice). This flow measuring technique is used by accredited laboratories for certifying fan performance. Measuring the pressure drop across this calibrated nozzle, through the use of noninvasive static taps at the throat of the venturi, accurately determines the inlet flow of the fan.

Termination Plate

Stainless steel termination plate is attached to the fan curb cap. The fan measurement (Sure-Aire™) is factory plumbed up to the termination plate and includes a connection location for both the high and low pressure ports.

The fan size and flow equation is etched on the termination plate for reference.

Flow Equation

$$\text{CFM} = k\sqrt{\frac{dp}{\rho}}$$

- $k$ = fan specific factor provided by factory
- $dp$ = measured differential pressure
- $\rho$ = air density
Bypass Airflow Measurement

The Vektor Sure-Aire™ laboratory airflow measuring system utilizes Speciflow™ measurement technology to accurately measure the bypass airflow by applying static pressure sensors on each bypass damper blade. The configuration of pressure sensors on the damper blades makes the measurement insensitive to non-uniform flow conditions. This results in a flow measurement accuracy of ± 3 percent, regardless of the bypass damper position, velocity, or flow.

The bypass airflow measurement is accomplished by utilizing air pressure pickup sensors mounted on each blade of the bypass air damper. Bypass dampers are corrosion resistant coated steel airfoil blades that are designed to withstand velocities up to 6,000 ft/min. and differential pressures of up to 15 in. wg.

Control Features

The Greenheck Vektor Sure-Aire™ flow measurement system calculates, displays and reports the exhaust fan flow.

- Real time digital LCD display shows fan flow and the measured differential pressure of the flow monitoring system
- Touch screen allows for convenient programming
- NEMA-4 enclosure is suitable for outdoor or indoor mounting
- Provides a 4-20 mA DC output signal for interfacing
- Voltages: 115/60/1, 208/60/1, 230/60/1, 200/50/1, 220/50/1 or 230/50/1
- Optional temperature compensation available
- Accuracy to ± 0.5% of full scale at 77°F (25°C)

Vektor Sure-Aire™ can be factory provided on any Vektor fan system.
Greenheck warrants this equipment to be free from defects in material and workmanship for a period of either 1 or 3 years from the shipment date depending on the model and warranty period selected. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

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