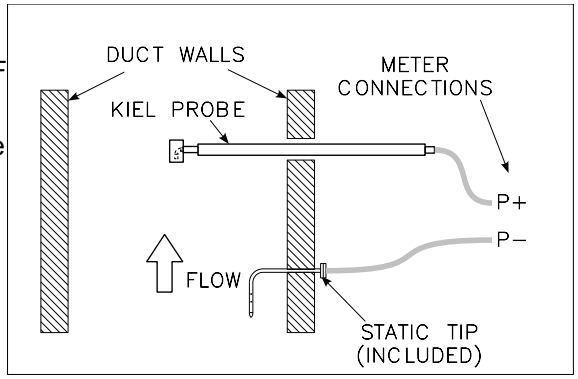
Introduction:

Kiel probes are total pressure probes designed to measure velocity where the direction of flow changes considerably during testing. To measure the dynamic pressure a static tip (included) or a wall tap must be used with the Kiel probe. This type of probe experiences very low sensitivity to turbulence, Reynolds number and Mach number. The Kiel probe has a flow coefficient (*K*) of 1.0 and requires no calibration. Temperature rating: 900°F (482°C) if using a mounting chuck with a stainless steel ferrule; 400°F (204°C) if using a Teflon ferrule.

Measuring standard velocity

You will need a simple differential manometer. Using this method you assume that the temperature and pressure in the test area are at standard conditions where Pamb=14.696psi (101325 Pa), Temp=70ºF (21.1ºC) and RH=0%.



Connect the static tip / wall tap port to the low pressure port (P-) of the differential manometer. The Kiel port should be connected to the high pressure (P+) port on the differential manometer.

Standard velocity in m/sec is calculated using

$$V = K \cdot \sqrt{\frac{2 \cdot \Delta P}{density}}$$

where

density = 1.2 kg/m^3 for standard air

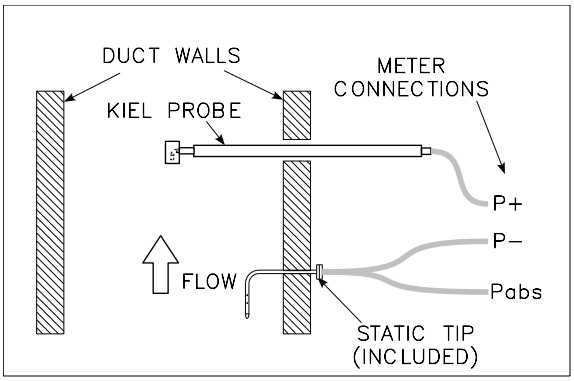
ΔP is the differential pressure reading from the manometer in Pascals.

K is the Pitot flow coefficient (1.0)

I**f you are using a FlowKinetics manometer the velocity is calculated automatically**.

Measuring actual velocity

To obtain the actual velocity you will need a differential and an absolute pressure manometer. You will also need a way to measure the temperature of the flow being tested.



Using a splitter connect the static tip / wall tap port to the low pressure port (P-) of the differential manometer and the absolute pressure port (Pabs) of the absolute manometer. The Kiel port should be connected to the high pressure (P+) port on the differential manometer. This way you can measure the differential pressure and the static pressure simultaneously. Also insert the temperature sensor into the flow.

Actual velocity in m/sec is calculated using

$$V = K \cdot \sqrt{\frac{2 \cdot \Delta P}{density}}$$

where

ΔP is the differential pressure reading from the manometer in Pascals.

$$density = \frac{Pabs + (1 - K^2) \cdot \Delta P}{R \cdot (Temp + 273.15)} \text{ in kg/m}^3$$

Temp is the temperature of the flow in Celsius.

R is the gas constant. $R = 287.026 \frac{joule}{kg \cdot Kelvin}$ for air.

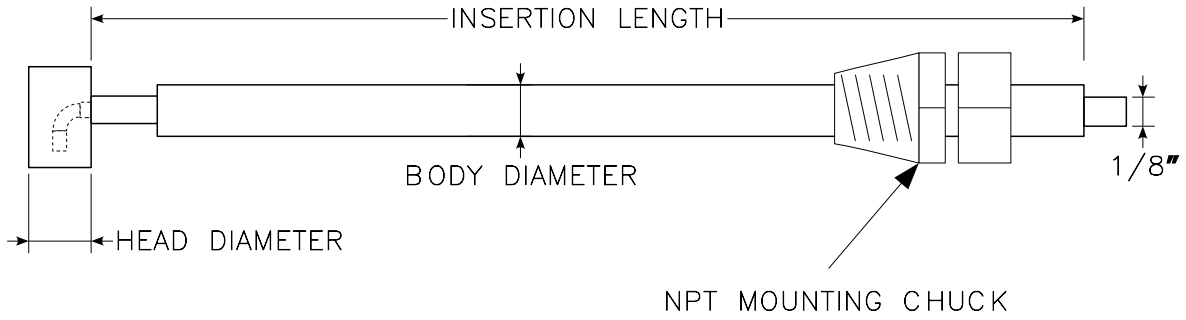
Pabs is the static pressure measured with the absolute pressure manometer in Pascals.

K is the Pitot flow coefficient (1.0)

If you are using a FlowKinetics FKT series manometer the velocity is calculated and corrected automatically for temperature, ambient pressure, humidity and gas type.

General Dimensions

KIEL PROBE



DIMENSIONS IN INCHES, MATERIAL: STAINLESS STEEL

NOT TO SCALE

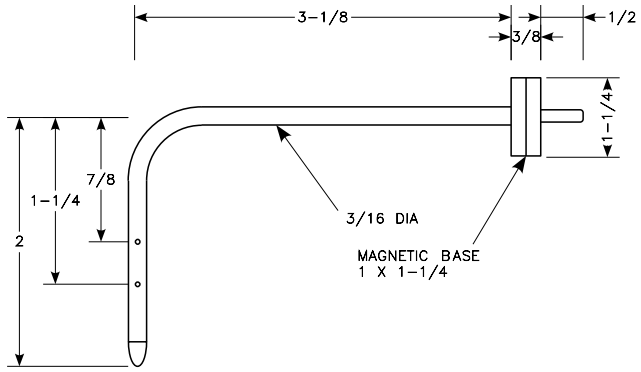
AVAILABLE SIZES:

Head diameter (inches)	Body diameter (inches)	Flow yaw/pitch range (degrees)	Head clearance hole (inches)	Mounting chuck NPT thread size (inches)
1/4	1/8, 1/4	+/- 49	1/2	1/8, 1/4
3/8	1/8, 3/16, 1/4	+/- 58	7/8	1/8, 1/4
3/4	1/4	+/- 61	1 3/4	1/4

The head clearance hole is the hole size needed for the head of the Kiel probe to pass through.

There are two types of mounting chucks: One with a stainless steel ferrule and one with a Teflon ferrule. The one with stainless steel is rated to 900°F but it can only be set once and cannot be repositioned. The Teflon ferrule allows the mounting chuck to be repositioned but it is only rated to 400°F. The chuck itself is made of stainless steel.

STATIC TIP



DIMENSIONS IN INCHES, NOT TO SCALE

MATERIAL: BRASS

Limitations of Usage and Cautions

FlowKinetics™ LLC's products including, but not limited to, instruments, sensors, probes and accessories are not "intrinsically safe", and must not be used in dangerous or hazardous areas. Servicing of these instruments incorporating battery changing must only occur in a safe area. Use of the FKS series may require working in a hazardous environment. Necessary safety precautions must be followed.

FlowKinetics™ LLC's products are not authorized for use as any component in a life support system or device or as component of an aircraft's on board flight system. Life support systems or devices are defined as any system that can sustain, monitor or support life.

Any attempts to service or modify or alter the product in any way, will void the warranty and will negate any right of claim against FlowKineticsTM LLC, relating to any liability in respect of the product.