

TECHNICAL DATASHEET

Prandtl pitot tube made of stainless steel

Type TPL

Flow measurement using the pitot tube method

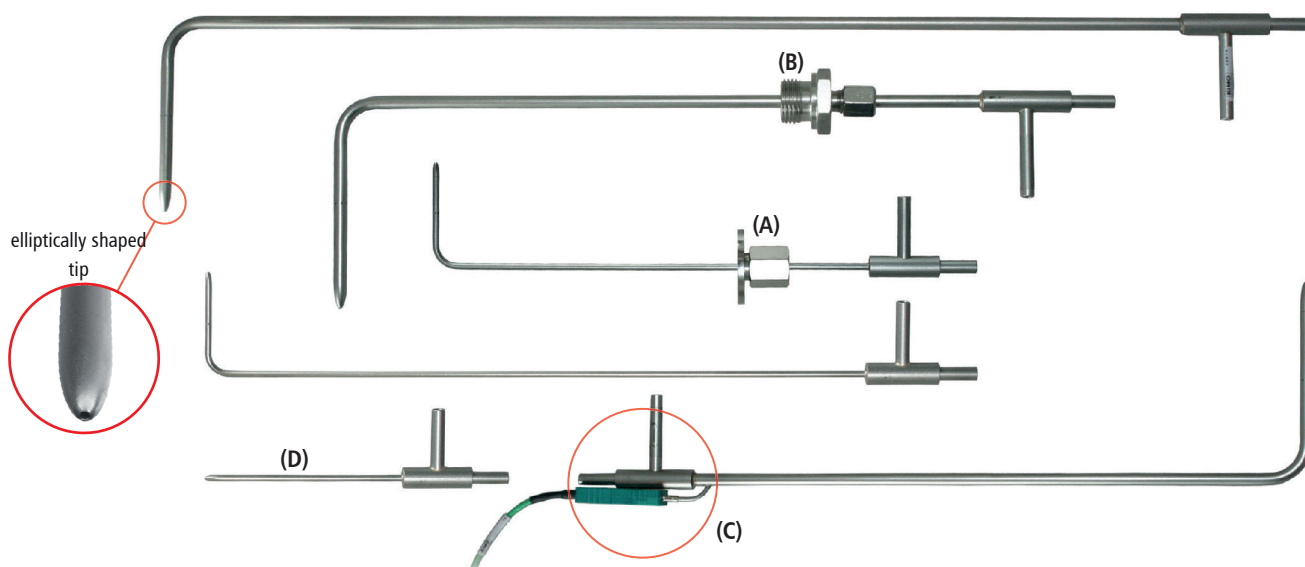
Pitot tubes are used with differential pressure instruments to measure the pressure, velocity and flow rate of gases. They have no moving parts subject to wear and are robust in handling and use.

They are suitable for harsh operating conditions. Even rapidly changing pressures are registered without delay.

Our Prandtl pitot tubes are suitable for aggressive and dust laden gases up to +600 °C, optionally up to +1,000 °C.



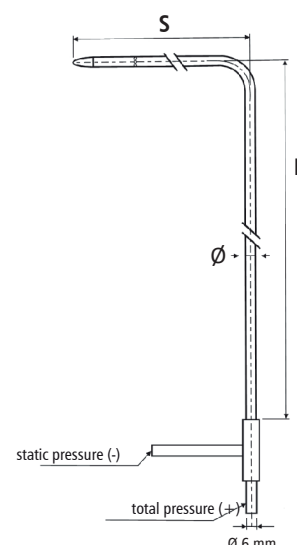
Technical data		Features
Material	Stainless steel	» ideal for flow measurements in harsh environments
Temperature rating	+600 °C (optional up to +1,000 °C)	» heat resistant to +600 °C, optionally up to +1,000 °C
Correction factor	1.0015	
Recommended instruments	» stationary: CP 210, C 310 » portable: MP 120 (shown), MP 210, AMI 310	» with or without integral thermocouple for dynamic temperature compensation
Options / accessories	» compression fitting "PE 458" (A) » threaded compression fitting "RCT" (B) » integral thermocouple with cable (C) » straight version (D) » stainless steel mounting flange "BF" » graduation with red rings "TP-GR" » high temperature rating to +1,000 °C "TIG" » line cleaner EMLR-1 » flow straightener	» custom versions also available



Versions

Diameter	Model	L [mm]	S [mm]
ø 3 mm	TPL3.0100	100	48
	TPL3.0200	200	48
	TPL3.0300	300	48
ø 6 mm	TPL6.0300	300	96
	TPL6.0500	500	96
	TPL6.0800	800	96
ø 8 mm	TPL8.1000	1,000	128
	TPL8.1250	1,250	128
ø 12 mm	TPL12.1500	1,500	192
	TPL12.2000	2,000	192
ø 14 mm	TPL14.2500	2,500	224
	TPL14.3000	3,000	224

with or without integral thermocouple



Small parts



Pressure tubing

- » PVC, silicone or PTFE
- » various colors and diameters available



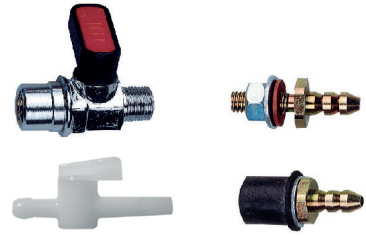
Fittings / hose connectors

- » various designs
- » for all hose diameters



Pressure snubber

- » dampens pressure pulses and smooths the signal
- » ideal for pulsating flow



Valves / pressure taps

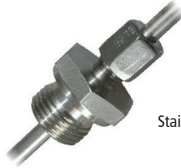
- » shutoff valves / ball valves
- » pressure taps
- » wide selection

Mounts / mounting flanges



Compression fitting

- » Type PE 458 with 3 holes on mounting plate
- Material: nickel plated brass



Compression fitting with 1/2" or 1/4" thread

- » Type RCI (stainless steel ferrule)
- Material: stainless steel



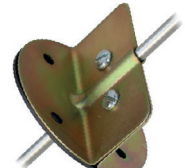
Compression fitting with 1/2" or 1/4" thread

- » Type RCT (PTFE seal)
- Material: stainless steel



Mounting clamp

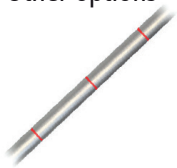
- » Type BF for Ø 3, 6, 8, 12 mm
- Material: stainless steel



Two part mount

- » Type EMA-158 for Ø 7–10 mm
- Material: brass

Other options



Graduation with red ring marks

- » Type TP-GR



Integral thermocouple

- » Type TPL-T Type K element concealed in pitot tube tip, incl. 1.5 m TC cable
- Measuring range to +1,000 °C

up to
+1,000 °C
Heat resistance

TIG welding

- » this special welding process makes pitot tubes heat resistant up to +1,000 °C

Line cleaner / automatic purging system

The EMLR-1 line cleaner sends adjustable compressed air pulses through the measuring line to clean it.

- » back purging of measuring lines / pitot tubes / flow probes
- » protects measuring lines from dirt, particles and dust
- » freely adjustable pulse and pause durations, etc.



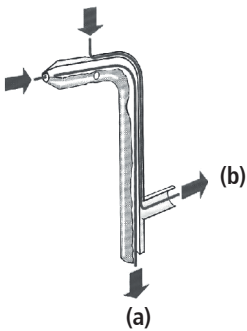
Plug in flow straightener

Our EMGL plug in flow straighteners are ideal for straightening airflow profiles, especially in turbulent flows.

- » provides an accurate, reproducible flow measurement signal
- » available in diameters from 100 to 1,000 mm
- » galvanized spiral duct with lip seal



The pitot tube opening receives the total pressure and conveys it to port (a) of the differential pressure instrument. Static pressure is received through side holes and conveyed to port (b). The resulting differential pressure is the flow dependent dynamic pressure. It is evaluated and displayed, for example, by our portable or stationary KIMO flow instruments.



Air velocity [v]

$$v = s \cdot \sqrt{\frac{2 \cdot \Delta P}{\rho}}$$

Volume flow [Q]

$$Q = v \cdot A \cdot 3600$$

$\Delta P = a - b$ = dynamic pressure in pascals
 v = flow velocity in m/s
 s = Pitot tube factor = 1.0015
 Q = volumetric flow rate in m³/h
 A = area/cross-section of the duct in m²
 ρ = air density in kg/m³
at +22°C ambient temperature = 1.204 kg/m³

Air density [ρ]

$$\rho = \frac{p_a}{R_i \cdot T}$$

ρ = Air density (kg/m³)
 p_a = Air pressure (Pa)
(Standard condition = 101,325 Pa)*
 R_i = Gas constant (air = 287 J/kg • K)
 T = Temperature (K) = 273 + t
t = Reference temperature in °C

*Atmospheric pressure vs. altitude

Altitude (m)	Air pressure (Pa)
0	101325
100	100130
1000	89876
4000	61645

The chart below shows pitot pressure versus flow velocity as measured with our pitot tubes.

The following conditions apply:

- » pitot tube factor: 1.0015
- » medium: air at sea level
- » medium temperature: -50 °C, +22 °C, +100 °C and +400 °C (see corresponding curves)

