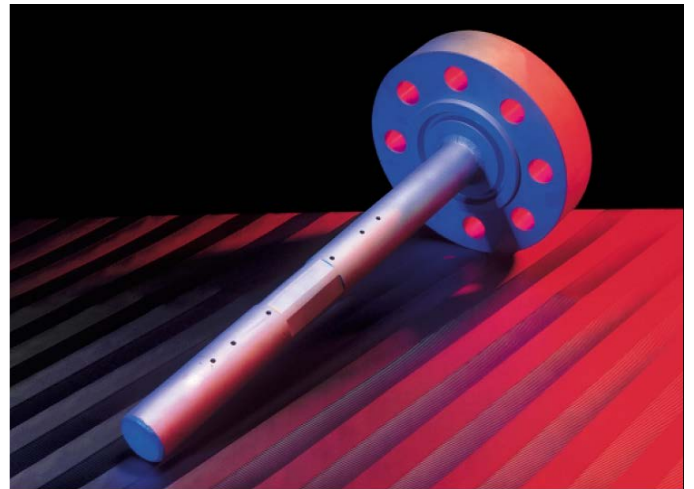


## Datasheet *Pitot tube*

Rev.1 June 2015

- ✓ Flow sensor for liquids, gases or steam
- ✓ Unique profile shape enables high flow turndown
- ✓ Dual averaging for better accuracy
- ✓ Low permanent pressure loss
- ✓ One-piece outer tube for optimum strength
- ✓ Long term accuracy unaffected by wear
- ✓ Zero long-term drift for a better stability
- ✓ Repeatability and reliability of the flow element
- ✓ Suitable for pipes from 10mm to 5000mm



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## Overview – Operating principle

The Deltafluid Pitot tube is an averaging sensor for use on pipes, ducts or chimneys. Differential pressure created across the tube has the standard square root relationship to flow rate, making a simple, removable sensor for installation or retrofit on flowlines of any size.

The principle of the Pitot tube consists in direct measurement of the dynamic pressure of the fluid (or impact pressure) that is to say the difference between the total pressure and the static pressure.

The tube is mounted across the pipe diameter, with a number of impact pressure sensing ports on the upstream face. Liquid and gas flows produce an **impact pressure**. The Pitot tube averages this pressure across the pipe diameter, to take account of any profile irregularities and to be less sensitive to the deformation of the velocity profile.

Downstream there is a single pressure sensing port; the precision engineered profile at this reference pressure position ensures a stable separation for flow vortices, giving a stable flow calibration factor over a wide flow turndown.

Each Pitot tube is designed to span the process pipe diameter and comprises four basic components :

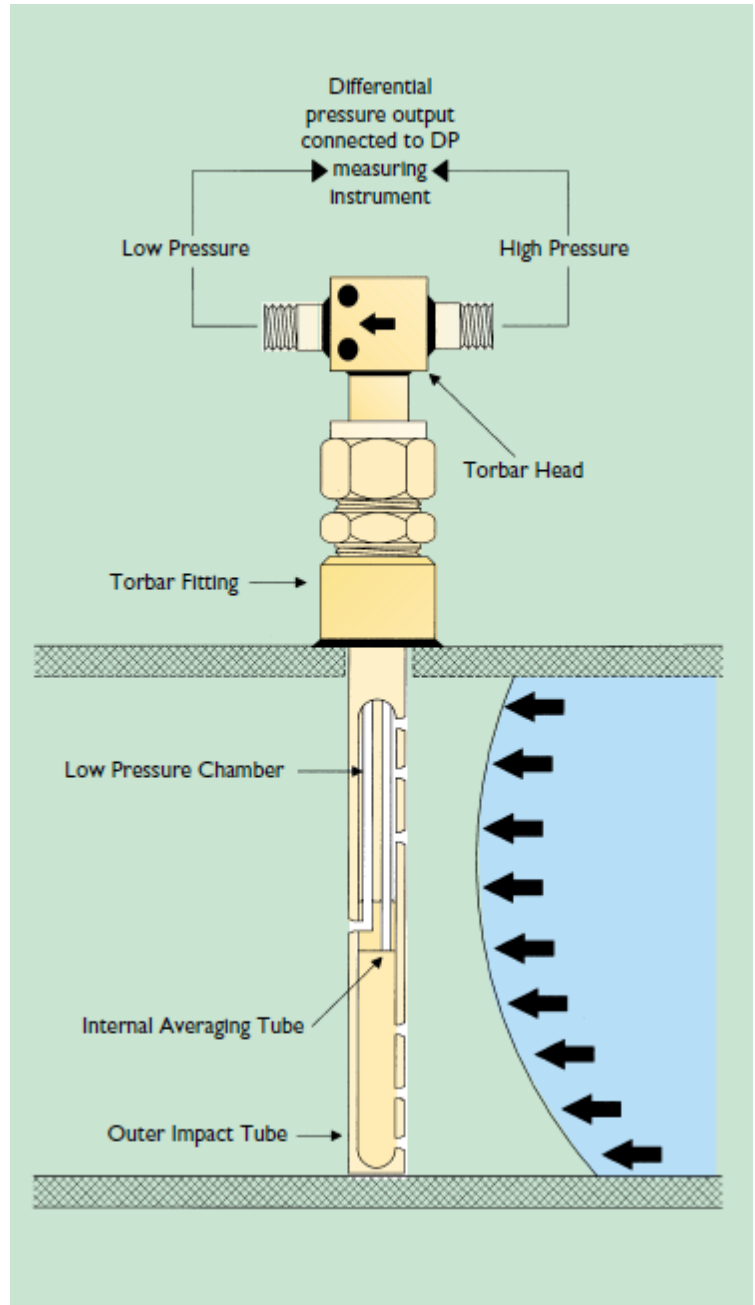
- Outer impact tube as a one-piece construction
- Internal averaging tube
- Low pressure chamber
- Head

The outer impact tube has a number of pressure sensing holes facing upstream which are positioned at equal annular points in accordance with a log-linear distribution.

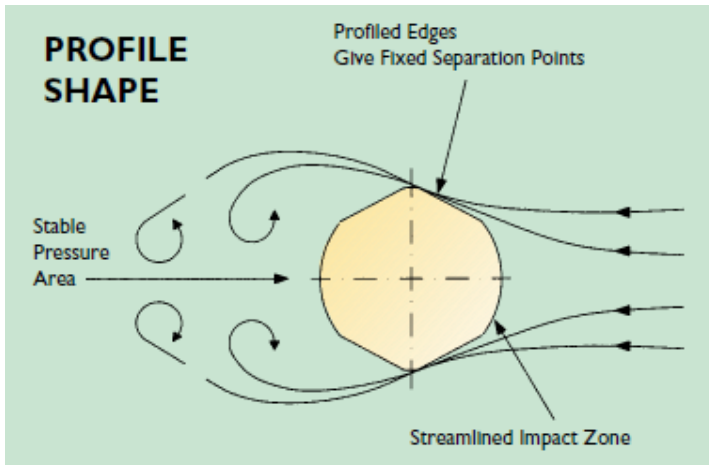
**The Total Pressure** developed at each upstream hole by the impact of the flowing medium are firstly averaged within the outer diameter tube and then to a second order and more accurately averaged within the internal averaging tube.

This Total Pressure consisting of **static pressure and dynamic pressure** of the fluid is represented at the head as **the high pressure component of the DP output**.

The low pressure component is generated from a single sensing hole located on the downstream side of the outer impact tube.



Profile shape :



The Deltafluid Pitot Tube is an improvement on the round sensor design due to the unique profile flats which are positioned around the downstream hole in order to define the separation point at which the flow lines “break-off” as the fluid passes around the outer impact tube.

This feature creates a stable pressure area at the downstream pressure sensing hole thereby maintaining a more constant flow coefficient K at high velocities enabling a very wide range of flow measurement (turndown).

## Technical specifications



*Pitot tubes are particularly interesting for flow-measurement in large pipes.*

### Applications – standards

Standards	The installation of Deltafluid Pitot Tube must follow the normal rules stated for Orifice Plate or similar DP devices in ISO5167 standard
Fluid temperature	Up to +1300°C with selected materials and fittings From -50°C to +120°C if direct mounting of DP transmitter
Type of fluid	Gas, steam, liquid (single-phase fluids)
Nominal diameters	Suitable for pipes from 10mm to 5000mm and larger with a special 2 pieces construction. For pipe sizes 2” and below, in line pitot pipe sections are available.
Maximum operating pressure	Up to 600 bar Limited by flange rating (flange model)



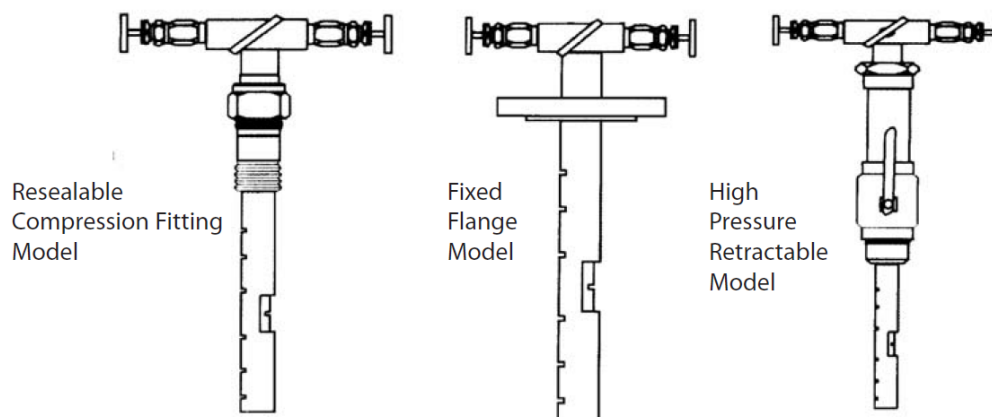
In line Pitot pipe sections

### Features

Accuracy	± 1% - checked by independent flow laboratories
Repeatability	± 0,1%
Limits of use	Minimum ReD : 1,2x10 <sup>4</sup>
Flow rate turndown	10:1
Maximum viscosity	200 cp (mPa.s)

## Installation

Straight lengths	In general, an averaging pitot tube must be placed at least 7D downstream of a single bend and 3D upstream of a similar obstruction
Mounting	3-way manifold integrated if needed to mount directly a DP transmitter or DP transmitter mounted separately via impulse tubes.
Piping connection	3 models available : <ul style="list-style-type: none"> <li>- With compression fitting screwed into the pipeline</li> <li>- With a fixed flange</li> <li>- Retractable model where the installation requires the Pitot Tube to be retracted under line pressure, for pipe cleaning for example...</li> </ul>



## Construction

Material	Stainless steel as standard material of construction Others materials available on request
Checkings	100% leak-tested before delivery Options : hydrostatic pressure testing and non-destructive testings