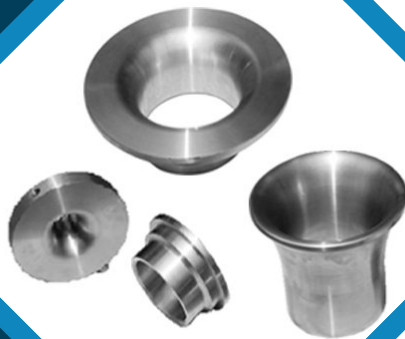




MECHANICAL ENGINEERS

SINCE : 1993



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Introduction

Mechanical Engineers was founded in 1993 by **Mr. J.K. Sarkar** after having 20 years of strong knowledge base in the Instrumentation Industry. We are one of the leading manufacturer of flow Elements (Venturi Tube, Orifice Plate Assembly, Flow Nozzle Assembly, Krellbar and Wedge flowmeter) in pipe lines for all applications. We ensure optimal flow measurement with the correct Primary Element. We are specialised in designing and manufacturing all types of primary elements for measurement of fluid flow in pipes / ducts. Our Flow Elements are designed as per BS - 1042 / ISO – 5167 which are of the International Standards For trusted performance in differential pressure (DP) flow measurement, Mechanical Engineers offer a wide range variety of primary element options for a huge range of process conditions.

We are associated with big and well-known companies in the market like TATA STEEL, JSW, JSPL, ALSTOM, THERMAX, L&T, VOLTAS, and HPC etc. We regularly supply to all major Instrument Manufacturers that are. ABB, Honeywell, Yokogawa, Blue Star, TLT, Emerson, etc. for their package requirements and their direct requirements.

Mission

Our Mission is to associate with our clients as partners and deliver profitable value to maximize their contentment by providing right flow of measurement solution.

Vision

To be the most preferred flow element manufacturer and create value in the business by providing our customers with the best solution for their application requirements by offering most competitive prices and best turnaround time.

Quality Policy

We trust in providing high quality products to our associates to enhance customer satisfaction and hence we use top category standardized products in comparison to any other providers in the market.



FLOW MEASUREMENT

Flow measurement could be done in various ways in a Pipe/Duct. Amongst all, most commonly used method for Flow Measurement is by installing flow elements in a pipeline. Flow Elements can be any of the following types.

- ORIFICE PLATE
- VENTURI TUBE
- FLOW NOZZLE
- KRELLBAR
- WEDGE FLOW METER

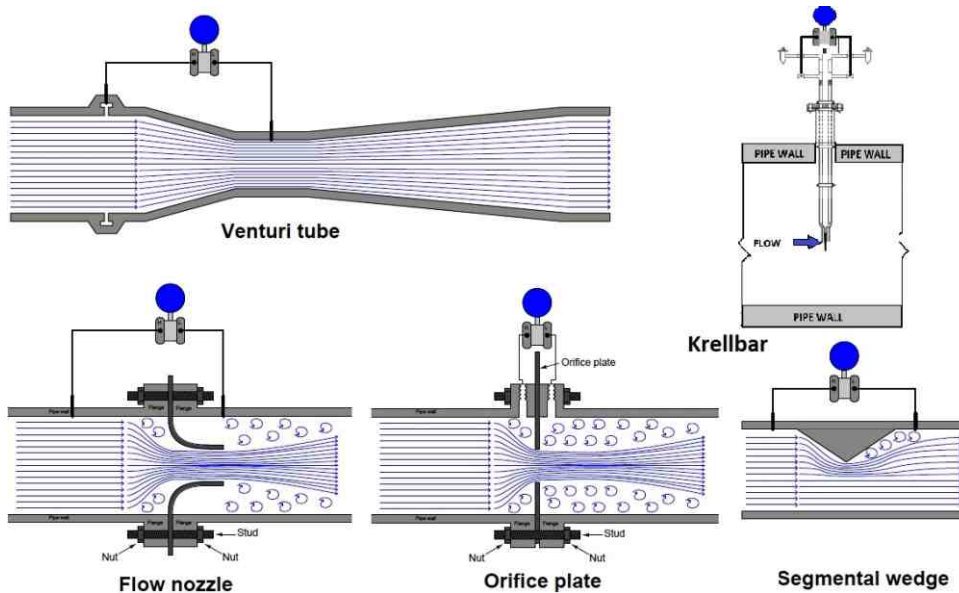
Before we explain the type of device that is to be used for Flow Measurement, and also know their relative advantages and disadvantages, it is important to note the basic function of any type of Flow Elements.

PRINCIPLE OF MEASURE

Flow measurement from the Bernoulli principle, through which we determine the velocity of passage of a fluid or gas by detecting the difference between the dynamic and static pressure, which is measured upstream and downstream of a primary element.

FUNCTION OF A FLOW ELEMENT

Any type of Flow Element when installed in a pipe line, creates an obstruction to the flow path. Due to this obstruction, we observe difference in Pressure before and after the Flow Elements. The "DIFFERENTIAL PRESSURE" is sensed by a Transmitter which then gives out a signal proportional to the Differential Pressure. Transmitted output signal if connected to an indicating instrument will directly read the instantaneous flow.



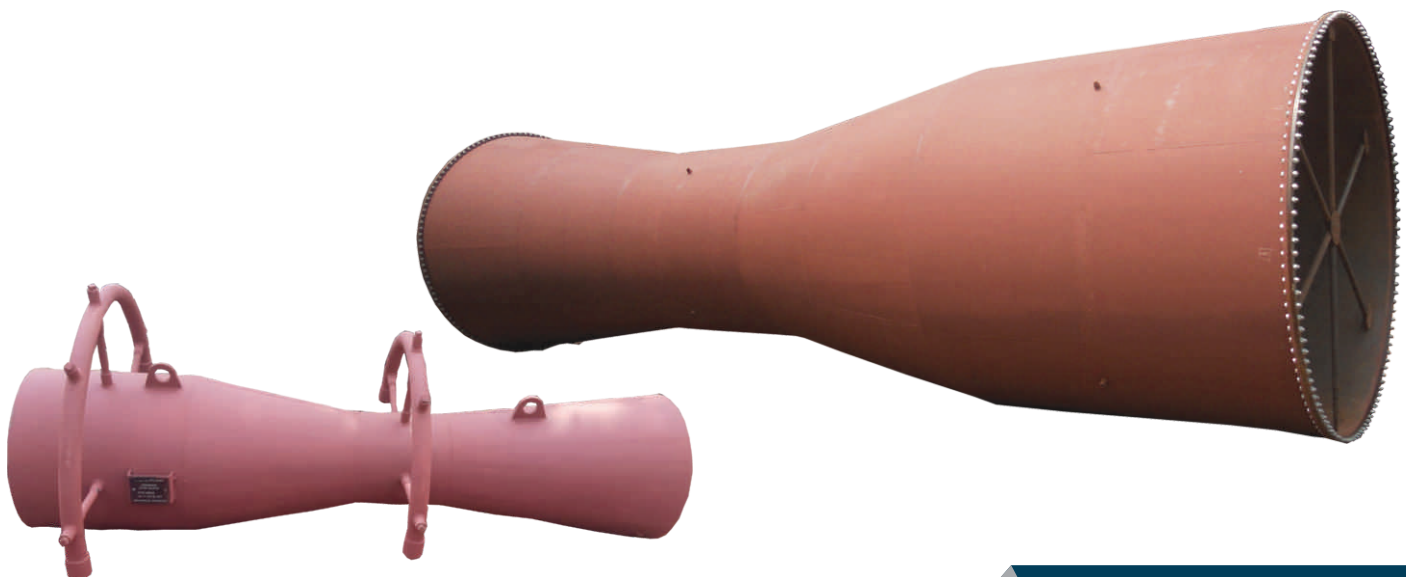
Venturi Tube

Differential pressure type flow sensing device is named after an Italian physicist Giovanni Battista Venturi. Venturi Tubes are low-pressure-drop metering devices designed with a tapered inlet that creates a drop in pressure with a constricted middle section and restores pressure through a tapered outlet. This element provides low susceptibility to erosion, high-pressure recovery and installation at any angle with virtually maintenance-free operation.

The name of this product is derived from the Venturi effect which states that, the fluid pressure is reduced when the fluid passes through the constricted section of pipe. Venturi tubes gives accurate measurement of non-viscous fluids in clean as-well-as dirty fluids, manufactured strictly in accordance with ISO-5167, BS-1042 etc. Venturi can be used for a wide variety of gaseous applications. Since divergent cone is provided at outlet of Venturi, the pressure recovery is very good. Typically the convergent angle is fixed to 21° , Divergent angle can vary between 7° - 15° without any effect on the pressure loss and discharge coefficient. For larger pipe multiple tappings in the form of piezometric ring tappings are provided.

ADVANTAGES

- Can be used on dirty fluids
- Lower susceptibility to erosion
- Low permanent pressure loss
- Extended product life with no moving parts
- Vertical or horizontal Installation
- They can handle large flow volumes at low pressure drops.
- Lowest Pressure loss in the family of Primary Flow elements.
- They can be mounted in large diameter pipes via flanged, welded or threaded-end fittings.
- Venturi tubes involve no projections into the fluid and no sharp corners. Also there are no rapid changes in contour



Orifice Plate

A DIFFERENTIAL PRESSURE TYPE FLOW SENSING ELEMENT

Orifice plates are most commonly used primary elements for flow measurement in pipelines based on the principle of measurement of 'differential pressure' created when an obstruction is placed in the fluid flow, due to increase in the fluid velocity and decrease in the pressure. It is one of the most common differential producer type flow element for measuring liquids, gases, and low-velocity vapor (steam) flow. The difference in pressure is measured and converted into a DP flow measurement for a simple measurement solution. Their bore diameter is calculated to generate the specified differential pressure at full scale flow rate. This solution is widely used for gas, liquids and steam applications, including high temperature and high pressure environments. The technologies are field-proven and well suited for a variety of applications.

The design offers optimum flexibility which is ideal for applications with many diverse existing piping schemes, and require considerably lower investment for the initial purchase of equipments. They give an acceptable level of uncertainties at lowest cost and long life without regular maintenance.

Although a number of different types of flow- rate measuring devices are available, the differential pressure type of flowmeter- orifice plate still makes up the largest segment of the total flow measurement in the market.

Mechanical Engineers manufactures all types of orifice plate: square edged, conical entrance, annular and integral orifice assembly. And further distinguished as an orifice plate assembly with corner tapplings, d & $d/2$ tapplings, and flange tapplings with or without carrier ring. Drain holes are provided as per standard and based on application. For larger pipe multiple tapplings in the form of piezometric ring tapplings are provided.

ADVANTAGES

- May be used on Liquid, gas or Steam
- Offers low capital investment
- Low maintenance and Life expectancy typically 10-15yrs
- Range ability dependent on DP cell used
- Materials of Construction in all metal
- Easy to install and No moving parts
- Easy to replace and simple construction
- Transmitting instruments are external
- Wide application of flowing fluids



Types of Orifice Plate



Multi Stage Orifice



Integral Orifice



Carrier Ring Orifice



Segmental orifice

KrellBar

Krellbar was originally designed by an eminent manufacturer in West Germany (Hartmann & Braun) for the measurement of fluid flow in duct or pipes in a large cross-sectional area. The principle of operation is similar to Anubar or Pitot tube. The element design claimed to be more suitable for the flow measurement of gaseous fluid containing dust.

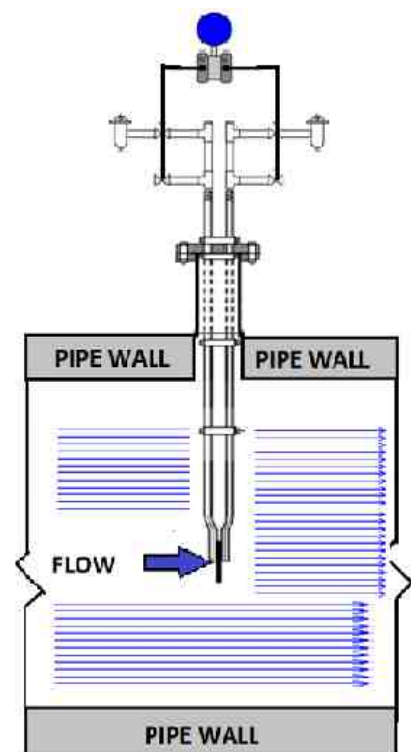
Its construction is just opposite to that of the conventional orifice plate but similar to Annubar with a much simpler design. There is a small diameter blind circular plate installed near the central axis of the flow path temporarily restricting the flow. The HP and LP impulse pipes/tubes are welded on two sides of this plate so that their open end is located at the center of the plate.

The fluid velocity becomes zero when it impinges on the plate and is converted into equivalent pressure. The upstream impulse pipe senses the static head plus the dynamic (or velocity) head, whereas the downstream impulse pipe senses the static head only. The DPT connected to this impulse lines generates the appropriate flow signal.

Here the bore of both impulse pipes is comparatively large and thereby problems with dust choking are very minimal. The DP produced by this type of element is more than that of Anubar, resulting in high resolution and accuracy.

ADVANTAGES

- The meter is recommended for clean and dirty liquids/ gas.
- Pressure loss is medium
- Relative cost is low
- Accuracy is higher than Anubar



Flow Nozzle

Flow nozzle is a flow measurement device which is used for measuring high velocity flow, such as high pressure steam. It can also be used with other fluids such as water, air or other gases. The typical profile of this device offers a smooth passage to the fluid which leads to the lesser pressure drop and thus more efficient. The rounded profile is particularly useful when the steam contains particles which damage the edges of the flow element which doesn't happen due to the smooth profile. Thus the product life increases.

Flow Nozzles feature is an elliptical inlet that increases velocity, decreases pressure and leads into a cylindrical throat to DP measurements. This design allows sweep-through of particles in the flow stream, reducing risk of nozzle damage. Directly welded into the line to reduce potential leaks, this nozzle is also erosion- and corrosion-resistant and performs well in many high temperature and high velocity applications, including water, vapor, steam and gas.

ADVANTAGES

- Widely used for high pressure and high temperature steam flow
- Useful for flow measurement at high velocities
- Rounded Inlet which is not subject to wear or damage, extending product life
- Better sweep-through effect for debris and liquids, eliminate damming effect
- Lower susceptibility to erosion
- Extended Product Life with no moving parts

SALIENT FEATURES

- Best suitable for measurement of high velocity steam, high pressure and high temperature
- Smooth profile and rigid structure makes the assembly extremely stable.
- Free from leakage (when provided in welding type assembly).
- Zero maintenance since no moving parts.
- Less straight lengths requirement.



Wedge Flow Meter

Wedge flow meter consists of a pipe inside with a v-shaped wedge fitted. Through this constriction, a differential pressure is generated which is dependent upon the volume flow. Due to its design, the wedge flow meter is suitable for nearly all types of flow, especially for media with a very low Reynolds number of 300 up till very high Reynolds numbers of several million. As a result, it is very well suited for the measurement of slurries and highly viscous media (e.g. Wastewater, sewage sludge, tar sand, cement) as well as gases and vapors.

Wedge Meters are used on many different process applications and conditions. Line sizes available range from 25mm up to 800mm and greater. Wedge Meter design provides a key cost saving benefit, as the profile is virtually immune to any wear or erosion, therefore with very little maintenance and inspection is required. Wedge Meters can be supplied to meet the requirements of your application. We offer a wide range of differential designs that suit the need of any pipe-work configuration, with different lengths and orientations. We also have end connections available.

ADVANTAGES

- Proven flow metering technology and robust design
- Accurate flow metering of slurries and high viscous liquids with suspended solids
- Wedge Meter profile is inherently robust with no maintenance and inspection required
- Low permanent pressure loss resulting in energy savings
- Low maintenance through robust design
- For very high and very low Reynolds number
- Bi-directional measurement possible

Key Parameters

- Proven Technology
- Robust design
- Low Permanent Pressure Loss
- Flow Metering of Low Reynolds Numbers
- Accurate Flow Measurement
- Suitability for most process conditions



Questioner

1	NAME	
2	CONTACT NO.	
3	EMAIL ID	
4	QUERY	
5	LINE SIZE	
6	PIPE SCHEDULE	
7	DUCT SIZE & THICKNESS	
8	PIPE/DUCT MATERIAL	
9	FLUID	
10	STATE	
11	MAX. FLOW	
12	MIN. FLOW	
13	MAX. TEMP.	
14	OPERATING TEMP.	
15	MAX. PRESSURE	
16	OPERATING PRESSURE	
17	SPECIFIC GRAVITY (SG)	
18	DENSITY	
19	VISCOSITY	
20	BAROMETRIC PRESSURE	



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