



Technology Solutions

TEK-DP 1670A

Wedges



FLOW



Introduction

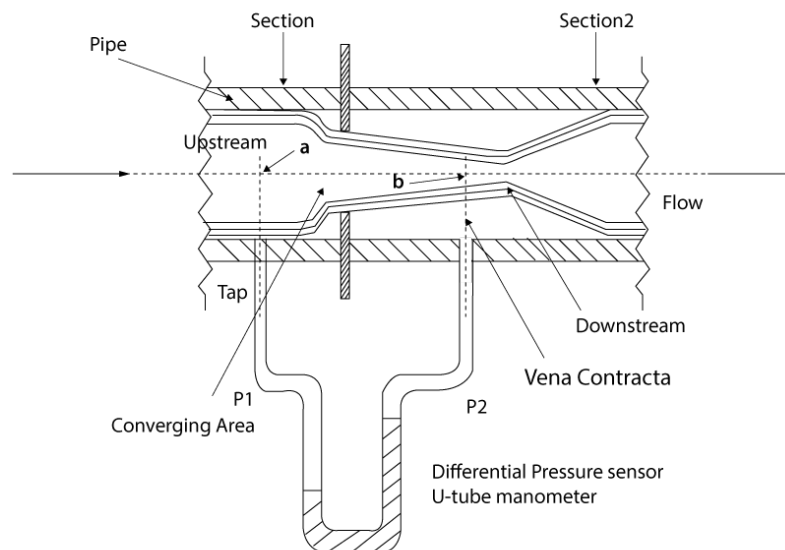
Tek-DP 1670A Wedges are differential pressure producing devices that are suitable for flow measurement for nearly all fluids and gases, especially for highly viscous, particle-laden and abrasive process applications. They offer excellent performance for the fluids having Reynolds no as low as 500 and work equally well for the fluids having Reynolds no up to several millions.

Wedges stand out from the other primary flow elements due to their distinct construction. They allow bi-directional flow measurement as required in some applications.

Tek-DP 1670A Wedge series is the ideal flow measurement solution for thick slurries, sewage sludge, viscous liquids and many more. Meticulously designed Tek-DP 1670A Wedge series takes care of specific application needs by providing custom pipe-configuration, pipe-length, orientation and end connection.

Measuring Principle

Wedges work on the principle of differential pressure measurement. It is based on Bernoulli's theory of conservation of mass and energy in a closed pipe. According to this principle, obstruction to the flow of fluid leads to increase in the flow velocity (i.e. $V_2 > V_1$), thereby creating a pressure drop. The flow rate can be determined by measuring the static pressures at upstream and downstream, minimum cross sectional area and temperature. The flow rate of the fluid is calculated by applying the law of conservation of mass and energy.



Bernoulli described this relation between differential pressure and flow rate by equation,

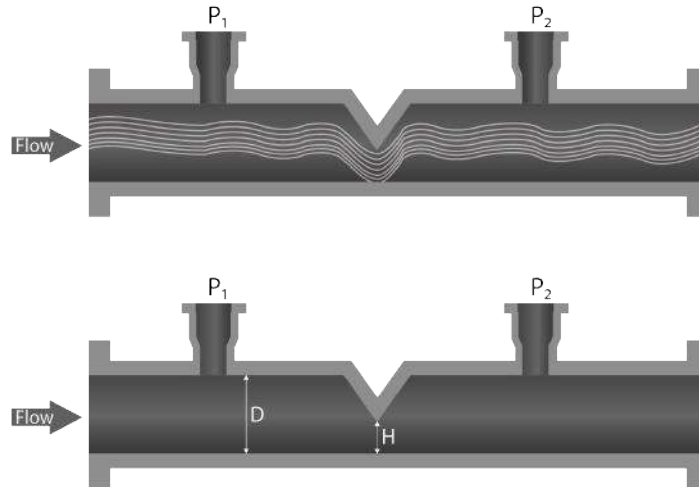
$$\Delta p \propto Q_m^2$$

The differential pressure generated, Δp , is proportional to the square of mass flow rate, Q_m . In simple terms, for a given size of restriction, higher the Δp , higher is the flow rate.

Operation

A wedge is a primary flow element that consists of a pipe with a v-shaped groove in it. The wedge acts as a constriction to the fluid flow and generates a differential pressure depending upon the volume flow.

The tapping for the differential pressure measurement are positioned at the upstream and downstream of the wedge.



The fluid passing through the pipe is obstructed at the wedge resulting in a drop in pressure. As the fluid passes ahead, it rejoins the pipe walls with some permanent pressure loss. A DP transmitter connected across the wedge senses the drop in pressure ($P_1 - P_2$). Knowing the cross-sectional area of the pipe and the differential pressure, the volumetric flow rate is determined effectively.

Tek-DP 1670A Series Wedges

Tek-DP 1670A Series Wedges are available in six standard WEDGE ratios to provide required differential pressures and acceptable permanent pressure loss over a wide range of process media. The WEDGE ratio, H/D is the ratio of the wedge opening height (H) and the pipe diameter (D).



In case of difficult fluids, wedges are equipped with a pair of remote seals. This assembly effectively isolates the metered fluid from the DP transmitter without affecting accuracy.

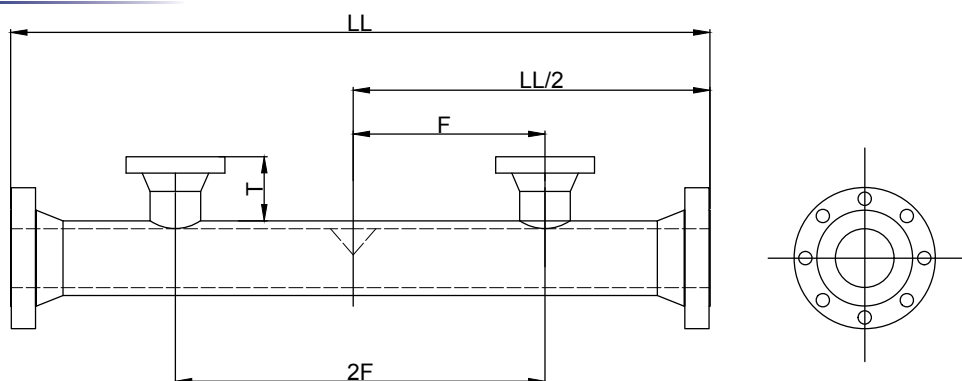
Features

- Compact and robust design with no moving parts
- Bidirectional flow possible
- No clogging risk, self-cleaning
- Accurate flow metering for highly viscous fluids, slurries and suspended solids
- Minimal permanent pressure loss resulting in energy savings
- Accuracy $\leq \pm 0.5\%$ of the actual flow rate (Calibrated)
- Repeatability 0.2 %
- Available for all pipe sizes and in a wide range of materials

Applications

- Chemical and petrochemical industry
- Mining, oil and gas refineries
- Waste water, sewage plants
- Pulp and paper industry

Dimensional Drawing



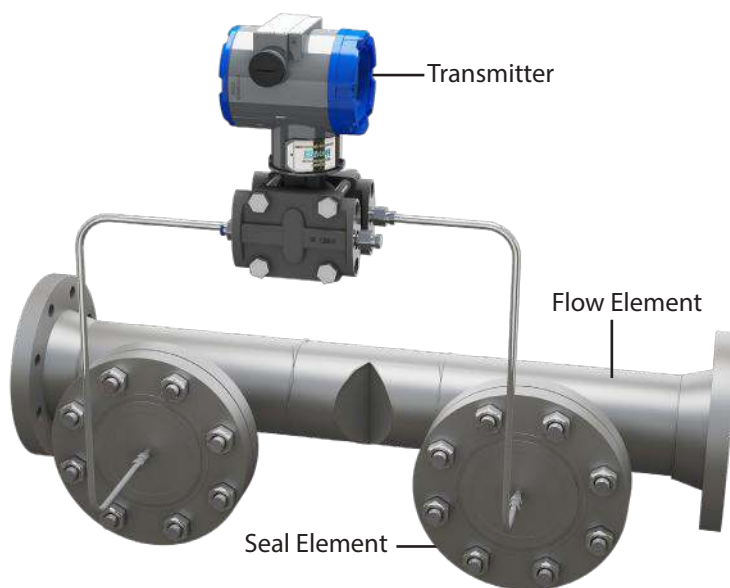
Line Size (Inch)	Dimension LL			Dimension F			Dimension T			Approx. Weight (Lbs)		
	150	300	600	150	300	600	150	300	600	150	300	600
1½	20.86	21.37	22.00	5.75	5.75	5.75	8.18 ⁺⁺	8.43 ⁺⁺	8.37 ⁺⁺	55	61	71
2	21.50	22.00	22.75	5.75	5.75	5.75	8.50 ⁺⁺	8.75 ⁺⁺	9.12 ⁺⁺	62	70	84
3	24.50	25.25	26.00	6.13	6.13	6.13	6.13 ⁺⁺	6.56 ⁺⁺	6.88 ⁺⁺	78	92	102
4	35.50	36.25	38.00	7.50	7.50	7.50	4.50	4.93	5.25	135	150	175
6	40.50	41.25	43.25	9.00	9.00	9.00	4.50	4.93	5.25	160	210	270
8	43.00	43.75	46.00	10.25	10.25	10.25	4.50	4.93	5.25	210	265	365
10	45.00	46.25	49.50	11.75	11.75	11.75	4.50	4.93	5.25	270	345	525
12	52.00	53.25	55.75	13.25	13.25	13.25	4.50	4.93	5.25	350	480	
14	55.00	56.25	58.50	14.00	14.00	14.00	4.50	4.93	5.25	410	610	
16	58.00	59.50	62.50	15.25	15.25	15.25	4.50	4.93	5.25	500	755	
18	62.00	63.50	66.00	16.75	16.75	16.75	4.50	4.93	5.25	580	870	
20	66.37	67.75	70.50	18.50	18.50	18.50	4.50	4.93	5.25	700	1100	
24	73.00	74.25	77.50	21.00	21.00	21.00	4.50	4.93	5.25	955	1310	

Specifications

Materials	Stainless Steel 304,316,321,347, Carbon Steel, Hastelly C or Monel, Other marials on request
Sizes	2" to 36", Higher sizes on order
Pressure rating	150 Psi to 2500 Psi
Operating Temperature	Standard at -20°F to 100 °F, optional -40 °F to 1200 °F
Process connections	ANSI B 16.5, Class 150 lbs to 2500 lbs
Viscosity	Up to 3000 Cp
Mounting Position	Parpendicular to the fluid flow direction
Mounting Style	Flange connection according to ANSI or DIN
Flange Face	Flat face, Raised face and Ring type joint
Installation Requirement	Minimum 5xD upstream and 2xD downstream

Installation Guidelines

- Ensure that the flow direction of the medium is corresponds to the arrow marked on the wedge meter.
- Installation of the wedge meter in both horizontal and vertical position is possible.
- Rotate the meter 45° to 90° to allow suspended solid particles to easily pass beneath the wedge with out clogging.
- Maintain the minimum straight pipe run to achieve better results and expected accuracy.
- Do not use the device as a flow pipe support, do not subject the device to shocks and vibrations.
- While filling the pipeline, do not over-pressurize the meter.



Horizontal Installation



Vertical Installation

Customer Service and Support



TEKMATION LLC reserves the right to change the designs and/or materials of its products without notice. The contents of this publication are the property of TEKMATON and cannot be reproduced by any other party without written permission. All rights reserved. Copyright © 2016 TEKMATON LLC
DOC # TEK/AV/180330/TEK-DP/A
TEKMATION LLC



www.tek-trol.com

Tek-Trol is a fully owned subsidiary of TEKMATON LLC. We offer our customers a comprehensive range of products and solutions for process, power, and oil and gas industries. Tek-Trol provides process measurement and control products for Flow, Level, Temperature and Pressure Measurement, Control Valves, and Analyzer systems. We are present in 15 locations globally and are known for our knowledge, innovative solutions, reliable products, and global presence.

Tek-Trol LLC

796 Tek Drive Crystal Lake, IL 60014 USA

Tel: +1 847 857 6076, +1 847 655 7428 Fax: +1 847 655 6147

Email: tekrol@tek-trol.com

www.tek-trol.com