



Technology Solutions

TEK-DP 1611I

Compact Orifice Flow Meter



FLOW



Introduction

Meet the Tek-DP 16111 Compact Orifice Flow Meter, the cutting-edge solution in orifice assembly technology. It guarantees precise and consistent measurements, whether you're dealing with single-phase flow or steam flow. This compact flow meter offers the simplicity of easy installation and direct mounting to a DP transmitter, eliminating the need for additional tubes, fittings, or accessories. Plus, it features a smart, compact design adhering to ISO 5167 standards.

Tek-Trol's Compact Orifice Plates are masters of differential pressure production, making them perfect for measuring fluid flow rates in pipes. They seamlessly handle liquids, gases, and vapors, providing reliable performance every time. Designed and installed following the highest standards—AGA Report Number 3, ASME MFC 3M, and ISO 5167—these plates ensure top-notch accuracy and efficiency.



Standard Compact Orifice plate

Features

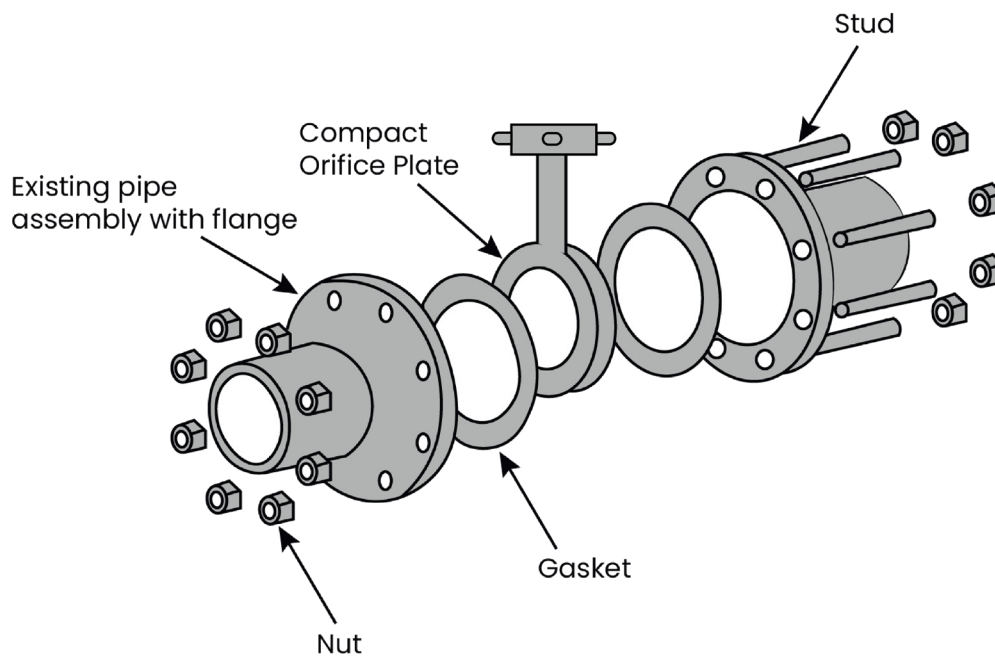
- **Integrated Solution:** Say goodbye to the hassle of fittings, tubing, valves, adapters, manifolds, and mounting brackets. Our fully integrated design streamlines your setup.
- **Accuracy and Repeatability:** Experience precise measurements you can trust, every time.
- **Easy Installation:** Our direct mount assembly makes installation a breeze.
- **User-Friendly:** Simple to use, easy to prove, and straightforward to troubleshoot.
- **High Accuracy:** Achieve an impressive accuracy of $\pm 0.5\%$ of the actual flow rate, with repeatability of $\pm 0.1\%$.
- **Optimal Flow Measurement:** Self-centering mechanisms simplify installation and ensure optimal accuracy, all based on ASME/ISO/AGA Corner Tap Design.

Applications

The Tek-DP 1611I Compact Orifice Flow Meter is versatile and ideal for various industries, including:

- **Chemical and Petrochemical Industries:** Ensure precise flow measurements for efficient chemical processing and petrochemical operations.
- **Process Plants and Power Generation:** Optimize flow control in process plants and enhance the efficiency of power generation systems.
- **Water Treatment and Distribution:** Achieve accurate flow monitoring in water treatment facilities and distribution networks.
- **Gas Processing and Transport:** Reliable flow measurement for gas processing and safe transport.
- **Oil Production and Refining:** Enhance the accuracy of flow measurements in oil production and refining processes.

Dimensional Drawing



Customer-specific connections on request

We understand that every operation is unique. That's why we offer customized connections to suit your specific needs:

- **Mounted Differential Pressure Gauge or Transmitter:** Tailor your setup with precision measurement tools.
- **Mounted Thermowell with Thermometer:** Ensure accurate temperature monitoring with our mounted thermowell.
- **Flat Gasket and Valve Manifold Seals:** Graphoil (standard: PTFE) for reliable sealing.
- **Studs and Nuts for Pipelines:** Custom-fitted studs and nuts to match your pipeline specifications.

Size	Pipe OD	Class	Pipe ID			D	H
			Sch.10S	Sch.40	Sch.80		
1 1/2"	48.3	150	1.68"(42.7)	1.61"(40.9)	1.47"(37.3)	3.37"(85.7)	5.71"(145)
1 1/2"	48.3	300				3.75"(95.3)	5.91"(150)
2"	60.3	150	2.15"(54.7)	2.07"(52.5)	1.94"(49.3)	4.13"(104.8)	6.06"(154)
2"	61.3	300				4.37"(111.1)	6.22"(158)
3"	88.9	150	3.26"(82.8)	3.07"(77.9)	2.9"(73.7)	5.37"(136.5)	6.69"(170)
3"	89.9	300				5.87"(149.1)	6.97"(177)
4"	114.3	150	4.26"(108.2)	4.03"(102.3)	3.83"(97.2)	6.87"(174.6)	7.44"(189)
4"	115.3	300				7.13"(181.1)	7.6"(193)
6"	168.3	150	6.36"(161.5)	6.07"(154.1)	5.76"(146.3)	8.75"(222.3)	8.39"(213)
6"	169.3	300				9.87"(250.7)	8.94"(227)
8"	219.1	150	8.33"(211.5)	7.98"(202.7)	7.63"(193.7)	11"(279.4)	9.53"(242)
8"	220.1	300				12.13"(308)	10.08"(256)
10"	273	150	10.42"(264.6)	10.02"(254.5)	9.56"(242.8)	13.37"(339.7)	10.71"(272)
10"	274	300				14.25"(362)	11.14"(283)
12"	323.9	150	12.39"(314.7)	11.94"(303.2)	11.38"(289.1)	17.75"(450.9)	12.09"(307)
12"	324.9	300				19.13"(485.8)	12.32"(313)
14"	355.6	150	13.62"(346)	13.12"(333.3)	12.5"(317.5)	17.75"(450.9)	12.87"(327)
14"	356.6	300				19.13"(485.8)	13.58"(345)
16"	406.4	150	15.62"(396.8)	15"(381)	14.31"(363.3)	20.25"(514.4)	14.13"(359)
16"	407.4	300				21.25"(539.8)	14.65"(372)

Note:

Higher Class 300# and 600# are also available. Please contact the factory for more information.

Straight length requirement for Compact Flow Meter

	Beta	0.40	0.65
	Upstream (inlet) Side of Primary	Reducer	5
Single 90° bend or tee		16	44
Two or more 90° Bends in a same Plane		10	44
Two or more 90° Bends in a different plane		50	60
Expander		12	28
Ball / Gate valve fully open		12	18
Downstream (outlet) side of primary			6

Typical Orifice Bore Sizes In (mm)

Line Size	With Beta Ratio = 0.4	With Beta Ratio = 0.65
1.5" (40 mm)	0.64"	0.69"
2" (50 mm)	0.82"	34.13"
3" (80 mm)	1.22"	1.34"
4" (100 mm)	1.61"	2.61"
6" (150 mm)	2.42"	3.94"
8" (200 mm)	3.20"	5.19"
10" (250 mm)	4.00"	6.51"
12" (300 mm)	4.8"	7.8"

Note:

Line sizes 14" and 16" are also available. Please contact the factory for more information.

Installation

Install the Tek-DP 1611I in the correct location within the piping branch to prevent inaccurate measurements caused by flow disturbances.

Note:

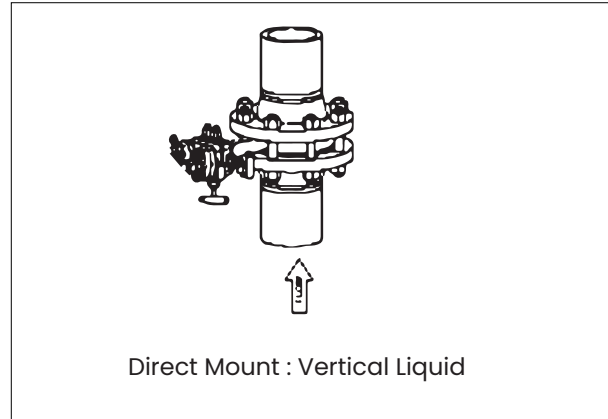
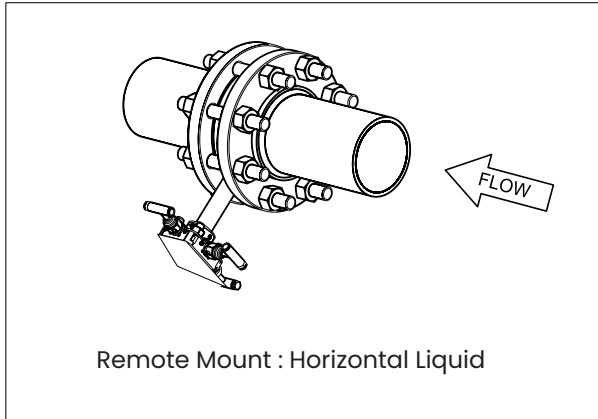
Recommended lengths are represented in pipe diameters. If longer lengths of the straight run are available, position the 1611I so 80 percent of the pipe run is upstream and 20 percent is downstream. Flow conditioners may be used to reduce the required straight run length, improving performance

- For steam up to 400 °F (204 °c), use direct mount orientation, and for steam up to 850 °F (454 °c), use remote mount orientation.
- For direct mounting, ambient temperature should be less than 100 °F (38 °c).
- For remote mount installations, the impulse piping should slope upwards slightly from the instrument connections on the 1611I Compact Orifice to the cross fittings, allowing condensate to drain back into the pipe.

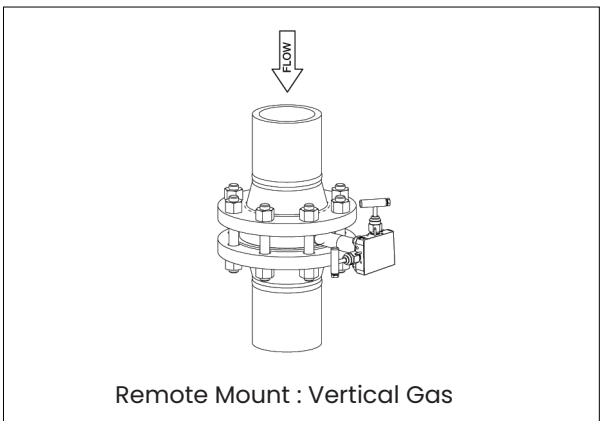
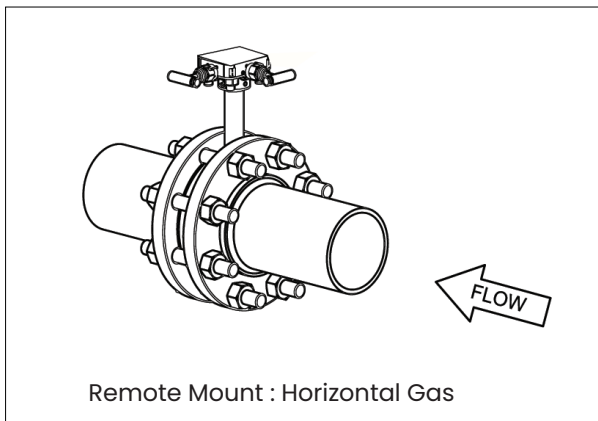
Primary element orientation

The primary element can be installed in any position around the circumference of the pipe, provided the vents are positioned properly for bleeding or venting. Optimal results for liquid or steam in a vertical line are obtained when flow is up

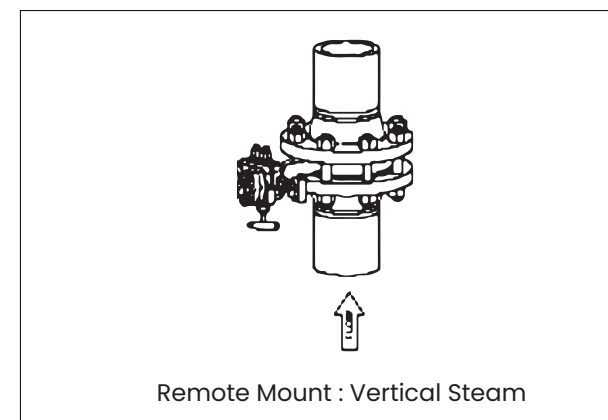
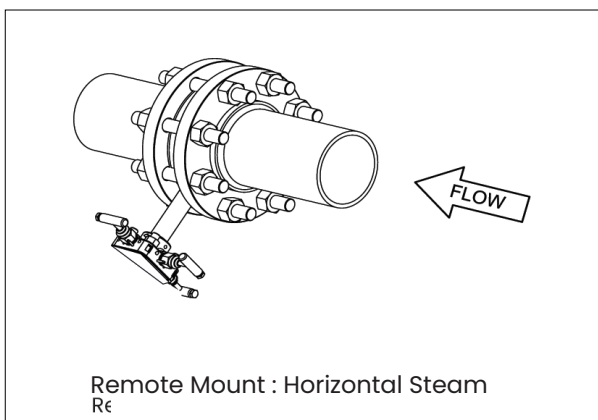
Liquid Installation



Gas Installation



Steam Installation



Specifications

Beta Ratio	Standard 0.40 or 0.65 Customer-specific values are individually calculated, 0.4 / 0.65
Line Sizes	½" to 16"
Accuracy	0.5% to 1.50%
Pipe Size	2 ... 16" per ANSI/ASME, DN 50 ... 400 per EN Other sizes on request
Pressure Ratings	Class 150, 300, 600 raised face (RF) per ANSI/ASME B16.5 Class 150 ... 2500 with raised face (RF) and ring-type joint (RTJ) per ANSI/ASME B16.5
Pressure Limit	Maximum Pressure retention per ANSI B16.5 600# or DIN PN100
Design	Square Edged Concentric
Material	AISI 316/SST , Special alloys on request (Orifice plate body Welded or turned from one piece Main body thickness: 25 ... 65 mm)
Pressure Taps	Options <ul style="list-style-type: none"> • NPT thread • Weld stub • Nipple Same shape and dimensions for all sizes and connection options
Service	Liquid / Gas / Vapour (Vapor)

Primary element installation

Procedure

1. Orient the assembly according to the guidelines provided in Primary element orientation.
2. Insert two studs through the flange holes located opposite the head of the 1611 Compact Orifice
3. Insert gaskets.
4. Insert the Tek-DP 1611 between the flanges so the indentations on the alignment ring contact the installed studs. The studs must contact the alignment ring in the indentation marked with the appropriate flange rating to ensure proper alignment.
5. Starting on the side opposite the 1611 head, rotate the alignment ring such that the radius corresponding to the alignment ring marking matches that of the application flange rating.

Note:

- For the Tek-DP 1611 model in steam applications, with DP readings in a low flow condition as low as 0.75 inH₂O in horizontal pipes consider installing the primary element/flow meter in the top mounting for steam configuration.
- For the Tek-DP 1611 in wet steam applications, do not mount the flow meter at the direct vertical position. Mounting at an angle will avoid measurement inaccuracy due to water running along the bottom of the pipe.
- For ease of installation, you can secure the gasket to the flange face with small pieces of tape. Be sure the gasket or tape does not protrude into the pipe.



Conclusion

The Tek-DP 16111 Compact Orifice is an innovative technology based on the most common differential primary element in the industry. While it does not strictly adhere to the standards of AGA Report Number 3, ASME MFC 3M, or ISO 5167, it is engineered with these guidelines in mind, delivering exceptional performance in short straight pipe runs and tight-fit applications with upstream flow disturbances..

Model Chart

Example	Tek-DP 1611I	S	05	1	W	1	S	40	1	D	N	1	MTR	Tek-DP 1611I -S-05-1-W-1-S-40-1-D-N-1-MTR
Series	Tek-DP 1611I													
Type		S												Standard Compact Orifice
Pipe Size			05 10 15 20 30 40 60 80 100 120 140 160											1/2" 1" 1 1/2 " 2" 3" 4" 6" 8" 10" 12" 14" 16"
Pipe Schedule				1 XX										STD (Factory Standard) Special (Please Specify)
Counter Flanges					W F									No Flanges With Counter Flanges
Pressure Rating						1 2 3 4 XX								150# 300# 600# 900# Special
Material of Construction							S H X							316 SST Alloy C-276 Special
Beta								40 65 XX						0.4 0.65 Special
Standard compact option									1					Standard Compact Option only
Mounting										D R X				Direct Mount Remote Mount Special
Temperature Connection											N T R			None Remote Thermowell and RTD Integrated RTD


Flow Transmitters / Computers												1	None (Customer Supplied)	
												2	Tek-Bar 3110 (Liquids) -Smart DP	
												3	Tek-Bar 3800 (MVT Steam & Compressed Gases)	
												4	Tek-FC 8000 (Natural Gas - Flow Computer)	
												XX	Special	
Options													MTR	Material Test Report EN3.1
													MC	Material Cert EN2.1
													PMI	Positive Material Identification (NDE)
													COC	Certificate of Conformity
													HYD	Hydro Test
													XRT	X-Ray
													DPT	Dye Penetrant
													MPT	Magnetic Particle Testing
													O2C	O2 Cleaned
													TAG	SS Tag Plate
													CDE	Certified Drawing Electronic(As Built)
													MRB	Manufacturing Record Book
													DFT	Dry Film Thickness - Custom Paint Spec
													CPC	Custom Product Code
												3WH	3 Way Manifolds (Type H)	
												5WHP	5 Way Manifolds (Type H)	


Customer Service & Support



www.tek-trol.com

Tek-Trol LLC
796 Tek Drive Crystal Lake,
IL 60014, USA

 +1 847-857-6076

 tekrol@tek-trol.com

 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 & gas industries. Tek-Trol provides process measurement and control products for Flow, Level, Temperature & Pressure measurement, Control valves & 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 reserves the right to change the designs and/or materials of its products without notice. The contents of this publication are the property of TEK-TROL LLC and cannot be reproduced by any other party without written permission. All rights reserved. Copyright © 2022 TEK-TROL LLC
TEK-TROL LLC
DOC # TEK/ITPS/CAT/241207/1611