

Orifice Plate Meter Tube

PFS-OMT Orifice Meter Tube

General Description:

The PFS-OMT is designed for measurement of gas in pressurized piping, orifice meters of various designs have been popularized and in fact standardized (at least for the natural gas industry) for well over a half century. In order to accommodate the demand for this popular flow metering technology, Primary Flow Signal, Inc. provides a line of orifice plates, flange unions and orifice meter tubes in full compliance with all applicable standards and codes as elsewhere delineated below. The scope of this bulletin concentrates on the "orifice meter tube" as defined by the **American Gas Association Report Number 3., Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids (hereinafter referred to as AGA Report No. 3 or "the standard"**. In as much as the orifice meter tube technology is defined by the referenced report, not only to the extent of specification of fabrication and design tolerances, but installation requirements as well as predicted performance parameters, Primary Flow Signal, Inc. makes no warranty or representation with respect thereto, except that all products provided are in full conformance to and meet or exceed AGA Report No. 3.

PFS-OMT with Flanged Ends



The Orifice Meter Tube

An orifice meter is a fluid flow measuring device that produces a differential pressure in pressurized line fluid flowing through a narrow (generally concentric) constriction in the process piping. This differential pressure is then related inferentially to the rate of flow of the line fluid through the area of the constriction. The orifice meter consists of three distinct elements:

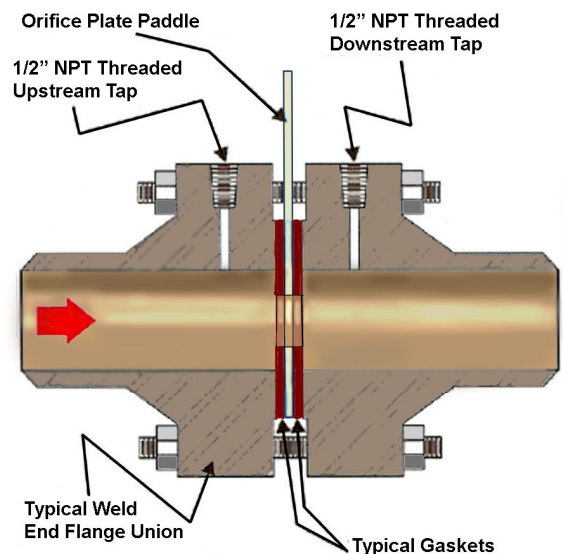
- A thin concentric orifice plate.
- An orifice plate holder consisting of a set of orifice flanges equipped with the appropriate differential pressure sensing taps.
- The meter tube consisting of the appropriate adjacent piping sections, with or without flow conditioners and temperature well(s).

For the purpose of this bulletin the term orifice meter tube shall be construed to include the orifice plate, the orifice flange union, appropriate mounting hardware and the adjacent meter tube of proper design, fabrication and length, provided as a complete unit.

Working Pressure:

The maximum allowable working pressure for orifice meter tube assemblies is dependent upon the maximum allowable working pressures of the pipe, flange unions, orifice fitting and valves comprising the assembly, and then is limited to the lowest rated component of the assembly.

Flanges for Primary Flow Signal, Inc., orifice meter tubes are classified and rated in accordance with ANSI Code B-16.5 as excerpted below, by way of illustration, governing classification of carbon steel, raised face and ring joint female face flanges at 100°F. Others are available.



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Working Pressure (Continued)

The working pressure of pipe and tubing incorporated in the manufacture of orifice meter tubes is further governed by American national Standard for Pressure Piping (ANSI). Piping design is classified within the following categories: B-31.2 Fuel Gas Piping, B-31.1 Power Piping, B-31.3 Refinery Piping and B-31.8 Gas Transmission and Distribution Piping, covering applications for production, distribution and transmission of natural and/or manufactured gas.

Tolerances for Orifice Meter Tubes:

In order to obtain the performance envelope defined by the standard, strict adherence to the manufacturing tolerances thereby specified must be obtained.

The tolerances as recommended by AGA and ASME are either met or exceeded by all Primary Flow Signal, Inc. orifice meter tube products.

The Primary Flow Signal, Inc. Orifice Meter Tube:

Primary Flow Signal, Inc. will manufacture orifice meter tubes to any material, size and capacity specification desired by the customer, consistent with the AGA code. A common example is the Orifice Flange Standard Meter Tube including a paddle-type orifice plate with raised face weldneck flanges, upstream and downstream piping as required, 1/2" pipe coupling on the downstream pipe and pipe plugs, studs, nuts, bolts and gaskets. Primary Flow Signal, Inc. is also able to supply a complete array of secondary instrumentation and therefore assume single source responsibility for the fulfillment of the complete flow meter installation.

Manufacturing Procedures and Capabilities:

Primary Flow Signal, Inc. is an ISO 9001 certified resource and adheres to strictly controls quality procedures and specifications in the design and manufacture of all of the flow metering and secondary instrumentation that it provides. Precise requests and instructions of the customer are faithfully fulfilled in order to minimize difficulties in the field. We are committed to provide any special treatment to accommodate customer requirements.

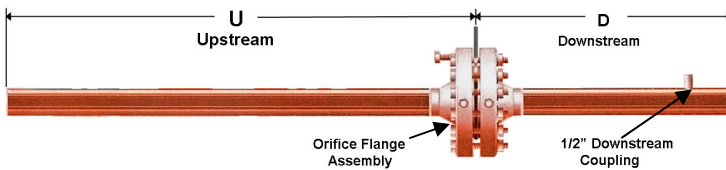


Figure 5: Typical PFS Orifice Meter Gross Dimensions

Pipe Size	Straight Unobstructed Meter Tube Length From the Upstream Side of the Orifice Plate		Overall Laying Length	Pipe I.D. (inches)	
	U	D		Sched 40	
				Dia.	Dia.
2 inch	5'-0"	3'-0"	8'-0"	2.067"	1.939"
3 inch	6'-0"	4'-0"	10'-0"	3.068"	2.900"
4 inch	8'-0"	4'-0"	12'-0"	4.026"	3.826"
6 inch	12'-0"	5'-0"	17'-0"	6.065"	5.761"
8 inch	15'-0"	5'-0"	20'-0"	7.981"	7.625"
10 inch	19'-0"	6'-0"	25'-0"	10.020"	9.564"
12 inch	21'-0"	7'-0"	28'-0"	11.938"	11.376"

Figure 3: Maximum Allowable Working Pressure psi @100°F

ANSI RATING	Class A Facing Ring Joint-Female or Raised Face Carbon Steel
150 lbs	285 lbs
300 lbs	740 lbs
600 lbs	1480 lbs
900 lbs	2220 lbs
1500 lbs	3705 lbs
2500 lbs	6170 lbs

Final Equipment Quality Certification:

Consistent with our quality assurance program and ISO 9001 certification of our quality system, a dimensional inspection report is provided as an integral part of our standard documentation. This report confirms that all applicable codes including the AGA concerning dimensional tolerances, surface finish and concentricity are in full compliance.

General Product Configuration:

Unless otherwise instructed by the customer, Primary Flow Signal, Inc. will provide:

Connection- on 1/2" pipe coupling and plug supplied on the downstream tube, additional couplings available upon request.

End Arrangement- orifice meter tube ends are provided beveled for field welding. Other end arrangements including threaded, flanged and mechanical are available upon request.

Included Items- Standard product configuration includes orifice flanges, orifice plate, gaskets, bolts, nuts, studs and plugs as required.

Alignment- All orifice meter tubes are provided with alignment holes and studs.

Packout/Crating- Unless otherwise specified, all orifice meter tubes are crated fully assembled and ready for installation.

Please Note:

The dimensions provided in Figure 5 represent the actual design laying length and pertinent upstream and downstream meter tube lengths that Primary Flow Signal, Inc. offers as a standard configuration that seems favored and prevalent by most vendors and users.

Admittedly, the AGA standards may change as updates are published and the work of the committee continues in this field. As such, the dimensions displayed in Figure 5 may not meet the requirements of AGA Report No.3 for all piping configurations (i.e. upstream and/or downstream disturbers or special installation conditions). Please refer to the most current edition of AGA Report No. 3 for recommended dimensions pertaining to specific applications and installation conditions. Primary Flow Signal, Inc. will engineer and manufacture any configuration requested by the customer in full compliance with the customer's specifications and instruction.