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Golden Rules Co., Ltd

Orifice Plate & Flange type

Liquid, Gas, Vapor

Orifice Flange Assembly

KC-2100 Series

The nation's development item, 100% domestic goods,Patent **NO.** 10-1660226

10. Orifice Flange Assembly KC-2100 Series

10-1. Orifice Plate & Flange KC-2100

Features & Specification

- **ORIFICE FLANGE TYPE**

  [Butt Welding Type]

  Welding Neck

  Ring Type Joint Welding-Neck

  [Insertion Welding Type]

  Slip-on

  Socket Welding

  Threaded-Screwed Joint Type

- **FLANGES RATING**

  ANSI(JPI) 150#, 300#, 600#, 900#, 1500#

  JIS 10K, 20K, 30K, 63K

KC-2100
Orifice Flange Assembly

Application

Semiconductor Industry / Steel Industry / Chemical Industry / Environmental engineering / Food / Pharmaceutical / Water Plant / Power Plant / R&D Testing

Description

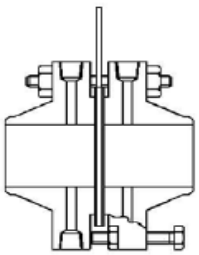
ORIFICE FLANGES are widely used in conjunction with orifice meters for measuring the rate of flow of liquids and gases. An orifice flange assembly is the combination of an orifice plate, flanges with taps, bolts and nut, and gaskets.
The flange are subject to ANSI(JPI) or JIS other regulating standards, and are joined to pipings. The flanges are divided into a few types, Flat Face (FF), Raised Face (RF) and Ring Joint (RTJ), depending on their contact surface formation with the gasket. They have taps for taking out differential pressures.

Construction & Type

- **WELDING NECK FLANGE**

The welding neck flange is normally referred to as the "high hub" flange. It is designed to transfer stresses to the pipe, thereby reducing high stress concentations at the base of the flange. The welding neck flange is the best designed butt-welded flange of those currently available because of its inherent structural value. It is expensive because of the design.

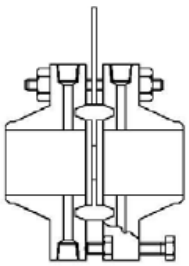
KC-2100-1



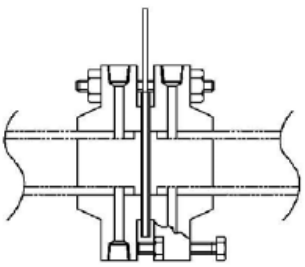
- **SLIP-ON FLANGE**

The slip-on flange has a low hub because the pipe slips into the flange prior to welding. It is welded both inside and out to provide sufficient strength and prevent leakage. Slip-on flanges are all bored slightly larger than the O.D. of the matching pipe. They are preferred over welding neck flanges by many users due to their lower initial cost, but final installation cost is probably not much less than that of the welding neck flange because of the additional welding involved.

KC-2100-2



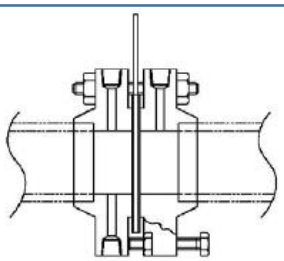
KC-2100-3



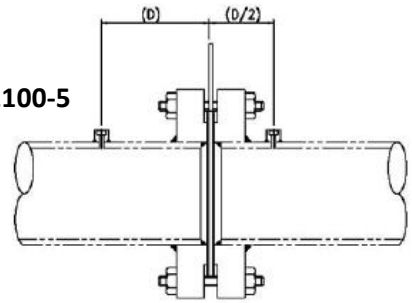
- **SOCKET-WELDING FLANGE**

The socket welding flange is similar to a slip-on flange except it has a bore and a counterbore dimension, The counterbore is slightly larger than the O.D. of the matching pipe, allowing the pipe to be inserted into the flange similar to a slip-on flange. The diameter of the smaller bore is the same as the I.D. of the matching pipe. A restriction is built into the bottom of the bore which sets as a shoulder for the pipe to rest on. This eliminates any restriction in flow when using a socket welding flange.

KC-2100-4

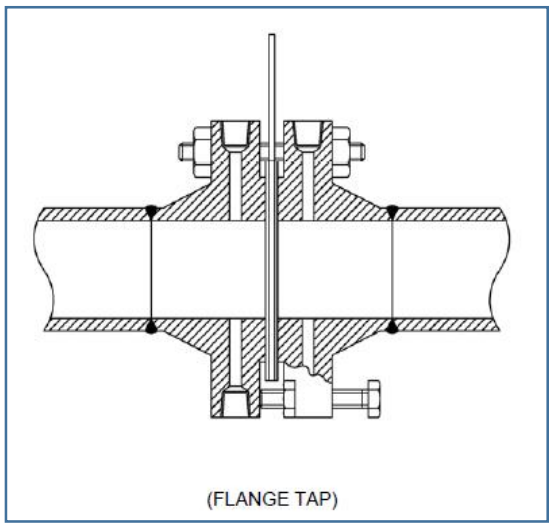


KC-2100-5



CHOICE OF TAP LOCATION FOR ORIFICE

1. FLANGE TAP

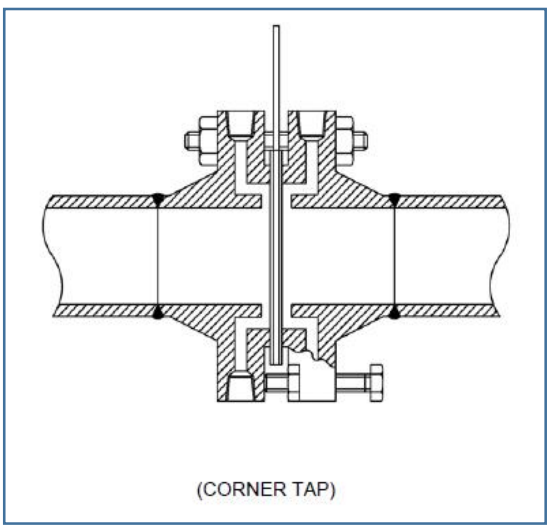

(FLANGE TAP)

The most commonly used tap locations on pipe Sizes of 2 inches or larger are in the orifice flange Or fitting at 1 inch upstream and 1 inch downstream From the faces of the orifice plate. These taps are Located by the flange manufacturer, thereby Eliminating some of the personal element from the Installation. The flanges are equipped with spreader Screws which facilitate removing the plate and Separating the faces for inspection of the tap holes, Which, being near the opening, are readily Accessible. Flange taps, because they are Symmetrically located, are readily adapted to Reversing flows on which measurement is desired in Both directions. If the proper limitations to their use Are followed, they give an accuracy of measurement Adequate for all commercial requirements. They are The predominant staddard in the gas, oil, and Chemical industries.

Flange taps lose much of their advantage when the Orifice may be installed in an existing flange union. However, holding rings equipped wigh pressure Holes having flange tap spacing can be obtained for Raised-face flanges, ring-joint flange, Van Stone Flanges, and other types of flange consrtruction.

The use of flange tapsshould be limited to pipe size Of 2 inches or larger. In the smaller sizes, the Downstream tap location is at an unstable region of The pressure recovery curve on high diameter ratios (d/D).

2. CORNER TAP


(CORNER TAP)

On pipe sizes of less than 2 inches, corner taps Located directly at the faces of the orifice plate Should be used. Otherwise, on high d/D ratios the Low pressure tap will be downstream from the vena Contracta in a highly turbulent region for which Standard coefficients will not apply. For ultimate accuracy, individually calibrated meter runs should Be used, if the pipe size is less than 2 inches.

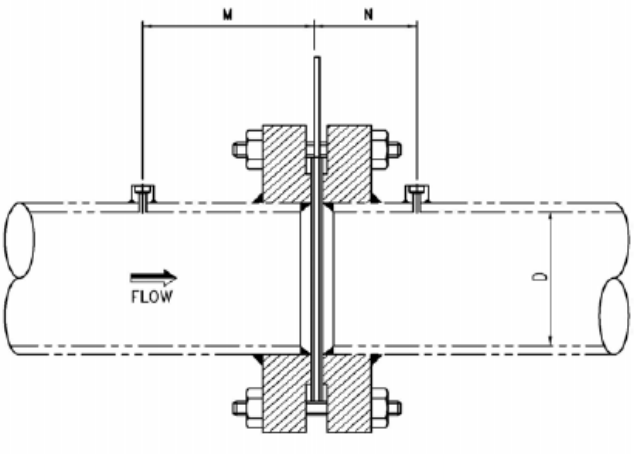
3. VENA CONTRACTA TAP

Vena contracta taps, located at 1 pipe Diameter upstream (Dimension M) and at The point of minimum pressure downstream (Dimension N) are most widely used in the Measurement of steam.

With laboratory care in installation, they are Capable of accuracy slightly better than that Of flange taps.

For pipe sizes above the limits of existing Test data, it is probable that extrapolated Coefficients for vena acontracta taps are more Accuracte than for flange taps, because of The geometric similarity of the installation.

Pipe sizes smaller than 6 inches usually Require special drilling through the flange.

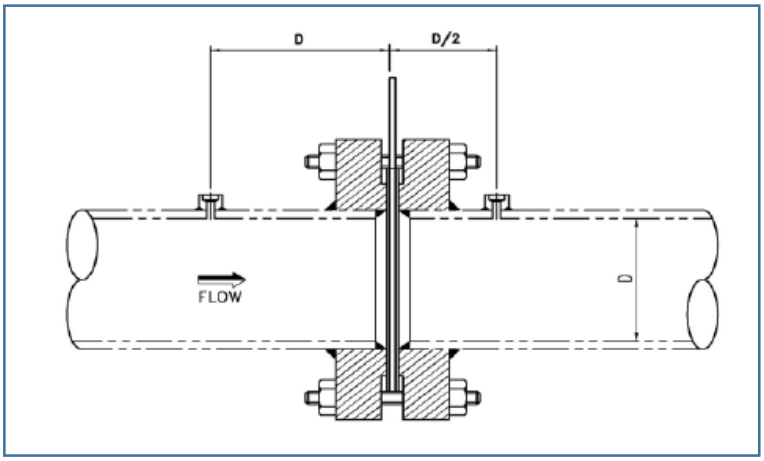


(VENA CONTRACTA TAP)

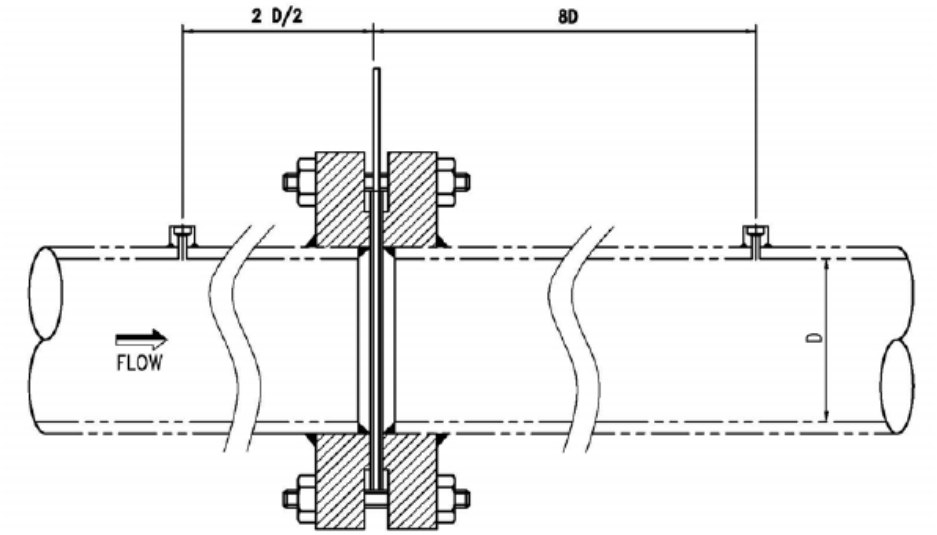
Orifice to Pipe Diameter Ratio	Location of Downstream Pressure Tap (N)		
d/D	(Pipe-Diameters)		
	Minimum	Mean	Maximum
0.2	.37	.85	1.30
0.3	.44	.80	1.15
0.4	.47	.73	1.00
0.5	.47	.66	.84
0.6	.42	.57	.70
0.7	.35	.45	.55
0.8	.25	.33	.41

4. RADIUS TAP (1D & 1/2D TAP)

This type of connection is a modification of, and has largely replaced, the Vena Contracta taps. It yields equally accurate results and has the advantage that the downstream connection is easier To locate The upstream connection should be at 1D above the upstream face of the orifice plate, But location of the upstream connection any where between 1/2D and 2D introduces only Negligible Error. The downstream connection is located 1/2D downstream form the upstream face of the Orifice plate.



5. FULL-FLOW PIPE TAP (2-1/2D & 8D TAP)



(PIPE TAP)

Full-flow taps at 2-1/2 pipe diameters upstream and 8 pipe downstream, attained their popularity (largely in the westem and middlewesten pats of the United States) before the development of the A.G.A-A.S.M.E. coefficient data in 1935.

Using the old coefficient data, these taps gave more consistent results when comparing the Measurement of one orifice with that of one or more orifice of different d/D ratio. Since the Development of the new coefficient data there has been a trend toward replacement by flange taps. Because the locations are geometrically similar for all pipe size, full-flow taps, like vena contracta Taps, have an advantage for use on line sizes outside the range covered by the test data, without The limitation, however, as to minimum pipe size.

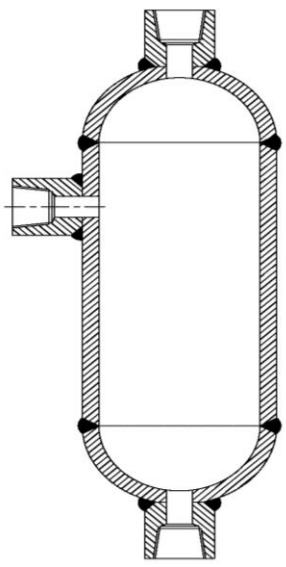
Full-flow taps at 2-1/2 and 8 pipe diameters have the same advantage as vena contracta or radius Taps in that they permit installation of the orifice in an existing flange, However, the wide spacing Of the 2-1/2 and 8 pipe diameter taps necessitates a considerably greater length of straight pipe For a satisfactory installation.

The probable error of measurement with these tap locations is about 50% greater than with flange Or vena contracta taps. Although their flow capacity with the same orifice at the same differential Is somewhat greater, in order to attain the same accuracy the d/D ratio limitation should be Reduced to such an extent that the maximum d/D will pass no more than is allowable with any Of the other taps.

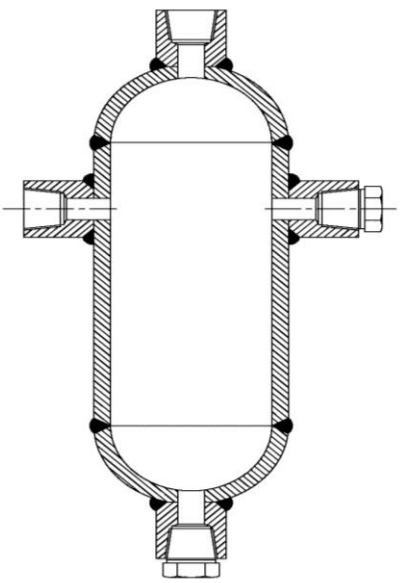
Pressure tap holes should be smooth and slightly rounded at the edges and cylindrical for a Distance form the entrance of 2 to 2-1/2 times the diameter of the tap hole.

ACCESSORY

Condensate and Seal Chambers



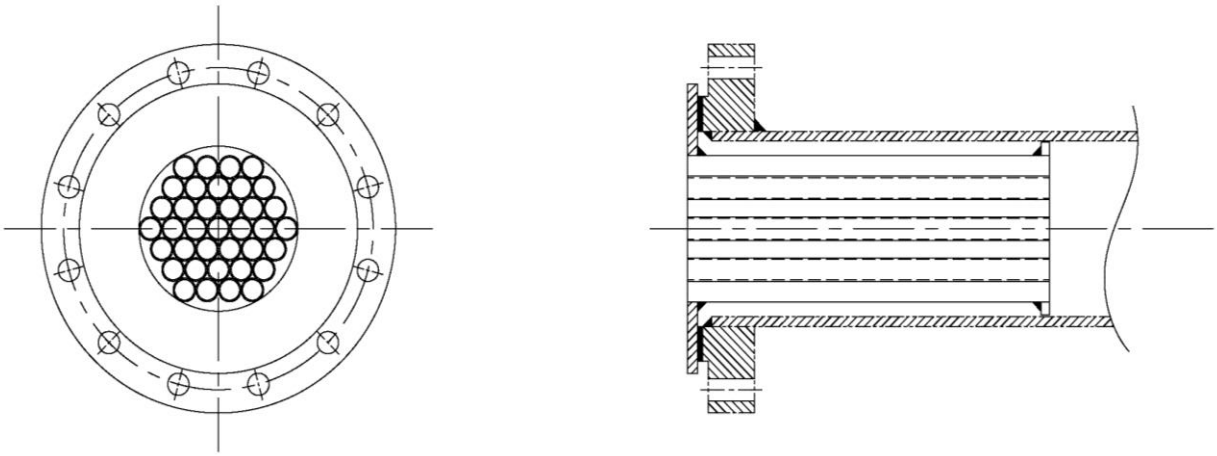
MODEL : KCS-10



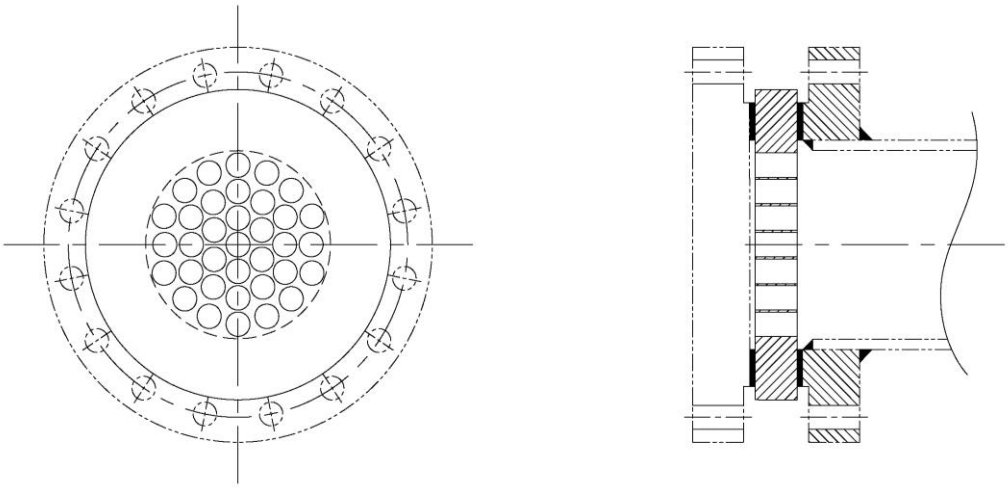
MODEL : KCS-20

Straightening Vanes

STRAIGHTENING VANES are recommended to eliminate swirls and crosscurrents set up by pipe fittings and valves preceding the meter tube.
The use of these vanes in meter tubes can reduce considerably the length of straight tube required preceding the orifice plate.
Straightening vanes are constructed from thin wall steel tubing.
The nest of tubes is symmetrical and each tube is beveled on both ends.
Tangent points on both ends are welded for maximum strength.
Available in C.S or S.S



MODEL : KCV-PB



MODEL : KCV-SP

Order Code KC-2100 Series (Orifice Flange Assembly)

	Type	Size	F-Rating	T-type	F-Mat'l	P-Mat'l	Option
KC-2100 –	☐	☐	☐	☐	P☐	☐☐	V☐
	1	2	3	4	5	6	7

Orifice Plate & Flange type	Code 1
Weld-Neck	1
Weld-Neck (RTJ)	2
Slip-On	3
Socket-Weld	4
Slip-On (D-D1/2 Tap)	5
Agency approved specified	W

Line Size	Code 2
Ex) 300A	12"
Agency approved specified	W

Flange Rating	Code 3
JIS 10K	1
JIS 20K	2
JIS 30K	3
ANSI 150#	4
ANSI 300#	5
ANSI 600#	6
ANSI 900#	7
etc (Piping spec)	e

D/P Tap type	Code 4
Flange Tap	1
Corner Tap	2
Radius Tap (D-D1/2 Tap)	3
Vena Tap	4
Pipe Tap	5
Agency approved sepcified	W

Flange Material	Code 5
Carbon Steel	C
Stainless Steel 304	S1
Stainless Steel 316	S2
Ete (Piping spec)	e

Plate Material	Code 6
Stainless Steel 304	S1
Stainless Steel 316	S2
Monel	M
Hastelloy-C	H
etc	e

Option	Code7
Tap valve & Nipple	TN
Agency approved specified	W

Golden Rules

• GOLDEN RULES

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Gas & Liquid & Steam

Mass & Magnetic & Total Flow Meter

Specialized manufacturer

Distributer

Certified in accordance with

KC Q ISO 9001 : 2015

KC Q ISO 14001 : 2015

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