

### Outline

Wafer-Cone® Differential pressure flowmeter with wafer type connections among V-cone flowmeters is designed and fabricated by Tokyo Keiso Thailand Co., Ltd. under the license of McCROMETER, Inc. U.S.A. Its newly born body is made of the precision casting using lost wax process. The simple and rigid construction taking advantages of V-cone flowmeter realized the low cost.



### Features

- **Simple installation**  
 Wafer connection makes installation simple. Flowmeter body flanges designed to match the pipe flanges guides to the pipe center line.
- **Wide application**  
 Wafer-Cone® flow meter can measure almost all process fluids, i.e. liquids, gases and steam.
- **Short straight runs**  
 The required straight runs are less than 1/5 of those required for orifice and vortex flowmeters. The narrow installation space allows simple and flexible piping arrangement plan. It leads to space and cost saving.
- **Stable differential pressure output**  
 Stable measurement is assured if the differential pressure across the meter is more than 0.025 kPa.
- **Wide range-ability**  
 Since the differential pressure created by the meter is stable at low flow rate, it can measure the flow rate in the range of the turn down ratio 10:1 with the standard maximum differential pressure.
- **Low pressure loss**  
 Small differential pressure allows low pressure loss with less throttling.
- **High reliability**  
 V shape cone has durable structure against wear or adhesion. Moreover, it is maintenance-free because of structure without a moving part. For a long period, reliable flow measurement is assured.

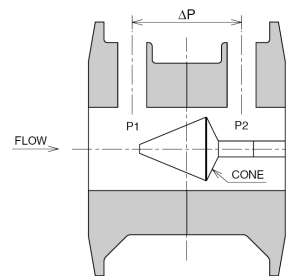
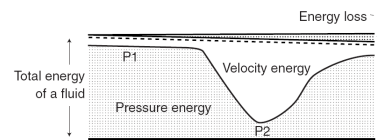
### Measuring Principle

The principle of Wafer-Cone® flowmeter is the same as that of a common differential pressure type flowmeter, and it is based on the Bernoulli's theorem of the conservation of a fluid energy. As shown in Fig. 1, the pressure P1 at the approaching point to V-cone decreases to P2 at the edge point with increasing fluid velocity by throttling the flow path along the contoured shape of Wafer-Cone®.

P1 and P2 are measured from the pressure taps and the difference of the two pressures is given as:

$$\Delta P = P1 - P2$$

( $\Delta P$  is differential pressure output)



[Fig. 1]

### Sizing

Based on a selected Wafer-Cone®  $\beta$  ratio, the differential pressure at maximum flow range is determined by the meter size and fluid properties. The maximum differential pressure corresponds to the maximum flow range of indicator. The maximum differential pressure can be selected as required by designating a Wafer-Cone®  $\beta$  ratio and a flow range if meter size and fluid properties are given.

The Wafer-Cone® sizing program presents a solution to meet your requirements such as low pressure loss measurement or more precise flow measurement.

Please contact Tokyo Keiso Thailand for further information of the Wafer-Cone® sizing program.

### Standard Specification

Meter Size	: 25, 40, 50, 65, 80, 100 mm	Uncertainty of discharge coefficient	: $\pm 1.0\%$ of F.S. (Standard)
Connection	: Wafer type	Turn down ratio	: 10:1 (Standard)
Rating	: JIS10/20K, ANSI Class 150/300	Reynolds No.	: $\geq 8000$
Connection Size	: 25A(1"), 40A(1-1/2"), 50A(2"), 65A (2-1/2"), 80A(3"), 100A(4")	Differential pressure	: $\geq 0.025$ kPa
Materials	: SCS14A(Body), SUS316 (Cone)	V-Cone $\beta$ ratio	: 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80
Measuring fluids	: Liquids, Gases, Steam	Differential pressure tapings (Taper pipe threads)	: Rc1/4 or 1/8, NPT1/4 or 1/8
Fluid pressure	: According to flange specification	Flow direction	: Horizontal or Vertical
Fluid temperature	: According to flange specification		

# VH Series Wafer-Cone® Differential pressure flowmeter

## Required Straight Runs

Measuring Fluid	Liquids general, Gases and Steam Re No < 200,000		Gases and Steam Re No > 200,000	
	Up-stream side	Down-stream side	Up-stream side	Down-stream side
Type of joints				
1 piece of 90° bend	0D	0D	1D	1D
2 pieces of 90° bend	0D	0D	1D	1D
T joint	0D	0D	1D	1D
Butterfly valve (Flow control valve)	3D	3D	10D	5D
Butterfly valve (Fully open)	3D	0D	5D	3D
Gate valve (Fully open)	0D	0D	1D	1D
Expander (Diameter 0.67D expands to 1D, length 2.5D)	1D	1D	2D	2D
Reducer (Diameter 3D reduces to 1D, length 3.5D)	1D	1D	1D	1D

[Notes]  
D shows the nominal size of Wafer-Cone® flowmeter.  
The required straight runs are the distance from the flange faces of Wafer-Cone® flowmeter.  
Add 1D to the above mentioned figures for the service β ratio is 0.65 or more.

## Model Code

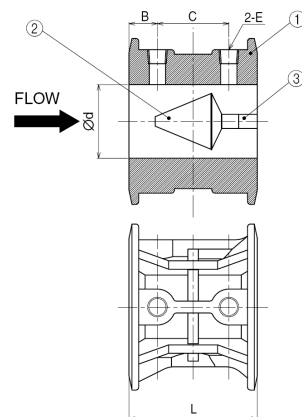
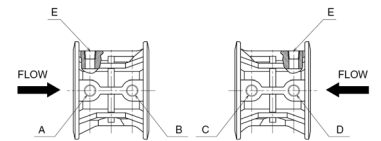
Model Code							Description
VH	1	3	J1	-45	-1	1	(Example)
Material	1						SCS14A/SUS316
Meter size /Connection size		3					25A (1")
		4					40A (1-1/2")
		5					50A (2")
		6					65A (2-1/2")
		7					80A (3")
		8					100A (4")
Connection rating			J1				JIS10K
			J2				JIS20K
			A2				ANSI Class 150
			A5				ANSI Class 300
V-Cone β ratio							Others
				-45			0.45
				-50			0.50
				-55			0.55
				-60			0.60
				-65			0.65
				-70			0.70
Screws of pressure taps						-1	Rc
						-2	NPT
Differential pressure tap location (See tap location below)						1	Type 1 (Standard)
						2	Type 2
						3	Type 3
						4	Type 4
						5	Type 5
						6	Type 6

## Dimensions

Meter size (mm)	L (mm)	Φd (mm)	B (mm)	C (mm)	E (Rc or NPT)	Weight (kg)
25	57	24.3	12.7	31.8	1/8	1.0
40	76	38.1	16.5	43.2	1/8	2.0
50	86	49.3	19.0	47.8	1/4	2.5
65	102	59.0	19.0	63.5	1/4	4.5
80	121	73.7	25.4	69.9	1/4	6.5
100	152	97.2	31.8	88.9	1/4	12

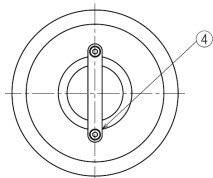
## Differential pressure taps location type

Type	High pressure tap	Low pressure tap
1	A	B
2	A	C
3	D	C
4	D	B
5	E	B
6	E	C



● Materials

Part No.	Part name	Materials
1	Body	SCS14A
2	Cone	SUS316
3	Support	SUS316
4	Fastening bolts	SUS316L



## Installation Stud bolts size

Connection rating	JIS		ANSI	
	10K (mm)	20K (mm)	Class 150 (inch)	Class 300 (inch)
25A (1")	M16 x 130	M16 x 140	1/2 x 5	5/8 x 5-1/4
40A (1-1/2")	M16 x 160	M16 x 160	1/2 x 6	3/4 x 6-3/4
50A (2")	M16 x 170	M16 x 170	1/2 x 6-1/2	5/8 x 6-3/4
65A (2-1/2")	M16 x 190	M16 x 190	5/8 x 7-1/2	3/4 x 8
80A (3")	M16 x 210	M20 x 220	5/8 x 8-1/4	3/4 x 9
100A (4")	M16 x 240	M20 x 260	5/8 x 9-1/2	3/4 x 10-1/2

- Wafer-Cone® is registered trademarks of McROMETER, Inc.
- Specification is subject to change without notice.

# TOKYO KEISO (THAILAND) CO., LTD

Head Office & Factory: 700/277 Moo1, Amata Nakorn Industrial Estate/Free Zone,  
Baankao, Phanthong, Chonburi 20160 Thailand  
Tel: 66 (0)3846 5757-60 Fax: 66 (0)3846 5761

Bangkok Office: 58 Soi Ramkhamhaeng 18 (maenkhan 3), Ramkhamhaeng Rd.,  
Huamark, Bangkok, Bangkok, 10240 Thailand  
Tel: 66 (0)2369 3585 Fax: 66 (0)2369-3581  
Website: www.tokyokeiso.com