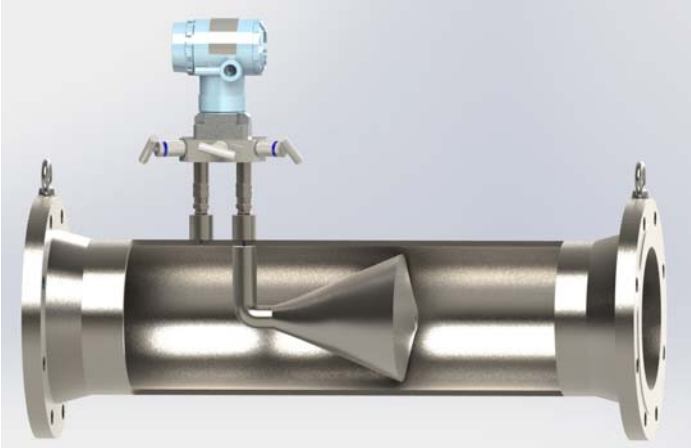
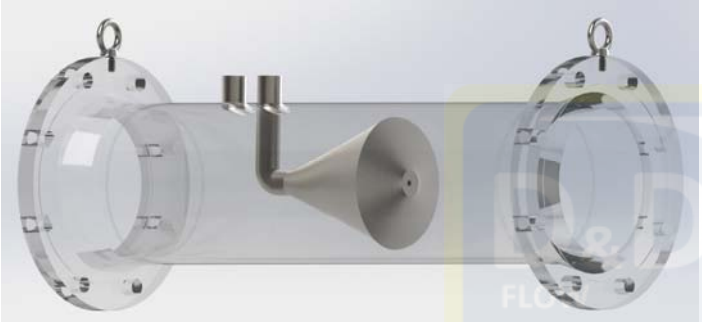
VENTURI CONE

■ MODEL : DHIF-VC700 SERIES

DAEHAN & DS INSTRUMENT CO.,LTD





■ APPLICATIONS

Oil and Gas production
Petroleum refining
Power / Co-generation
Chemical

■ SPECIFICATIONS

☐ VENTURI CONE TYPE

- Flange end type
- Beveled end type

☐ Flange Ratings

- JIS 10, 16, 20, 30, 40 and 63K
- ANSI class 150, 300, 600,900,1500,2500#

☐ Nominal pipe sizes available

- 25 ~ 1,800 mm(1"~72")

☐ MATERIAL

- Carbon steel
- Stainless Steel (304SS,316SS,321SS,321H)
- Low Alloy (A335-P5,P9,P11,P12,P22,P91)

☐ HEAD LOSS

- Approximately 20% of the generated differential pressure.

☐ ACCURACY

- Typically ±2% un-Calibrated
- Typically ±0.5% Calibrated

■ DESCRIPTION

Venturi cone is an innovative flowmeter which offers theability measure a differential pressure and a flow rate.
Venturi cone offers a better accuracy, variety of ranges, installation flexible, and requires less maintenance.
The key benefit of venturi cone is that unique design, offers the ability to provide a repeatable accuracy up to 0.5% of rate under the most harsh flow conditions. Furthermore, it offers a wide range of reynolds numbers.
Venturi cone offers an exceptional sizing flexibility, it'ssuch as offers the diameter1 ~ 72".
Venturi cone assures a casting performance, and it has no moving parts to be replaced.
Additionally, the contoured shape of the cone directs the flow without impacting the abrupt surface.

■ BENEFITS

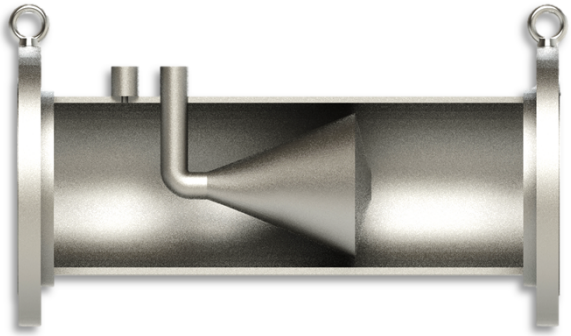
- An accuracy of ±0.5% in the majority of applications and Head loss approximately 20% of the generated Differential pressure.
- A repeatability of ±0.1%.
- A typical range of 10 : 1
- Minimum Reynolds No. of 8000.
- Userd for static mixing by vortex mixing downstream of the cone.
- Used for measuring fluid of water, stream,gas,etc.,as well as many other fluids.
- Differential is generally lower than other differential producers and lower permanent loss,a constant coefficient over a wide Reynolds. No. Range.

VENTURI CONE

■ MODEL : DHIF-VC700 SERIES DAEHAN & DS INSTRUMENT CO.,LTD

■ VENTURI TYPE

▶ FLANGE END TYPE
(Model : DHIF-VC710)



▶ BEVELED END TYPE
(Model : DHIF-VC730)

■ PRINCIPLES OF THE METHOD OF MEASUREMENT AND COMPUTATION

The VENTURI CONE flow meter is a differential pressure type flowmeter. Basic theories behind differential pressure type flowmeters have existed for over a century. The principal theory among these is Bernoulli's theorem for the conservation of energy in a closed pipe. This states that for a constant flow, the pressure in a pipe is inversely proportional to the square of the velocity in the pipe. Simply, the pressure
decreases as the velocity increases. For instance, as the fluid approaches the VENTURI CONE flow meter, it will have a pressure of P_1. As the fluid velocity increases at the constricted area of the VENTURI CONE, the pressure drops to P_2, as shown in Figure 1.
Both P_1 and P_2 are measured at the VENTURI CONE flow meter's taps using a variety of differential pressure transducers. The Dp created by a VENTURI CONE flow meter will increase and decrease exponentially with the flow velocity. As the constriction takes up more of the pipe cross-sectional area, more differential pressure will be created at the same flowrates. The beta ratio equals the flow area at
the largest cross section of the cone (converted to an equivalent diameter) divided by the meter's inside diameter

■ Effective Area Ratio (A1),Velocity of Approach(E),and Beta Ratio(β) defined as:

$$A1 = \frac{\pi}{4}(D^2 - d^2) \qquad E = \frac{1}{\sqrt{1 - \beta^4}} \qquad \beta = \frac{\sqrt{D^2 - d^2}}{D} \text{ or } \beta = \sqrt{1 - \frac{d^2}{D^2}}$$

■ Mass Flow defined as:

$$Q_m = C_d A_1 E \alpha \sqrt{2x\Delta P} \quad \text{or} \quad Q_m = \frac{C_d}{\sqrt{1-\beta^4}} \varepsilon \frac{\pi}{4} (D\beta)^2 \sqrt{2\Delta P \rho}$$

■ Volumetric Flow defined as:

$$Q_V = C_d A_1 E \alpha \sqrt{\frac{2\Delta P}{\rho}}$$

Q_v	:	Volumetric Flow
Q_m	:	Mass Flow
C_d	:	Discharge Coefficient
E	:	Velocity of Approach
A_1	:	Meter Throat
ρ	:	Fluid Density
ε	:	Expansion Coefficient
ΔP	:	Differential pressure(P_1-P_2)

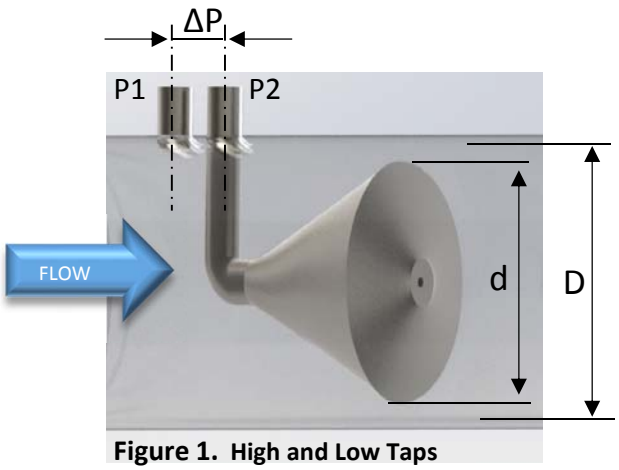


Figure 1. High and Low Taps

VENTURI CONE

■ MODEL : DHIF-VC700 SERIES DAEHAN & DS INSTRUMENT CO.,LTD

■ REQUIRED STRAIGHT LENGTHS FOR VENTURI CONE METER

Required straight lengths for Venturi Cone meter

Beta ratio	Single 90° bend		Two or more 90°bends in the same Plane		Two or more 90°bends in the Different Plane		Reducer		Expander		Full bore ball or gate valve fully open	
	1		2		3		4		5		6	
0.45≤β	A	B	A	B	A	B	A	B	A	B	A	B
< 0.6	3	2	3	2	3	2	3	2	3	2	3	2
0.6≤β	A	B	A	B	A	B	A	B	A	B	A	B
< 0.85	6	2	6	2	6	2	3	2	3	2	3	2

a. The radius of curvature of the bend shall be greater than or equal to the pipe diameter.

b. Column "A" Upstream Required straight lengths. (Norminal pipe Diameters)

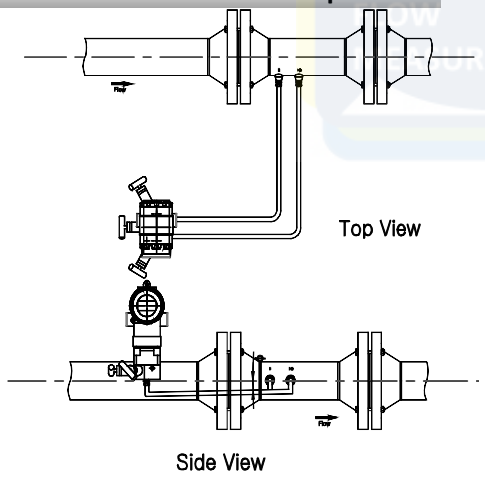
c. Column "B" Downstream Required straight lengths. (Norminal pipe Diameters)

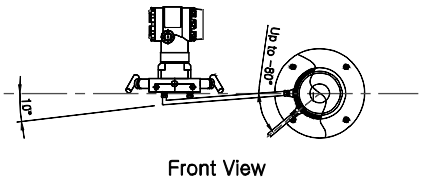
d. A partially closed valve should not be installed within 10D upstream of a cone meter

e. Concentric expander - additional uncertainty in flow rate of up to 0,5 % can be expected.

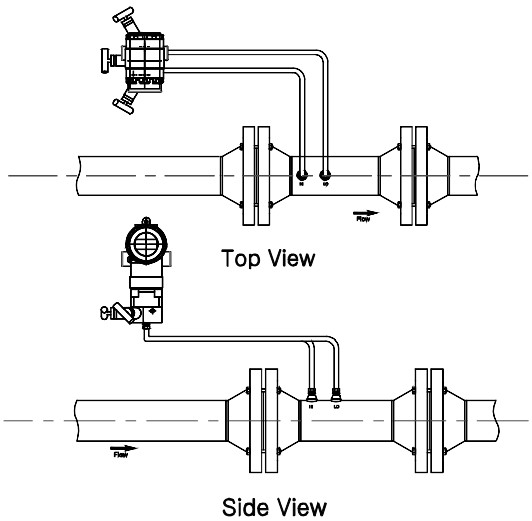
■ INSTALLATION

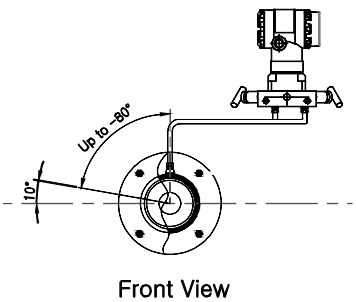
▶Typical Horizontal Installation for Liquid





▶Typical Horizontal Installation for Gas

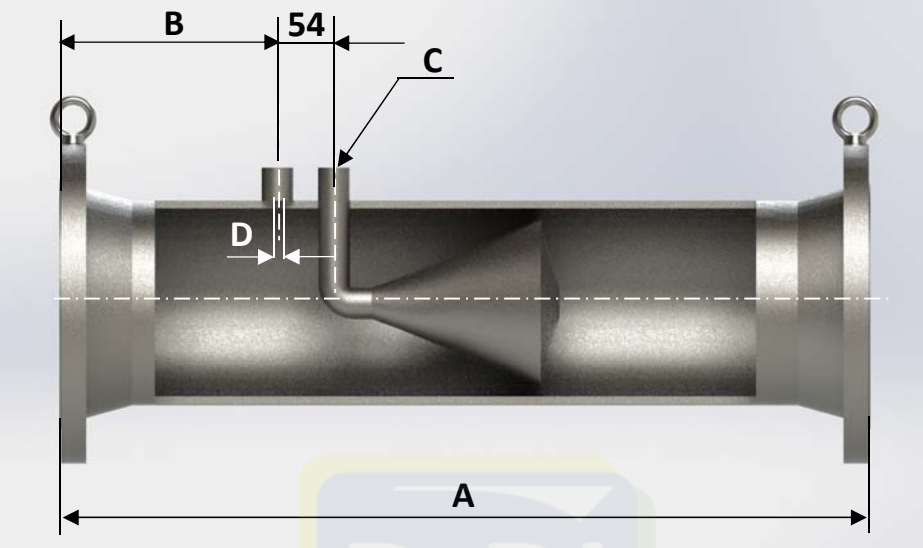




VENTURI CONE

■ MODEL : DHIF-VC700 SERIES DAEHAN & DS INSTRUMENT CO.,LTD

■DIMENTION



MODEL : DHIF-VC710 WNRF TYPE

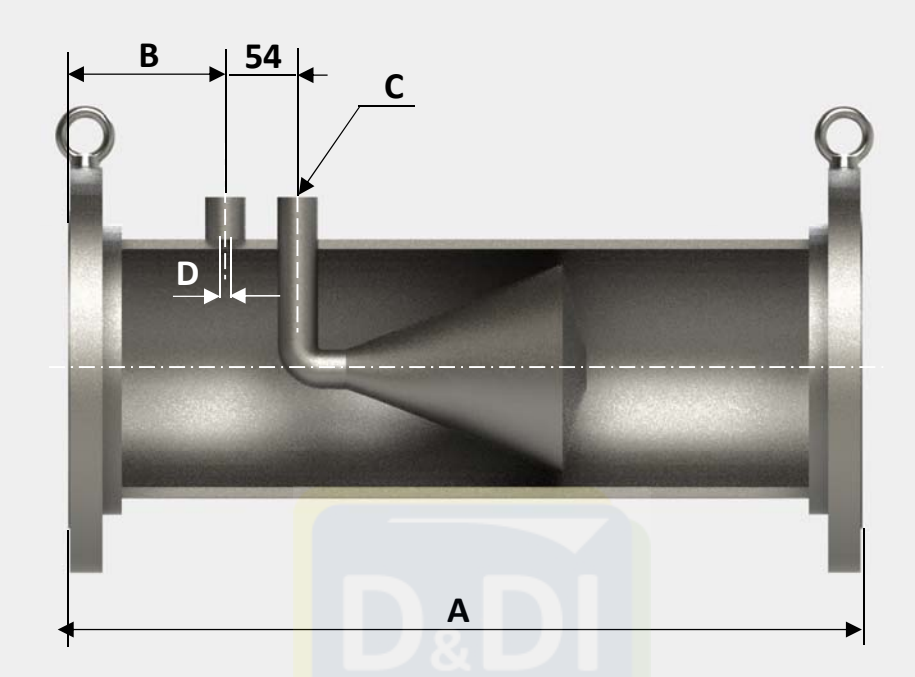
PIPE SIZE		A						B						C	D
		Flange Rating						Flange Rating						PT or NPT	Tap Hole (mm)
A (mm)	B (Inch)	150	300	600	900	1500	2500	150	300	600	900	1500	2500		
25A	1B	280	290	300	320	320	360	110	120	120	130	130	150	1/4"	6
40A	1.5B	290	310	320	340	340	400	120	130	130	140	140	170	1/4"	6
50A	2B	330	340	340	400	400	440	120	130	130	160	160	190	1/2"	6
65A	2.5B	340	340	360	400	400	480	130	130	140	160	160	200	1/2"	6
80A	3B	400	410	410	430	450	540	130	140	140	160	180	230	1/2"	6
100A	4B	430	440	460	470	480	600	130	140	160	170	180	250	1/2"	8
125A	5B	600	610	620	640	660	750	150	160	170	190	210	300	1/2"	8
150A	6B	600	610	630	650	680	820	150	160	180	200	230	350	1/2"	8
200A	8B	690	700	720	750	800	950	160	170	190	220	270	400	1/2"	8
250A	10B	740	760	790	820	900	1300	160	180	210	240	320	550	1/2"	8
300A	12B	800	820	840	890	980	1400	170	190	210	260	350	570	1/2"	8
350A	14B	950	970	1000	1080	1250	-	210	230	250	300	390	-	1/2"	8
400A	16B	1030	1050	1090	1150	1350	-	210	250	270	310	410	-	1/2"	8
450A	18B	1130	1150	1170	1250	1450	-	230	250	270	320	430	-	1/2"	8
500A	20B	1230	1250	1280	1340	1550	-	230	250	280	340	450	-	1/2"	8
600A	24B	1420	1440	1470	1570	1800	-	240	260	290	390	510	-	1/2"	8

VENTURI CONE

■ MODEL : DHIF-VC700 SERIES

DAEHAN & DS INSTRUMENT CO.,LTD

■DIMENTION



MODEL : DHIF-VC720 SORF TYPE

PIPE SIZE		A						B						C	D
		Flange Rating						Flange Rating						PT	Tap
A (mm)	B (Inch)	150	300	600	900	1500	2500	150	300	600	900	1500	2500	or NPT	Hole (mm)
25A	1B	200	205	300	320	320	360	65	70	120	130	130	150	1/4"	6
40A	1.5B	260	265	320	340	340	400	75	80	130	140	140	170	1/4"	6
50A	2B	300	300	340	400	400	440	90	90	130	160	160	180	1/2"	6
65A	2.5B	300	300	360	400	400	480	90	90	140	160	160	200	1/2"	6
80A	3B	360	370	410	430	440	540	90	100	140	160	170	230	1/2"	6
100A	4B	400	410	460	470	480	600	100	110	160	170	180	250	1/2"	8
125A	5B	560	570	620	630	660	750	110	120	170	180	210	300	1/2"	8
150A	6B	560	570	620	650	680	820	110	120	170	200	230	350	1/2"	8
200A	8B	660	670	720	750	800	950	130	140	190	220	270	400	1/2"	8
250A	10B	710	730	790	820	890	1300	130	150	210	240	310	550	1/2"	8
300A	12B	760	780	840	890	970	1400	130	150	210	260	340	570	1/2"	8
350A	14B	800	820	1000	1080	1250	-	160	150	250	300	390	-	1/2"	8
400A	16B	900	920	1090	1150	1350	-	180	180	270	310	410	-	1/2"	8
450A	18B	1000	1020	1170	1250	1450	-	200	220	270	320	430	-	1/2"	8
500A	20B	1100	1120	1280	1340	1550	-	200	220	280	340	450	-	1/2"	8
600A	24B	1350	1370	1470	1570	1800	-	200	220	290	390	510	-	1/2"	8

VENTURI CONE

■ MODEL : DHIF-VC700 SERIES DAEHAN & DS INSTRUMENT CO.,LTD

■ ORDERING INFORMATION

MAIN ORDER	CODE	DESCRIPTION
1.Base Model	DHIF-VC700 SERIES	Base Model
2.Type	VC710	Flange End Type(Welding Neck)
	VC720	Flange End Type(Slip-on)
	VC730	Beveled End Type
3. Line Size	□□□	Pipe Size (In or mm)
4. Cone/Pipe/Flange Material	A	316SS/316SS/316SS
	B	304SS/304SS/304SS
	C	316SS/C.S/C.S
	D	304SS/C.S/C.S
	E	316SS+T.C/316SS/316SS
	F	316SS+T.C/C.S/C.S
	G	ALL 316SS+T.C
	H	316SS+Stell/316SS/316SS
	I	316SS+Stell/C.S/C.S
	J	ALL 316SS+Stell
	O	Option
5. Flange Rating	15W	ANSI/ASME 150LB WNRF
	30W	ANSI/ASME 300LB WNRF
	60W	ANSI/ASME 600LB WNRF
	90W	ANSI/ASME 900LB WNRF
	150WJ	ANSI/ASME 150LB WNRJ
	250WJ	ANSI/ASME 2500LB WNRJ
	15S	ANSI/ASME 150LB SORF
	30S	ANSI/ASME 300LB SORF
	60S	ANSI/ASME 600LB SORF
	90S	ANSI/ASME 900LB SORF
	150SJ	ANSI/ASME 150LB SORJ
	250SJ	ANSI/ASME 2500LB SORJ
	000	Option
6. DP Connection	A	1/2"NPT(PT)
	B	1/4"NPT(PT)
	O	Option
7. DP Transmitter	TR	Transmitter Include.
	E	Transmitter Exclude.
8. Taps Q'ty	1	1 Pair
	2	2 Pair
	3	3 Pair
	4	4 Pair