VENTURI TUBE

■ MODEL : DHIF- V4 SERIES

DAEHAN & DS INSTRUMENT

■ APPLICATIONS

Power generation
Oil production and refining
Water treatment and distribution
Gas processing and transmission
Chemical and petrochemical industry

■ SPECIFICATIONS

☐ Venturi type
• Fabricated flanged type
• Fabricated weld-on type
• Machined flanged type
• Machined weld-on type

☐ Flow calculation standards
• ISO 5167-4, ASME 3M

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

☐ Nominal pipe sizes available
• 25 ~ 2000 mm(1"~80")

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

☐ ACCURACY
• Typically ±1% un-Calibrated(Machined type)
• Typically ±1.5% un-Calibrated(Fabricated type)
• Typically ±0.5% Calibrated.
• Typically ±0.25% Calibrated.(High Accuracy)

■ DESCRIPTION

The venturi tube is characterized by its tapered inlet and diverging outlet. This design greatly reduces head loss to the system when compared to an orifice plate, in fact, the venturi can handle 25 ~ 50% more flow, than an orifice for comparable larger line size and lower head loss.
The venturi is well suited for dirty fluids. There are no places for dirt to build up in the tube. Traditionally, the venturi tube has been used on low pressure gas flow, water and waste applications. Venturi tubes are generally constructed with the system of pressure taps which project radially into the pipe and feed into a common camber known as a piezometer ring. This multiple tap arrangement provides an average pressure reading over the entire circumference of the element. As a result, the need for a long pipe runs is eliminated. A general rule is that a venturi tube requires only half the upstream and downstream runs of an orifice plate. The discharge coefficient of the venturi is constant and predictable to ±2% for pipe reynolds numbers greater than 200,000.

■ PRINCIPLES OF THE METHOD OF MEASUREMENT AND COMPUTATION

The principle of the method of measurement is based on the installation of a Veturi tube into a pipeline in which a fluid is running full. In a Venturi Tube a static pressure difference exists between the upstream section and the throat section of the device. Whenever the device is geometrically similar to one on which direct calibration has been made, the conditions of use being the same, the flowrate can be determined from the measured value of this pressure difference and from knowledge of the fluid conditions.
The mass Flowrate can be determined by the following formula:

$$q_m = \frac{C}{\sqrt{1-\beta 4}} \varepsilon \frac{\pi}{4} d^2 \sqrt{2\Delta P \rho_1}$$

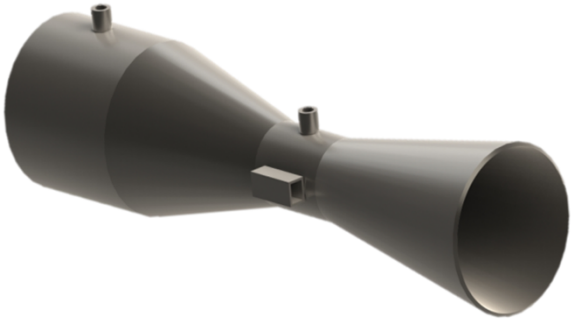
VENTURI TUBE

■ MODEL : DHIF- V4 SERIES DAEHAN & DS INSTRUMENT

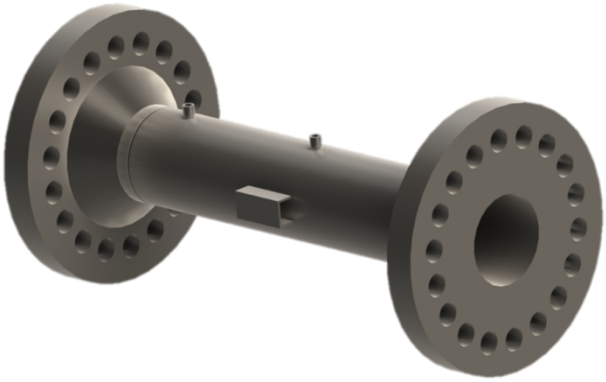
■ VENTURI TYPE

▶ FABRICATE FLANGED TYPE
(Model : DHIF-V410)

▶ FABRICATE WELD-ON TYPE
(Model : DHIF-V420)



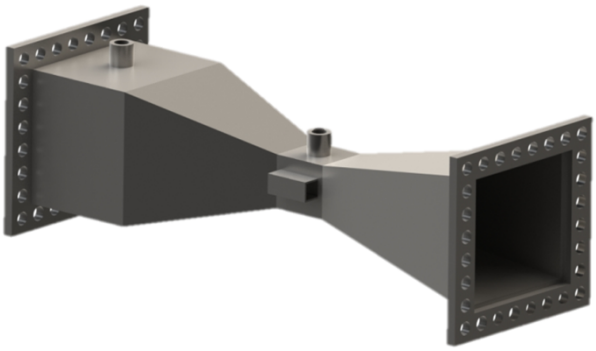
▶ MACHINED FLANGED TYPE
(Model : DHIF-V430)



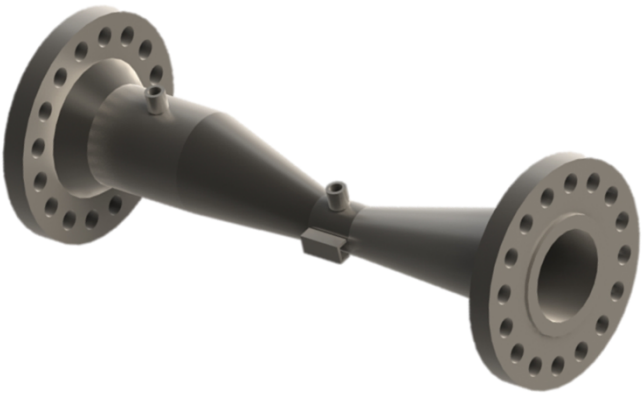
▶ MACHINED WELD-ON TYPE
(Model : DHIF-V440)

■ SPECIAL VENTURI TYPE

▶ RECTANGULAR TYPE
(Model : DHIF-V450)



▶ ECCENTRIC TYPE
(Model : DHIF-V460)



VENTURI TUBE

■ MODEL : DHIF- V4 SERIES DAEHAN & DS INSTRUMENT

■ REQUIRED STRAIGHT LENGTHS OF CLASSICAL VENTURI TUBES

Valve expressed as multiples of internal diameter D

1	2	3	4	5	6	7	8
Diameter ratio	Single 90° bend[a]	Two or more 90° bends in the same plane or different planes[a]	Reducer 1.33d to D over a length of 2,3D	Expander 0.67D to D over a length of 2.5D	Reducer 3D to D over a length of 2.5D	Expander 0.75D to D over a length of D	Full bore ball or gate valve fully open
–	$A^b(B^c)$	$A^b(B^c)$	$A^b(B^c)$	$A^b(B^c)$	$A^b(B^c)$	$A^b(B^c)$	$A^b(B^c)$
0.3	8(3)	8(3)	4(d)	4(d)	2.5(d)	2.5(d)	2.5(d)
0.4	8(3)	8(3)	4(d)	4(d)	2.5(d)	2.5(d)	2.5(d)
0.5	9(3)	10(3)	4(d)	5(4)	5.5(2.5)	2.5(d)	3.5(2.5)
0.6	10(3)	10(3)	4(d)	6(4)	8.5(2.5)	3.5(2.5)	4.5(2.5)
0.7	14(3)	18(3)	4(d)	7(5)	10.5(2.5)	5.5(3.5)	5.5(3.5)
0.75	16(3)	22(3)	4(d)	7(6)	11.5(3.5)	6.5(4.5)	5.5(3.5)

The minimum straight lengths required are the lengths between various fittings located upstream of the classical Venturi tube and the classical Venturi tube itself. Straight lengths shall be measured from the downstream end of the curved portion of the nearest(or only) bend or the downstream end of the curved or conical portion of the reducer or expander to the upstream pressure tapping plane of the classical Venturi tube.

If temperature pockets or wells are installed upstream of the classical Venturi tube, they shall not exceed 0.13D in diameter and shall be located at least 4D upstream of the Venturi tube.

For downstream straight lengths, fittings or their disturbances (as indicated in this Table) or densitometer pockets situated at least four throat diameters downstream of the throat pressure tapping plane do not affect the accuracy of the measurement.

NOTE.

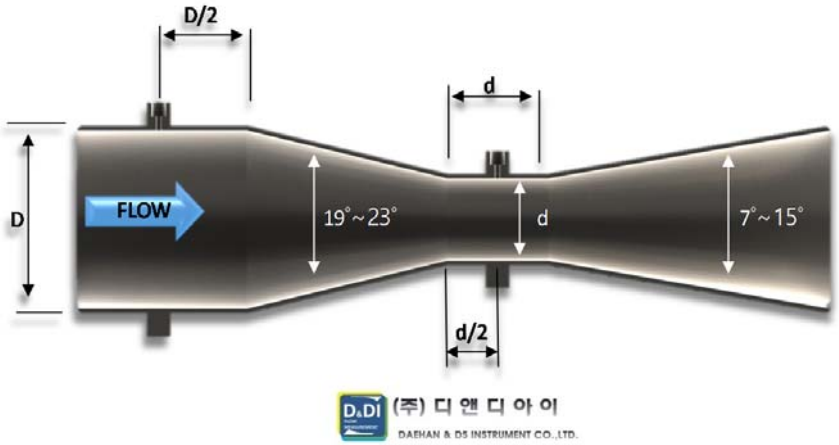
a. The radius of curvature of the bend shall be greater than or equal to the pipe diameter.

b. Column A for each fitting gives lengths corresponding to "zero additional uncertainty" values.

c. Column B for each fitting gives lengths corresponding to "0.5% additional uncertainty" values.

d. The straight length in Column A gives zero additional uncertainty : data are not available for shorter straight lengths which could be used to give the required straight lengths for Column B.

■ THE CRITICAL DIMENSIONS OF CLASSICAL VENTURI TUBE



(주) 디 앤 디 아 이
DAEHAN & DS INSTRUMENT CO.,LTD.

VENTURI TUBE

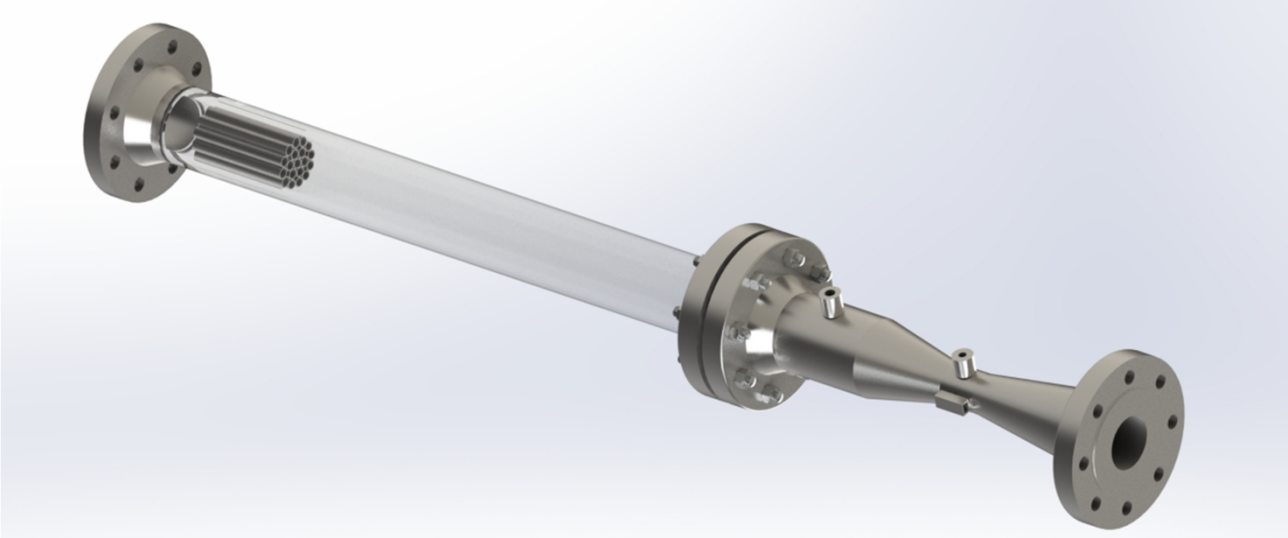
■ MODEL : DHIF- V4 SERIES DAEHAN & DS INSTRUMENT

■ ORDERING INFORMATION

Main order	CODE	DESCRIPTION
1. Base Model	DHIF-V4 SERIES	Base Model
2. Type	V410	Fabricated Flanged
	V420	Fabricated Weld-on
	V430	Machined Flanged
	V440	Machined Weld-on
	V450	Rectangular type
	V460	Eccentric type
3. Line Size	□□□ A	Pipe Size (mm)
4. Throat/Body/Flange Material	A	316SS(316L SS)
	B	304SS(304L SS)
	C	Carbon Steel
	D	A182-F11
	E	A182-F22
	F	A182-F91
	O	Option
5. Flange Rating	015	ANSI/ASME 150LB
	030	ANSI/ASME 300LB
	060	ANSI/ASME 600LB
	090	ANSI/ASME 900LB
	150	ANSI/ASME 1500LB
	250	ANSI/ASME 2500LB
	000	Option
6. Taps Type & Size	A	NPT 1/2
	B	SW 1/2
	C	NPT 3/4
	D	SW 3/4
7. Taps Q'ty	1	1 Pair
	2	2 Pair
	3	3 Pair
	4	4 Pair
8. Option	HA	High Accuracy
	R	Ring Type
	O	Option

HIGH ACCURACY VENTURI TUBE

■ MODEL : DHIF- V4 SERIES DAEHAN & DS INSTRUMENT



■ SPECIFICATIONS

☐ NOMINAL PIPE SIZES AVAILABLE
- 25 ~ 2000 mm(1" ~ 80")

☐ ACCURACY
- Typically ±0.25% Calibrated

☐ FLOW CALCULATION STANDARD
- ISO 5167-4, ASME 3M

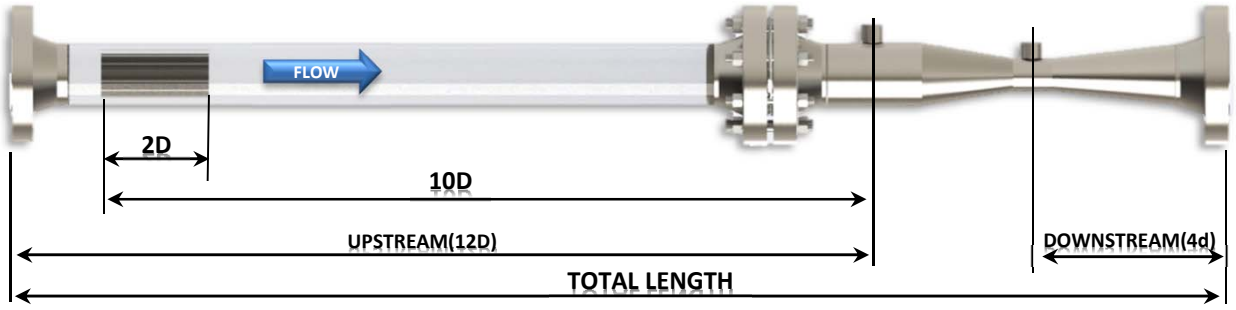
☐ FLOW STRAIGHTENER TYPE
- 19TUBE BUNDLE
- ZANKER
- ETOILE

☐ CONNECTION
- For the reading directly to flange 1/2"NPTF, 3/4"NPTF, 1/2"SW, 3/4"SW
- For connecting with nipple 1/2"NPTM, 3/4"NPTM, socket weld, butt weld or Flange.

■ COMPOSITION
- Venturi Tube
- Flange
- Flow Straightener(Conditioner)
- Meter run Pipe
- Bolt & Nut
- Gasket

■ DESCRIPTION

These flange & meter run tube, flow conditioner include high accuracy venturi tube assembly.
For applications demanding a high accuracy flow measurement from the flow element, the upstream and downstream pipe section must be attached to a so-called meter run assembly, such as the venturi assembly.



HIGH ACCURACY VENTURI TUBE

■ MODEL : DHIF- V4 SERIES DAEHAN & DS INSTRUMENT

■ ORDERING INFORMATION

Main order	CODE	DESCRIPTION
1. Base Model	DHIF-V4 SERIES	Base Model
2. Type	V471	Flow straightener Included
	V472	Flow straightener Excluded
3. Line Size	□□□ A	Pipe size (mm)
4. Throat/Body/Flange Material	A	316SS(316L SS)
	B	304SS(304L SS)
	C	Carbon Steel
	D	A182-F11
	E	A182-F22
	F	A182-F91
	O	Option
5. Flange Rating	015	ANSI/ASME 150LB
	030	ANSI/ASME 300LB
	060	ANSI/ASME 600LB
	090	ANSI/ASME 900LB
	150	ANSI/ASME 1500LB
	250	ANSI/ASME 2500LB
	000	Option
6. Taps Type & Size	A	NPT 1/2
	B	SW 1/2
	C	NPT 3/4
	D	SW 3/4
7. Taps Q'ty	1	1 Pair
	2	2 Pair
	3	3 Pair
	4	4 Pair
8. Flow Straightener	T	Tube Bundle
	E	Etoile
	Z	Zanker
	SE	Straightener Exclude
	O	Option
9. DP Transmitter	T	DP Transmitter Include
	E	DP Transmitter Exclude

CERTIFICATE OF CPA

■ MODEL : DHIF- V4 SERIES

DAEHAN & DS INSTRUMENT

中华人民共和国

计量器具型式批准证书

PATTERN APPROVAL CERTIFICATE OF THE MEASURING INSTRUMENTS OF THE PEOPLE'S REPUBLIC OF CHINA

韩国 DAEHAN INSTRUMENT CO.,LTD.

根据《中华人民共和国计量法》及相关规定和技术要求，下列计量器具经定型签定合格，现予批准。

According to the Law on Metrology of the People's Republic of China and the relevant regulations, the pattern of measuring instruments applied for pattern approval have been approved.

计量器具名称及型号：

Name and type of the measuring instruments:

文丘里管（DHIF-V4 型）

规格：DN25mm～DN2000mm

计量器具的技术指标见型式注册表。

The technical specifications of the measuring instruments are described in the pattern registration list.

型式批准的标志与编号：

The mark and identification numbers of the pattern approval:

PA

2015-F230

批准时的附件：

1. 计量器具型式评价报告

2. 型式注册表

3. 型式评价大纲

各 1 份

批 准 人
Approval signature

吴清海

批准部门
Approval authority

批准日期 二〇一五年九月六日
Approval date

HISTORY OF D&DI

■ MODEL : DHIF- V4 SERIES

DAEHAN & DS INSTRUMENT