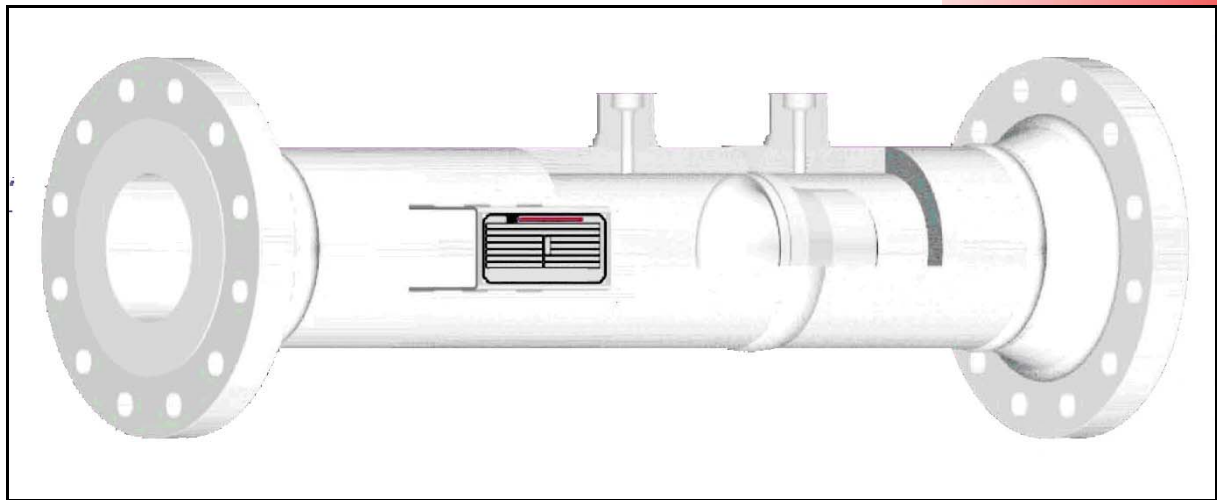


Flow Nozzle Flowmeter DATASHEET

JUNHO 2013

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IntraNozzle Flow Nozzle Type: IFN



Technical Information

02/2011



FLOW

THE EXPERT IN LEVEL AND FLOW

1 General Description

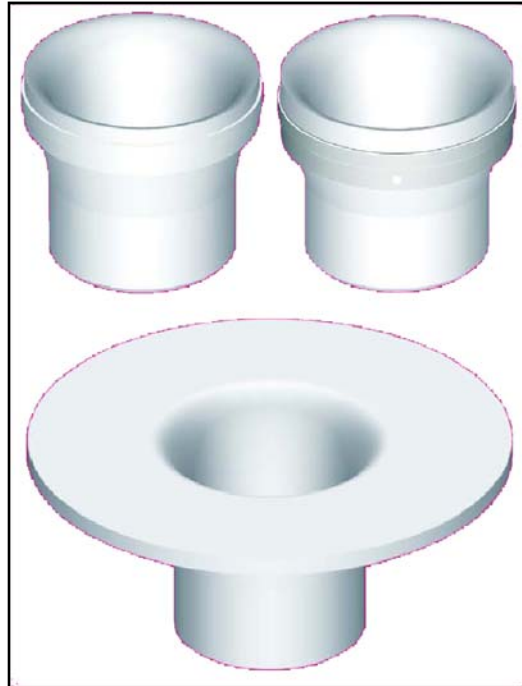
A flow nozzle is to be installed in a pipe line. While a fluid is flowing through this pipe line due to the nozzle a pressure difference is generated. From the value of this pressure difference, which can be measured by a differential pressure transmitter, the flow rate can be calculated.

Flow nozzles are designed to work with high pressure and high temperature applications. Their construction is more rugged than orifices. They allow the flow of more than 60 percent greater volume than orifices do. They are less sensible against solid particles in the fluid. Also, they are applicable for high-speed flowing fluids.

We can provide the nozzles assembled in a measurement section, inlet 4D and outlet 2D.

Available Standards:

- ISO-5167
- ISA 1932
- Venturi-Nozzles
- ASME MFC-30
- ASME PTC-6



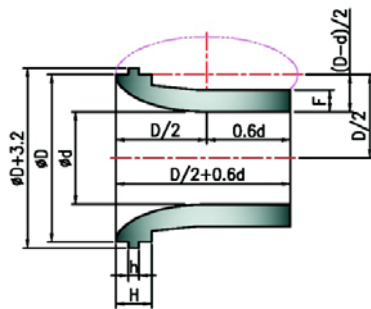
2 Specifications

- ◆ ISO-5167 Nozzle type: Long radius nozzles
 1. High ratio: $0,25 \leq \beta \leq 0,8$
 2. Low ratio: $0,2 \leq \beta \leq 0,5$ISA 1932 Nozzle, Venturi-Nozzle
- ◆ ASME MFC-3M, ASME PTC-6 Nozzle
 1. High ratio: $0,5 \leq \beta \leq 0,8$
 2. Low ratio: $0,2 \leq \beta \leq 0,5$
 3. Low ratio, with throat tap: $0,25 \leq \beta \leq 0,5$
- ◆ Pressure Taps: Pipe Wall Taps at D & D/2, Throat Tap
- ◆ Throat calculation codes:
 - ISO 5167
 - ASME MFC-3M
 - L.K. SPINK
 - AGA No. 3
- ◆ Construction types:
 - Weld-in type
 - Holding ring type
 - Knock pin type
 - Flanged type
- ◆ End connection:
 - Butt-weld type
 - Flanged type

3 Nozzle types

3.1 ISO 5167

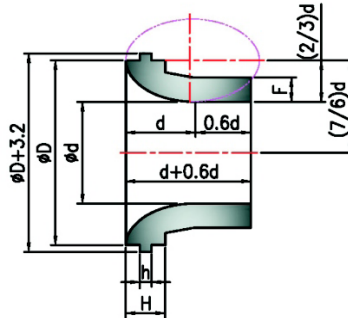
- Nozzle types in full compliance with ISO-5167
- Two types of long radius nozzles
 - High ratio nozzles
 - Low ratio nozzle



$$3 \leq H \leq 0,15D$$

$$3 \leq F$$

[A] High Ratio $0,25 \leq \beta \leq 0,8$



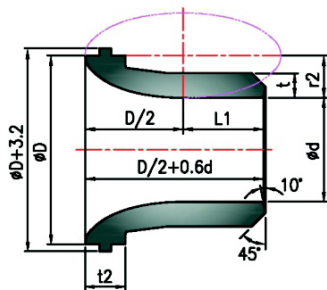
$$3 \leq H \leq 0,15D$$

$$3 \leq F$$

[B] Low Ratio $0,2 \leq \beta \leq 0,5$

3.2 ASME MFC-3M

- Nozzle types in full compliance with ASME MFC-3M
- ASME PTC6 for throat tap
- 3 Types of long radius nozzles:



$$0,5 \leq \beta \leq 0,8$$

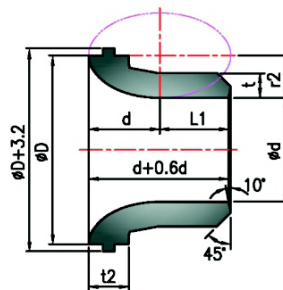
$$L1 \leq 0,6d \text{ or } \leq D/3$$

$$R2 = (D-d)/2$$

$$2t \leq D-(d+6 \text{ mm})$$

$$3 \text{ mm} \leq t2 \leq 0,15D$$

[A] High β Nozzle



$$0,2 \leq \beta \leq 0,5$$

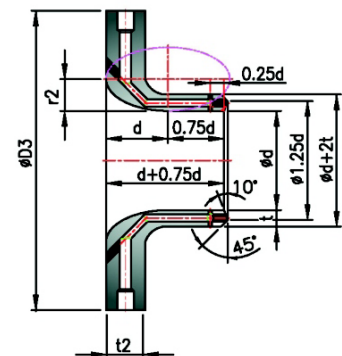
$$0,6d \leq L1 \leq 0,75d$$

$$0,63d \leq r2 \leq 0,63d$$

$$3 \text{ mm} \leq t \leq 12 \text{ mm}$$

$$3 \text{ mm} \leq t2 \leq 0,15D$$

[B] Low β Nozzle



$$0,25 \leq \beta \leq 0,5$$

$$0,63d \leq r2 \leq 0,63d$$

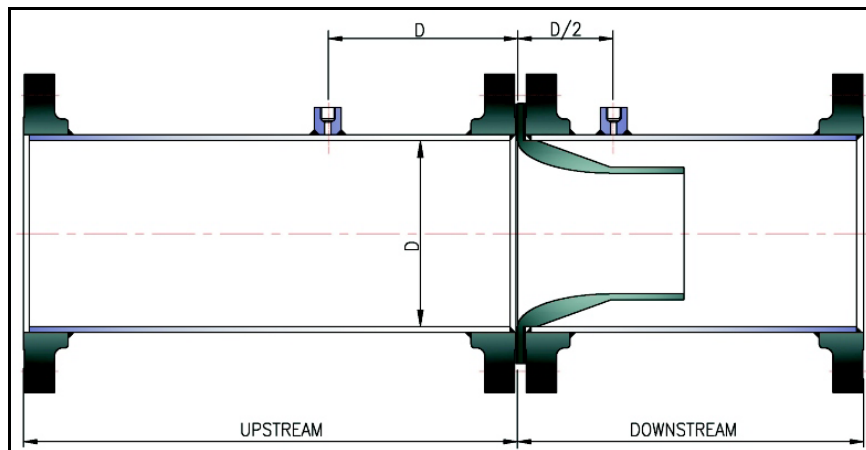
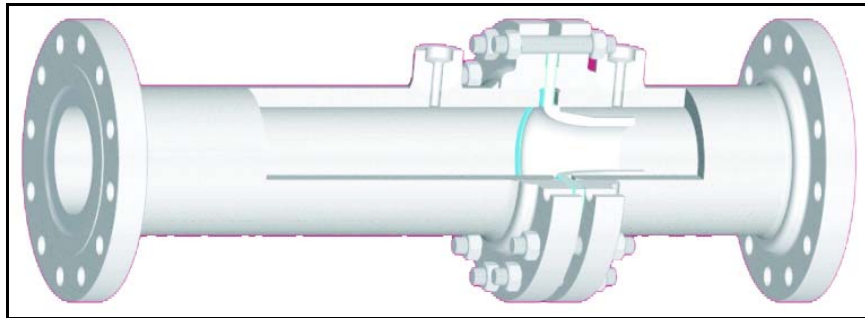
$$t = 0,25d$$

$$t2 = 38 \text{ mm}$$

[C] Low β Nozzle, with Throat Tap

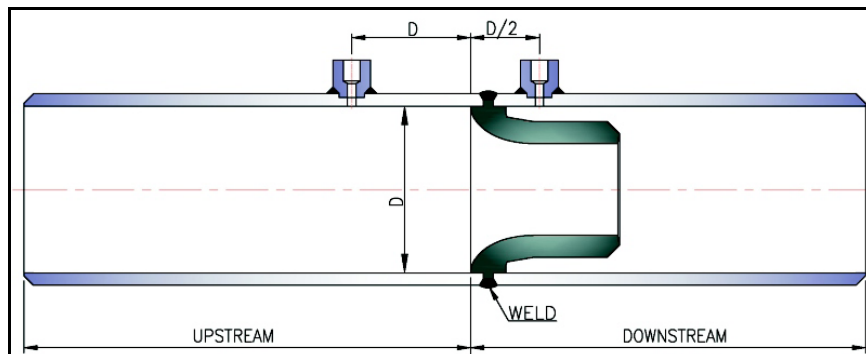
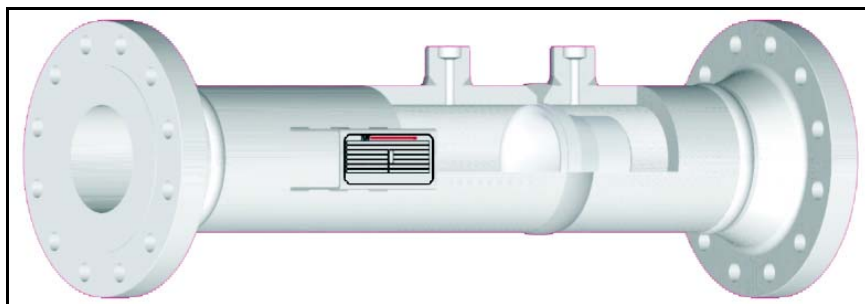
4 Nozzle Designs

4.1 Flanged Type



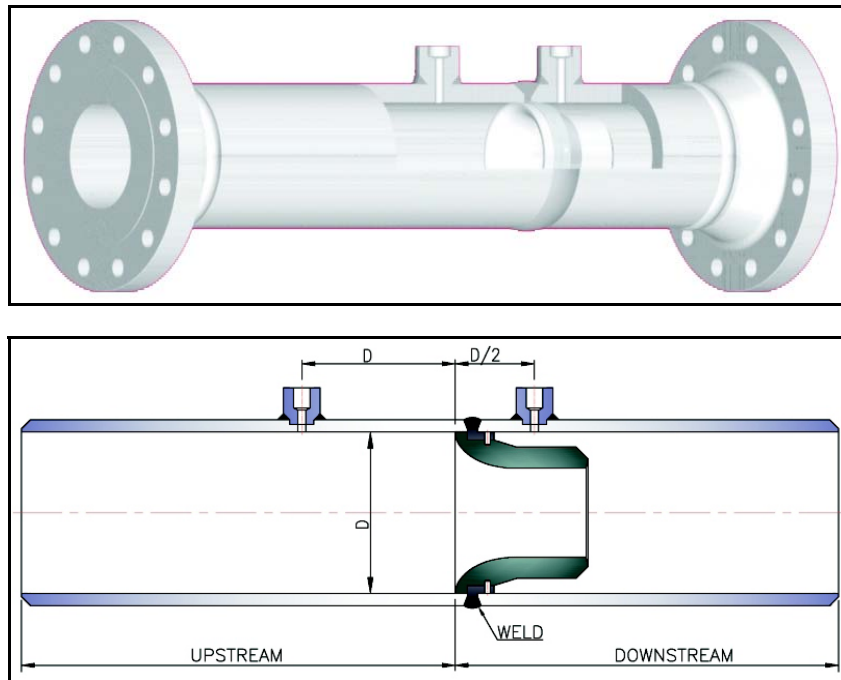
Flanged type flow nozzles are inserted between pipe flanges.

4.2 Weld-in Flow Nozzles



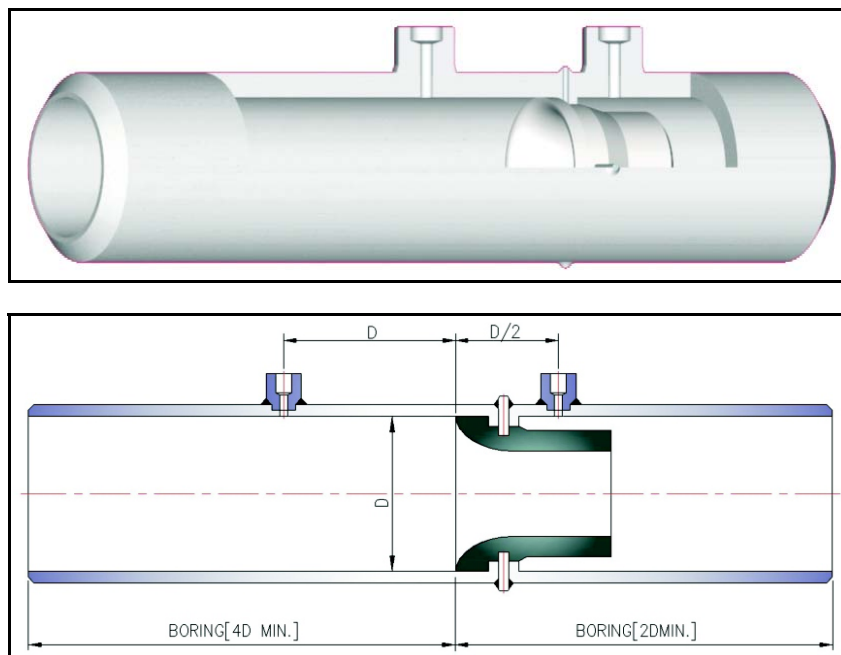
Weld-in flow nozzles are used where flanges are not applicable, such as high temperature and high pressure applications.

4.3 Holding Ring Type



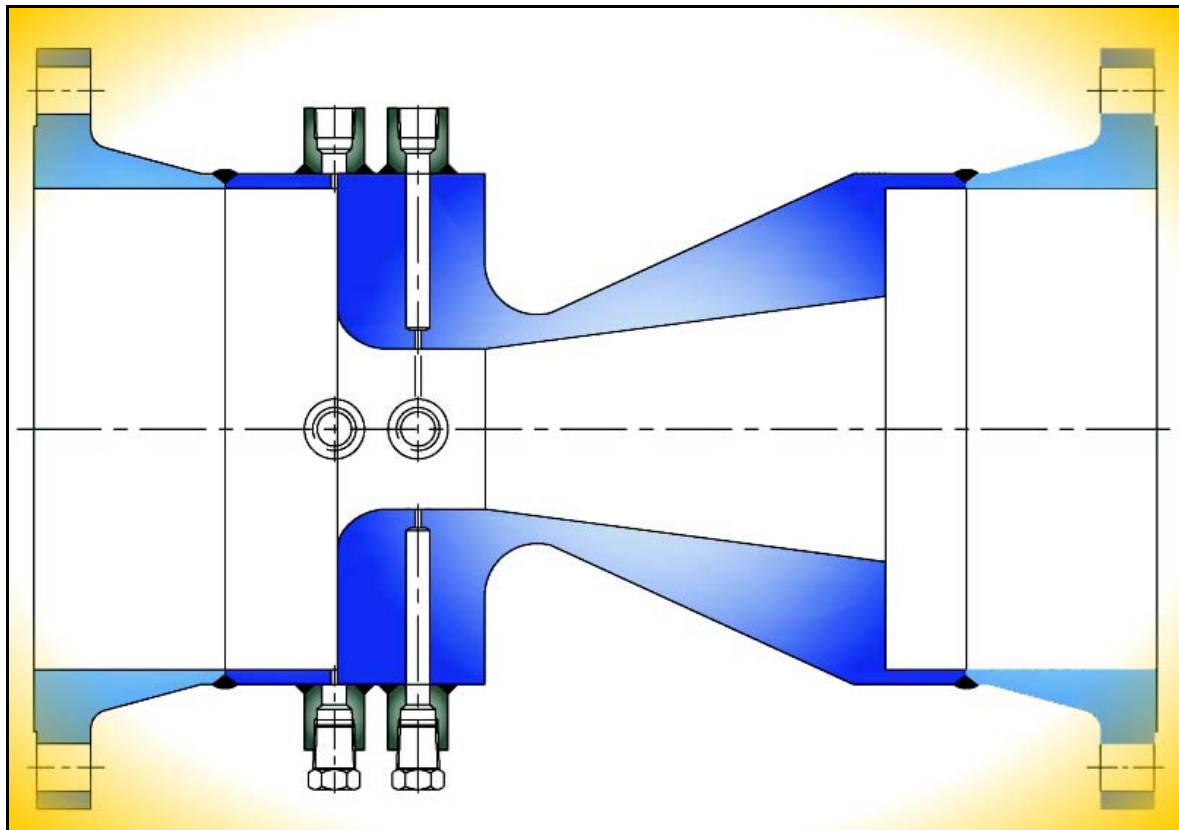
The holding ring flow nozzle design eliminates the welding of dissimilar materials, because the ring, pins and pipe are made of compatible material.

4.4 Knock-Pin Type



Knock-pin flow nozzles avoid welding operation between dissimilar materials.

4.5 Venturi Type

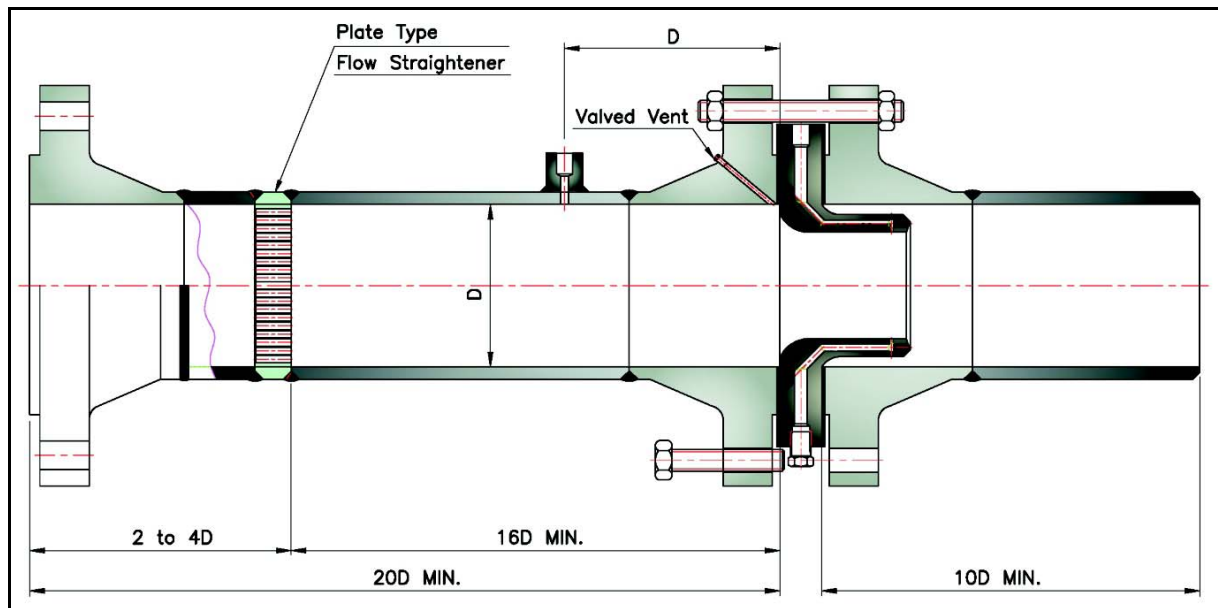


The profile of a Venturi-nozzle is axis-symmetric. It consists of a convergent section with a rounded profile, a cylindrical throat and a divergent section. The upstream face is identical with that of an ISA 1932 nozzle.

The upstream tapplings shall be corner tapplings [see drawing above]. The tapplings may be located in the pipe or its flanges or in carrier rings.

The throat pressure tapplings shall be comprise at least 4 single pressure tapplings. Piezometer ring on request only.

5 Typical Construction of Flow Nozzle with Throat Tap [ASME PTC-6-Standard]



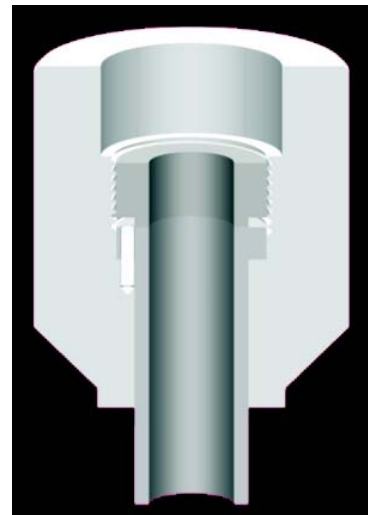
6 Pressure Tapping



Full penetration groove weld
[Welding Adaptor]



Up to 425°C (800°F)
[Welding Adaptor]



For temperature above 425°C
(800°F)
[Thermal Sleeve Welding
Adaptor 2 ¼ Cr-Mo Steel]

Nominal inside pipe diameter (ID)		Recommended max. of pressure tap holes	
DIN	ANSI	inch	mm
< DN50	< 2"	1/4"	6,35 mm
DN50...DN80	2"...3"	3/8"	9,5 mm
DN100...DN200	4"...8"	1/2"	12,7 mm
≥ DN250	≥ 10"	3/4"	19,05 mm

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