

Flow Nozzles



Technical Information

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FLOW NOZZLES 1. General description

This is suitable for determining the flow rate of fluid flowing at high pressure and high temperature and is permit approximately 60 % greater capacity than the orifice plate.

Manual

The principle of the method of measurement is based on the installation of a nozzle into a pipeline which is completely filled with a fluid. The installation of the primary device causes a static pressure difference between the upstream side and the throat. The flow rate can be determined from the measured value of this pressure difference.

The flow nozzles, more costly than other orifice due to their construction, are suited for determining the flow rates of fluids flowing at high temperature and high pressure. Under the same measuring conditions, a flow nozzle has a higher mechanical strength, can permit the flow of more than 60 % greater volume of a fluid, and can measure flow rates of fluids containing solid particles less disturbed than an orifice having the same bore. Thus, they are suited, in addition, for high-speed flowing fluids. We can offer only nozzles as well as flow nozzle assemblies having welded short pipe both on their upstream (4D) and downstream (2D) sides.



♦ Other types are available on request in full compliance with ISO-5167 (including ISA 1932 nozzles), Venturi Nozzles, ASME MFC-3M, ASME PTC-6 standards.

2. Specifications

tap

ISO-5167 Nozzle types: Long Radius Nozzles is
1. High Ratio: $0,25 \le \beta \le 0,8$
2. Low Ratio: $0.5 \le \beta \le 0.5$
ISA 1932 Nozzle, Venturi Nozzle
ASME MFC-3M, ASME PTC-6 Nozzle types:
1. High Ratio: $0,25 \le \beta \le 0,8$
2. Low Ratio: $0.5 \le \beta \le 0.5$
3. Low Ratio, with throat tap: $0,25 \le \beta \le 0,5$
Pressure taps: pipe wall taps at D & D/2, throat

Throat Calculation codes: ISO-5167, ASME MFC-3M, L.K.SPINK., AGA NO.3 Construction types : Weld-in : Holding ring

: Knock pin : Flanged

End connections

: Butt welds : Flanged

3. Nozzle type: ISO 5167

We offer all flow nozzle in complete compliance with ISO-5167. There are two types of long radius nozzles, which are called:

- High ratio Nozzles and Low Ratio. For β -values between 0,25 and 0,5, either design may be used. And ISA-1932-Nozzle, Venturi Nozzle.



Flow Nozzles are suitable for determining the flow rate of fluids at high temperature and high pressure, and also can measure the flow rate of fluids containing a little amount of solid particles with less inconvenience than an orifice.



 $\begin{array}{c} 3 \leq H \leq 0,15 \\ 3 \leq F \end{array}$

[A] Low ratio $0.2 \le \beta \le 0.5$

[A] High ratio $0,25 \le \beta \le 0,8$

 $3 \leq F$

4. Nozzle type: ASME MFC-3M

We offer all flow nozzle in complete compliance with ASME MFC-3M for all below types and also ASME PTC 6 for throat tap and there are 3 types of long radius style ASME flow nozzles covered by this standard.

		2 2 0.25d 0.2
$0,\!25 \leq \beta \leq 0,\!8$	$0,2 \leq eta \leq 0,5$	
L1 ≤ 0,6 d or ≤ D/3	$0,6d \le L1 \le 0,75d$	
$r^{2} = (D-d)/2$	$0,63d \le r2 \le 0,67d$	
2t ≤ D-(d+6 mm)	$3 \text{ mm} \le t \le 12 \text{ mm}$	
$3 \text{ mm} \le t2 \le 0,15 \text{D}$	3 mm ≤ t2 ≤ 0,15D	
[A] High β Nozzle	[B] Low β Nozzle	

5. Flanged type flow nozzle

This is designed to be inserted between piping flanges. Flow nozzle is designed in accordance with ISO 5167 and ASME specifications





6. Weld-in type flow nozzle

This is designed to be used where flanges are not applicable (high temperature or high pressure applications).





7. Holding ring type flow nozzle

This type holding ring flow nozzle eliminates the welding of dissimilar materials [=for avoiding the welding operation between two kinds of material] because the ring, pins and pipe are of compatible materials.





8. Knock-pin type flow nozzle

This nozzle type also avoids welding operation between dissimilar materials however, they have rather difficult to assemble the nozzle from piping. This type should basically be boring operation due to it's structure.





9. Typical construction of flow nozzle with throat tap (ASME PTC-6 standard)



10. Pressure tapping

Full penetration groove weld [Welding Adaptor]	Up to 800 °F [Welding Adaptor]	For temperature above 800 °F [Thermal Sleeve Welding Adaptor 2 ¼ Cr-Mo Steel]

Nominal inside pipe diameter [D]	Recommended max. diameters of pressure tap holes						
> 2"	¼" (6,35 mm)						
2" & 3"	3/8" (9,5 mm)						
4" to 8"	½" (12,7 mm)						
10" and over	³ ⁄ ₄ " (19,05 mm)						

11. Venturi Nozzle

The profile of a venture nozzle is axissymmetric. 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 pressure tappings shall be corner tappings (see drawing below). The tappings may be located either in the pipe of its flanges of in carrier rings.

The throad pressure tappings shall be comprise at least four (4) single pressure tappings and we will offer the piezometer ring only on request.



12. Flow Nozzle Data Sheet

										SHEET		OF		
				FLOW NOZZI ES										
					FLOW NOZZLES				CONTRACT		DATE			
				NO	BY	DAT	F	RFV	ISION					
				1		5.0				REQ. P.O				
				2						BY	CHK'D	AP	PR.	
Intra-Automa	atio	n G	imbH	4										
F	ELC	W	NOZZLE	S					FLA	ANGES (OR SPOO	LIPIPE1		
1 TYPE LONG R		IS	■ OT	HFR ·	0									
2. STANDARD : ISC	2-51	67		HER :			8. TAP SIZE : 1/2" SW OTHER :							
3. BORE : MAX. RA	ATE		NE/	ARES	REST 1/8"			YPE : N	WELDN	NECK 🗆	SLIP C	n 🗆 The	Raded 🗆	
4. MATERIAL : 304	SS		_□ 316 _	SS 🛛	S OTHER : 10. MATERIAL : ST									
6 MODEL NO & M	.õu i IFR	۲P	E :	E RE		& 41	12	FLANG	E INCL					
C. MODEL NO. UN	II 1 X.		. 01					Dute		<u></u>			·	
	*	13	Tag No.											
		14 15	Line No											
	*	16	Fluid Name)										
	*	17	Fluid State											
	*	18	Maximum F	low	m³/hr]									
	×	19	Normar Flo	w [m]	<u>//nr</u> Nor lka/orr² a	a			0					
	×	20	Temp @ M	lav /	Nor Kalom ²								9	
	÷	22	Sp. Gr. / De	ensitv	at Base	u							6	
	\star	23	Sp. Gr. / De	ensity	at Oper.									
	\star	24	Super Com	ip. Fa	ctor [Z]				0					
	*	25	Mol. W.T.	-	Cp / Cv									
	*	26	Operating \	/iscos	sity [cp]									
		27	Base Press	3.	Base Temp).			0					
	*	28	Type of Me	ter										
	\star	29	Diff. Range	H2O]				2						
METER		30	Static Press. Range											
	*	31	Full Scale I	Range	e [m²/hr]				0					
		32	Chart Multi	plier					2				2	
	*	33	Flange Rat	ing										
NOZZLE	*	34	Line Size		Sch.	2								
& FLANGE	×	35	Line Materi	al .	nanna a shara	_								
OR PIPE	×	30	Paris of Ta	apping	3	-								
e oddinan or shall f	×	38	Ninnle	6		7								
ACCESSORY		39	Block Valve)										
100 C 100 C 100 C														
MANU'ER		40	Model			-								
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NOTE ·														

Manual



Flow Measurement

Itabar®-Flow-Sensors

IntraSonic IS200 Ultrasonic Flow Meters

Level Measurement



ITA-mag. level gauges





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IntraDigit digital indicators





For further information please contact us or visit our homepage: <u>www.intra-automation.com</u>.