Flow nozzle
Model : F600

Spec. sheet no. FD06-01

Description

The flow nozzles, more costly than other orifice due to their structure, 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 percent great volume of a fluid, and can measure the 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 supply not only single flow nozzles, but also flow nozzles having welded short pipes on both their upstream and downstream sides.

Specification

Nozzle mounting types

Flange type
Weld-in type
Holding ring type
PTC-6

Flow calculation standards

- Long-radius flow nozzle
  JIS Z 8762, IS0 5167-3, ASME MFC-3M
- ISA 1932, flow nozzle
  ISO 5167-3 JIS Z 8762

Pressure taps

1D and ½D tap, throat tap

Nominal pipe sizes available

50 ~ 600 mm
2 ~ 24"

β Limit

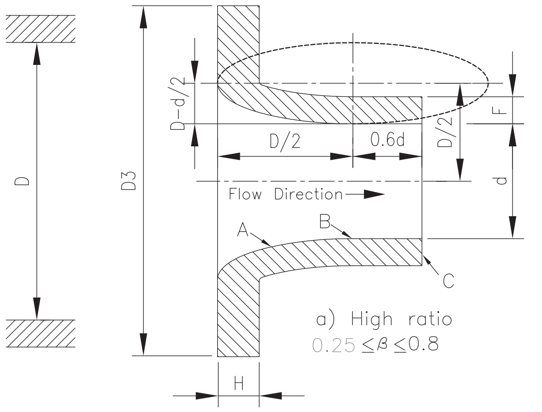
0.2 < β < 0.8
(Low - beta) long - Radius nozzle 0.2 ≤ β ≤ 0.5
(High - beta) long - Radius nozzle 0.25 ≤ β ≤ 0.8
β : Ratio of throat to pipe diameter = d/D
(d: Throat diameter)

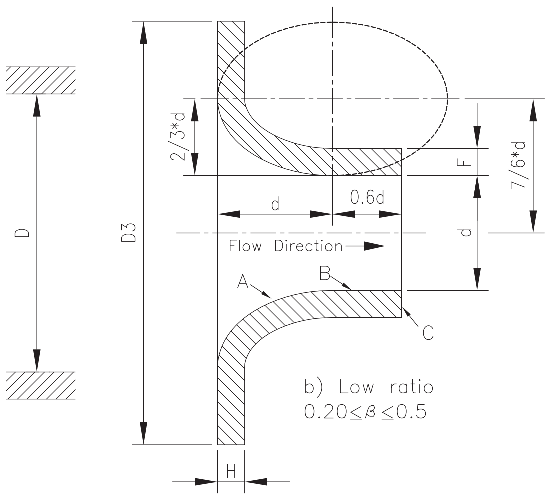
Nozzle thicknesses

Maker standards

Material

A182-F11, F22, F91
A182-F304
A182-F316 / F316L and Other





1. Base model

F600	Flow nozzle

2. Line size

A01	½"	**J01**	15A
A02	¾"	**J02**	20A
A03	1"	**J03**	25A
A04	1½"	**J04**	40A
A05	2"	**J05**	50A
A06	3"	**J06**	80A
A07	4"	**J07**	100A
A08	6"	**J08**	150A
A09	8"	**J09**	200A
A10	10"	**J10**	250A
A11	12"	**J11**	300A
A12	14"	**J12**	350A
A13	16"	**J13**	400A
A14	18"	**J14**	450A
A15	20"	**J15**	500A
A16	24"	**J16**	600A
ZZZ	Other		

3. Connection

A01	150Lb RF	**J01**	10K RF
A02	300Lb RF	**J02**	16K RF
A03	600Lb RF	**J03**	20K RF
A04	900Lb RF	**J04**	30K RF
A05	1500Lb RF	**J05**	40K RF
A06	2500Lb RF	**J06**	63K RF
A11	150Lb FF	**J11**	10K FF
A12	300Lb FF	**J12**	16K FF
A13	600Lb FF	**J13**	20K FF
A14	900Lb FF	**J14**	30K FF
A15	1500Lb FF	**J15**	40K FF
A16	2500Lb FF	**J16**	63K FF
A21	150Lb RTJ	**J21**	10K RTJ
A22	300Lb RTJ	**J22**	16K RTJ
A23	600Lb RTJ	**J23**	20K RTJ
A24	900Lb RTJ	**J24**	30K RTJ
A25	1500Lb RTJ	**J25**	40K RTJ
A26	2500Lb RTJ	**J26**	63K RTJ
ZZZ	Other	**B00**	B.W

4. Element type

W	Weld-in
H	Holding-ring
F	Flanged
K	Knock-pin
I	ISA 1932
P	PTC-6
O	Other

5. Tap type

1	½" S.W, 1 Pair
3	¾" S.W, 1 Pair
O	Other

6. Nozzle material

6S	A182 F316
6L	A182 F316L
ZZ	Other
11	A182 F11
22	A182 F22
91	A182 F91
92	A182 F92

7. Pipe material

6B	A106-B
6C	A106-C
ZZ	Other
11	A335 P11
22	A335 P22
91	A335 P91
92	A335 P92

8. Meter run type

1	Up / Downstream : 4D / 2D
2	Up / Downstream : 20D / 10D

9. Option

C	Calibration test
S	Straightener
O	Other
N	None

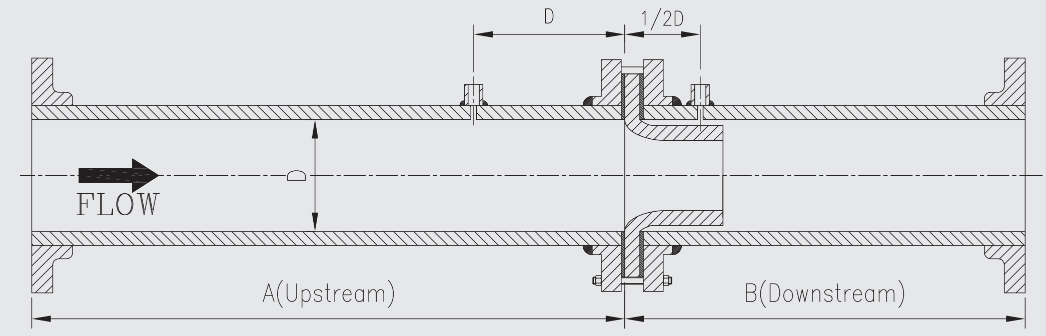
Sample ordering code

1	2	3	4	5	6	7	8	9
F600	**A01**	**A01**	**W**	**1**	**6S**	**6B**	**1**	**C**

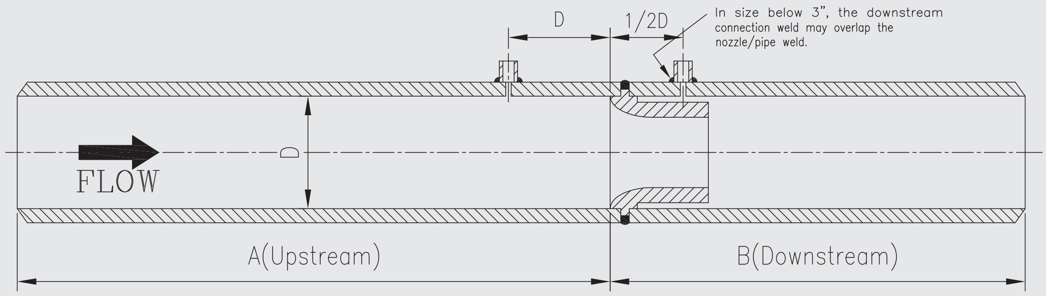
WISE®

© WISE Control Inc. All rights reserved. ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

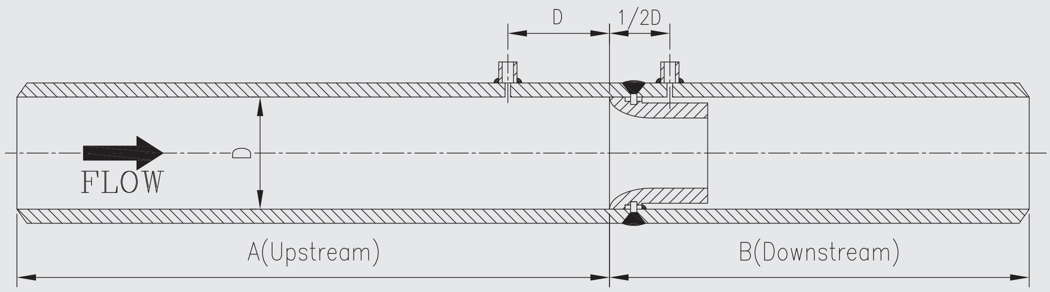
Dimension



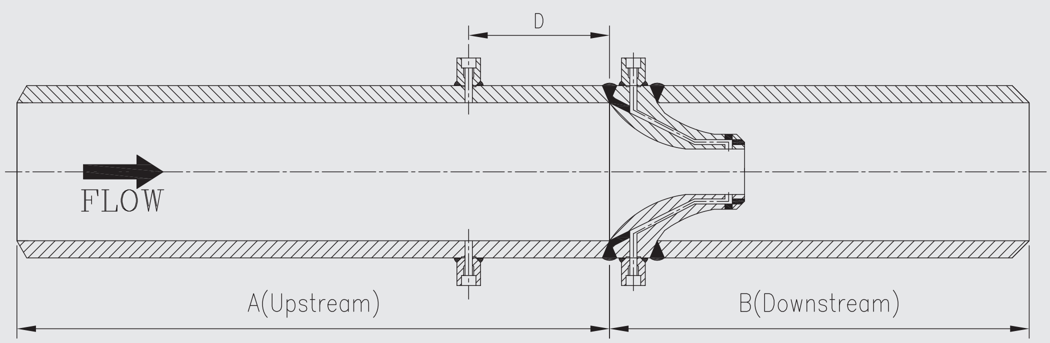
— Flange type —



— Weld in type —



— Holding ring type —



— Throat tap type —

Differential pressure and pressure loss

When a throttle element is interposed in a closed passage of fluid in piping, a difference is produced between the pressures upstream and downstream the throttle element as illustrated in Fig.1. This difference ($\Delta P = p1 - p2$) is called differential pressure.
The fluid passing through the section 2 gradually regains its pressure as it flows downstream, but the downstream pressure cannot be recovered up to the upstream pressure, part of the pressure being lost. This loss is called a pressure loss (permanent pressure loss = p3). The extent of this pressure loss depends on the type of throttle elements and their open area ratio, as shown in Fig.2 The relation given by:

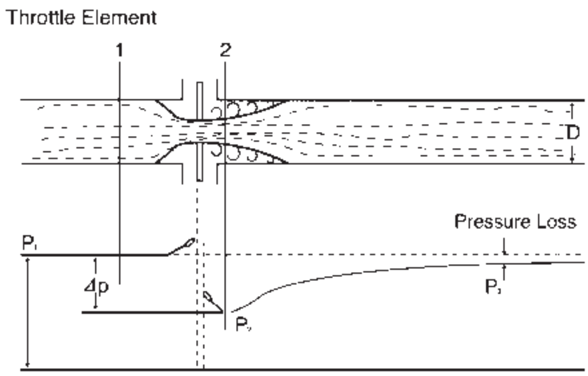


Fig.1

$$Q = C\sqrt{\Delta P/\rho}$$

$$Qn = C\sqrt{\Delta P * \rho/\rho n}$$

$$W = C\sqrt{\Delta P * \rho}$$

Q (m³/h) : Volume rate of flow at density operating conditions
Qn (Nm³/h) : Volume rate of flow at density bass conditions
W (kg/h) : Weight rate of flow
ρ (kg/m³) : Density in operating conditions
ρn (kg/Nm³) : Density in base conditions
C : Constant coefficient

Table 1 : Relation between Flow Rate and Differential Pressure

Flow rate (%)	100	90	80	70	60	50	40	30	20	10	0
Differential pressure	100	81	64	49	36	25	16	9	4	1	0

From the above, the relation between the flow rate and the differential pressure where the density is constant but the flow rate is variable is as listed in table 1. In other words, the flow rate is obtainable by measuring the differential pressure.
When the density is variable (When the pressure and temperature are variable), the true flow rate can be given by compensating the variate of the density by the above equation (This however, is not applicable when the density varies to a great extent.)

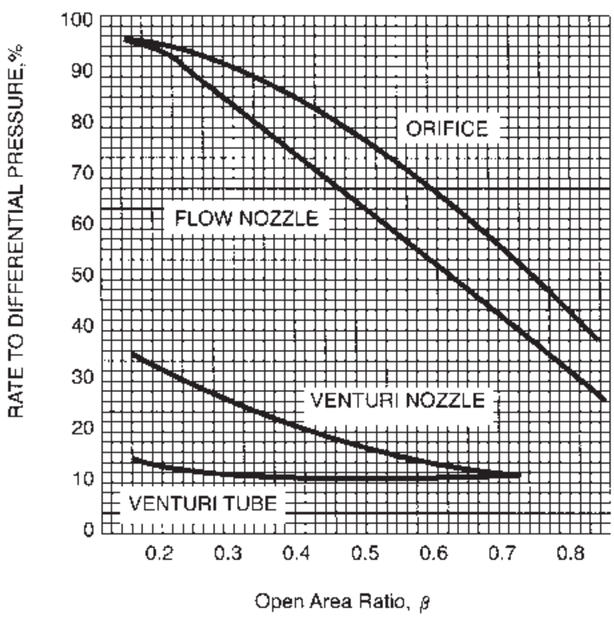


Fig.2