

Ring-joint-type Orifice Flange Assemblies

Model NOJ

The Ring-joint-type Orifice Flange Assembly is a combination of flanges, a holder ring and an orifice plate designed for ring-type joint (RTJ) of ANSI or JPI Standards. The holder ring has a function of holding the orifice plate and also a function as a gasket to prevent leakage of the process fluid. This metallic sealing system is applicable to a fluid of high temperature and high pressure. The pressure tapping system normally is of the flange tap type.

Standard Specifications

Types of Orifices Bores:

- Regular-edge concentric bore,
- Quadrant-edge concentric bore

Calculation Standards:

- Regular-edge concentric bore:
JIS Z8762-1969 (ISO R541-1967)
- Quadrant-edge concentric bore:
Shell Flow Meter Engineering Handbook, 1968

Available Ranges

I) Holder Rings and Orifice Plates

| Type of orifice bore | Tapping system | Nominal diameter | Flange specification [*2] | Plate thickness (mm) | Plate material | Shape of holder ring sealing plane | Holder ring material [*4] | β ; Limit of diameter ratio for restriction (D2/D1) [*6] |
|-------------------------------|----------------|------------------|---------------------------|----------------------|----------------|------------------------------------|-------------------------------------|--|
| Regular-edge concentric bore | Flange taps | 1½" to 14" [*1] | ANSI (or JPI) 300, 600 1b | 1½" to 6"=3 | SUS304 | Octagonal [*3] | Pure steel for industrial-use grade | 1½"=0.10~0.50 |
| Quadrant-edge concentric bore | | | | 8" to 14"=5 | SUS316 | | | 2"=0.10~0.60 |
| | | 1½" to 10" | | | | | SUSF304, SUSF316 | 2½"=0.10~0.65 |
| | | | | | | | | 3"=0.10~0.70 |
| | | | | | | | | 4"≤0.10~0.75 |
| | | | | | | | | 1½"=0.20~0.50 |
| | | | | | | | | 2"=0.20~0.60 |
| | | | | | | | | 2½"=0.20~0.65 |
| | | | | | | | | 3"≤0.20~0.70 |

II) Orifice Flanges

| Connection method | Flange material [*4] | Differential pressure piping connection | Materials of bolts and nuts [*7] |
|-------------------|----------------------------------|---|--|
| Butt-end welding | SF45A [*5] SUSF304 SUSF316 | Select from the Model No. Table | Bolts: SNB7 Nuts: S45C Jack bolts and nuts: S25C |

Notes

- (*1): The regular-edge concentric bore orifice for 1½" pipe is available, although it is not covered by the standard specifications.
- (*2): The dimensions of ANSI and JPI flanges are identical.
- (*3): Oval shapes also are available upon special order.
- (*4): Other materials also are available. [Ex. SFHV12B (ASTM F1 equivalent), SFHV23B (ASTM F11 equivalent. etc.)]
- (*5): Azbil Corporation standard SF45A is produced by forging JIS structural carbon steel S25C to a mechanical strength equivalent to that of JIS SF45A steel.

(*6): β Diameter ratio of restriction is checked using a nomograph. Request it if required.

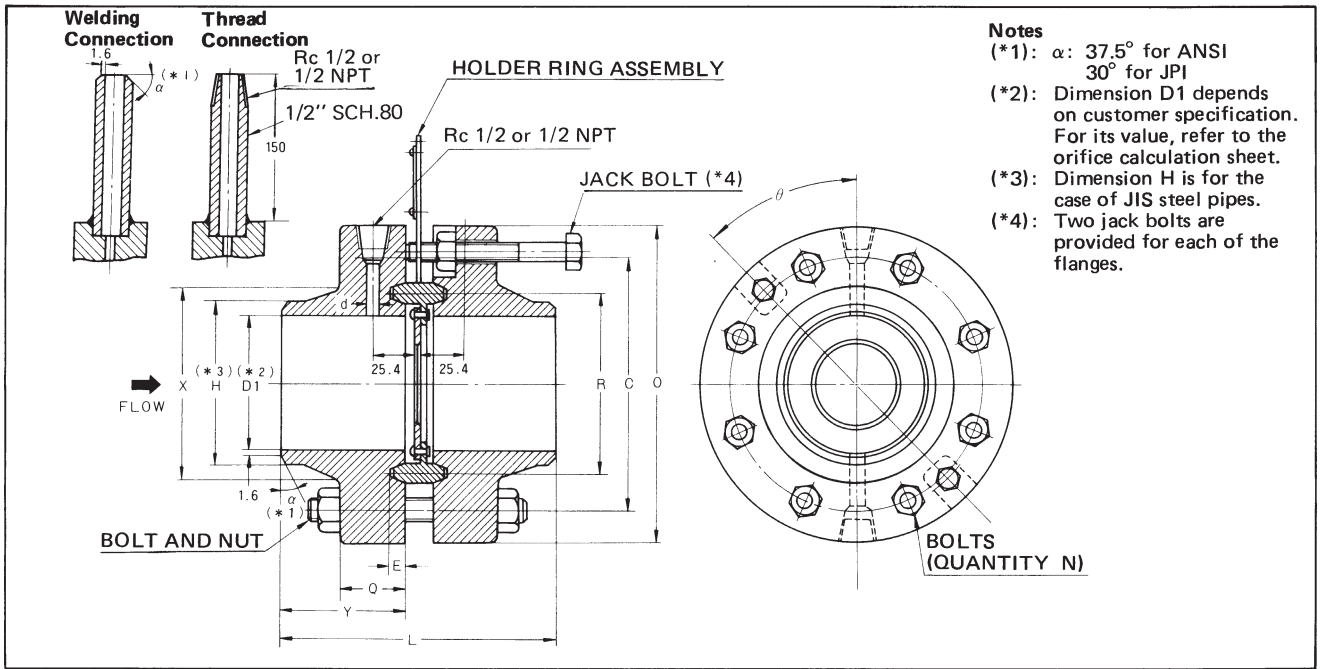
(*7): Select materials of bolts and nuts depending on fluid temperature and referring to its following table.

| Item | Temperature | |
|---------------------|-----------------|---------------|
| | -45° C or below | -45° ~ 400° C |
| Bolts | SUS304 | SNB7 |
| Nuts | SUS304 | S45C |
| Jack bolts and nuts | SUS304 | S25C |

Model No. Table

| Basic Model No. | Selectable specifications | | | | | | Optional specifications (Holder ring and plate) | | | | | | Description |
|-----------------|---------------------------|--------------------------|------------------------------------|--------------------------|---|----------------------------|---|---|--|----------------------------------|------------------------|--------------------------|---|
| | I Specifi- cation | II Pressure rating | III Nominal pipe diameter | IV Flange material | V Diff. press. connection method | VI Bolt/nut material | VII Type of orifice bore | VIII Tapping system Available range | | IX Holder ring material | X Plate material | XI Plate thickness | |
| NOJ | | | | | | | | | | | | | RJT orifice flange assembly |
| | -P | 300 | | | | | | | | | | | JPI 300RTJ |
| | | 600 | | | | | | | | | | | " 600RTJ |
| | -A | 300 | | | | | | | | | | | ANSI 300RTJ |
| | | 600 | | | | | | | | | | | " 600RTJ |
| | | | 040 | | | | | ○ ○ | | | | ○ | Pipe size 1½" |
| | | | 050 | | | | | ○ ○ | | | | ○ | " 2" |
| | | | 065 | | | | | ○ ○ | | | | ○ | " 2½" |
| | | | 080 | | | | | ○ ○ | | | | ○ | " 3" |
| | | | 100 | | | | | ○ ○ ○ ○ | | | | ○ | " 4" |
| | | | 125 | | | | | ○ ○ ○ ○ | | | | ○ | " 5" |
| | | | 150 | | | | | ○ ○ ○ ○ | | | | ○ | " 6" |
| | | | 200 | | | | | ○ ○ ○ ○ | | | | ○ | " 8" |
| | | | 250 | | | | | ○ ○ ○ ○ | | | | ○ | " 10" |
| | | | 300 | | | | | ○ ○ ○ ○ | | | | ○ | " 12" |
| | | | 350 | | | | | ○ ○ ○ ○ | | | | ○ | " 14" |
| | | | | | | | | | | | | | 1 SF45A |
| | | | | | | | | | | | | | 2 SUSF316 |
| | | | | | | | | | | | | | 7 SUSF304 |
| | | | | | | | | | | | | | A Rc½ internal thread |
| | | | | | | | | | | | | | B ½NPT internal thread |
| | | | | | | | | | | | | | C Nipple with Rc½ external thread |
| | | | | | | | | | | | | | D Nipple with ½NPT external thread |
| | | | | | | | | | | | | | E Nipple with bevel |
| | | | | | | | | | | | | | 1 SNB7/S45C |
| | | | | | | | | | | | | | 2 SUS304/SUS304 |
| | | | | | | | | | | | | | -C 2 Regular-edge concentric bore, flange taps |
| | | | | | | | | | | | | | -O 2 Quadrant-edge concentric bore, flange taps |
| | | | | | | | | | | | | | -E 2 Eccentric bore, flange taps |
| | | | | | | | | | | | | | -S 2 Segment opening, flange taps |
| | | | | | | | | | | | | | -X No holder ring assembly supplied |
| | | | | | | | | | | | | | 1 Pure iron |
| | | | | | | | | | | | | | 2 SUS316 |
| | | | | | | | | | | | | | 7 SUS304 |
| | | | | | | | | | | | | | 2 SUS316 |
| | | | | | | | | | | | | | 7 SUS304 |
| | | | | | | | | | | | | 03 ↓ | 3mm |
| | | | | | | | | | | | | 05 ↓ | 5mm |

RJT Orifice Flange Assembly Dimension Drawings



For ANSI (or JPI) 300 lb flanges

(Unit: mm)

| Nominal diameter (inch) | Flange OD O | Flange thickness Q | OD of hub welded section H | Hub root diameter X | Flange length Y | Pitch dia. of groove R | Depth of groove f | Tap hole dia. d | Bolt hole dia. C | No. of bolts N | Bolt size | Position of jack bolt θ | Face-to-face distance L |
|-------------------------|-------------|--------------------|----------------------------|---------------------|-----------------|------------------------|-------------------|-----------------|------------------|----------------|-----------|--------------------------------|-------------------------|
| 1-1/2 | 156 | 40 | 48.6 | 70 | 86 | 68.262 | 6.4 | 6.5 | 114.5 | 4 | 3/4 | 72° | 190 |
| 2 | 165 | 40 | 60.5 | 84 | 87 | 82.550 | 8.0 | 6.5 | 127 | 8 | 5/8 | 45° | 190 |
| 2-1/2 | 190 | 40 | 76.3 | 100 | 90 | 101.600 | 8.0 | 6.5 | 149 | 8 | 3/4 | 45° | 196 |
| 3 | 210 | 40 | 89.1 | 117 | 90 | 123.825 | 8.0 | 10 | 168 | 8 | 3/4 | 45° | 196 |
| 4 | 254 | 40 | 114.3 | 146 | 95 | 149.225 | 8.0 | 13 | 200 | 8 | 3/4 | 45° | 206 |
| 5 | 279 | 44 | 139.8 | 178 | 106 | 180.975 | 8.0 | 13 | 235 | 8 | 3/4 | 45° | 228 |
| 6 | 318 | 45 | 165.2 | 206 | 106 | 211.138 | 8.0 | 13 | 270 | 12 | 3/4 | 30° | 228 |
| 8 | 381 | 50 | 216.3 | 260 | 119 | 269.875 | 8.0 | 13 | 330 | 12 | 7/8 | 30° | 256 |
| 10 | 444 | 56 | 267.4 | 321 | 125 | 323.850 | 8.0 | 13 | 387.5 | 16 | 1 | 22.5° | 268 |
| 12 | 521 | 59 | 318.5 | 375 | 138 | 381.000 | 8.0 | 13 | 451 | 16 | 1-1/8 | 22.5° | 294 |
| 14 | 584 | 62 | 355.6 | 425 | 151 | 419.100 | 8.0 | 13 | 514.5 | 20 | 1-1/8 | 18° | 320 |

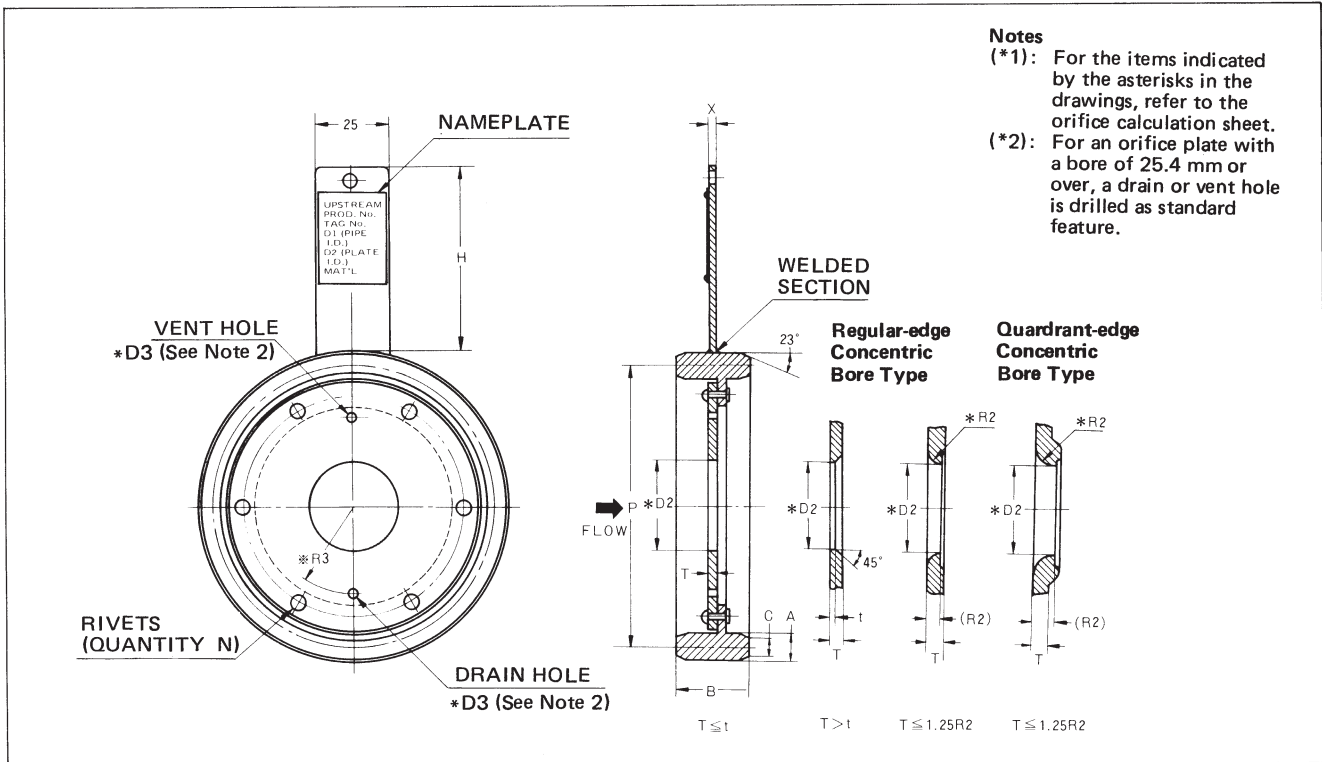
For ANSI (or JPI) 600 lb flanges

(Unit: mm)

| Nominal diameter (inch) | Flange OD O | Flange thickness Q | OD of hub welded section H | Hub root diameter X | Flange length Y | Pitch dia. of groove R | Depth of groove f | Tap hole dia. d | Bolt hole dia. C | No. of bolts N | Bolt size | Position of jack bolt θ | Face-to-face distance L |
|-------------------------|-------------|--------------------|----------------------------|---------------------|-----------------|------------------------|-------------------|-----------------|------------------|----------------|-----------|--------------------------------|-------------------------|
| 1-1/2 | 156 | 40 | 48.6 | 70 | 86 | 68.262 | 6.4 | 6.5 | 114.5 | 4 | 3/4 | 72° | 190 |
| 2 | 165 | 40 | 60.5 | 84 | 87 | 82.550 | 8.0 | 6.5 | 127 | 8 | 5/8 | 45° | 190 |
| 2-1/2 | 190 | 40 | 76.3 | 100 | 90 | 101.600 | 8.0 | 6.5 | 149 | 8 | 3/4 | 45° | 196 |
| 3 | 210 | 40 | 89.1 | 117 | 90 | 123.825 | 8.0 | 10 | 168 | 8 | 3/4 | 45° | 196 |
| 4 | 273 | 47 | 114.3 | 152 | 110 | 149.225 | 8.0 | 13 | 216 | 8 | 7/8 | 45° | 236 |
| 5 | 330 | 53 | 139.8 | 189 | 125 | 180.975 | 8.0 | 13 | 266.5 | 8 | 1 | 45° | 266 |
| 6 | 356 | 56 | 165.2 | 222 | 125 | 211.138 | 8.0 | 13 | 292 | 12 | 1 | 30° | 266 |
| 8 | 419 | 64 | 216.3 | 273 | 141 | 269.875 | 8.0 | 13 | 349 | 12 | 1-1/8 | 30° | 300 |
| 10 | 508 | 72 | 267.4 | 343 | 160 | 323.850 | 8.0 | 13 | 432 | 16 | 1-1/4 | 22.5° | 338 |
| 12 | 559 | 75 | 318.5 | 400 | 164 | 381.000 | 8.0 | 13 | 489 | 20 | 1-1/4 | 18° | 346 |
| 14 | 603 | 78 | 355.6 | 432 | 173 | 419.100 | 8.0 | 13 | 527 | 20 | 1-3/8 | 18° | 364 |

Holder Ring Assembly

Dimension Drawings



Notes

- (*1): For the items indicated by the asterisks in the drawings, refer to the orifice calculation sheet.
- (*2): For an orifice plate with a bore of 25.4 mm or over, a drain or vent hole is drilled as standard feature.

Table of Dimensions

(Unit: mm)

| Nominal pipe diameter (inch) | Holder ring | | | | Orifice plate | | Handle (tab) | | No. of rivets N |
|------------------------------|--------------|---------|----------|-------------------------|-------------------|------------------|--------------|-------------|-----------------|
| | Pitch dia. P | Width A | Height B | Width of flat section C | Plate thickness T | Edge thickness t | Height H | Thickness X | |
| 1½ | 68.262 | 7.938 | 26 | 5.232 | 3 | 0.5 | 110 | 2 | 4 |
| 2 | 82.550 | 11.112 | 26 | 7.747 | 3 | 0.8 | 110 | 2 | 4 |
| 2½ | 101.600 | 11.112 | 26 | 7.747 | 3 | 1.0 | 110 | 2 | 4 |
| 3 | 123.825 | 11.112 | 26 | 7.747 | 3 | 1.0 | 110 | 2 | 6 |
| 4 | 149.225 | 11.112 | 26 | 7.747 | 3 | 1.5 | 125 | 3 | 6 |
| 5 | 180.975 | 11.112 | 26 | 7.747 | 3 | 2.0 | 140 | 3 | 6 |
| 6 | 211.138 | 11.112 | 26 | 7.747 | 3 | 2.0 | 140 | 3 | 6 |
| 8 | 269.875 | 11.112 | 28 | 7.747 | 5 | 3.0 | 140 | 3 | 6 |
| 10 | 323.850 | 11.112 | 28 | 7.747 | 5 | 3.0 | 150 | 3 | 6 |
| 12 | 381.000 | 11.112 | 28 | 7.747 | 5 | 5.0 | 150 | 3 | 6 |
| 14 | 419.100 | 11.112 | 28 | 7.747 | 5 | 5.0 | 150 | 3 | 6 |

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4th Edition: Issued in Feb. 2015

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