

FOR SPECIFYING AND PURCHASING ENGINEERS

Orifice fittings

Single and dual chamber fittings for flange-tapped orifice meters to ISO 5167-2 and AGA Report No. 3 · NPS 2" – 24" standard · ASME Class 150 – 2500

SIZE RANGE	PRESSURE CLASS	PLATE CHANGE
NPS 2" – 24" standard	Class 150 – 600 standard	Under line pressure, dual chamber

1. Product and variants

An orifice fitting is a pressure-containing body, installed permanently in the pipeline, that holds the orifice plate. It locates the plate, carries the sealing arrangement and the flange tappings, and gives access to the plate for inspection or replacement without cutting the pipe. Single and dual chamber bodies use the same handle-free plate format, held in a carrier matched to the fitting bore.

The two differ in what a plate change costs. A single chamber fitting is opened once the line section is isolated and depressurised, and the plate comes out through the top. A dual chamber fitting adds an upper chamber, isolated from the lower chamber by a rotary valve, so the carrier can be raised out of the flow on pinion shafts and the plate changed while the line stays in service.



Single Chamber, NPS 2" – 10"

CARRIER UNDER THE SEAL BAR

The plate sits in a carrier screwed under the seal bar; the clamp bar presses the unit onto the body. With the clamp bar off, seal bar, carrier and plate lift out by hand. Fewest parts, lowest clear height.



Single Chamber, NPS 12" and Above

PLATE CARRIER WITH PINION GEAR

A separate plate carrier is raised out of the bore by a pinion gear, so the gear takes the weight of a large plate. Overall height and headroom grow with the carrier travel.



Dual Chamber

PLATE CHANGE UNDER LINE PRESSURE

For lines that cannot stop for a plate change. The carrier is raised into the upper chamber and the rotary valve closes below it; only the upper chamber is vented before it is opened.

PLATE CHANGE, DUAL CHAMBER

With the seal block tight and the vent closed: equalise, release both latches, open the rotary valve and raise the carrier fully above it; close the valve and the equalizer, then vent. Loosen the top seal block only with the vent open and the gauge at zero. Refit the plate to the flow-direction marking, sharp edge upstream, and reverse the steps: in service the rotary valve, equalizer and vent are closed, latches engaged, gauge at zero.

2. Technical data

PROPERTY	VALUE
LINE SIZE	DN 50 – DN 600 (2" – 24") standard; up to DN 1000 (40") special production, class on request above NPS 24". ISO 5167-2 covers $50 \text{ mm} \leq D \leq 1000 \text{ mm}$, $d \geq 12.5 \text{ mm}$ and $0.10 \leq \beta \leq 0.75$ (5.3.1); below $D = 50 \text{ mm}$ (NPS 2" Sch 80 and heavier) the fitting is outside it whatever the tap holes, and is built to AGA-3.
PRESSURE RATING	ASME Class 150 – 600 standard; special production up to Class 2500 for NPS 2" – 12" and up to Class 1500 for NPS 14" – 24"
DESIGN STANDARD	ISO 5167-1 and -2:2022 plate basis; AGA Report No. 3 (Part 2: 5th edition, 2016) / API MPMS Ch. 14.3 where specified and where ISO 5167-2 does not apply
PRESSURE DESIGN	ASME B31.3, B31.8 or B31.1, as specified; PED where it applies
END CONNECTIONS	Weld × flange standard; flange × flange or weld × weld on request; integral with the body casting. Flanged to ASME B16.5 (B16.47 above NPS 24"), RF or RTJ; butt weld ends to ASME B16.25
PRESSURE TAPPINGS	Flange tappings in the body, 25.4 mm from each plate face (ISO 5167-2:2022, 5.2.2.3; AGA-3 Part 2, 5.4.1); two pairs on the horizontal axis as standard. Tap holes on AGA-3 work: 9.53 mm (3/8") on NPS 2" – 3", 12.7 mm (1/2") from NPS 4" (AGA-3 Part 2, 5.4.3). On ISO 5167 duties: 4, 5, 6, 8, 10 or 12 mm by line size, within the ISO 5167-2 limit of less than 0.13D and less than 13 mm (5.2.2.7). AGA-3 holes exceed that limit on NPS 2", NPS 3" Sch 160 and heavier and NPS 4" Sch 80 and heavier
SINGLE CHAMBER	Plate out through the top once the line section is isolated and depressurised and the clamp bar is removed. NPS 2" – 10": carrier screwed under the seal bar; NPS 12" and above: separate carrier raised by a pinion gear
DUAL CHAMBER	Rotary valve between the lower and the upper chamber, with position indicator; two opposing spring-loaded latches hold it open and closed and are released by hand before it turns; no greasing step in operation. Equalizer valve, vent valve, upper-chamber pressure gauge and operating wrench as standard
MEASURING UNCERTAINTY	Set by β , the Reynolds number and the installation; stated on the duty's calculation sheet
PERMANENT PRESSURE LOSS	About 95 % of the differential at β 0.20, 73 % at β 0.50 and 45 % at β 0.75, falling as β rises (ISO 5167-2:2022, 5.4.1, with $C \approx 0.6$)

3. Materials

The body and its end connections are one casting, so one grade covers both. Low temperature grades are specified where the minimum design temperature, including Joule–Thomson cooling at the station, calls for them. Apart from the AISI 431 shafts, gears and stems, the standard materials are selected for sour service. Where sour service is specified, those parts change to 17-4PH, double aged (H1150D); additional tests such as hardness testing are carried out and the documentation is prepared to NACE MR0175 / ISO 15156.

PART	MATERIAL	NOTE
FITTING BODY	A216 WCB casting as standard; LCB-equivalent cast steel for low temperature service; other grades on request. EN grade for PED: GP240GH	Dual chamber upper and lower body in one grade.
END CONNECTIONS	Integral with the body casting, same grade	Flanged end RF or RTJ to the line flange; butt weld end to the line pipe outside diameter and wall. No end pieces welded on.

PART	MATERIAL	NOTE
ORIFICE PLATE	316L stainless steel as standard; duplex (UNS S31803 / S32205), Alloy 400 (UNS N04400), Alloy 625 (UNS N06625), Alloy C-276 (UNS N10276) on request	Higher grades for high CO ₂ content and free water. Thickness: Inkotek standard by line size, see INK-DS-01.
INTERNALS, DUAL CHAMBER	Rotary valve, valve seat, plate carrier and carrier guide AISI 316L; pinion shafts, pinion gears and valve stems AISI 431, quenched and tempered (17-4PH, double aged H1150D, in sour service)	Standard build, all passivated; valve discs virgin PTFE, wetted screws A4-80.
SEAL BAR & CLAMP BAR, DUAL CHAMBER	Seal bar 17-4PH stainless, double aged (H1150D); clamp bar AISI 4140, quenched and tempered, zinc plated	Together they form the top seal block. Clamp bar and clamping screws sit outside the pressure space; screws zinc-flake coated.
INTERNALS, SINGLE CHAMBER	Plate carrier AISI 316L; seal bar 17-4PH stainless, precipitation hardened; plate seal HNBR	Seal bar, clamp bar, plate carrier and pinion gear; other grades similar to the dual chamber.
SEALS AND O-RINGS	HNBR O-rings, plate seal and valve seals; PTFE conical rod seals and face seals; elastomer rod seals NBR in clean sales gas only, HNBR, FKM or PTFE-based in raw or sour gas	Plate seal moulded and post-cured. Selected against gas composition, temperature and rate of depressurisation.
BODY BOLTING, DUAL CHAMBER	Studs property class 10.9, nuts class 10, zinc-flake coated; EN 10204 3.1	Standard build; low temperature, sour service and line flange bolting to the project specification.

4. Dimensions

Body length and centre-to-face follow the end standard and rating; height and headroom follow the carrier travel. Tables: weld × flange builds from Inkotek designs. Figures not to scale; the approved project drawing governs.

4.1 Dual chamber

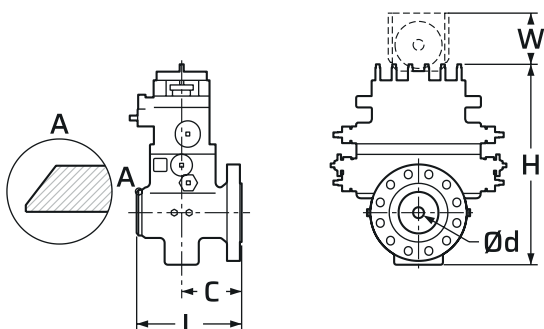


Figure 1 — Weld × flange. Standard; detail A: weld end.

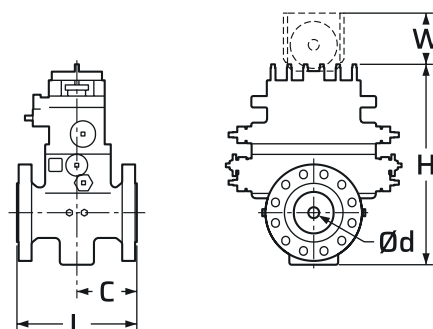


Figure 2 — Flange × flange. On request.

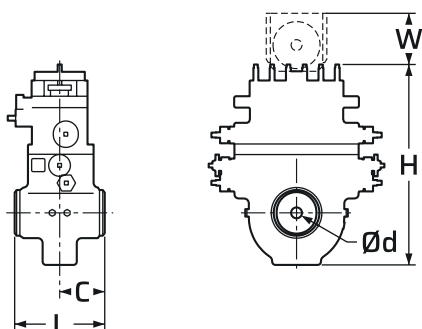


Figure 3 — Weld × weld. On request; no flanged ends.

- L Body length between end connections
- C Centre-to-face dimension; not drawn in Figures 4 – 5
- H Overall height
- W Headroom for plate removal
- d Plate bore, calculated for the duty
- D Line bore, pipe internal diameter (Figures 4 – 5)

NPS	CLASS	WELD END × FLANGE FACE	L mm	C mm	H mm	W mm
6"	600	Sch 80 × RF	387	221	738	190
8"	600	Sch 80 × RTJ	460	256	872	254
10"	600	Sch 80 × RF	506	278	997	317
10"	900	Sch 120 × RTJ	588	318	1055	317
12"	150	Sch 40 × RF	406	206	1071	321
16"	600	Sch 80 × RF	642	346	1333	449
20"	600	Sch 80 × RF	718	382	1586	553

Table 1 — Dual chamber fittings, weld × flange.

- L: weld end to flange face. C: plate centre to flange face. Flange × flange and weld × weld lengths on the approved drawing.
- W: headroom above H when the plate carrier is lifted until its lowest point clears the highest point of the body; the top seal block is removed first. Lifting gear is additional. Clear height needed above the bottom of the fitting: H + W.

4.2 Single chamber

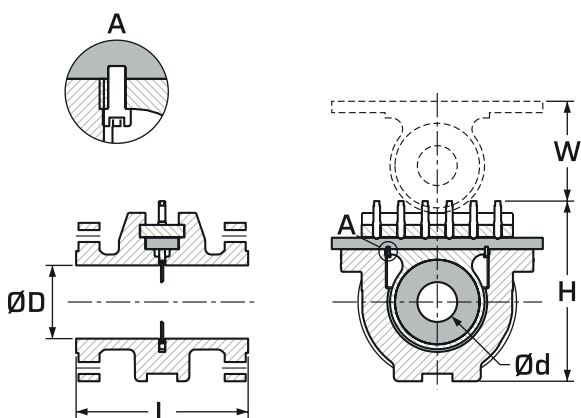


Figure 4 — NPS 2" – 10", flange × flange. Detail A: seal bar and carrier.

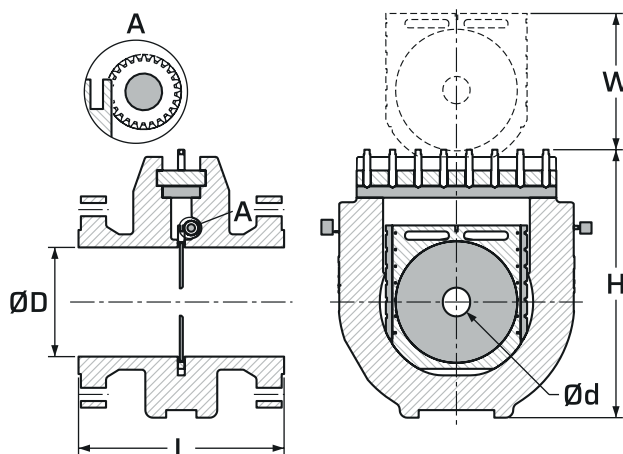


Figure 5 — NPS 12" and above, flange × flange. Detail A: pinion gear.

NPS	CLASS	WELD END × FLANGE FACE	L mm	C mm	H mm	W mm
2"	600	Sch 160 × RTJ	264	136	283	67
4"	600	Sch 80 × RF	333	167	339	129
4"	600	Sch 80 × RTJ	335	169	339	129
6"	600	Sch 80 × RF	399	203	413	187
8"	600	Sch 80 × RF	453	227	477	264
12"	600	Sch 80 × RF	488	272	709	360
16"	600	Sch 80 × RF	642	346	775	433

Table 2 — Single chamber fittings, weld × flange. NPS 2" Sch 160: built to AGA-3 (D < 50 mm, 5.3.1). NPS 4" Sch 80: AGA-3 tap holes exceed 5.2.2.7.

- Symbols as in 4.1; H with the clamp bar fitted. W: seal bar, carrier and plate lifted on NPS 2" – 10"; carrier and plate from NPS 12".

5. Options and configuration

OPTION	CHOICES
PLATE SEAL	IS interchangeable seal, dual O-ring or PTFE seal; seal vulcanised to the plate on request
CONNECTIONS	Flange facing RF or RTJ, centring pins on RF faces; three or four tapping pairs, the extra pairs 30° below the horizontal axis; drain connections to the approved datasheet
FINISH	Painted outside, bore bare; electroless nickel plating all over in place of paint, on request
SUPPLY AND INSPECTION	Alone or built into a complete meter run (INK-DS-03); witnessed and third-party inspection to the project specification

6. Quality control and documentation

ITEM	SCOPE
QUALITY SYSTEM	ISO 9001:2015; PED 2014/68/EU where it applies; EN 10204 3.1 certificates, 3.2 on request
PRESSURE TEST	Hydrostatic test, or pneumatic where the project specifies; leak test to the project ITP
FUNCTION TEST	Factory function test on single and dual chamber fittings
MARKING	Nameplate with model, size and serial number; flow direction on the body; tag number and bore per project
DOCUMENTATION	General arrangement drawing for approval before fabrication; sizing calculation, material certificates, dimensional report, pressure test report and specified pressure-part records. Dual chamber: operation and maintenance manual for the project, issued after award with the approved drawings, seal materials, spares list and lifting data

7. What to send with an enquiry

DATA	WHAT IT DECIDES
Pipe size and schedule · Pipe material	Fitting bore and body grade
Flange standard and rating · End connection arrangement	Pressure class, facing and end arrangement
Medium and its state · Plate change under pressure?	Seals and sour service build; single or dual chamber
Minimum, normal and maximum flow · ISO 5167 or AGA-3	β, the plate bore, the differential and the tap hole size
Pressure and temperature: operating, design and minimum design	Flow calculation, class, body grade and seals
Available vertical clearance · Line orientation	Checked against H + W in Section 4
Tag numbers · Quantity · Project reference Required documentation · Inspection · Delivery location	Marking, test and documentation scope, delivery time

Send the enquiry to info@inkotekenerji.com or through the enquiry form at inkotekenerji.com/en/contact/.

DOCUMENT CONTROL

Ranges are manufacturing capability and are not an offer. Final geometry, materials and documentation are governed by the approved project drawing and the contract.

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