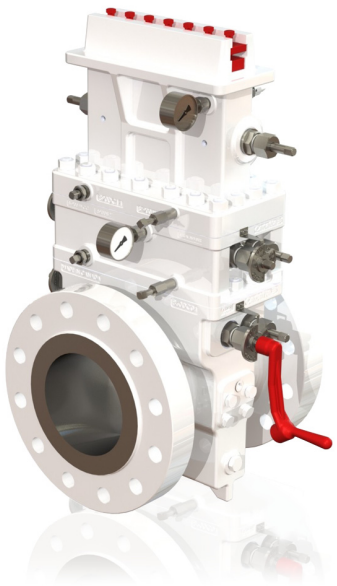
Data sheet DS/FPD220–EN Rev. B

FPD220
Dual-chamber orifice fitting with double block and bleed

Safety by design

Measurement made easy



Double isolation with visible proofing mechanism
— meets HSG253 Category II 'Proved Isolation' requirements

Reduced operating costs
— uninterrupted gas flow while plates are inspected safely without the need for backup lines

Maintenance can be performed at any time
— no need to wait for annual shutdown

High-pressure solution for up to ANSI 2500 rating
— duplex manifold rated to 10,000 psi (698 bar)
— manifold valves fire-tested to BS6755 Part 2 and API 6FA (optional)

Patents pending
— unique technology covered by multiple patents

Automatic valve latches
— a manual reset is required before the valve can be opened
— provides an added opportunity for safety assessment
— latch can be padlocked for additional security

Soft seat valve seal option
— enables a bubble-tight seal between the 3 chambers without the need for frequent valve lubrication

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ABB

FPD220
Dual-chamber orifice fitting with double block and bleed

Introduction

ABB's FPD220 dual chamber orifice fitting with double block and bleed is a proven system for safely and quickly inspecting and changing orifice plates in conformance with strict Oil & Gas industry guidelines.

Orifice meters used in the Oil & Gas industry are typically of either the single chamber or dual chamber design. Single-chamber orifice fittings have an orifice plate that can be replaced without removing the fitting from the pipeline. However, before the plate can be withdrawn, the flow must be stopped and the pipeline vented.

Conventional dual chamber orifice fittings have an extra chamber into which the orifice plate is first withdrawn; this chamber is then isolated from the pipeline. This means that the flow in the pipeline does not have to be stopped to enable removal and refitting of the orifice plate and, although the second chamber must be vented, there is no requirement to vent the pipeline section. However, there is still a safety issue caused by the possibility of leakage from the pipeline into the second chamber during plate removal.

To ensure safe removal of the orifice plate while the line remains pressurized and the product continues to flow, the device must demonstrate that it offers proven isolation of the process from the plate removal area. The FPD220 solution meets these requirements by complying with the HSG253 publication *The safe isolation of plant and equipment* and having been classified as having 'Category II Proved Isolation'. The FPD220 displays the pressures in each chamber using full safety pattern pressure gauges and, before plate removal, these can be monitored; either for absolute value or for time-dependent degradation, as required.

ABB also offer retrofit packages enabling users to upgrade certain existing Dual Chamber and Daniel® Senior® Orifice Fittings to double block and bleed functionality. Each package includes the middle chamber body and a full set of the parts and sub-assemblies needed to add a functioning second valve with separate venting to the orifice fitting. Replacement body studs and nuts are also included to match the new configuration.

Each product has been fully FEA (Finite Element Analysis) tested at the design stage, ensuring maximum safety to the user and the system. The FPD220 has undergone a series of rigorous test cycles ensuring the repeatability of the seals and equipment. During product assembly, each product is fully pressure-tested to satisfy industry safety and European pressure guidelines.

The FPD220 is designed and manufactured in compliance with ASME 16.34 and ASME 16.5, ASTM specifications, AGA-3 Latest Edition and ISO-5167.

Overview

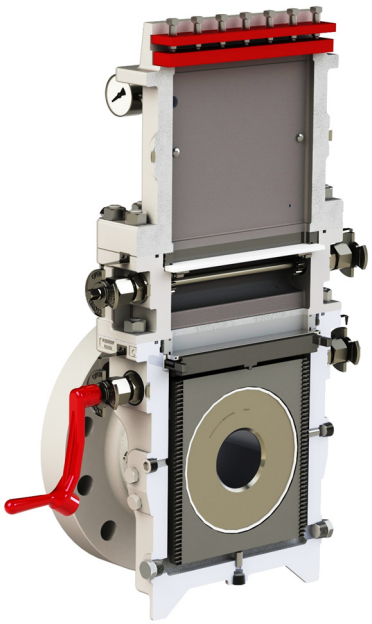


Fig. 1: Sectional view of FPD220

ABB's FPD220 double block and bleed orifice fitting pairs the unmatched safety of double block and bleed functionality with the already exceptional quality and performance of ABB's range of orifice fittings. Two valves separate the operator from the flow line, eliminating the need to isolate the meter run with multiple ball valves. In the event of lower valve failure, the risk of toxic or high pressure emissions through the meter top – putting personnel in danger – is virtually eliminated.

Pressure gauges on the upper and middle chambers help the operator assess equipment status. Local pressure readout can indicate valve failure, vent blockages and other dangerous system malfunctions. For added protection, blowout preventers are installed between each of the gauges and the fitting body.

Automatic valve latches can be fitted to one or both of the valve operating shafts. This security accessory must be reset manually before the valve can be opened, providing an added opportunity for safety assessment and operator awareness. The ability to padlock the latch also brings additional security to fiscal flow measurement applications.

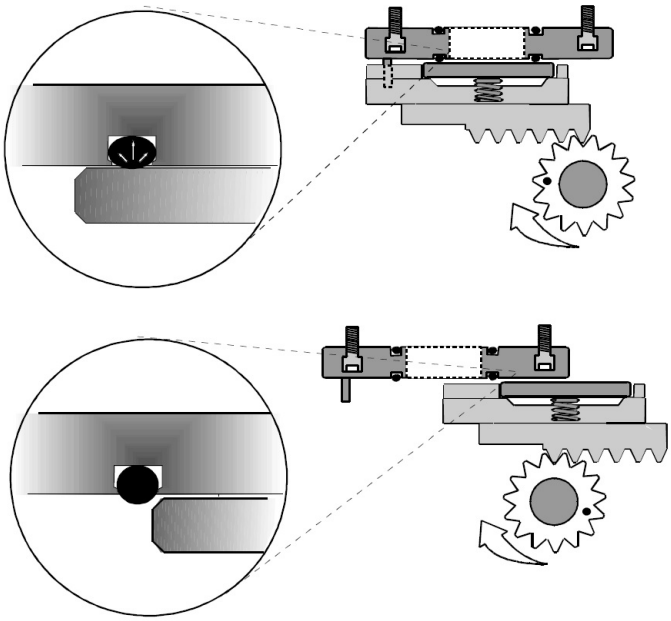


Fig. 2: Soft seat valve seal

The soft seat valve seal is available for the FPD220 DBB orifice fitting models. Effective in all scenarios, this unique design enables a bubble-tight seal between the three chambers without the need for frequent valve lubrication. The specially machined seal channel helps prevent O-ring dislocation and the O-ring seals incorporated are available in a wide variety of compositions. The DBB orifice fitting is also effective with standard grease seals.

FPD220
Dual-chamber orifice fitting with double block and bleed

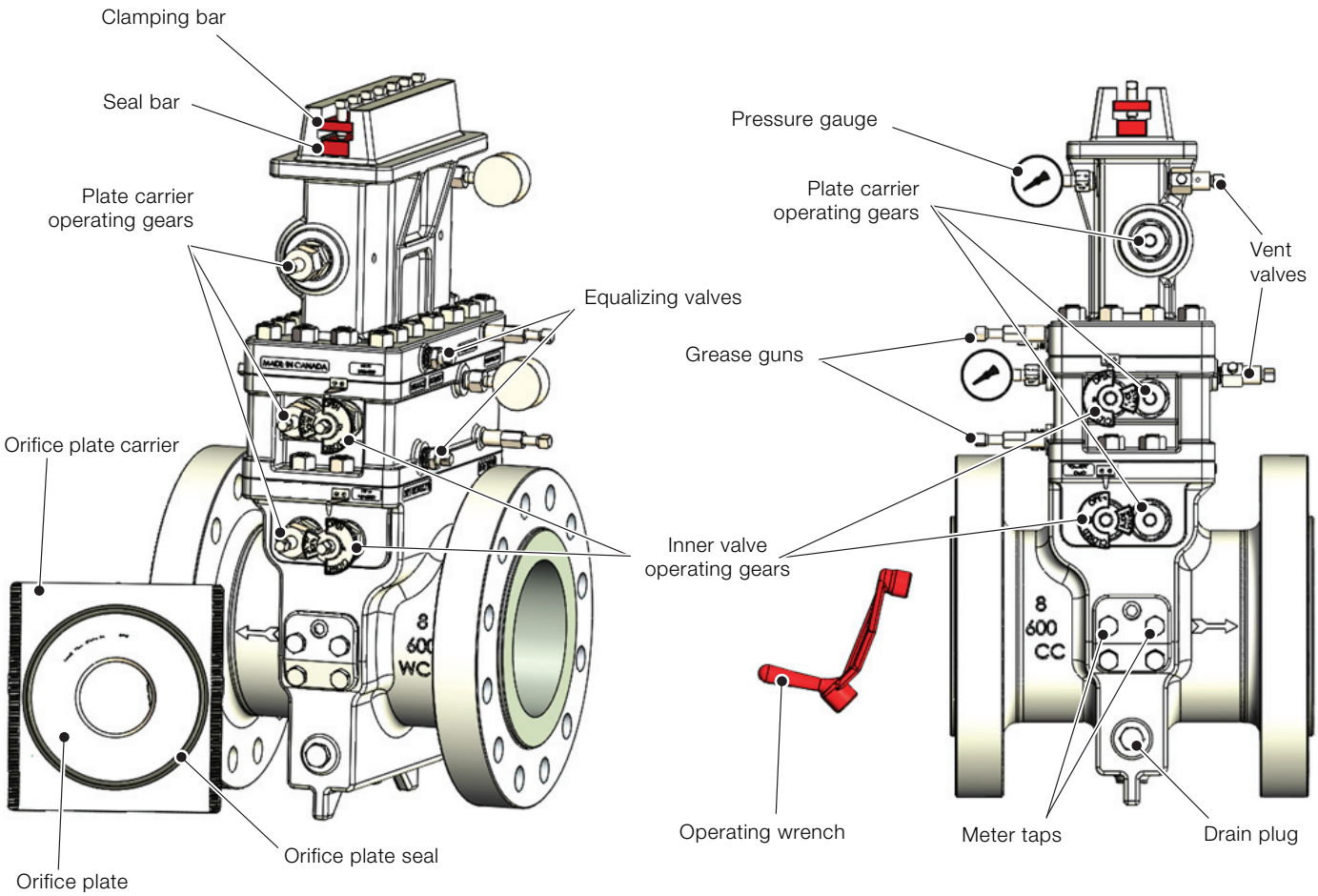


Fig. 3: Key operating parts

Specification

Body configuration
— Flange x flange
— Flange x weld
— Weld x weld
Flanges to FF, RF and RTJ are available in the following formats:
— ANSI 16.5 or 16.47
— Techlok & SPO
— Grayloc®
— API 6A
— or to specific client specification

Design codes
— HSG 253 The safe isolation of plant and equipment
— NACE MR-01-75
— ASME B31.1 Power Piping
— ASME B31.3 Liquid Petroleum Transportation Piping Systems
— PED 97/23/EC Pressure Equipment Directive

Measurement standards
— ISO 5167
— API MPMS 14.3.2 (AGA Report No. 3)

Standard materials of construction
Body casting
— ASTM A216 WCB, WCC
— ASTM A352 LCC
— ASTM A487 4D
— ASTM A351 CF8M
— ASTM A995 Gr.4A, Gr.6A
— Other materials are available on request

Internal components
— Stainless steel 316 / 316L
— Stainless steel A351 CF8M
— Carbon steel AISI430

Pressure tappings
— 1 or 2 sets per side; 1/2 in. NPT female
— Flanged end pressure tappings available to suit ANSI rating of meter

External bolting
— ASTM A194 Gr.4 (Zinc coated)
— ASTM A320 L7 (Zinc coated)
— Other materials are available on request, including optional coatings such as PTFE, Xylan and Xylar

Seals
Seal bar
— HNBR O-ring (standard); gasket (optional)
Shafts
— PTFE packing (standard); HNBR O-ring (optional)
Inner valves
— Grease seal (standard); HNBR O-ring (optional)
Orifice plate
— Type 'K' 2000 edition formed HNBR seal on a 316 SS retainer ring
— Dual ring HNBR O-rings standard on a 316 SS retainer ring
— PTFE snap seal two-piece virgin PTFE assembly

Orifice plates
Industry-standard orifice plate thicknesses as per the guidelines set out within ISO 5167 and API 14.3.

FPD220
Dual-chamber orifice fitting with double block and bleed

Pressure gauges
— Full safety pattern type scaled:
LP chamber: 0 to 29 psi (0 to 2 bar)
HP chamber: 0 to 1160 / 3625 / 9427 psi (0 to 80 / 250 / 650 bar), depending on meter pressure rating.
— Dials: standard or fluorescent
— Gauge material: Inconel, stainless steel 316

Manifold valves
— Fire tested to BS6755 Part 2 and API 6FA (optional)

Maximizing performance
To ensure absolute metering accuracy, it is recommended that industry practice is followed and meter tubes are purchased and manufactured to complement the orifice fitting. This ensures concentricity between the pipe and the fitting and eliminates uncertainties associated with misalignment.

ABB can supply the following items for a complete metering solution:
— orifice fitting with meter tube including straightening vane / profiler
— DP transmitters and process transmitters
— flow computer and enclosure
— spare parts for service and commissioning
— product service training

Temperature rating
–29 to 38 °C (–20 to 100 °F) standard

Pressure rating

Size in. (mm)	ANSI pressure class (fully-rated)
2 (50) to 12 (300)	150, 300, 600, 900, 1500, 2500
14 (350) to 24 (600)	150, 300, 600, 900, 1500
18 (450) to >24 (>600)	150, 300, 600, 900

Note. 600, 900, 1500 and 2500 flanges are available as RF or RTJ. 150 and 300 flanges are available as RF only.

Acknowledgements

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Notes

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