

<b>Package Number</b>	IN-FO-0150
<b>Package Name</b>	Orifice Plate / Restriction Orifice Plate
<b>Scope of Work (* To be confirmed)</b>	<p><b><u>General</u></b></p> <ol style="list-style-type: none"> <li>1) The SUPPLIER is totally responsible for ensuring that all the requirements industry codes and standards applicable to Orifice Plate / Restriction Orifice Plate are met.</li> <li>2) All materials shall be new and shall conform in appearance and quality to Industry Standards, requirements of this requisition, applicable Codes and Standards and recommended practice.</li> <li>3) Raised Face (RF) flanges shall have surface texture of 125 to 250 AARH (3.2 to 6.3 µm) and Ring-Type Joint (RTJ) flanges shall have surface texture of 63 AARH (1.6 µm) according to ASME B16.36.</li> <li>4) The bolts and nuts shall be as per piping specification requirements.</li> <li>5) The SUPPLIER shall provide inspection certificate type 3.1 as per EN 10204.</li> <li>6) The use of asbestos for any part of the assembly is strictly not allowed.</li> <li>7) Orifice Plate, Restriction Orifice Plate, shall be designed and fabricated to meet the requirements of the latest edition of ISO 5167 and ISO/TR 15377. Orifice Plates which are not covered by ISO 5167 shall be designed as per R. W. Miller or L. K. Spink or ISO/TR 15377,</li> <li>8) Orifice Plate, Restriction Orifice Plate, material shall be minimum SS316.</li> <li>9) Orifice assembly shall be supplied complete with orifice plate, pair of flanges with tapping, bolts, nuts, gaskets, plugs, jack screws, etc. The complete assembly shall be fully checked and assembled at the factory.</li> <li>10) Plate thickness shall be such that the effects of the process with respect to plate deflection is reduced to a minimum. Notwithstanding this the following minimum thicknesses shall be implemented: <ul style="list-style-type: none"> <li>• Below 8" line size the thickness shall be 4.0 mm</li> <li>• 8" to 12" line size the thickness shall be 8.0 mm</li> <li>• Above 12" line size the thickness shall be 12.0 mm</li> </ul> </li> <li>11) It shall be the SUPPLIER's responsibility to verify plate thickness based on process conditions and, if required, advise a higher thickness.</li> <li>12) In such cases where the thickness of the orifice plate is more than permitted by limitations for the orifice edge, the downstream edge shall be counter-bored or bevelled at an angle of 45° (±15°) to the required thickness at the orifice edge.</li> <li>13) The SUPPLIER shall provide Orifice Plate, Restriction Orifice Plate, sizing calculations.</li> <li>14) Plate handles (tabs) shall be attached to the plate by welding. Attachments based on a screwed arrangement shall not be accepted.</li> <li>15) Orifice assembly shall be tropicalised and provided with anti-corrosion protection and shall be suitable for the humid and saline atmosphere.</li> <li>16) The SUPPLIER shall provide documentation in accordance with the SUPPLIER Data Requirements Listing (SDRL) after issuing of Purchase Order.</li> <li>17) Positive Material Identification (PMI) shall be done as per project requirement.</li> <li>18) Substitution of equivalent materials is subject to approval of BWO. All requests for</li> </ol>

substitution shall be accompanied with sufficient data / details for review / approval.

19) Packing and preservation shall be provided as per project requirement.

**Orifice Plate**

20) Suitable type of orifice plate shall be selected by the SUPPLIER in accordance with the operating conditions provided.

21) Unless otherwise specified Orifice Plate shall be sharp, square edged, concentric and bevel, for normal service.

22) Quadrant edge type orifice plate shall be used for viscous service where the pipe Reynolds number is less than 10,000.

23) Eccentric or segmental orifices may be used in special services such as slurry and wet gas service.

24) Orifice plate beta ratio (d/D) shall be within limits of 0.2 and 0.7. Orifice bore of less than 12.5 mm is to be avoided. Drain or vent holes shall only be provided on line sizes greater than 4". Diameter of drain holes shall not exceed 0.1 x the orifice bore (d). Drain holes shall comply with the requirements of ISO TR15377

25) For the meter maximum scale reading a round figure should be selected that is 5% above the maximum flow to be measured under normal or abnormal operating conditions, and 15-20% above the normal operating flow.

26) Standard differential pressure ranges used shall be 125 mbar, 250 mbar, 500 mbar and 1000 mbar as far as possible. However, other ranges may be used when the standard ranges cannot meet the other requirements. Ranges lower than 0-12.5 mbar and higher than 0-1000 mbar should be avoided.

27) Conditioning orifice plates may be considered where the upstream and downstream straight length availability is limited.

**Flanges**

28) Orifice flanges shall be according to ASME B16.36. Flanges shall be forged. Flanges fabricated from plate shall not be accepted.

29) Orifice flanges shall be of minimum 300lbs rating for line sizes up to 16". Line sizes above 16" shall be minimum 150lbs rating .

30) Orifice assemblies having Ring Type Joint (RTJ) flanges shall be supplied with a plate carrying holder unless otherwise specified.

31) Orifice flange assembly shall have two sets of tap 180° apart. Tap size shall be ½" NPT (Female). One set of tap shall be provided with ½" NPT (Male) SS316 nipple and other set with ½" NPT (Male) blanking plugs.

32) Orifice "Flange Taps" shall generally be used for line sizes up to and including 12". Orifice "Radius Taps (D, D/2 taps)" shall be used for line sizes 14" and above. Radius Taps shall be located at 1 pipe diameter upstream and ½ pipe diameter downstream of orifice plate inlet face.

33) For line sizes less than 2" integral orifice or pre-fabricated meter run shall be used. Fabricated piping shall meet the requirements of the prevailing piping specification and be coated as per the requirements of Specification - Surface Preparation and Protective Coatings.

34) If one flow measuring element is used for two independent measurements, four tappings are required to obtain segregation. For instance, this is the case if a control and shutdown transmitter shares the same measuring element.

**Restriction Orifice Plate**

- 35) Restriction Orifice Plate shall be concentric, sharp edged and suitable for mounting between flanges and gasket supplied by others
- 36) Concentric or eccentric type multi-stage restriction orifice design shall be considered for very high pressure drop application.
- 37) For high pressure drops, consideration should be given to hard-facing the orifice or to selecting a material which can be hardened throughout.
- 38) A single stage multi-hole restriction orifice plate design shall be considered where cavitation and excessive noise are foreseen, however this type shall not be used on services containing solid particles. For the requirements with respect to noise the level stipulated in Human Factor Engineering Philosophy, shall be taken into consideration.
- 39) An integral handle shall be provided with restriction orifice.
- 40) In case of restriction orifice plate mounted between ring-type joint flanges, the plate shall be supplied with a plate holder.

Total quantities required: 37-off

Size ranges from ½" to 24"

Thickness ranges from SCH 30 to SCH XXS

Flange materials are of A105 Galvanized outer & Cu-Ni Inner or GRE

Estimated contract award: Q4 2021 \*

Estimated delivery: Q2 2022 FCA factory \*

**Project Registration**

Santos is committed to ensuring Australian Industry the opportunity to participate in the Barossa Project. Expressions of Interest are invited from contractors and suppliers with the relevant capability and capacity to undertake the scope of work.

This is a request for specific expressions of interest. Contractors and suppliers will be considered for prequalification and tender if suitably qualified against this package.

**Scope level definition:**

**Full scope:** Able to produce / supply all the package.

All registrations are to be completed via ICN Gateway [BarossaOffshore.icn.org.au](http://BarossaOffshore.icn.org.au). Please contact the ICNNT if registration assistance is required. Contact details: (08) 8922 9422 [or resources@icnnt.org.au](mailto:resources@icnnt.org.au).

Project Website: [Santos Australia](http://Santos Australia)