

Package Number	TBA																																																
Package Name	Elastomeric bearings system																																																
Scope of Work (* To be confirmed)	<p>The elastomeric bearing together with restraints and shearing/sliding mechanisms shall withstand specified vertical and horizontal loads and shall constrain and/or compensate the relative movements of topside module in specified directions.</p> <p>There shall be 2 types of elastomeric bearings, PIN and L-Sliding.</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Pattern</th> <th>Requirement</th> <th>Max Longitudinal Dimension</th> <th>Max Transverse Dimension</th> <th>Vertical Dimension</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>PIN</td> <td>Constrained in 3 Linear Movements with Moments Released</td> <td>3.0 m</td> <td>3.0 m</td> <td>1.5 m (Fixed)</td> </tr> <tr> <td>II</td> <td>L-Sliding (LSLD)</td> <td>Constrained Linear Movements in Vertical and Transverse, Free Linear Movement in Longitudinal, with Moments Released</td> <td>3.0 m</td> <td>2.0 m</td> <td>1.5 m (Fixed)</td> </tr> </tbody> </table> <p>There shall be 4 groups of the elastomeric bearings with the maximum load bearing capacities as specified below</p> <p>Operating/Transit Conditions</p> <table border="1"> <thead> <tr> <th>Capacity</th> <th>Type I - PIN</th> <th>Type II - LSLD</th> </tr> </thead> <tbody> <tr> <td>GROUP A</td> <td>F₁ = 250 MT F₁ = 650 MT F_v = 2450 MT Max Uplift 245 MT</td> <td>F₁ = 25 MT F₁ = 650 MT F_v = 2450 MT Max Uplift 245 MT</td> </tr> <tr> <td>GROUP B</td> <td>F₁ = 160 MT F₁ = 500 MT F_v = 1620 MT Max Uplift 162 MT</td> <td>F₁ = 16 MT F₁ = 500 MT F_v = 1620 MT Max Uplift 162 MT</td> </tr> <tr> <td>GROUP C</td> <td>F₁ = 130 MT F₁ = 390 MT F_v = 1160 MT Max Uplift 116 MT</td> <td>F₁ = 13 MT F₁ = 390 MT F_v = 1160 MT Max Uplift 116 MT</td> </tr> <tr> <td>GROUP D</td> <td>F₁ = 80 MT F₁ = 210 MT F_v = 790 MT Max Uplift 79 MT</td> <td>F₁ = 8 MT F₁ = 210 MT F_v = 790 MT Max Uplift 50 MT</td> </tr> </tbody> </table> <p>Design Accidental Conditions</p> <table border="1"> <thead> <tr> <th></th> <th>Type I - PIN</th> <th>Type II - LSLD</th> </tr> </thead> <tbody> <tr> <td>GROUP A</td> <td>F₁ = 600 MT F₁ = 900 MT F_v = 2560 MT Max Uplift 256 MT</td> <td>F₁ = 60 MT F₁ = 900 MT F_v = 2560 MT Max Uplift 256 MT</td> </tr> <tr> <td>GROUP B</td> <td>F₁ = 340 MT F₁ = 650 MT F_v = 1630 MT Max Uplift 163 MT</td> <td>F₁ = 34 MT F₁ = 650 MT F_v = 1630 MT Max Uplift 163 MT</td> </tr> <tr> <td>GROUP C</td> <td>F₁ = 260 MT F₁ = 530 MT F_v = 1200 MT Max Uplift 120 MT</td> <td>F₁ = 26 MT F₁ = 530 MT F_v = 1200 MT Max Uplift 120 MT</td> </tr> <tr> <td>GROUP D</td> <td>F₁ = 170 MT F₁ = 290 MT F_v = 790 MT Max Uplift 79 MT</td> <td>F₁ = 17 MT F₁ = 290 MT F_v = 790 MT Max Uplift 79 MT</td> </tr> </tbody> </table>	Type	Pattern	Requirement	Max Longitudinal Dimension	Max Transverse Dimension	Vertical Dimension	I	PIN	Constrained in 3 Linear Movements with Moments Released	3.0 m	3.0 m	1.5 m (Fixed)	II	L-Sliding (LSLD)	Constrained Linear Movements in Vertical and Transverse, Free Linear Movement in Longitudinal, with Moments Released	3.0 m	2.0 m	1.5 m (Fixed)	Capacity	Type I - PIN	Type II - LSLD	GROUP A	F ₁ = 250 MT F ₁ = 650 MT F _v = 2450 MT Max Uplift 245 MT	F ₁ = 25 MT F ₁ = 650 MT F _v = 2450 MT Max Uplift 245 MT	GROUP B	F ₁ = 160 MT F ₁ = 500 MT F _v = 1620 MT Max Uplift 162 MT	F ₁ = 16 MT F ₁ = 500 MT F _v = 1620 MT Max Uplift 162 MT	GROUP C	F ₁ = 130 MT F ₁ = 390 MT F _v = 1160 MT Max Uplift 116 MT	F ₁ = 13 MT F ₁ = 390 MT F _v = 1160 MT Max Uplift 116 MT	GROUP D	F ₁ = 80 MT F ₁ = 210 MT F _v = 790 MT Max Uplift 79 MT	F ₁ = 8 MT F ₁ = 210 MT F _v = 790 MT Max Uplift 50 MT		Type I - PIN	Type II - LSLD	GROUP A	F ₁ = 600 MT F ₁ = 900 MT F _v = 2560 MT Max Uplift 256 MT	F ₁ = 60 MT F ₁ = 900 MT F _v = 2560 MT Max Uplift 256 MT	GROUP B	F ₁ = 340 MT F ₁ = 650 MT F _v = 1630 MT Max Uplift 163 MT	F ₁ = 34 MT F ₁ = 650 MT F _v = 1630 MT Max Uplift 163 MT	GROUP C	F ₁ = 260 MT F ₁ = 530 MT F _v = 1200 MT Max Uplift 120 MT	F ₁ = 26 MT F ₁ = 530 MT F _v = 1200 MT Max Uplift 120 MT	GROUP D	F ₁ = 170 MT F ₁ = 290 MT F _v = 790 MT Max Uplift 79 MT	F ₁ = 17 MT F ₁ = 290 MT F _v = 790 MT Max Uplift 79 MT
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The elastomeric bearings shall have the stiffness ranges as follows

Bearing Type	Rubber Dimension	Shear Stiffness, k		Compression	Rotational
	(L x W x H)	x-dir.	y-dir.	Stiffness, k _v	Stiffness, k _r
	mm	kN/mm	kN/mm	kN/mm	kNm/rad
Type I - PIN	650 x 650 x 300	4800~5200	4800~5200	1500~2500	n/a
Type II - LSLD	650 x 650 x 300	10.0	4800~5200	1500~2500	n/a

(all technical data provided above are preliminary, subject to final detail engineering)

All the equipment and other items in the scope of Work shall be designed to ensure a minimum design life of 25 years

The scope of work of the package comprises the supply of all the materials, performance of all the activities and provisions of all the resources necessary to complete the Work and provide necessary warranties.

1. Unless otherwise noted, the Supplier’s scope of work shall include, but not limited, to the design, engineering, procurement, fabrication, testing, inspection, warranty, packing, preservation, transportation and installation support of the elastomeric bearing assembled to steel casing (System)
2. Compliance with applicable AS standards, Flag state, IMO codes, DNV class, International codes and standards. Includes necessary approvals, Certification and Documentation.

The FPSO shall be registered as a Floating Production Storage and Offloading (FPSO) unit under Singapore flag. The FPSO shall comply with national requirements and international maritime conventions ratified or adopted by Flag State.

The FPSO shall be classed by Det Norske Veritas Germanischer Lloyd (DNV GL). The FPSO and all equipment onboard are to comply with the requirements arising from the following Class notation:

✕ OI, Ship-shaped, Oil production storage installation, BIS, Crane-offshore, ECO, FMS, HELDK-SH, POSMOOR, PROD

Key applicable IMO standards:

Standard	Title	Edition
SOLAS 74/88	Safety of Life at Sea convention 1974, and its Protocol of 1988	2014
MODU Code	Code for the Construction and Equipment of Mobile Offshore Drilling Units	2010
LSA Code	International Life-Saving Appliance (LSA) Code, 1996	2010 Edition
MARPOL	Articles, Protocols, Annexes and Unified Interpretation of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 and 1979 Protocols	Consolidated Edition 2011

Key applicable international standards:

International Standard	Title	Edition
AISC 335	Specification for Structural Steel Buildings – Allowable Stress Design and Plastic Design	1989
AISC 316-89	Manual of Steel Construction – Allowable Stress Design	9 th edition, 1989
API RP2A	Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms – Working Stress Design	2014
ASTM D573	Standard Test Method for Rubber – Deterioration in an Air Oven	2019
Norsok N-003	Actions and Action effects	2017
EN 1337-3	Structural Bearings – Part 3: Elastomeric Bearings	2005

3. Initial technical development in order to arrive a detailed technical specification of the System
4. Detail design of the System to meet the approved specification
5. Provision of the elastomeric bearing maintenance and replacements
6. Detailed calculation of elastomeric bearing in compliance with EN 1337-3
7. Finite element analysis (FEA) will be used to calculate and analyse the strength and stiffness of the complete steel cases to justify design
8. Perform spectral fatigue calculations of the elastomeric bearings
9. Manufacturing of the System to agreed standards
10. Tagging and labelling for all System
11. Inspection, Testing and Certification
 - Inspection and testing during manufacturing in accordance with the project requirements and approved Inspection and Test Plan
 - Factory Acceptance Test / Final Acceptance Test
 - Mechanical Completion with documentations in accordance with project requirements
 - Full functional test for the package

Elastomeric bearing shall be tested in accordance with EN 1337-3. ASTM D573 will be used to check its long-term performance.
12. Full documentations for all System in accordance to Supplier Register Document List (SDRL)
13. Rules and Regulatory requirements

	<ul style="list-style-type: none"> ○ DNV Class Approval Certification ○ DNV Statement of Conformity against Project Written Scheme of Examination ○ Classification Society Inspection to be executed by the Vendor in its shop <p>14. The conditioning prior to packing, to ensure safe preservation of the System during transportation, storage on site, erection and stand by before operation</p> <p>15. Supervision and commissioning service for installation, pre-commissioning and start-up on day rate basis</p> <p>16. Training of BWO and End User Personnel</p> <p>Other requirements:</p> <ul style="list-style-type: none"> ● Supplier shall perform the Work in a safe manner and keep the working environment in clean condition at all times. Supplier shall comply with the Santos and BWO's QHSE procedures and standards ● Supplier shall note that this package will be operating in Offshore FPSO. All the equipment supplied shall be designed for minimum maintenance, longest possible duration for refilling of chemicals and change out of internals. ● Supplier shall ensure that the material of construction shall be suitable for the service life, operating and design conditions and all the requirements given in this requisition and its attachments. ● Supplier shall also provide necessary support to BWO, related to his scope of supply, to obtain permits and consents from principal regulatory authority for all oil and gas operation in Barossa Field, Australia ● Supplier shall ensure compliance to the codes, standards, laws, rules, international conventions and guidelines applicable to the design, manufacturing, transportation, installation, commissioning, start-up and operation of the Work as required by BWO, Coast State (Local Government Authorities), CS, Flag State, Insurance companies and other interested parties having statutory or other jurisdiction over the Work. ● Supplier shall ensure that the items included in this package are designed for the accelerations, motions and metocean conditions of the Barossa field. The elastomeric bearings will be installed by BWO on the FPSO Topside module stools. ● Supplier shall provide Project Management, Services and Administration of the Work and the site facilities in accordance with BWO requirements. ● Supplier shall provide Risk Management and Reporting for his scope of Work in accordance with BWO requirements. Risk analysis shall be undertaken in the early stages of the Work, a risk register prepared and it shall be continuously updated and issued for BWO's review.
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- Supplier shall ensure correct choice of materials, goods, plants and workmanship to enable the Work to be completed and/or be fully operational in accordance with BWO requirements
- The goods shall be based on industrial proven technology and materials. Design and method of manufacturing and installation shall conform to current industrial standards upon installation
- Supplier shall manage the preparation, development and coordination of all design, engineering, procurement and manufacturing activities of the Work at all stages.
- Supplier shall identify all the interfaces between Supplier and BWO
- Supplier shall supply recommended spare materials, equipment, parts, test instruments and tools with associated costs that will be required to effectively start up, operate and maintain the FPSO in accordance with BWO requirements.
- Supplier shall carry out the stage inspection, shop visits, testing, final inspection and FAT of all the equipment and other items in his scope of supply. All the records of visits and inspection reports shall be submitted to BWO.
- BWO will have the right to participate and witness the different stages of manufacturing including stage inspection and FAT. Supplier shall provide sufficient notice to BWO for participation and shall not despatch the items unless inspected and/or cleared by BWO.
- BWO inspection requirements are governed by the Criticality Rating assigned to the Work and described in the Quality System Requirements specification.
- Criticality Rating applicable for this package is Category 2
- All the items supplied shall be painted and surface protected according to the BWO Specification for surface preparation and protective coating.
- Supplier shall implement a documented system for weight control, in accordance with BWO requirements and specifications. For all weights listed, the tolerance shall be given. The weighing procedure shall give requirements for weighing equipment accuracy and calibration. Supplier shall calculate the weight and Centre of Gravity (COG) of the skids on a continuous basis and report to BWO.
- Supplier shall provide necessary assistance with on and offshore commissioning and start-up as requested by BWO.
- Supplier shall provide warranty for the Work performed in accordance with BWO requirements.
- Supplier shall ensure that all materials and equipment related to the Work are

	<p>stored, protected, preserved, tagged or labelled, packaged and handled in accordance with BWO requirements. Supplier's preservation procedure shall include methods of preservation, de-preservation and re-preservation. Preservation and packing shall be suitable for all environments the supplied items may be exposed to including seaworthy conditions during transport. This shall also apply to free issued BWO items received by Supplier, if any.</p> <p>Quantities required: 30 sets of PIN type 30 sets of LSLD type</p> <p>Estimated contract award: Q4 2021 * Delivery required: Q4 2022 *</p>
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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.

Note that an important part of the project registration process is to register an Expression of Interest at the correct Scope level.

Scope level definition:

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

Partial scope: Able to produce / supply one or more of the sub-packages.

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

Project Website: Santos Australia