



## Bayu Undan / Darwin LNG Facilities Technical Delivery Terms

<b>Material Description:</b>	<b>Flexible Hose Assemblies (FHAs)</b>		
<b>Doc No:</b>	<b>TDT 04</b>	<b>Rev:</b>	<b>09</b>
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### 1 SCOPE

This document outlines the minimum technical requirements applicable for the supply of flexible hose assemblies (FHAs) required for the Santos Australian Business Unit (ABU) – West facilities managed by the Integrated Operations Support Centre (IOSC). This excludes Offtake (OCIMF) and Elastopipe Hook Up Spools. The information for these hoses can be found in their relevant MR documents (TBA & H8-10000077067 respectively).

### 2 GENERAL REQUIREMENTS

The engineering, specification, procurement and supply of FHAs shall be in accordance with the requirements of the Flexible Hose Assembly Management Policy document number ABUW/MAIN/POL/001, and Flexible Hose Specification ABUW/MAIN/SPE/0007. The Policy outlines the requirements for temporary and permanent FHAs and is supplemented by this Technical Delivery Terms (TDT) document which specifies traceability and certification levels and requirements.

#### CODES & STANDARDS

Specifically, the following codes and standards shall apply to all FHAs purchased for these facilities (unless clearly specified otherwise on the relevant FHA datasheet):

ISO 1402	Rubber and plastics hoses and hose assemblies – Hydrostatic testing
ASME B16.5	Pipe Flanges and Flanged Fittings.
EN 10204	Metallic Products – Types of Inspection Documents.
ISO 10380	Pipework for Corrugated Metallic Hoses and Hose Assemblies
ASME IX	Boiler and Pressure Vessel Code – Welding and Brazing Qualifications
ASME B31.3	Process Piping

### 3 MANUFACTURING & FABRICATION REQUIREMENTS

Full descriptions of the FHA types, diameters, lengths, end fittings (inclusive of material grades), operating conditions (temperature and pressure) and the intended service shall be provided by the Purchaser on any request for quote (RFQ) for FHAs, typically in the form of a datasheet, specification and/or OEM part number. All FHAs shall be manufactured in accordance with a Santos approved

datasheet unless where specifically stated otherwise in ABUW/MAIN/POL/001 or as approved by the Santos FHA Technical Authority (TA).

All welding of end fittings shall be performed and supported by documentary evidence of a qualified Welding Procedure Specification in accordance with specifications for Welding and Inspection of Piping Systems Doc. No H8-GEN-00-020-S01-0003.

#### 4 TESTING & TEST FACILITY REQUIREMENTS

FHAs shall be tested to the standard specified on their datasheet and/or specification, typically ISO 1402. In the scenario that no test standard is specified on the FHA datasheet, the Supplier shall seek confirmation of the required test standard from the Santos FHA TA.

Testing facilities approved for performing pressure testing of FHAs shall conform to the requirements of AS ISO / IEC 17025 and be NATA accredited in the field of Mechanical Testing, Class 13.65.11 (Pipes, hoses, valves and fittings, Hydrostatic pressure tests).

Testing facilities approved for performing Electrical resistance and/or conductivity testing of FHAs shall conform to the requirements of AS ISO / IEC 17025 and be NATA accredited in the field of Mechanical Testing, Class 13.65.99 (Pipes, hoses, valves and fittings, Determination of electrical resistance and/or conductivity of hose assemblies).

Where testing needs to be performed outside of Australia, testing shall be performed by an appropriate and competent FHA testing facility but must be independently witnessed by a third party inspector/surveyor from a Classification Society that is a member of the International Association of Classification Societies (IACS).

#### 5 CERTIFICATION REQUIREMENTS

For all flexible hose assemblies, material certification shall be provided in accordance with the requirements of EN 10204 as follows:

COMPONENT	SERVICE	EN10204 CERTIFICATION
<b>Hose</b>	Bunkering	2.1
	Fire Suppression	2.1
	Process	2.1
	Utility	2.1
	Packaged	2.1
COMPONENT	MATERIAL	EN10204 CERTIFICATION
<b>Fittings</b>	Stainless Steel	3.1
	Carbon Steel	2.1
	Bronze/Brass	2.1
	Nylon/Plastic	2.1
	Nial Bronze (Nickel, Aluminum Bronze)	3.1
COMPONENT	STYLE	EN10204 CERTIFICATION
<b>Couplings</b>	Camlock	3.1
	Surelock	2.1

	Dry Disconnect	3.1
	ISO-B	2.1
	QRC- Hydraulic	2.1
	QRC Air (Nitto, Cejn, Rectus etc.)	2.1
	Flange	*

**NOTES :**

- \* Refer TDT06 for Flange Specifications
- 1. Refer the FHA Datasheet (for Process and Packaged Equipment FHAs) or the FHA Specification (for Utility FHAs) for the FHA PED Category and Risk Class. Where a datasheet does not specify the PED Category and/or the Risk Class, consult the Santos FHA TA.
- 2. Where applicable, for any welding the items shall be accompanied by a qualified and approved welding procedure specification, welder qualification records, post-weld heat treatment records, non-destructive testing (NDT) reports and proof load testing report (or engineering calculation and NDT) for lifting lug / pad-eye welds.
- 3. The certificates shall be in the English language or in other languages if they are accompanied by an endorsed and dated English translation of the contents. All certificates shall be originals or certified copies of the originals.
- 4. The Supplier shall retain on file (and make available on request by the Purchaser) certification including evidence of relevant type tests performed on the specific hose assemblies. These type tests shall include proof pressure hold tests and burst tests as specified in ISO 1402, or an approved equivalent standard.
- 5. All hydraulic hoses must be supplied with MSHA (Mine Safety and Health Administration (USA)) "Hydraulic hose meeting interim fire rating" approval.

## 6 IDENTIFICATION

All FHAs shall be fitted with a stainless steel tag lanyarded to the assembly. Lanyards shall be made from 316 stainless steel wire with 316 stainless steel ferrules. All FHAs equal to or longer than two meters in length shall be fitted with two tags, one on each end of the assembly. All FHAs will be permanently etched with the Unique ID at each end fitting. In accordance with the requirements of ABUW/MAIN/POL/001, all tags shall bear the assembly manufacturer's identification and design markings.

The information displayed on the tags shall be in accordance with the following table:

TAG FIELD	FHA TYPE				
	BUNKERING	FIRE SUPPRESSION	PROCESS	UTILITY	PACKAGED EQUIPMENT
UNIQUE ASSY ID.	✓	✓	✓	✓	✓
TEST CERT #	✓	✓	✓	✓	✓
SERVICE	✓			✓	
ASSY. DATE	✓	✓	✓	✓	✓
MWP (BARG)	✓	✓	✓	✓	✓
NEXT TEST. DATE	✓	✓			
DATASHEET NO.	✓	✓	✓	✓	✓
SAP MM	✓	✓	✓	✓	✓
POSITION NO.					✓
SP ITEM NO.	✓		✓		

FHAs shall also be identified by their service colour code using the method of application specified in their Specification (for Utility FHAs) or Datasheet (for all other FHAs). Note, the FHA Specification and Datasheets shall specify the required colour code.

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All information displayed on tags shall be laser etched. Hand engraving is not permitted.

## **7                    PRESERVATION AND SHIPPING REQUIREMENTS**

Crating and packages shall be suitable for opening and resealing without difficulty or damage. Preservation shall be such that if the packaging is disturbed, then negligible degradation is permitted for a minimum period of 12 months from dispatch from the vendor's works. Crating and packages shall be marked with clear handling, storage and warning instructions to protect against damage to the preservation applied. Any FHAs that require complete protection from weather (e.g. water ingress, etc.) shall be sealed with blanks as appropriate to prevent any contaminants from entering during handling / transportation. Document ALL/SUP/LOG/PRO/2000 (Export Packing Requirements) also provides guidance.