



Exploration & Production

GENERAL SPECIFICATION

SUBSEA SYSTEMS

GS EP SPS 007

Tie-in systems

07	01/2011	General revision
06	10/2009	General revision
05	10/2008	General revision
04	10/2007	General revision
00	10/2002	First issue
Rev.	Date	Notes

Owner: EP/TDO/TEC

Managing entity: EP/TDO/TEC/SBS



Contents

1. Scope	3
2. Reference documents.....	3
3. Introduction	6
3.1 Terms and Abbreviations.....	6
3.2 Responsibility.....	6
4. Design philosophy	6
4.1 General.....	6
4.2 Materials and corrosion protection.....	9
4.3 Flow assurance.....	9
5. Tie-in system requirements.....	9
5.1 General.....	9
5.2 Stroke-in and Connection Tool	11
5.3 Connectors and seals	12
5.4 Hubs and terminations.....	13
5.5 Jumpers/Spools	14
5.6 Caps/pig launchers	14
5.7 ROV tools	14
5.8 Tie-In Porches and alignment structures	14
5.9 Operations	15
5.10 Design report	16
6. Interfaces	16
7. Qualifications/testing.....	17
7.1 Qualification	17
7.2 Integration test prior to SWT	17
7.3 Shallow water test.....	18
7.4 Deep water acceptance test	18



1. Scope

The purpose of this document is to specify the minimum additional requirements and amendments thereof for the design, fabrication, installation, testing, commissioning, operation and abandonment of the Subsea Tie-in Systems for Subsea Production Systems.

This specification is complementary to **GS EP SPS 001** and **GS EP SPS 002**.

The Tie-in System encompasses Pull In and Connection equipment and tools for the Tie-in of rigid and flexible lines and spools as well as the Tie-in of umbilicals.

The specification covers both permanently installed equipment and associated tools and temporary equipment required for offshore installation and commissioning of the systems as well as potential intervention work.

This specification is valid for diverless Tie-in systems.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

This technical specification is supplementary to the reference documents reported section 1 and shall therefore be used in conjunction with these said documents; in the event of any conflicts between the provisions of the reference documents, the following order of priority shall apply:

- Company specifications
- Main International reference documents, with the following order of priority:
 - **ISO 13628**, as the baseline for Tie-in systems design, installation and operation requirements, particularly section 1, 2, 5, 6, 8 and 9
 - **API**, which should be used for specific material and components selection
 - Others standards upon Company approval, wherever a specific item is not covered by the above documents.

Standards

The latest edition of the following industry standards, including amendments at the time of order placement and other referenced standards and codes, shall apply unless otherwise specifically agreed.

Reference	Title
ANSI	ASME Boiler and Pressure Vessel code section III - Rules for Construction of Nuclear Power Plant Components
ANSI B 16.5	Pipe Flanges and Flanged Fittings
ANSI B 31.4	Liquid Transportation Systems for Hydrocarbons
ANSI B 31.8	Gas transmission and distribution piping system
ANSI B 31.3	Chemical plant and Petroleum refinery piping
API	Rules and Recommended Practices as listed in ISO 13628 - Part 1: Bibliography (p. 128) - In addition API RP 17D



Reference	Title
DNV	- DNV-OS-F101 Submarine pipeline Systems - DNV-RP-F104 Mechanical pipeline couplings - Certification note 2.7-1: Offshore Freight Containers - RMO: Rules for planning and execution of Marine Operations
ISO 13628	Petroleum and Natural Gas Industries - Design and Operation of Subsea Production Systems
ISO 13628-1	Petroleum and Natural Gas Industries - Design and Operation of Subsea Production Systems - Part 1: General Requirements and Recommendations
ISO 13628-2	Petroleum and Natural Gas Industries - Unbonded flexible pipe systems for subsea and marine applications
ISO 13628-4	Petroleum and Natural Gas Industries - Design and Operation of Subsea Production Systems - Part 4: Subsea Wellhead and Tree Equipment
ISO 13628-5	Petroleum and Natural Gas Industries - Subsea umbilicals
ISO 13628-8	Petroleum and Natural Gas Industries - Design and Operation of Subsea Production Systems - Part 8: Remotely Operated Vehicle (ROV) Interfaces on Subsea Production Systems
ISO 13628-9	Petroleum and Natural Gas Industries - Design and Operation of Subsea Production Systems - Part 9: Remotely Operated Tool (ROT) Intervention Systems
ISO 15156-1	Petroleum and Gas Industries-Materials for Use in H ₂ S-containing environments in oil and gas production - Part 1: General principles for selection of cracking-resistant materials Including Technical Corrigenda and Technical Circulars
ISO 15156-2	Petroleum and Gas Industries-Materials for Use in H ₂ S-containing environments in oil and gas production - Part 2: Cracking-resistant carbon and low alloy steels, and cast irons Including Technical Corrigenda and Technical Circulars
ISO 15156-3	Petroleum and Gas Industries-Materials for Use in H ₂ S-containing environments in oil and gas production - Part 3: Cracking-resistant CRAs (corrosion resistant alloys) and other alloys including Technical Corrigenda and Technical Circulars
Others	Equivalent recognised standards not referenced above may be used upon Company agreement

**Professional Documents**

Reference	Title
Not applicable	

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	

Total General Specifications

Reference	Title
GS EP COR 102	Design of cathodic protection of sea line by sacrificial anodes
GS EP COR 401	Installation of anodes on submerged pipelines
GS EP COR 502	Control by electrical measurements of cathodic protection of submerged pipelines
GS EP PLR 222	Carbon steel flanges and branch outlet fittings and forged components for pipelines (sweet service)
GS EP PLR 231	Induction bends for pipelines (mild, intermediate and severe sour service)
GS EP PLR 232	Carbon steel flanges and branch outlet fittings and forged components for pipelines (mild, intermediate and severe sour service)
GS EP PLR 401	Installation of submarine pipelines
GS EP PLR 420	Site welding of carbon steel pipelines to API 1104 (sweet service)
GS EP PLR 421	Site welding of carbon steel pipelines to API 1104 (mild, intermediate and severe sour service)
GS EP PVV 614	Welding of duplex and superduplex stainless steel



Reference	Title
GS EP SPS 001	Design philosophy and requirements for Subsea Stations
GS EP SPS 002	Design of subsea structures
GS EP SPS 008	Thermal insulation of subsea stations
GS EP SPS 009	Corrosion protection of subsea stations
GS EP SPS 023	Cleaning and Flushing of Hydraulic Systems
GS EP SPS 027	WROV spread minimum requirements
GS EP SPS 029	Metallic Materials for Subsea Production Facilities

3. Introduction

3.1 Terms and Abbreviations

The following abbreviations and terms are used in this specification:

API	American Petroleum Institute
FEA	Finite Element Analysis
Host structure/Facility	Structure or facility to which a given Tie-in system is dedicated
ISO	International Standardisation Organisation
Line system	Mono-bore or multi-bore system comprising flexible line(s), rigid spool(s), pipeline(s) and umbilical(s)
OBSROV	Observation Remote Operated Vehicle
ROT	Remote Operated Tool
WROV	Work-class Remote Operated Vehicle
XT	Christmas Tree

3.2 Responsibility

Deviations from any of the requirements defined herein shall be treated as non-conformances in accordance with Company procedures.

It is the responsibility of anyone who supplies structures, intervention means and equipment according to this specification to ensure compliance with all relevant statutory requirements.

4. Design philosophy

4.1 General

The Tie-In systems shall be designed for diver less and guideline less interventions (installation, retrieval, and reconnection...), taking into consideration the environmental conditions such as water depth and current.

Metrology systems are considered as field proven and depending on connection technology a pull-in system is assumed not be required. Consequently, for projects which include large size