

GENERAL SPECIFICATION

INSTRUMENTATION

GS EP INS 146

Generation and Distribution of Hydraulic Energy
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1. Scope

This specification defines the minimum requirements for the design, fabrication and testing of hydraulic power generation systems and their associated distribution network.

2. Reference documents

The equipment shall satisfy the requirements and regulations of the country of installation and specific standards referred to in this specification.

Where national regulations exist, their provisions and those of the standards and codes to which they refer shall apply, supplementing or amending the provisions of this document.

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

Reference	Title
Directive 94/9/EC	European Directive 94/9/EC (23/03/94) on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres
IECEX	IEC System for Certification to Standards relating to Equipment for use in Explosive Atmospheres (IECEX System)
ISO 4406	Hydraulic fluid power - Fluids - Method for coding the level of contamination by solid particles

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
GS EP ELE 031	Design of earthing and bonding systems for Offshore Installations
GS EP ELE 032	Design of earthing and bonding systems and lightning protection for Onshore Installations
GS EP ELE 079	Electrical apparatus for potentially explosive gas atmospheres
GS EP ELE 111	Induction motors
GS EP INS 101	Instrumentation Design
GS EP INS 102	Instrumentation Identification
GS EP INS 106	Instrument Installation

Reference	Title
GS EP INS 110	Instrumentation for package units
GS EP INS 114	Instrument Tubing and Fittings
GS EP INS 115	Instrument Earthing
GS EP INS 147	Wellhead Control Panels
GS EP PVV 112	Piping material classes
GS EP PVV 211	Design and fabrication of pressure vessels according to ASME VIII
GS EP PVV 212	Design and fabrication of pressure vessels according to BSI PD 5500
GS EP SAF 261	Emergency Shutdown and Emergency De-Pressurisation (ESD & EDP)
GS EP SPS 019	Subsea production control system
GS EP SPS 023	Cleaning and flushing of hydraulic systems

3. Terminology and Definitions

There are five types of statements in this specification, the “shall”, “should”, “may”, “can” and must” statements. They are to be understood as follows:

Shall	Is to be understood as mandatory. Deviating from a “shall” statement requires derogation approved by Company.
Should	Is to be understood as strongly recommended to comply with the requirements of the specification. Alternatives shall provide a similar level of protection and this shall be documented.
May	Is to be understood as permission.
Can	Is to be understood as a physical possibility.
Must	Expresses a regulatory obligation.
Company	TOTAL E&P or any TOTAL E&P subsidiary.
Contractor	Any Party that has signed a Contract with Company for the Engineering, Procurement, Construction, and Installation in part(s) or in full of a project.
Vendor	The package Vendor sub-contracted by the Contractor or by Company.
Supplier	The Party that manufactures or supplies equipment, either individually or as a Packaged unit for the project.

3.1 Abbreviations

The following terms and abbreviations are used in this document.

DHSV	Down Hole Safety Valve
ESD	Emergency Shut-Down (SIS)
FAT	Factory Acceptance Test
HP	High Pressure
HPU	Hydraulic Power Unit
ICSS	Integrated Control and Safety System
PLC	Programmable Logic Controller
VHP	Very High Pressure
WHCP	Wellhead Control Panel

4. General Principles

Hydraulic systems will comprise of a Hydraulic Power Unit (HPU) for generating the hydraulic energy and an associated distribution network in order to provide hydraulic energy to the user.

The different users requiring hydraulic energy are typically:

- Hydraulic on/off valves
- Hydraulic wellhead valves
- Hydraulic control or choke valves
- Hydraulic pumps
- Subsea production systems.

Hydraulic systems may be segregated for different functions and users. The number and segregation of hydraulic systems shall be defined by the project specifications. However, HPUs for Subsea production Systems shall be independent and dedicated for this function.

For small installations, the HPU may be combined with the Wellhead Control Panel (WHCP), refer to [GS EP INS 147](#), although the HPU functionalities shall remain within a dedicated section of the overall equipment.

The hydraulic system shall be designed to ensure that the fluid retains at least cleanliness codes 17/15/12 as defined by [ISO 4406](#).

The hydraulic fluid shall be defined in the project specifications. For subsea control applications, it shall be specified by the subsea production system supplier. The overall hydraulic system shall be designed to operate with the defined fluid with specific care taken with the fluid viscosity.

Detailed requirements of each hydraulic system shall be defined in a project particular specification. This specification shall detail the environmental data, sizing criteria, construction and operation requirements. It shall address the hydraulic power unit, and the sizing of the distribution network. The distribution network shall comprise of supply and return lines.