



Exploration & Production

## GENERAL SPECIFICATION

### Drilling & Wells

**GS EP FP 333**

|                                                                          |
|--------------------------------------------------------------------------|
| <b>Specification for Downhole Completion Equipment<br/>Manufacturing</b> |
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## 1. Scope

This document defines the requirements for Quality Assurance and Quality Control with respect to design, material, manufacturing, testing and final supply of downhole completion equipment for the use within TOTAL.

This General Specification applies to the following but not limited list of equipment:

- Packers,
- Liner Hangers
- Sub Surface Safety Valves
- Tubing Retrievable Safety Valves
- Wireline Safety valves
- Side Pocket Mandrels
- Formation Isolation Valve
- Lock Mandrels & Nipples
- Sliding sleeves
- Gauges and Gauges mandrels
- Control Line management system
- Sand Control Equipment
- Downhole Chemical injection valves.

## 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.

### Standards

| Reference                    | Title                                                                                            |
|------------------------------|--------------------------------------------------------------------------------------------------|
| <a href="#">ISO TS 29001</a> | Quality management system requirements for product & service supply                              |
| <a href="#">ISO 10432</a>    | Petroleum and natural gas industries — Downhole equipment<br>Subsurface safety valve equipment   |
| <a href="#">ISO 16070</a>    | Petroleum and natural gas industries — Downhole equipment —<br>Lock mandrels and landing nipples |
| <a href="#">ISO 14310</a>    | Petroleum and natural gas industries — Downhole equipment —<br>Packers and bridge plugs          |
| <a href="#">ISO 11960</a>    | Petroleum and natural gas industries — Steel pipes for use as<br>casing or tubing for wells      |

| Reference             | Title                                                                                                                        |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------|
| API Q1                | Quality management system requirements for product & service supply                                                          |
| ISO 14001             | Environmental management systems — Requirements with guidance for use                                                        |
| ISO/IEC 17025         | General requirements for the competence of testing and calibration laboratories                                              |
| NACE MR0175/ISO 15156 | Material for use in H <sub>2</sub> S containing environments in Oil & Gas production                                         |
| ISO 13680             | Petroleum and natural gas industries - Corrosion-resistant alloy seamless tubes for use as casing, tubing and coupling stock |
| ASNT-SNT-TC-1A        | Outlines for Qualification of Nondestructive Testing Personnel                                                               |
| ISO 13678             | Evaluation and testing of thread compounds for use with casing, tubing and line pipe                                         |
| ASME IX               | Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators               |
| ISO 10005             | Quality management systems - Guidelines for quality plans                                                                    |
| API SPEC 6A718        | Specification of Nickel Base Alloy 718 (UNS N07718) for Oil and Gas Drilling and Production Equipment                        |
| BS EN 10204           | Metallic materials. Types of inspection documents                                                                            |

### 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 |
|----------------|-------|
| Not applicable |       |

## 3. Quality Management requirements

### 3.1 Quality Assurance

The selected contractor/supplier/manufacture shall be able to demonstrate conformity and be auditable to [ISO TS 29001 / API Q1](#), and [ISO 14001](#).

The selected contractor/supplier/manufacture and/or its Subcontractor(s)/Supplier(s) shall be able to demonstrate conformity and be auditable to ISO/API standards related to materials to be delivered.

### 3.2 Quality control

In all respects to manufacturing and testing the contractor/supplier/manufacture shall provide a **Quality Control Plan** (QCP) to TOTAL for approval. Inside this QCP will be the agreed production / testing route and the third party inspection points for TOTAL. The QCP shall conform to [ISO 10005](#) and shall be submitted for approval prior to any manufacturing.

## 4. Contract Management

### 4.1 Project contract management

At the time of tendering for a contract a flow diagram should be submitted for approval as part of the overall Quality management process.

### 4.2 Purchase order management

In the event of Direct Purchase Order award a flow diagram should be submitted for approval as part of the overall Quality management process.

### 4.3 Subcontract

Any manufacturing subcontracted shall be the responsibility of the contractor/ supplier/ manufacturer who was awarded the contract / purchase order by TOTAL. All dialogue if required between the contractor/supplier/manufacture's sub vendor and TOTAL will be via the contractor/supplier/manufacture.

## 5. Design & Product Qualification Requirements

### 5.1 General

Unless differently quoted on the purchase agreement the design requirements shall include methods, assumptions and calculations, and shall include those criteria for size, test, working and operating pressures, materials, environment (temperature limits, chemical) and other pertinent requirements upon which the design is based. Design documentation shall be reviewed and verified by a qualified individual other than the individual who created the original design.

Equipments shall be manufactured to drawings and specifications that are substantially the same as those of the size, type and model of equipment which has passed the validation test.

The contractor/supplier/manufacture shall establish verified internal yield pressure, collapse pressure and minimum tensile strength, temperature limits, and rated working pressure, excluding end connections. The contractor/supplier/manufacture shall identify the critical component(s) of the product and the modes of stress. The contractor/supplier/manufacture shall calculate the stress level in the critical component(s) based upon the maximum loads in the design input requirements to determine those component(s) which are critically stressed. Critically stressed components are those which are stressed to 90% or greater of the minimum design yield strength of calculations, which shall include consideration of temperature limit effects and thermal cycles. Metal mechanical properties de-rating shall be in accordance with [ASME](#) Boiler and Pressure Vessel, Section II, Part D.

The design shall take into account the effects of pressure containment and pressure-induced loads. Specialized conditions, such as pressure testing with temporary test plugs, shall also be considered.

Component and subassembly identification and interchange ability shall be required within each contractor/supplier/manufacture's size, type and model, including working pressure rating of equipment. Cumulative dimension tolerances of components shall be such that proper operation of the equipment is assured. This requirement applies to supplier/manufacture assembled equipment and to replacement components or sub-assemblies.

The contractor/supplier/manufacture shall perform a **Failure Mode, Effects and Criticality Analysis (FMECA)** on the equipment in accordance with TOTAL requirements and with the relevant international standard.

FMECA shall be initiated as an integral part of the early design process (as soon as the concept is sufficiently detailed) and shall be periodically reviewed and updated to address any changes or deviations.

The objectives of FMECA shall be to:

- Identify simple failures modes and mechanisms that may lead to a fearful event.
- Evaluate corresponding causes and potential consequences on reliability.
- Rank each failure according to a criticality category of failure effect and occurrence.
- Establish mitigation actions to suppress or control the critical risks (with appropriate measures such as design, qualification testing, additional testing, procurement, manufacturing, quality assurance, maintenance, installation ...).