



Exploration & Production

GENERAL SPECIFICATION

Drilling & Wells

GS EP FP 333

Specification for Downhole Completion Equipment Manufacturing
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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
ISO TS 29001	Quality management system requirements for product & service supply
ISO 10432	Petroleum and natural gas industries — Downhole equipment Subsurface safety valve equipment
ISO 16070	Petroleum and natural gas industries — Downhole equipment — Lock mandrels and landing nipples
ISO 14310	Petroleum and natural gas industries — Downhole equipment — Packers and bridge plugs
ISO 11960	Petroleum and natural gas industries — Steel pipes for use as 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 ₂ 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 ...).



All FMECA studies shall be carried out at the level of the smallest part about which information is available, such as the failure rate (e.g.: electronic components).

The contractor/supplier/manufacturer shall use probability and consequence criteria, and assess the risk through a matrix of criticality, which defines risk acceptable zones (low probabilities and/or low consequences) and risk non acceptable zones (high probabilities and/or high consequences).

At the beginning of the design phase, the contractor/supplier/manufacturer shall submit a FMECA execution plan which shall outline required level of analysis detail for each system/sub-system, work responsibilities and analysis approach (including a risk criticality classification scheme).

The contractor/supplier/manufacturer shall consolidate their inductive analysis (FMECA) by a **Fault Tree Analysis (FTA)** on identified fearful events concerning availability, in compliance to the relevant international standard.

The main objectives are to identify the critical path which contributes to the top event and its probability of occurrence.

The quantification of the different undesirable events shall be achieved through a failure tree-diagram, which enables to get a model of the undesirable events and quantify their probability of occurrence.

Note: FMECA and FTA techniques are compatible methods of risk analysis (FMECA considers only single failures, while FTA considers combination of multiple failures)

Unless otherwise specified on the Purchase Order the following minimum design validation grades shall apply to the listed products:

5.1.1 Liner Hangers, Packers and Bridge Plugs

- For Hydrocarbon applications according to [ISO 14310 V3](#)
- For Gas applications according to [ISO 14310 V1](#)
- For applications that TOTAL deems to be critical, according to [ISO 14310 V0](#) plus any special requirement stated in the PO.

Note: All qualification testing shall be carried out on casing and tubing in the as manufactured condition representative of the maximum OD and ovalization permitted by the manufacturing specification. Pre machining of the casing or tubing ID except for casing wear grooves is not permitted.

5.1.2 Sub Surface Safety Valves (SSSV)

All valves shall be qualified by a Test Agency according to [ISO 10432](#) Annex B for the stipulated Service Class. The Test Agency shall conform to [ISO/IEC 17025](#) and [ISO 10432](#) Annex A.

5.1.3 Lock Mandrels

For Hydrocarbon applications according to [ISO 16070 V1](#)

For Gas applications the test medium shall be gas or alternatively additional testing shall be undertaken at the rated working pressure with gas

Qualification scaling limitations are as defined in the applicable Product Specification



5.2 Performance rating

The contractor/supplier/manufacture shall state the pressure, temperature and axial performance ratings, as applicable for the products with a product performance envelope defined and justified. This envelope is a graph that illustrates the combined effects of differential pressure and axial loads on the given piece of equipment. The various failure modes shall be given for any piece of proposed equipment.

5.3 Design verification

The contractor/supplier/manufacture shall successfully complete a detailed design verification review on the basis of design input parameters provided by TOTAL as part of the Functional / Equipment Specification. Design input parameters shall include but not be limited to:

- Well architecture or design
- Well conditions, including pressure, temperature, Co₂ and H₂S content and in situ Ph
- Flow or injection regimes
- Tensile, bending, burst and collapse parameters
- Minimum required flow by area

Design verification shall be performed to ensure that each piece of equipment design meets the supplier/manufacture technical specifications and the needs of TOTAL. Design verification shall include one or more of the following:

- Design reviews
- Design calculations
- Physical tests
- Comparison with similar designs and historical records of defined operating conditions.

In the case of stress analysis and finite element analysis on critical components and assemblies, TOTAL shall review contractor/supplier/manufacture design data and performance calculations prior to issuing Manufacturing Drawings. The review shall verify good design practice and documentation that supports performance qualification testing.

The Design Verification Review records for all critical equipment shall be subject to further verification by recognized and reputable Certifying Authority, a Design Appraisal Report shall be generated and made available to TOTAL as an output to this process

5.4 Design changes

All design changes shall be documented and reviewed against the design verification and design validation to determine if the change is a substantive change. A design that undergoes a substantive change becomes a new design requiring design verification and design validation.

Design validation may be done by testing only the component or series of components, rather than the entire assembly. The test shall adequately simulate the loading conditions that would be present if the entire assembly were tested. The contractor/supplier/manufacture shall document the detailed test results and analysis that demonstrate that the component test adequately simulates the required loading conditions.

Design changes identified as non-substantive shall include documented justification.



The contractor/supplier/manufacture shall, as a minimum, consider the following:

- Stress levels of the modified or changed components;
- Material changes;
- Functional changes.

6. Material control

6.1 General

Material and/or service shall be stated by the contractor/supplier/manufacture.

Should the contractor/supplier/manufacture propose to use another material (metallic or non-metallic), the contractor/supplier/manufacture shall state that this material has performance characteristics suitable for all specified parameters.

Supplied material shall meet the relevant requirements of [ISO 15156](#) / [NACE MR0175](#) where service conditions dictate.

All supplied material shall come from an approved source and contractor/supplier/manufacture approval system demonstrated in the tender.

Chrome series or CRA accessories shall be made from [ISO 13680](#) casing / coupling stock or proprietary grades conforming to Total requirements. Alternative materials shall be subject to prior Total approval.

6.2 Qualification of material properties

Non wrought products are not permitted without formal approval from TOTAL.

All forgings shall be rough machined as far as possible to near net shape prior to heat treatment to minimize degradation of mechanical properties after final machining.

Where Qualification Test Coupons are in use, they shall be processed as part of the same heat treatment lot and be representative of the design ruling section. All testing shall be conducted at the 1/4T location.

Mechanical testing shall include but not be limited to the following:

- Tensile testing including Yield, UTS, Reduction of Area and Elongation,
- Hardness testing of products and QTC
- Charpy V Notch toughness testing as per relevant standard(s)

For pressure containing parts with a design ruling section greater than 4", material shall be qualified on a prolongation. Where requested by TOTAL additional test specimens should be taken at 1/2" T location in addition to the standard 1/4" T specimens. Where such parts are subject to weld overlay and Post Weld Heat Treatment, a simulated PWHT specimen may be requested by TOTAL. This specimen shall undergo PWHT per the contractor/supplier/manufacture Welding Procedure Specification at 10-15°C below the parent material tempering temperature. Mechanical testing comprising of tensile, hardness and Charpy V notch testing shall be completed and reported on the Material Test Certificate for information purposes.

In the case of pressure containing materials being deployed at operating temperatures greater than 150°C, additional tensile test shall be performed at the maximum operating temperature.



Material property reduction factor for elevated temperatures can be proposed to Total with supporting data.

7. Alloy 718

[API SPEC 6A 718](#) requirements shall apply to products manufactured from Alloy 718.

Prior to manufacture TOTAL shall formally approve all metallurgical reports generated to demonstrate freedom from deleterious phases.

8. Manufacturing

Manufacturing shall be performed by API and/or ISO licensed facilities or their approved sub vendors. Manufacturing shall work only to approved Engineering Bills of Material and specifications that meet the applicable requirements.

A pre-manufacturing meeting is to be held by the contractor/supplier/manufacture prior to manufacturing to assure compliance to TOTAL requirements. The TOTAL representative may attend this meeting although this is not mandatory.

8.1 Traceability

Each critical component, as defined during the design phase, shall be uniquely traceable during the whole manufacturing stage. This unique serial number shall be permanently marked on the component and be specified on every report related to this component.

The downhole completion assembly equipment shall be uniquely traceable. This unique serial number shall be permanently marked on the assembly and be specified on every report related to this assembly.

It is the responsibility of the manufacturer to maintain the identification of material until it is received by TOTAL.

8.2 Welding

Any welding of components shall be in accordance with the applicable standard and is subject to inspection as noted in the QCP.

All welding shall be carried out using Welders / Welder Operators & Welding Procedure Specifications qualified in accordance with [ASME IX](#) & [ISO 15156](#) (as applicable).

All welding Plant, equipment and monitoring devices shall be calibrated on a maximum frequency of 6 calendar months.

Post Weld Heat Treatment shall be carried out in accordance with the qualified Welding Procedure Specification.

Nickel base alloy overlays shall exhibit an Fe content of less than 5% when analyzed 3mm from the base material fusion line unless otherwise specified on the PO or other formal Contractual document.

Where weld overlays are used for repair purposes they shall be considered as part of the design criteria and as such shall be appropriately qualified. Particular attention should be paid to the use of corrosion resistant overlays during repair or remanufacture, the application of such processes may provide deposited material with lower mechanical properties than the base



material so Engineering analysis and verification is required prior to the application of such overlays.

For equipment intended to be used for a non critical application, no repair welding is permitted on materials without prior written permission from TOTAL.

For equipment intended to be used for critical application, no repair welding is permitted on materials.

Repair excavation techniques shall be limited to grinding or machining, no flame or arc gouging is permitted.

8.3 Non-Destructive Examination (NDE)

NDE procedures shall be approved by a Level III Examiner.

NDE techniques shall be in accordance with the ASTM and ASNT reference standard requirements, as applicable.

NDE technicians shall be qualified and certified to ASNT recommended practice [SNT-TC-1A](#), for the particular NDE method being utilized.

Interpretation of the results shall be performed by individuals qualified to [ASNT SNT-TC-1A](#), Level II minimum.

Acceptance criteria shall be in accordance with the materials relevant standard.

In the case of weld repairs 100% of the weld repair area and remaining original weld shall be subject to the NDE as detailed within the specification or drawing.

8.3.1 Ultrasonic Inspection

All Ultrasonic Flaw detectors shall be subject to daily calibration checks prior to commencement of testing consisting of linearity and resolution, probe index and calibration against the applicable reference standard.

All Pressure containing and pressure controlling parts shall be examined using ultrasonic straight beam and angle beam techniques prior to finish machining.

8.3.2 Magnetic Particle Inspection

All Pressure containing and pressure controlling parts shall be examined using Wet Fluorescent MPI or Penetrant (corrosion resistant materials) post final machining.

Magnetic Particle apparatus shall be checked a minimum weekly for magnetic field strength, particle strength and Fluorescence, UV Lights shall be periodically checked for intensity.

8.3.3 Hardness testing

Hardness tester shall be calibrated with appropriate reference block prior to hardness measurement.



8.4 Assembly

8.4.1 General

Assembly of the equipment shall be performed as per:

- Approved product assembly drawing as specified in paragraph 9.2 of this General Specification;
- Contractor/supplier/manufacturer's detailed assembly drawing(s)
- Contractor/supplier/manufacturer's detailed assembly procedure(s)
- Bill of materials

All bolting shall be tightened using Torque wrenches calibrated on a maximum frequency of 6 calendar months. Applied torque shall be according to API or in the case of special bolting per the manufacturers specified torque, due consideration shall be given to the presence of coating or plating on bolting when establishing the correct torque.

Traceability of critical components shall be assured during the whole assembly stage and recorded on a specific contractor/supplier/manufacturer's report.

At the end of the assembly, the equipment shall be marked as minimum with:

- Part Number,
- Unique Serial Number

8.4.2 Connections make up

TOTAL shall approve the type of mill end thread compound used for Thread and Coupled (T&C) connections. The mill end of the proprietary T&C connections shall be assembled with a torque / turn monitoring graph. The assembly shall be fully traceable by using test charts / electronic records, pipe numbers, coupling lot number etc.

The mill end make up torque shall be in conformance with the proprietary T&C connections procedures and will be aimed towards the maximum torque unless otherwise agreed with TOTAL. All connections after make up shall be arms length drifted with the appropriate drift size and length as indicated in 4.3.

The applied thread compound on the mill end to the T&C connection shall conform with the proprietary T&C connections procedures and to [ISO 13678](#) unless otherwise specified on the purchase agreement or from the following list.

For environmentally classified thread compounds; (CEFAS Class E or OSPAR Class Yellow)

- **SEAL Guard ECF** – applicable to metal to metal sealing premium connections
 - Not to be used on materials where the chrome content is 22% or above
 - Not to be used where the down-hole well temperature is above 150°C
- **Best-o-life 3010 NM Special** - applicable to metal to metal sealing premium connections
 - Not to be used on super 13% Chromium or where the chrome content is higher than 13%.
 - Not to be used where the down-hole well temperature is above 120°C



Where an unapproved CEFAS Class E or OSPAR Class Yellow thread compound will be used, Manufacturer shall demonstrate through tests that the thread compound will be suitable for the given application before use.

The use of "Dope-free" or "Dope-less" products shall be qualified by TOTAL HQ before use.

8.5 Corrosion Protection

Each product shall be suitably protected against corrosion during transit and storage for a period of one (1) year under the specific storage conditions.

The coating material shall be readily removable with environmentally friendly products.

The contractor/supplier/manufacturer shall advise for any precaution during handling and removal of coating material, in particular regarding the disposal procedure.

8.5.1 Protection during manufacture of equipment

Corrosion protection shall be ensured throughout the manufacturing process, including temporary periods where components or sub-assemblies are stocked.

8.5.2 Final protection

Final corrosion protection of external surfaces of equipment is achieved through the contractor/supplier/manufacturer specifications.

8.5.3 Protection of threads

Storage grease shall be applied to all exposed threads after inspection by the TOTAL representative.

The thread protector's design should conform to [ISO 11960](#) annex I. and documented proof of conformity should be submitted to TOTAL before use.

Where closed end protectors have been specified in the purchase agreement a 5 mm weep hole shall be present in each closed-end type protector to allow venting of the pipe bores.

A light oil may be applied prior to the TOTAL inspection to prevent rust.

The approved storage compounds are as follows:

- TOTAL Jet Marine Imperator modified 2571 – for all zones
- Rust-Veto AS:
 - for all zones except sub Sahara or tropical zones
- Kendex OCTG Orange corrosion inhibitor:
 - for all zones except sub Sahara or tropical zones

Unless otherwise specified on the purchase agreement the above storage compounds shall only be used.

Where an unapproved CEFAS Class E or OSPAR Class Yellow storage compound will be used, Manufacturer shall demonstrate that the storage compound will properly protect the thread for one and half year in the specific storage conditions before use.

Thread protector used shall be closed end and comply with all specified thread standard.



8.6 Sub-contracted items

Care shall be taken by contractor/supplier/manufacturer to comply with the above when ordering sub-assemblies or components from sub-contractor/supplier/manufacturer.

TOTAL QA/QC reserved the right to audit any sub-contractor/supplier/manufacturer facility.

8.7 Identification and Marking

8.7.1 General

All equipment supplied against this General Specification shall carry the API Monogram where the contractor/supplier/manufacturer is licensed to undertake this requirement. Any legitimate factors affecting the application of the Monogram i.e. non standard rating etc shall be highlighted by the contractor/supplier/manufacturer at Tender stage for TOTAL evaluation.

All critical components shall be permanently marked per bill of material requirements.

Markings shall meet the requirements of this specification, ISO reference standard and contractor/supplier/manufacturer Engineering Procedures. Marking of items should be legible after surface treatment or coating. All assembly and single end item stamping shall be done with low stress dies where part configuration allows.

Marking should be done in an area where it will not affect product function and be unaffected by potential grip marks during make-up.

Marking of OD and ID shall be in fractions (i.e. 3"1/2, 5"3/4).

Minimum marking shall specify:

- Assembly Part Number,
- Serial Number,
- Short item description,
- Thread size, weight and type,
- Material
- TOTAL PO number

8.7.2 Thread marking

Thread identification shall be low stress dies in all cases and comply with the following requirements:

- All threaded end connections are to be stamped with the thread size, weight, grade and thread type during the manufacturing process.
- Thread identification is to be circumferential and as close to the end of the part as possible. If all the information will not fit in one single circumferential line, two lines are allowed.



9. Quality control

9.1 Manufacturing Quality Control

All connections make up, dimensional inspections and/or NDE controls as stated in paragraph 8.3 of this General Specification shall be recorded on specific contractor/supplier/manufacture report(s).

Liner Hangers, Packers & Bridge plugs shall be inspected to [ISO 14310 Q1](#)

Landing Nipples & Lock Mandrels shall be inspected to [ISO 16070 Q1](#)

9.2 Pre Delivery testing

All equipments shall be subjected to a verification and acceptance testing programme to demonstrate that the equipment,

- Will satisfy all specified requirements,
- Will perform satisfactorily in service
- All Units and Systems have been completed in accordance with the specifications prior to delivery.

A comprehensive test program, covering the complete range from component and equipment integrity testing through functional and performance verification of all equipments shall be agreed and implemented.

The programme shall as a minimum include the following types of tests:

- System Tests (ST),
- System Integration Tests (SIT),
- Factory acceptance tests (FAT)

9.2.1 Factory Acceptance Test (FAT)

A Factory Acceptance Test (FAT) of equipment is the set of tests required to prove that the components of equipment and the equipment itself, satisfy all specified functional and performance requirements.

All Factory Acceptance Tests for equipments shall be performed as defined in the relevant TOTAL approved FAT procedure and with the relevant international standard.

All equipment supplied for gas applications shall have the body and seals validated with gas testing at the rated working pressure at time of design validation.

In the case of Liner Hangers and Packers FAT shall include verification of correct operation of the primary and secondary setting mechanism and pressure testing of all seals, chambers and installation / running tools associated with operation of the setting mechanism. Additional pressure testing shall be carried out at 80% of the lowest casing or tubing yield pressure after pre mobilization make up of the completion assembly.



9.2.2 System Test (ST)

System tests entail the testing of an assembled unit with the various tools and or equipment with the intention of validating functionality. The requirement for such testing is to be differentiated from a System Integration Test as discussed below.

It should be noted that it could be requested to demonstrate the following:

- Running, pulling and shifting tools shall be function tested with their associated completion equipment in a simulated operation mode.
- Wire line, CT or intervention tools specially designed for the given application shall be tested in a simulated operation mode.

9.2.3 System Integration Test (SIT) – When requested by TOTAL

System integration tests shall be carried out on the first set of equipment being produced; this shall include all contractor/supplier/manufacturer or Third Party interface or installation equipment. This shall entail testing an assembly of different tools and or equipment as close as possible to the final operating conditions. The Completion assembly shall be run in the contractor/supplier/manufacturer test fixture simulating a real completion operation.

All the main types of completion equipment shall undergo such testing.

The contractor/supplier/manufacturer & Third Party Technicians responsible for installation of the equipment in the field shall be present and participate in the SIT.

10. Third Party Inspection

10.1 Scope of Third Party Inspection

The third Party Inspection agency allocation details shall appear within the agreed QCP (see paragraph 3.2 of this General Specification).

Adequate time should be given and a good line of communication should be established between the nominated inspection company and the contractor/supplier/manufacturer.

Unless otherwise specified on the PO and/or QCP, for equipment intended to be used for non critical applications, the Third Party will:

- Witness assembly on 30% of equipment to be supplied,
- Witness make up on 30% of equipment to be supplied,
- Witness hydrostatic/functional tests (including OD and ID drifts when applicable) on 30% of equipment to be supplied,
- Perform a final visual inspection (including marking, premium thread(s), body...) on 100% of equipment to be supplied,
- Review the documentation on 100% of equipment to be supplied.

Unless otherwise specified on the PO and/or QCP, for equipment intended to be used for applications deemed to be critical by TOTAL, the Third Party will:

- Witness assembly on 50% of equipment to be supplied,
- Witness make up on 50% of equipment to be supplied,



- Witness hydrostatic/functional tests (including OD and ID drifts when applicable) on 50% of equipment to be supplied,
- Perform a final visual inspection (including marking, premium thread(s), body...) on 100% of equipment to be supplied,
- Review the documentation on 100% of equipment to be supplied.

Where the results of the witness of assembly and/or make up and/or hydrostatic/functional tests is found non satisfactory, TOTAL QA/QC reserved the right to witness up to 100% of assembly and/or make up and/or hydrostatic/functional tests.

TOTAL QA/QC reserves the right to attend the following operations (non-exhaustive list):

- Heat treatment,
- Chemical analysis,
- Mechanical tests,
- Welding,
- NDE Controls (MPI, Liquid penetrant, Ultrasonic)
- Hardness tests,
- Dimensional inspection,
- Thread gauging,
- In house or sub- contractor/supplier/manufacturer tests

Where the results of the witness of assembly and/or make up and/or hydrostatic/functional tests and/or final visual inspection and/or documentation review is found non satisfactory, TOTAL QA/QC reserves the right to receive a copy of the NCR raised by the contractor/supplier/manufacturer.

Equipments manufactured under this General Specification shall not be shipped without any Release Note from the Third Party Inspection body unless otherwise agreed on the PO and/or QCP.

10.2 Waiver / Derogation

Where the Manufacturer will not be able to fulfill the requirements of this General Specification, the Manufacturer shall formally request from TOTAL.

Where the equipment delivered by the Manufacturer will not fulfill the requirements of this General Specification and where the Manufacturer will not be granted a derogation by the purchaser, the third party inspection representative will not accept the materials.

11. Documentation requirements

11.1 Introduction

This section identifies the requirements that shall be applied by contractor/ supplier/ manufacturer to equipment orders for the customer. All drawing shall be assessed and approved by the TOTAL Project Manager / Engineer prior manufacturing. All design changes shall be documented with a new drawing.



11.2 Product assembly drawing

The contractor/supplier/manufacture supply assembly drawings

This drawing shall as a minimum contain the following information:

- Contractor/supplier/manufacture name,
- Contractor/supplier/manufacture Sales order,
- Total project name (if applicable),
- TOTAL PO number,
- Date and revision level,
- Part number,
- Serial number(s),
- Product name and size,
- Description of the threads (type, size, weight, grade),
- Pictorial with numbered balloons (large enough for legibility) which correlates to the item number and description of each component,
- The outside diameter, inside diameter and overall length,
- Quantity and description of each component for assembly

11.3 Product Technical Data sheet

The contractor/supplier/manufacture supply product technical data sheets

Product Technical data sheets shall be supplied at delivery to TOTAL and shall contain at least the following information, where applicable:

- Name and address of contractor/supplier/manufacture,
- TOTAL PO number,
- Pictorial which correlates to the description of the component,
- Contractor/supplier/manufacture product number,
- Contractor/supplier/manufacture product name,
- Product type,
- Product characteristics,
- Service,
- Metallic materials,
- Non-metallic materials,
- Drift diameter,
- Gauge OD,
- Overall length,



- Temperature range,
- Temperature cycle range,
- Rated performance envelope,
- Pressure rating,
- Top connection(s),
- Bottom connection(s),
- Casing or tubing range, size and mass and/or minimum and maximum casing or tubing IDs,
- Conveyance method,
- Maximum conveyance OD, inclusive of running/repositioning equipment, as applicable,
- Setting method, including minimum (maximum, as applicable) setting force / pressure,
- Retrieval method (if retrievable),
- Repositioning method (if repositionable),
- Quality control grade,
- Design validation grade,
- Technical / operations manual reference number.

Additionally special information relating to that actual product should also be captured on this document.

11.4 Delivery documentation

As minimum requirements contractor/supplier/manufacture shall provide a product data book consisting of:

- Certificate of Conformity
- Conformity to applicable specifications, duly signed by contractor/ supplier/ manufacturer authorized Officer (e.g. QA Manager) including equipment assembly part numbers and serial numbers
- Third Party Build Appraisal Report / Release Note (where applicable)
- Third Party Design Appraisal Report (where applicable)
- Total Release Note (where applicable)
- C of C for all premium threads
- NDE reports
- Load test certification (where applicable)
- Welding NDE reports
- Post Weld Heat Treatment Reports / Charts
- Heat treatment furnace charts are required for all pressure-containing parts.



- Hardness test reports
- Hydro test reports/charts
- All Torque Turn charts
- Gas test reports/charts
- Drift test report
- Micrographs for Alloy 718 components (if applicable)
- Mill Test certificates (acceptable also on CD support in PDF format) as per [BS EN 10204](#) type 3.1
- Customer release note
- Prototype and performance verification test signed by contractor/supplier/manufacture authorized Officer
- Factory Acceptance Test reports
- System integration Test reports
- Coating reports

The above documents shall have been reviewed by Third Party Inspection body before shipment.

- The appropriate quantities (as per the PO) in the English language of the following:
 - Operation, Maintenance & Installation Manual controlled copy (also on C.D. support) including instructions concerning field assembly and maintenance.
 - Colored laminated Wall Charts (details and cross referenced with operation manual)
 - All original documents shall be written in English should any doubt arise to the contents of the translation, the English version shall govern.

All design records shall be maintained for a minimum of 10 years, manufacturing quality records shall be maintained for a minimum of 5 years.

TOTAL to be contacted prior to disposal of any records relating to products purchased by them or their appointed agents.

The Product Data Book shall be supplied preferably on CD Rom in text searchable PDF format or A4 paper copy.

The following paper copy documents (as applicable) are to accompany the invoice and the goods:

- Certificate of Conformity,
- Third Party Build Appraisal Report / Release Note,
- Third Party Design Appraisal Report,
- Total Release Note,
- Load test certification.