

GENERAL SPECIFICATION

Drilling & Wells

GS EP FP 333

Specification for Downhole Completion Equipment Manufacturing
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04	12/2019	General revision – Covers all topics raised during Maersk Oil Gap Analysis
03	12/2015	NDE, sub-contractors and testing update – Addition of engineering alert
02	01/2012	Revision of the referential following E&P reorganization – March 2011
01	09/2009	Update of reference documents
00	11/2008	First issue – Replacement of CT 90.01.01 rev 3
Rev.	Date	Purpose of the revision

Owning entity: DSO/FP	Managing entity: DSO/FP
Other Approving entity(ies):	

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1. Scope

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

Where applicable, the requirements in this documents are in addition to the minimum requirements and provisions of the referenced standards unless otherwise specified within this General Specification or in the Company Purchase Order or Contract.

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

- Packers and Bridge Plugs.
- Liner Hangers.
- Downhole Cementing and Casing Accessories, including Centralizers, Float equipment & Wiper plugs.
- Tubing Retrievable Safety Valves.
- Wireline Retrievable Safety Valves.
- Sub-Surface Annular Safety Valves.
- Reservoir Isolation Valve.
- Lock Mandrels & Landing Nipples.
- Sliding Sleeves.
- Down-hole Monitoring Equipment - Gauge Mandrels & Gauge Assemblies and Accessories.
- Side Pocket Mandrels - Gaslift Mandrels and related equipment.
- Gas Lift Valves and Related Accessories.
- Downhole Chemical Injection Equipment – Injection Mandrels, Valves and Accessories.
- ESP and PCP equipment.
- Control Line (Encapsulated conductor cable and hydraulic capillary tubes).
- Sand Control Equipment (excluding sand screens).
- Open-hole Isolation Equipment (swell packers, inflatable packers, expandable packers, and open-hole packers).

Retrievable temporary down-hole well equipment including intervention equipment and associated running and retrieving tools that are considered by COMPANY as non-critical application, may be exempted from the TPI (Third-Party Inspection) requirements specified in this document.

2. Reference Documents

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
API SPEC 5CRA	Specification for Corrosion Resistant Alloy Seamless Tubes for Use as Casing, Tubing and Coupling Stock
API SPEC 5CT	Specification for Casing and Tubing
API SPEC 10D	Specification for Bow-string Casing Centralizers
API SPEC 10F	Specification for Cementing Float Equipment Testing
API SPEC 11D1	Packers and Bridge Plugs
API SPEC 14A	Specification for Subsurface Safety Valve Equipment
API SPEC 14L	Specification for Lock Mandrels and Landing Nipples
API SPEC 19AC	Specification for Completion Accessories
API SPEC 19G1	Side-pocket Mandrels
API SPEC 19G2	Flow-control Devices for Side-pocket Mandrels
API SPEC 19G3	Running Tools, Pulling Tools, and Kick-over Tools and Latches for Side-pocket Mandrels
API SPEC 19LH	Liner Hanger Equipment
API SPEC 19OH	Open-hole Isolation Equipment
API SPEC 20 SERIES	Supply Chain Management for Critical Materials and Processes used in Oil and Natural Gas Exploration and Production
API SPEC Q1	Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry
API STD 6ACRA	Age-hardened Nickel-based Alloys for Oil and Gas Drilling and Production Equipment
API TR 10TR6	Evaluation and Testing of Mechanical Cement Wiper Plugs
ASME-BPVC-2017 Section II Part D	ASME Boiler and Pressure Vessel Code (BPVC), Section II- Materials - Part D: Properties (Customary)
ASME-BPVC-2019 Section IX	ASME Boiler and Pressure Vessel Code (BPVC) - Welding, Brazing and Fusing Qualifications
ASME-BPVC-2019 Section VIII, Division 1	ASME Boiler and Pressure Vessel Code (BPVC), Section VIII- Rules for Construction of Pressure Vessels - Division 1
ASNT SNT-TC-1A	Personnel Qualification and Certification in Nondestructive Testing

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Reference	Title
ISO 4406	Hydraulic Fluid Power - Fluids - Method for coding the level of contamination by solid particles
ISO 9712	Non-destructive testing - Qualification and certification of NDT personnel
ISO 10005	Quality management - Guidelines for quality plans
ISO 11960	Petroleum and Natural Gas Industries - Steel pipes for use as Casing or Tubing for wells
ISO 13678	Petroleum and Natural Gas Industries - Evaluation and Testing of thread compounds for use with Casing, Tubing, Line pipe and Drill Stem elements
ISO 14001	Environmental Management Systems - Requirements with Guidance for use
ISO 14310	Petroleum and Natural Gas Industries - Downhole Equipment - Packers and Bridge Plugs
NACE MR0175/ISO 15156	Petroleum and natural gas industries - Materials for use in H2S-containing environments in oil and gas production

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 FP 330	Specification for new seamless OCTG carbon & low alloy material Manufacturing
GS EP FP 331	Purchase from stock of Conductor Pipe and seamless OCTG in carbon, low alloy and corrosion-resistant material

3. Application

Any equipment supplied to Company under this General Specification shall be manufactured by a Company-approved Manufacturer. Approval is granted by the QAQC entity within D&W in HQ.

3.1 Waiver / Derogation

Any significant deviation from the requirements stipulated in this document shall be approved by the relevant HQ DSO Product Line, upon recommendation of the QAQC entity in DSO/FP following the submission by the D&W entity of the subsidiary of a formal derogation request.

Should the equipment delivered by the Manufacturer not fulfill the requirements of this General Specification, and should the Manufacturer not be granted the derogation by the purchaser, then the Third-Party inspection representative will not accept the materials.

4. Glossary

BOM	Bill of Material
D&W	Drilling and Wells
ESP	Electric Submersible Pump
FAT	Factory Acceptance Test
FMECA	Failure Mode, Effects and Criticality Analysis
FTA	Fault Tree Analysis
GRAL	General Rolling Action List: Continuous improvement process tracking system
GS	General Specification
HPHT	High-Pressure High-Temperature
HAZ	Heat-Affected-Zone
HQ	Head Quarters
IQ-ALL	Integrity & Quality for ALL: Inspection and Vendor Management web application
MPI	Magnetic Particle Inspection
NCR	Non-Conformance Report
NDE/NDT	Non-Destructive Examination / Non-Destructive Testing
OCTG	Oil Country Tubular Goods
PCP	Progressive Cavity Pump
PO	Purchase Order
PWHT	Post Welding Heat Treatment
QAQC	Quality Assurance & Quality Control
QCP	Quality Control Plan (also known as QP or ITP in some organizations)
QTC	Qualification Test Coupon
SIT	System Integration Test
SPMs	Side Pockets Mandrels
T&C	Threaded and Coupled
TPI	Third-Party Inspection

5. Purchase Requirements

The Purchaser should consult **the relevant Company standard** before selecting the contractor / supplier / manufacturer.

The contractor / supplier / manufacturer of the equipment shall be licensed to [API SPEC Q1](#) and to the API specifications specific to the equipment.

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When enquiring or placing orders for equipment to be manufactured in accordance with this Company specification, the Purchaser shall specify the following details as described in Section 5.1.

5.1 Requirements to be specified on Purchase Order / Enquiry

The following information, as a minimum, shall be described in the Purchase Order:

- I. Nominal Size (Bore)
- II. Rated Working pressure
- III. Temperature rating
- IV. Material Class
- V. Connection type (studded, bolted, weld neck, thread, etc.) with relevant details
- VI. Reference to GS EP FP 333 and relevant Company-approved QP with the Vendor
- VII. Any already granted deviation from these general specification requirements
- VIII. Expected manufacturing Plant (informative only)
- IX. Quantity
- X. Delivery date and shipping instructions
- XI. Quality assurance requirements including contact details for inspection
- XII. Contact details (name + email of contact persons)

Depending on the type and planned operational use, the information below will be required:

- I. Performance Requirements
- II. Sour service, [NACE MR0175/ISO 15156](#), if applicable
- III. Electrical, hydraulic or air feed-through connection
- IV. External Coating (paint)
- V. Drift (special if required)
- VI. Certification requirements

A copy of the Purchase Order shall be provided to Company QAQC entity in D&W at HQs and / or to Company affiliate QAQC entity (if any) for technical and quality review and TPI allocation.

5.2 Vendor Acknowledgement of the Purchase Order

Prior to the acknowledgement of the Purchase Order the Vendor shall:

- Ensure that the requirements from above Chapter 5.1 are fulfilled,
- Confirm that the manufacturing plant is qualified by Company for the ordered equipment.

If either of the above conditions cannot be fulfilled, the Vendor shall not acknowledge the Purchase Order and shall instead call for an amendment to the Company Purchaser.

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Once the Purchase Order is acknowledged, the allocated Third Party Inspection Agency(ies) name(s) has(ve) to be communicated to the Vendor. If not done, the Vendor shall contact the Company QAQC entity in D&W in HQ and / or Company affiliate QAQC entity (if any), for clarification.

6. Quality Management Requirements

6.1 Quality Assurance

The selected contractor / supplier / manufacturer and / or its sub-contractor(s) / sub-supplier(s) shall be:

- able to demonstrate conformity and be auditable to [API SPEC Q1](#), [API SPEC 20 Series](#) and [ISO 14001](#).
- able to provide proof of license / certification to the API / ISO standards related to the equipment and materials to be delivered.
- auditable to ISO / API standards related to materials to be delivered.

The requirements from this General Specification shall be followed as if it was an integral part of the PO. The PO shall specify the obligation to comply with this General Specification requirements.

6.1.1 Supplier Qualification

The selected contractor / supplier / manufacturer, as well as the manufacturing plant, shall be qualified by Company for the related equipment. If the manufacturing facility to which the Purchase Order is awarded is not qualified by Company, a qualification process has to be launched by Company's QAQC entity in D&W in HQ. Manufacturing shall not start prior to positive completion of the above qualification process or without specific mitigations duly approved by Company's QAQC in HQ. The Company QAQC entity in D&W in HQ and / or Company affiliate QAQC department (if any) reserves the right to conduct audits of suppliers in order to ensure the quality of the activity performed.

Should the manufacturing plant be deemed not suitable for Company production after the qualification process, the selected contractor / supplier / manufacturer shall either:

1. Close and receive Company approval of all corrective actions stemming from qualification audits and / or technical assessments before manufacturing commences in order to guarantee equipment integrity and adequate delivery time, OR
2. Propose an already Company-qualified alternative manufacturing route to ensure delivery of equipment.

6.1.2 Sub-supplier Qualification

All sub-contractor / sub-suppliers involved in:

- Manufacturing of **COMPLETE** assemblies items and equipment.
- Material supply (forging and heat treatment facilities) of pressure containing parts.
- Pipe for pup joints (as per [GS EP FP 330](#) and / or [GS EP FP 331](#)).