International Association of Oil & Gas Producers

SPECIFICATION
S-616Q

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Quality Requirements for Line Pipe

Revision history

VERSION	DATE	AMENDMENTS
1.0	January 2019	Issue for Publication

Acknowledgements

This IOGP Specification was prepared by a Joint Industry Project 33 Standardization of Equipment Specifications for Procurement organized by IOGP with support by the World Economic Forum (WEF).

Foreword

This specification package was prepared under a Joint Industry Project 33 (JIP33) “Standardization of Equipment Specifications for Procurement” organized by the International Oil & Gas Producers Association (IOGP) with the support from the World Economic Forum (WEF). Ten key oil and gas companies from the IOGP membership participated in developing this specification under JIP33 Phase 2 with the objective to leverage and improve industry level standardization for projects globally in the oil and gas sector. The work has developed a minimized set of supplementary requirements for procurement, with life cycle cost in mind, based on the ten participating members’ company specifications, resulting in a common and jointly approved specification, and building on recognized industry and/or international standards.

The specification package has been developed in consultation with a broad user and supplier base to promote the opportunity to realize benefits from standardization and achieve significant cost reductions for upstream project costs. The JIP33 work groups performed their activities in accordance with IOGP’s Competition Law Guidelines (November 2014).

Recent trends in oil and gas projects have demonstrated substantial budget and schedule overruns. The Oil and Gas Community within the World Economic Forum (WEF) has implemented a Capital Project Complexity (CPC) initiative which seeks to drive a structural reduction in upstream project costs with a focus on industry-wide, non-competitive collaboration and standardization. The vision from the CPC industry is to standardize specifications for global procurement for equipment and packages, facilitating improved standardization of major projects across the globe. While individual oil and gas companies have been improving standardization within their own businesses, this has limited value potential and the industry lags behind other industries and has eroded value by creating bespoke components in projects. The specification package aims to significantly reduce this waste, decrease project costs and improve schedule through pre-competitive collaboration on standardization.

Following agreement of the relevant JIP33 work group and approval by the JIP33 Steering Committee, the IOGP Management Committee has agreed to the publication of this specification package by IOGP. Where adopted by the individual operating companies, the specification package aims to supersede existing company documentation for the purpose of industry-harmonized standardization.

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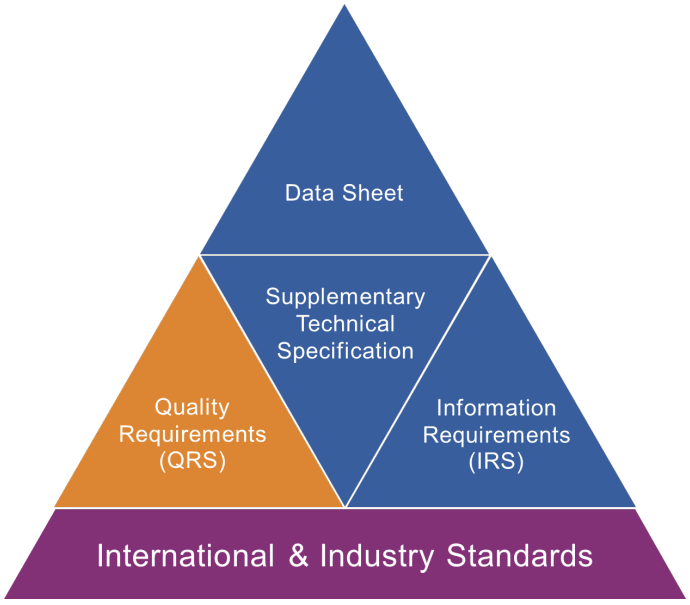
Introduction

The purpose of this quality requirements specification (QRS) is to define quality management requirements for the supply of line pipe in accordance with IOGP S-616 Supplementary Specification to API Specification 5L and ISO 3183, for application in the petroleum and natural gas industries.

The QRS includes a conformity assessment system (CAS) which specifies standardized purchaser interventions against quality management activities at four different levels. The applicable CAS level is specified by the purchaser in the line pipe material data sheet (LPMDS).

This QRS shall be used in conjunction with the supplementary requirements specification (IOGP S-616), information requirements specification (IOGP S-616L) and the LPMDS (IOGP S-616D) which together comprise the full set of specification documents. The Introduction section in the supplementary requirements specification (IOGP S-616) provides further information on the purpose of each of these documents and the order of precedence for their use.



JIP33 Specification for Procurement Documents
Quality Requirements Specification

1 Scope

To specify quality management requirements for the supply of line pipe to IOGP S-616 Supplementary Specification to API Specification 5L and ISO 3183, product specification level 2 (PSL 2) including:

a) manufacturer quality management system requirements;

b) purchaser conformity assessment (surveillance and inspection) activities;

c) traceability requirements;

d) evidence of conformance

2 Normative references

For the purpose of this document the documents referenced in IOGP S-616 and those listed below, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9001:2015	Quality management systems - Requirements
API Specification Q1	Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry
IOGP S-616	Supplementary Specification to API Specification 5L and ISO 3183 Line Pipe

3 Terms and definitions

For the purpose of this document, the terms and definitions given in IOGP S-616 and subsequently ISO 9000:2015 (normative to ISO 9001) and the following shall apply.

3.1 Conformity assessment

Demonstration that requirements relating to a product, process, system, person or body are fulfilled.

NOTE 1 Conformity assessment (or assessment) includes but is not limited to review, inspection, verification and validation activities.

NOTE 2 Assessment activities may be undertaken at a manufacturer's or sub-manufacturer's premises, virtually by video link, desktop sharing, etc. or by review of information formally submitted for acceptance or for information.

3.2 Conformity assessment system (CAS)

Systems providing different levels of assessment of the manufacturer's control activities by the purchaser (second-party) or independent body (third-party) based on evaluation of the manufacturer's capability to conform to the product or service specification, product specification level (PSL) and obligatory requirements.

NOTE CAS A reflects the highest risk and associated extent of verification. CAS D is the lowest.

3.3 Conformity assessment – hold point (H)

The point in the chain of activities beyond which an activity shall not proceed without the approval of the purchaser/purchaser's representative.

3.4 Conformity assessment – witness point (W)

The point in the chain of activities that the manufacturer shall notify the purchaser/purchaser's representative before proceeding. The operation or process may proceed without witness if the purchaser does not attend after the agreed notice period.

3.5 Conformity assessment – surveillance (S)

Observation, monitoring or review by the purchaser/purchaser's representative of an activity, operation, process, product or associated information.

3.6 Conformity assessment – review (R)

Review of the manufacturer's information by the user or the user's representative to verify conformance to requirements.

NOTE Information review requirements are managed on a surveillance basis and as such do not impose schedule constraints, unless specified as hold points in Annex A or as conditions specified in the associated IRS.

3.7 Critical

That deemed by the manufacturer, product specification, or purchaser as mandatory, indispensable or essential, needed for a stated purpose or task, and requiring specific action.

3.8 Product specification level (PSL)

Level defining the extent of control activities, typically including verification, inspection and testing to be undertaken by supplier to demonstrate conformance with requirements based on determination of service risk or obligations.

4 Symbols and abbreviations

For purposes of this document, the following symbols and abbreviations apply:

CAS conformity assessment system

5 Quality Requirements

5.1 Quality management system

The manufacturer shall demonstrate that the quality management arrangements established for the supply of products and services conform to ISO9001, API Specification Q1 or an equivalent quality management system standard agreed with the purchaser.

5.2 Conformance assessment

Quality plans and inspection and test plans developed as outputs to operational planning and control for the products and services shall define the specific controls to be implemented by the manufacturer and when applicable, their sub-manufacturers, to ensure conformance with the specified requirements.

Controls shall address both internally and externally sourced processes, products and services

Quality plans and inspection and test plans shall include provisions for:

a) PSL2 in accordance with IOGP S-616.

b) The purchaser's conformity assessment system (CAS) as specified in the LPMDS (see Annex A).

The manufacturer's performance in meeting the requirements will be routinely assessed during execution of the scope and where appropriate, corrective action requested and conformity assessment activities increased or decreased consistent with criticality and risk.

NOTE 1 For industrial well proven solutions CAS level D is specified unless risk assessment indicates that a more stringent CAS-level is required.

NOTE 2 Irrespective of conformity assessment requirements defined by the purchaser, either, by reference to standard and specification requirements or in the scope, the manufacturer remains responsible for operational planning and control and demonstration of the conformity of products and services with the requirements (see ISO 9001:2015, 8.1 and 8.2).

6 Traceability

Material certification and traceability of starting material including billet, plate, coil and welding consumables and production inspection and testing results to finished pipe identification numbers shall be maintained in accordance with IOGP S-616, 8.3, 8.13 and 10.

7 Control of nonconforming products and services

Nonconformance with specified requirements identified by or to manufacturer prior to or during the delivery of the products and services shall be corrected such that the specified requirements are satisfied or the purchaser's acceptance of the nonconformance agreed in accordance with purchase order conditions (see ISO 9001:2015, 8.2.3, 8.2.4, 8.5.6 and 8.7).

8 Evidence (conformance records)

Plans, procedures, methods and resultant records shall be provided in accordance with the associated IRS.

Annex A - Purchaser Conformity Assessment Requirements

This annex defines four CAS or levels of purchaser assessment.

The manufacturer shall provide for the specified CAS when developing quality plans and inspection and test plans in accordance with Section 5.

	PURCHASER ASSESSMENT ACTIVITIES	CAS			
		A	B	C	D
1	**Operational planning and control activities**				
1.1	Quality plan (S-616, 5.1 and ISO 10005, B4)	H	H		
1.2	Inspection and test plan (S-616, 5.1 and ISO 10005, B4)	H	H	R	R
1.3	Pre-Inspection/Pre-production planning	H	H	S	
1.4	Pre-production start readiness review (S-616, 5.4)	H	H	H	H
2	**Design and development activities**				
2.1	**Manufacturing Procedure Specification (MPS)** [S-616, 8.3.5, 8.6, 9.13.2.2, B.3, H.4.1.3, H7.2, and Table 28 Item Number b) 11)]				
2.1.1	Steelmaking and casting – for all pipe [S-616, Section 8 and B.3 a)]	H	R		
2.1.2	Pipe Manufacturing – for all pipe (S-616, Section 8, B.3 b), H.3, J.3 and N.3)	H	R		
2.1.3	Hot rolling for welded pipe [S-616, B.3 c)]	H	R		
2.1.4	Secondary processing (if applicable) - for welded pipe [API 5L, B.3 d)]	H	R		
2.1.5	Pipe manufacture – for welded pipe (S-616, Section 8, B.3 e), H.3, J.3 and N.3)	H	R		
2.1.6	Pipe manufacture – for SMLS pipe (S-616, Section 8, B.3 f), H.3, J.3 and N.3)	H	R		
2.1.7	Definition of essential variables (S-616, Table B.1, Table B2, B.5.7 and D.2)	H	R		
2.2	**Manufacturing Procedure Qualification Tests** (S-616, B.5)				
2.2.1	Mandatory Tests as applicable [S-616, B.5.2, Table 18, H.3, J.3 and N.3)	H	W	R	R
2.2.2	Welding Procedure Qualification (WPQR) (S-616, B.5.3 and Annex D, API 5L, Table B.4, Table B.5 and Table B.6)	H	W	R	R
2.2.3	Weldability testing (S-616, B.5.4, 9.15 and Annex N)	H	W	R	R
2.2.4	Coil/plate tensile property variability analysis (API 5L, B.5.5)	H	W	R	R
2.2.5	Non-destructive testing process and personnel qualification (S-616, Annex E, Annex K and Appendix 4)	H	W	R	R
2.3	**Manufacturing Procedure Re-Qualification** (S-616, B.5.6)				
2.3.1	MPS Revision reflecting changes in essential variables (S-616, B.5.6 and Section 7)	H	W	R	R
2.3.2	MPS requalification, see 2.2 above	H	W	R	R
3	**Control of external supply**				
3.1	External supply scope, risk assessment and controls (ISO 9001, 8.4)	H	R		
3.2	Nominated sub-suppliers of Steel (plate, billet, coil) as per MPS	H	H	R	R
3.3	Nominated sub-suppliers of welding consumables as per MPS	H	R	R	R
3.4	Nominated sub-suppliers of NDE services as per MPS	H	H	R	R

	PURCHASER ASSESSMENT ACTIVITIES	CAS			
		A	B	C	D
4	**Production and service provision**				
4.1	**Starting Materials Verification** (surveillance against MPS)				
4.1.1	Starting Material (billet, plate and coils) certification (S-616, 10.1.3)	S	S	S	
4.1.2	Welding consumables certification (S-616, Appendix 1)	S	S	S	
4.2	**Seamless Pipe Production** (surveillance against MPS)				
4.1.1	Billet pre-processing, heating	S	S	S	
4.1.2	Pipe rolling	S	S	S	
4.1.3	Heat treatment (S-616, 6.2, 8.8, 8.9, 8.12 and B.3)	S	S	S	
4.1.6	Straightening	S	S	S	
4.1.7	Cropping/end facing-sizing	S	S	S	
4.3	**Welded Pipe Production** (surveillance against MPS)				
4.3.1	**Pre-processing and Fabrication**				
4.3.1.a)	Plate/coil pre-processing	S	S	S	
4.3.1.b)	Tab welding (see 4.3.2 below)	S	S	S	
4.3.1.c)	Edge preparation - cutting milling preforming- crimping	S	S	S	
4.3.1.d)	Pipe forming	S	S	S	
4.3.1.e)	Bevel cleaning and fit up	S	S	S	
4.3.2	**Welding**				
4.3.2.a)	Welding equipment (S-616, Table B.1 and Table B.2)	S	S	S	
4.3.2.b)	Welder qualifications (S-616, D.3)	S	S	S	
4.3.2.c)	Consumable control (S-616, Appendix 1)	S	S	S	
4.3.2.d)	Tack welds (S-616, 8.4)	S	S	S	
4.3.2.e)	Weld seams (S-616, Section 8 and Annex D)	S	S	S	
4.3.2.f)	Weld repairs (S-616, C.4, Annex D)	S	S	S	
4.3.3	**Post welding processing**				
4.3.3.a)	Cold expansion [S-616, B.3 b) 12)]	S	S	S	
4.3.3.b)	Heat treatment (S-616, 6.2, 8.8, 8.9, 8.12 and B.3)	S	S	S	
4.3.3.c)	Straightening	S	S	S	
4.3.3.d)	Cropping/end facing-sizing	S	S	S	
4.4	**Production Inspection & Testing [S-616, 10, Table 18, H3, J3 & N3]**				
4.4.1	Material Traceability (S-616, 8.3, 8.13, 10, Table 18 Items 1 and 2)	W	S	S	R
4.4.2	Mechanical Testing (S-616, Table 18 Items 3 to 14, H.3, J.3 and N.3)	W	W	S	R
4.4.3	Hydrotesting (S-616, 9.4, Table 18 Item 15, 10.2.6)	W	W	S	R
4.4.4	Hydrotest Failure Investigation (S-616, 9.4.1)	H	H	H	H
4.4.5	Visual Inspection (S-616, 9.10, 10.2.7, Table 18 Item 16, H.5, J.5 and N.5)	W	W	S	S
4.4.6	Dimensions and Weight([S-616, 9.11, 10.2 Table 18 Items 17 to 21, H.6, J.6 & N.6)	H			R
4.4.7	Non-destructive inspection (S-616, Table 18 Item 15, Annex E and Annex K)	H			R
4.4.8	Reprocessing (S-616,10.2.11 and Annex C)	S	S	S	S

	PURCHASER ASSESSMENT ACTIVITIES	CAS			
		A	B	C	D
4.4.9	Retesting (S-616, 10.2.12 and E.4.6)	H	W	R	R
5	**Release of product or service**				
5.1	**Verify conformance to PO including as applicable**				
5.1.1	Manufacturer's certificates of conformance for shipment (S-616, 10.1.3)	H	H	R	R
5.1.2	Pipe Handling, preservation and loading (S-616, Section 14)	S	S	S	
5.1.3	Final documentation review as per IRS (IOGP S-616L)	H	R	R	R
5.1.4	Release Line pipe shipment	H	W	W	S
	H is hold point, W is witness point, S is surveillance and R is review Note Definitions for these terms are provided in Section 3.				

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