

REDLINE

Version 2.0 to Version 1.0

Quality Requirements for Centrifugal Pumps

Redline Version

Revision history

VERSION	DATE	PURPOSE
2.0	January 2023	Second Edition
1.0	January 2019	First Edition

Acknowledgements

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

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Foreword

This specification was prepared under Joint Industry Programme 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). Companies from the IOGP membership participated in developing this specification to leverage and improve industry level standardization 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, resulting in a common and jointly agreed specification, building on recognized industry and international standards.

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 CPC vision is to standardize specifications for global procurement for equipment and packages. JIP33 provides the oil and gas sector with the opportunity to move from internally to externally focused standardization initiatives and provide step change benefits in the sector's capital projects performance.

This specification has been developed in consultation with a broad user and supplier base to realize benefits from standardization and achieve significant project and schedule cost reductions.

The JIP33 work groups performed their activities in accordance with IOGP's Competition Law Guidelines (November 2020).

This second edition cancels and replaces the first edition published in January 2019.

Due to technical writing requirements leading to extensive changes, this second edition should be treated as a new document.

ABOUT THE REDLINE VERSION

This Redline version aims at comparing Version 2.0 to Version 1.0 but may not capture all changes.

The Redline version is not a specification document. It is a mark-up copy provided for information only. The user must refer to the official published version.

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Introduction

The purpose of this quality requirements specification (QRS) is to ~~define~~specify quality management requirements and the proposed extent of purchaser intervention activities for the ~~supply~~procurement of centrifugal pumps in accordance with IOGP S-615 ~~Supplementary Specification to ANSI/API Standard 610 Centrifugal pumps~~ for application in the petroleum and natural gas industries.

~~The QRS includes a~~ Purchaser intervention activities are identified through the selection of one of four conformity assessment system (CAS) which specifies standardized purchaser interventions against quality management activities at four different levels, based on a risk and criticality assessment. The applicable CAS level is specified by the purchaser in the ~~equipment datasheet~~procurement data sheet or purchase order.

This QRS shall be used in conjunction with the ~~supplementary requirements~~ specification (IOGP S-615), the procurement data sheet (IOGP S-615D) and the information requirements specification (IOGP S-615L) ~~and equipment data sheets (S-615D)~~ which together comprise the full set of specification documents. The ~~introduction~~ section in the ~~supplementary requirements~~ specification 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 centrifugal pumps to IOGP S-615 ~~Supplementary Specification to ANSI/API Standard 610 Centrifugal Pumps~~ including:

- a) ~~vendor~~supplier quality management system requirements;
- b) purchaser conformity assessment (surveillance and inspection) activities;
- c) traceability requirements;
- ~~d) evidence of conformity.~~

2 Normative references

For the purpose of this document, the documents referenced in IOGP S-615 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.

API Specification Q1, *Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry*

~~ANSI/API Std 610 11th Edition, Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries~~

IOGP S-615, *Supplementary Specification to ANSI/API Standard 610 for Centrifugal Pumps*

ISO 9001:2015, *Quality management systems - Requirements*

ISO 29001, Petroleum, petrochemical and natural gas industries — Sector-specific quality management systems — Requirements for product and service supply organizations

3 Terms and definitions

For the purpose of this document, the terms and definitions given in IOGP S-615 and ISO 9000:2015 (normative to ISO 9001:2015), and the following shall apply. ~~To align with the definitions used in ANSI/API Std 610 the term “purchaser” is used in place of “customer” and the term “vendor” in place of “supplier”.~~

3.1 ~~C~~

conformity assessment

~~D~~emonstration that specified requirements ~~relating to a product, process, system, person or body~~ are fulfilled.

NOTE

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

NOTE

Note 2 to entry: Assessment activities may be undertaken at a ~~vendor or supplier~~/sub-~~vendor's~~supplier's premises, virtually by video link, desktop sharing, etc. or by review of information ~~formally submitted for acceptance or for information.~~

3.2 ~~C~~

conformity assessment system

~~(CAS)~~

~~Systems providing system that provides~~ different levels of ~~assessment of the vendor's control activities by the purchaser (second party) or independent body (third party) based on evaluation of the vendor's capability to conform~~interventions to the product or service specification assess and ~~obligatory verify supplier conformance to specified~~ requirements. ~~The applicable~~

Note 1 to entry: CAS ~~level is specified by the purchaser in the data sheet.~~

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

3.3 ~~Conformity~~

hold point

H

<conformity assessment—witness> point (W)

~~Inspection or test where in the purchaser is notified chain of activities beyond which an activity shall not proceed without the timing approval of the inspection or test and a hold is placed on the inspection and test until the purchaser or purchaser's purchaser or purchaser's representative is in attendance (ANSI/API Std 610, 3.64)~~

3.4 ~~Conformity~~

witness point

W

<conformity assessment—observed (O)> point in the chain of activities that the supplier shall notify the purchaser or purchaser's representative before proceeding

~~Inspection or test where the purchaser is notified of the timing of the inspection or test and it is performed as scheduled regardless of whether the purchaser or purchaser's representative is present (ANSI/API Std 610, 3.38).~~

Note 1 to entry: 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~~ <conformity assessment> observation, monitoring or review by the purchaser or purchaser's representative of an activity, operation, process, product or associated information.

3.6

~~Conformity assessment—review~~

~~(R)~~

~~Review~~ <conformity assessment> review of the ~~vendor's~~ supplier's information ~~by the purchaser or purchaser's representative to determine conformity~~ 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.~~

4 Symbols and abbreviations

For purposes of this document, the following ~~abbreviation applies:~~ symbols and abbreviations apply.

CAS C conformity assessment system

IRS I information requirements specification

QMS quality management system

QRS Q quality requirements specification (this document)

5 Quality requirements

5.1 Quality management system

The vendor shall ~~demonstrate~~ operate and maintain a quality management system (QMS) that ~~the quality management arrangements established for the supply of products or services conform to~~ conforms with ISO

9001, [ISO 29001](#), API Specification Q1 or [an](#) equivalent quality management system standard ~~agreed with the~~

5.2 Conformity assessment system (CAS)

5.2.1

The conformity assessment system (CAS) provides different levels of assessment of the vendor control activities. The CAS level is defined by the purchaser, using a risk-based approach, and included in the purchase order/contract. The defined CAS level may be adjusted by the purchaser during manufacture based on vendor performance and re-assessment of risk.

5.2 ~~Conformance assessment~~

~~Quality plans or inspection and test plans developed as outputs to operational planning and control for the products or services shall define the specific controls to be implemented by the vendor and when applicable, sub-vendors, to ensure conformity with the specified requirements.~~

~~Controls will address both internally and externally sourced processes, products and services~~

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

5.2.2

Quality plans and inspection and test plans shall include provisions for the purchaser [intervention activities based on the CAS](#); ~~see Annex A, as specified~~ [level selected](#) in the [procurement](#) data sheet or purchase order. [See Annex A.](#)

5.2.3

Vendor performance in meeting the requirements ~~will~~ [may](#) 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~~ [6 Certification and traceability](#)

~~Where material certification and traceability requirements are not specified unless risk assessment indicates that a more stringent CAS level is required.~~

~~NOTE 2 Irrespective of the CAS level defined by the purchaser, either, by reference to in the parent standard and or supplementary specification requirements or in the scope, the vendor remains responsible for operational planning and control and demonstration of the conformity of products and services with the requirements (see ISO 9001, 8.1, 8.2).~~

6 ~~Traceability~~

Material, [material](#) certification and traceability shall be ~~provided~~ [maintained](#) in accordance with Annex B.

7 ~~Control of nonconforming products and services~~

~~Nonconformance with specified requirements identified by or to the vendor 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, 8.2.3, 8.2.4, 8.5.6, 8.7~~

8 Evidence (~~— conformance~~ records)

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

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Annex A (normative)

Purchaser conformity assessment requirements

This annex defines four conformity assessment systems (CAS) or levels of purchaser assessment.

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

	PURCHASER ASSESSMENT ACTIVITIES	CAS			
		A	B	C	D
1	Planning and Control Activities				
1.1	Quality plan (ISO 9001, 8.1 and ISO 10005)	R	R	R	
1.2	Inspection and test plan (ISO 9001, 8.1 and ISO 10005) <u>Operational planning and control activities</u>	R	R	R	R
1.3.1	Kick-off, pre-production and pre-inspection meeting (IOGP S-615, 8.1.5)	WH	OW	W	-
2	Design and Development Activities <u>development activities</u>				
2.1	Design verification review as required (ISO 9001, 8.3). Review that manufacture is against accepted revision of documents. <u>No activities applicable for purchaser intervention</u>	R	R	R	-
2.2	Weld procedure specification and procedure qualification records (ANSI/API Std 610, Table 11) or as specified in IOGP S-615D	R	R	R	
2.3	Non-destructive examination procedures (ASME BPVC-V, Non-destructive examination and ANSI/API Std 610, Table 15) or as specified in IOGP S-615D	R	R	R	
2.4	Raw materials used in the construction of pump parts comply with requirements of (ANSI/API Std 610, Annex H) or as specified in IOGP S-615D	R	R	R	
3	Control of External Supply <u>external supply</u>				
3.1	External supply scope, risk assessment and controls (ISO 9001, 8.4) <u>No activities applicable for purchaser intervention</u>	R	R	R	-
4	Materials <u>Production</u> and Component Manufacturing <u>service provision</u>				
4.1	Material certification and traceability (ANSI/API Std 610 as specified (IOGP S-615, 6.12.1.8, 6.12.4.3 and 8.2.2.7, Tables 4, 6.12.4.3, Table H.2 and Table H.4 and IOGP S-615, 6.12.1.8 and 8.2.2.7 when specified in IOGP S-615D) 3, Table H.4)	SW	R	R	R
4.2	Surfaces of castings (ANSI/API Std 610) <u>inspection as specified (IOGP S-615, 6.12.2.1)</u>	OW	S	-	-
4.3	Compliance of welding materials (ASME BPVC-II Part C)	S	S		
4.4.3	Fabrication				
4.4.3.1	Baseplate manufacture (ANSI/API 610, 7.3 and IOGP S-615, 7.3) flatness and coplanarity of baseplate equipment mounting pads <u>inspection (IOGP S-615, 7.4.8, 9.3.8.3.1)</u>	OW	SR	R	-
4.3.2	<u>Lifting lugs verification (IOGP S-615, 7.4.18, 8.4.5)</u>	W	R	R	R
4.5.4	Inspection, testing and verification activities (ANSI/API Std 610, 8.2 and 8.3 and IOGP S-615, 8.2 and 8.3)				

	PURCHASER ASSESSMENT ACTIVITIES	CAS			
		A	B	C	D
4.5.1	All welders have been qualified on approved welding procedures (ANSI/API Std 610, Table 11) or as specified in IOGP S-615D	R	R	R	
4.5.2	Weld repair procedure (excluding major weld repairs) (ANSI/API Std 610, 6.12.2 and IOGP S-615, 6.12.2)	R	R	R	R
4.5.3.4.1	Weld repair procedure (major) maps and other specified documentation (ANSI/API Std 610, 6.12.2.5 and IOGP S-615, 6.12.2.5) if specified in IOGP S-615D Inspector verification of materials as specified, production weld process controls and non-destructive examinations (IOGP S-615, 6.12.2, 6.12.3, 8.2.2.7, 6.4.3.10, 6.6.15.1, 7.4.18.3, 8.2.2, 9.3.2.5, 9.3.2.6, Table 11, Table 14, Table 15)	WS	WS	RS	R
4.5.4.2	Inspection of major weld repairs (ANSI/API Std 610, 6.12.2.3 and as specified (IOGP S-615, 6.12.2.3, 6.12.2.4, 6.12.2.5))	EH	EW	SR	R
4.5.5	Non-destructive examination personnel performing non-destructive examinations are qualified and certified in accordance with the requirements of Article 1, Section V of ASME BPVC	R	R	R	
4.5.6.4.3	Pressure casing and auxiliary process-liquid piping inspection as specified, including all welded and bolted connections associated with the casing (ANSI/API Std 610 Table 14 and process fluids (IOGP S-615, Table 14) or as specified in IOGP S-615D. Inspection timing (ANSI/API Std 610 7.6.2, 8.2.2.3, 8.2.2.6, Table 14)	EW	S	R	-
4.6.4.4	Non-destructive examinations of component parts (ANSI/API Std 610, 6.12.1.5 and 8.2.1.3) if specified in (IOGP S-615D 615, 6.12.3, 6.4.3.10, 8.2.1.3, 8.2.2.1, 8.2.2, 9.3.2.5, 9.3.2.6, Table 14, Table 15)	EW	R	R	-
4.7.4.5	Positive material identification (ANSI/API Std 610, 8.2.2.8 and as specified (IOGP S-615, 8.2.2.8) and other parts specified in IOGP S-615D	EW	S	R	-
4.4.6	Wear rings and running clearance verification (IOGP S-615, 6.7.5, Table 6)	W	S	S	-
4.4.7	Heat treatment (IOGP S-615, 6.12.2, 6.12.3, 6.4.3.10, Table 11)	S	S	S	-
4.4.8	Verify that the heat treatments, including PWHT, have been performed (ANSI/API Std 610, Table 11) or Hardness testing as specified in (IOGP S-615D 615, 8.2.2.7, 6.4.3.10)	RW	RS	R	-
4.4.9	Shaft and rotors (ANSI/API Std 610, (IOGP S-615 6.6, 7.1.8, 9.2.2.4, 9.3.3.1 and 9.3.12.2 d, Tables, 9.3.3.1, Table 17 and 19)	EW	OR	R	-
4.4.10	Rotating component balancing (ANSI/API Std 610 as specified (IOGP S-615, 8.3.3.8, 6.12.1.10, 6.12.1.11, 6.9.4.3, 7.2.2, 9.1.3.7 and 6, 9.2.4 and IOGP S-615, 6.9.4, 9.1.3.7 and 9.2.4) or as specified in IOGP S-615D 2, Table 19)	RW	R	-	-
4.4.11	Wear rings and running clearance verification (ANSI/API Std 610, Table 6 and IOGP S-615, 6.7.4)	R	R	R	
4.12.4.11	Cleanliness check prior to final assembly (ANSI/API Std 610, 8.2.2.6) if specified in (IOGP S-615D 615, 8.2.2.6)	EW	S	S	-
4.4.12	Verify installed instrumentation calibration and installation to applicable standards (IOGO S-615, 7.5.1, 7.5.2)	W	S	R	R
4.4.13	Inspection and test equipment calibration certificates'Ex' verification of equipment and assemblies for compliance with the specified hazardous area	RW	RS	RS	S

	PURCHASER ASSESSMENT ACTIVITIES	CAS			
		A	B	C	D
	classification (IOGP S-615, 6.10.2.9, 6.1.29, 7.1.6, 7.3.2.1, 7.3.2.2, 7.3.3.3, 7.3.3.4)				
4.4.14	Hydrostatic testing activities (ANSI/API Std 610, 8.3.2 and (IOGP S-615, 8.3.2)	WH	W	EW	R
4.4.15	Performance and mechanical run testing (ANSI/API Std 610, 8.3.3 and IOGP S-615, 8.3.3) or as specified in IOGP S-615D (IOGP S-615, 6.1.22, 6.10.2.7, 8.3.3, 8.3.4.2.2, 8.3.4.3.7, 8.3.4.7.3, C.4.1, C.4.2, C.4.3, Table 16, Table 8, Table 9)	WH	W	EW	R
4.4.16	NPSH Net positive suction head required or minimum submergence testing (ANSI/API Std 610, 8.3.4.3 and IOGP S-615, 8.3.4.3) if specified in IOGP S-615D (IOGP S-615, 6.1.22, 9.3.9.1, 6.10.2.7, 8.3.1, 8.3.4)	WH	EW	EW	R
4.17	Mechanical run testing (ANSI/API Std 610, 8.3.4.2 and IOGP S-615, 8.3.4.2)	W	Q	Q	R
4.184.17	Sound level testing (ANSI/API Std 610, 8.3.4.5) if specified in (IOGP S- 615D 615, 8.3.4)	WH	EW	SR	R
4.194.18	Complete unit testing (ANSI/API Std 610, 8.3.4.4) if specified in (IOGP S- 615D 615, 6.1.22, 6.10.2.7, 9.3.9.1, 8.3.1.4, 8.3.1.5, 8.3.4.1, 8.3.4.4.1, 8.3.4.4.2)	WH	WH	EW	R
4.204.19	Auxiliary equipment testing (ANSI/API Std 610, 8.3.4.6) if and as specified in (IOGP S- 615D 615, 8.3.4.1, 8.3.4.6)	QH	SW	R	R
4.214.20	Bearing housing resonance test (ANSI/API Std 610, 8.3.4.7) if specified in (IOGP S- 615D 615, 8.3.4.1, 8.3.4.7)	WH	EW	R	R
4.4.21	Nozzle force and moments testing if specified (IOGP S-615, 7.4.23, 7.4.24, 8.3.4.1, Table 13)	H	W	R	R
4.4.22	Structural resonance test (ANSI/API Std 610, 9.3.9.2) if specified in (IOGP S- 615D 615, 8.3.4.1, 9.3.9.2)	WH	EW	R	R
4.4.23	Disassembly after testing (ANSI/API Std 610, 8.3.3.8) if specified in (IOGP S- 615D 615, 8.3.3.9, 8.3.4.1, 9.3.3.1)	WH	EW	S	R
4.4.24	Hydrodynamic bearing inspection after testing (ANSI/API Std 610, 9.2.7.5 and if specified (IOGP S- 615, 9.2.7.5 4, 8.3.4.1)	WH	EW	S	-
4.4.25	Surface preparation and painting (ANSI/API Std 610, 6.12.2.1, 7.3.12, 8.4.2.4 and as specified (IOGP S-615, 6.1.37 9.3, 8.3.2, 7.4.16, 8.4.2.1.2.4, 9.3.8.3.3) or as specified in IOGP S-615D, 8.4.3.4)	WH	EW	R	-
5	Release of Pproduct or Sservice				
5.1	Verify conformity ance to PO the purchase order including as applicable				
5.1	Final Inspection				
5.1.1	Complete skid overall dimensions including holding down bolt hole and connection locations (IOGP S-615, 8.1.5)	WH	W	EW	EW
5.1.2	Couplings and guards (ANSI/API Std 610, 9.3.8.2.1, 7.2.1.3 and 7.2.3 and inspection (IOGP S- 615, 7.2.3), 7.3.2, 7.3.3, 9.3.8.2.1)	WH	W	EW	EW
5.1.3	Pump nameplate and rotation arrows (ANSI/API Std 610, 6.13 inspection. Review photograph for CAS C and IOGP SCAS D. (IOGP S-615, 6.13)	WH	W	ER	ER
5.2	Loose ship items, spares and special tools inspections as applicable (IOGP S-615, 7.7.1, 7.7.2)	WH	W	EW	ER

	PURCHASER ASSESSMENT ACTIVITIES	CAS			
		A	B	C	D
5.3	Nozzle force and moments testing (ANSI/API Std 610, 7.3.21) if specified in IOGP S-615D	W	Q	R	R
5.4.3	Preparation of preservation, packing and storage (ANSI/API Std 610, 8.4 and as specified (IOGP S-615, 8.4.2) or as specified IOGP S-615D)	WH	QW	S	-
5.5.4	Final documentation review as per IOGP S-615L Release of equipment (IOGP S-615, 6.12.3.3, 7.1.8, 7.5.2.2, 7.6.2.4, 6.4.3.5, 6.8.12, 7.4.25.3, 8.1.5, 8.4.14)	RH	RH	RH	RH
5.6	Inspection release note	W	W	W	W
<p>W is Key</p> <p>H: Hold point</p> <p>W: Witness point</p> <p>R: Review</p> <p>S: Surveillance</p> <p>witness point, Q is observed point, S is surveillance and R is review of documentation. Definitions are provided in Clause 3.</p>					

Certification and ~~and certification~~ requirements

)

B. Level II — Type ~~Traceability~~ traceability — The vendor maintains a system to identify material throughout manufacture, with traceability to a material certificate.

C. Level III — Compliance ~~Traceability~~ traceability — The vendor maintains a system of traceability that enables a ~~D~~ declaration of C compliance to be issued by the vendor.

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