

Quality Requirements for Reciprocating Positive Displacement Pumps

Revision history

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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).

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Introduction

The purpose of this quality requirements specification (QRS) is to define quality management requirements for the procurement of reciprocating positive displacement pumps in accordance with IOGP S-728 for application in the petroleum and natural gas industries.

The QRS includes definition of 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 equipment datasheet or purchase order.

This QRS shall be used in conjunction with the supplementary requirements specification IOGP S-728, the information requirements specification IOGP S-728L and the equipment data sheet IOGP S-728D 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 reciprocating positive displacement pumps to IOGP S-728 Supplementary Specification to API 674 Reciprocating Positive Displacement Pumps including:

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

2 Normative references

For the purpose of this document, the documents referenced in IOGP S-728 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*

IOGP S-728, *Supplementary Specification to API Standard 674 Reciprocating Positive Displacement Pumps*

ISO 9001, *Quality management systems — Requirements*

ISO 10474, *Steel and steel products — Inspection documents*

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-728 and ISO 9000 (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 supplier/sub-supplier'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 supplier's control activities by the purchaser (second party) or independent body (third party) based on evaluation of the supplier's capability to conform to the product or service specification 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)

Point in the chain of activities beyond which an activity shall not proceed without the approval of the purchaser or purchaser's representative.

3.4 Conformity assessment - Witness point (W)

Point in the chain of activities that the supplier shall notify the purchaser or 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 or purchaser's representative of an activity, operation, process, product or associated information.

3.6 Conformity assessment - Review (R)

Review of the supplier's information 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.

4 Symbols and abbreviations

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

CAS	conformity assessment system
IRS	information requirements specification
QRS	quality requirements specification (this document)

5 Quality requirements

5.1 Quality management system

The supplier shall demonstrate that the quality management arrangements established for the supply of products and services conform to ISO 9001, ISO 29001, API Specification Q1 or an equivalent quality management system standard.

5.2 Conformance assessment

5.2.1

Quality plans and inspection and test plans developed as outputs to operational planning and control shall define the specific controls to be implemented by the supplier to ensure conformance with the specified requirements.

5.2.2

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

5.2.3

Quality plans and inspection and test plans shall include provision for the purchaser conformity assessment system (CAS) as specified in IOGP S-728D. See Annex A.

5.2.4

Supplier 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 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 or specification requirements or in the scope, the supplier remains responsible for operational planning and control and demonstration of the conformity of products and services with the requirements. See ISO 9001, 8.1 and 8.2.

6 Certification and traceability

Material certification and traceability shall be maintained in accordance with Annex B.

7 Control of nonconforming products and services

Nonconformance with specified requirements identified by or to the supplier 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 and 8.7.

8 Evidence (conformance records)

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

Annex A (normative)

Purchaser conformity assessment requirements

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

	PURCHASER ASSESSMENT ACTIVITIES	CAS			
		A	B	C	D
1	Operational planning and control activities				
1.1	Quality planning (ISO 9001, 8.1 and ISO 10005) (IOGP S-728, 8.1.1)	H	R	R	-
1.2	Inspection and testing planning (ISO 9001, 8.1, Annex F and ISO 10005) (IOGP S-728, 6.11, Table 8)	H	W	R	R
1.3	Pre-inspection meeting (IOGP S-728, 9.1.3)	H	W	W	-
1.4	Review of inspectors checklists at pre-inspection meeting (API 674 Annex F) (IOGP S-728, 8.1.2)	H	W	W	-
2	Control of external supply				
2.1	External supply scope, risk assessment and controls (ISO 9001, 8.4) (IOGP S-728, 4.2)	H	R	R	-
3	Production and service provision				
3.1	Materials and component manufacturing				
3.1.1	Review of material traceability and verification (IOGP S-728, 6.11.1.5, 6.11.1.6, 6.11.3.4, 6.11.3.5, 8.2.1.1)	H	S	S	-
3.1.2	Welding inspection (IOGP S-728, 6.11.4.5, 6.11.6.2)	S	S	S	-
3.1.3	Review of material inspection results (IOGP S-728, 6.11.1.5, 6.11.1.6, 6.11.1.7, 6.11.1.8, 6.11.1.9, 6.11.6.3 a, 6.4.1.1, 8.2.2.1.1, Table 11, Table 12, Table 8)	W	W	S	-
3.1.4	Review of positive material identification results (IOGP S-728, 6.11.3.1, 6.11.3.2, 6.11.3.3, 6.11.3.5)	W	W	S	-
3.2	Inspection and testing				
3.2.1	Inspection of pressure containing parts (IOGP S-728, 6.11.1, Table 11, Table 12, Table 8)	W	S	S	-
3.2.2	Review details of all major repairs including heat treatment (IOGP S-728, 6.11.1.3, 6.11.5.2, 8.2.1.1)	H	H	W	R
3.2.3	Pump hydrostatic test (IOGP S-728, 8.2.1.2, 8.3.1.1, 8.3.2)	W	S	S	S
3.2.4	Hydrostatic testing of other pressure containing parts including pulsation suppressors and lube oil system components (IOGP S-728, 8.2.1.2, 8.3.2.1)	S	S	S	S

3.2.5	Pump cleanliness check (IOGP S-728, 6.11.1.10, 8.2.3.2, 8.3.3.1, Annex F)	S	S	S	-
3.2.6	Auxiliary equipment cleanliness check including lube oil system components (IOGP S-728, 6.11.1.10, 8.2.3.2, 8.3.3.1, Annex F)	S	S	S	-
3.2.7	Overspeed test (IOGP S-728, 8.3.4.4, 8.3.4.5, 8.3.9.3)	H	H	W	R
3.2.8	Governor or speed regulator test (IOGP S-728, 8.3.4.6, 8.3.9.3)	H	H	W	R
3.2.9	Pump performance test (IOGP S-728, 6.1.15, 8.3.1.1, 8.3.5, 8.3.6)	H	W	S	-
3.2.10	Lube oil system functional test IOGP S-728, 6.1.15, 8.3.3.1)	W	W	S	-
3.2.11	Pump mechanical run test (IOGP S-728, 8.3.1.1, 8.3.4)	H	W	S	-
3.2.12	Pump NPIP/NPSH test (IOGP S-728, 8.3.8)	H	W	W	R
3.2.13	Pump vibration level test (IOGP S-728, 7.1.2.2, 8.3.5, 8.3.6)	H	W	S	-
3.2.14	Pump noise level test (IOGP S-728, 8.3.9.2)	H	W	S	-
3.2.15	Complete unit test including contract lube oil system (IOGP S-728, 8.3.9.1)	H	W	S	-
3.2.16	Proof load test of package lifting points and associated contract lifting equipment	W	W	S	-
3.2.17	Disassembly and assembly inspection required after malperformance/running test (IOGP S-728, 8.3.4.8, 8.3.5.5, 8.3.6.5)	H	W	W	-
4	Release of equipment				
4.1	Visual surveys (including dimensional checks of equipment including overall dimensions, footprint, interfaces and P&ID) (IOGP S-728, 4.1, 8.1.3, 8.3.3.2, 8.3.3.3, 8.3.4, 8.3.5.2, 8.3.5.3, 8.3.5.4, 8.3.5.5, 8.3.6, 8.3.7, 8.4.3, 8.4.4, 8.4.5, 8.4.6, 8.4.7, 8.4.8, Table 13)	H	W	W	-
4.2	Painting/coating check (IOGP S-728, Annex F)	S	S	S	-
4.3	Nameplate check (IOGP S-728, 6.12, Annex F)	S	S	S	-
4.4	Check that loose ship items, spares and special tools are included as applicable (IOGP S-728, Annex F)	H	W	W	S
4.5	Preparation for shipment including review of preservation and packing (IOGP S-728, 8.4.2, 8.4.3.1, 8.4.3.10, 8.4.3.2, 8.4.3.3, 8.4.3.4, 8.4.3.5, 8.4.3.6, 8.4.3.7, 8.4.3.8, 8.4.3.9, 8.4.4, 8.4.5, 8.4.6, 8.4.7)	H	W	W	S
4.6	Final documentation review (IOGP S-728, 8.1.3, Annex F)	H	H	H	-
4.7	Release of the item (IOGP S-728, 8.4.3.1, 8.4.3.10, 8.4.3.2, 8.4.3.3, 8.4.3.4, 8.4.3.5, 8.4.3.6, 8.4.3.7, 8.4.3.8, 8.4.3.9)	H	H	H	H
<p>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.</p>					

Annex B (normative) Certification traceability and requirements

Item		Certificate Type	Traceability level	Additional Requirements
Equipment item	PD Pump pressure-containing parts,	3.1	Level II	
<p>Explanatory notes</p> <p>Inspection certificates shall be provided in accordance with ISO 10474 or EN 10204.</p> <p>Traceability</p> <p>A. Level I - Full Traceability - Material is uniquely identified and its history tracked from manufacture through stockists (where applicable) to the supplier and to actual position on the equipment with specific location defined on a material placement record (the traceability to a specific location only applies to skids / packaged equipment, not to bulks).</p> <p>B. Level II - Type Traceability - The supplier maintains a system to identify material throughout manufacture, with traceability to a material certificate.</p> <p>C. Level III - Compliance Traceability - The supplier maintains a system of traceability that enables a declaration of compliance to be issued by the supplier.</p>				

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