



International  
Association  
of Oil & Gas  
Producers

SPECIFICATION  
S-720Q

November  
2019

# Quality Requirements for Transformers

Public Review Draft



## Revision history

VERSION	DATE	PURPOSE
0.1	November 2019	Issued for Public Review

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## 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).

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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 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, resulting in a common and jointly approved specification, building on recognized industry and/or 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, facilitating improved standardization of major projects across the globe. 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 2014).

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## Introduction

The purpose of this quality requirements specification (QRS) is to define quality management requirements for the supply of transformers in accordance with IEC 60076-1: Power transformers - Part 1: General for application in the petroleum and natural gas industries.

The QRS includes definition of a conformity assessment system (CAS) which specifies standardized customer interventions against quality management activities at four different levels. The applicable CAS level is specified by the customer in the equipment datasheet or purchase order.

This QRS shall be used in conjunction with the supplementary requirements specification IOGP S-720, the information requirements specification IOGP S-720L and the equipment datasheet IOGP S-720D 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 transformers to IOGP S-720 Supplementary Specification to IEC 60076-1: Power Transformers including:

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

## 2 Normative references

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
API Specification Q1	Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry
IEC 60076-1	Power Transformers – Part 1: General
IOGP S-708	Supplementary Specification to IEC 60076-1 Power Transformers – Part 1: General

## 3 Terms and definitions

### 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 customer (second party) or independent body (third party) based on evaluation of the supplier'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

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

### 3.4 Conformity assessment - witness point

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

### 3.5 Conformity assessment – surveillance

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

### 3.6 Conformity assessment – review

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

CAS	Conformity assessment system
IRS	Information requirements specification
QRS	Quality requirements specification (this document)
PSL	Product Specification Level
QSL	Quality Specification Level

## 5 Quality requirements

### 5.2.1

Quality and inspection plans 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 supplier and when applicable, their sub-suppliers, 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 plans and test plans shall include provision for:

- product specification level (PSL) in accordance with the Supplementary Specification to IEC 60076-1 Power Transformers – Part 1: General.
- the customer conformity assessment system (CAS) as specified in the [insert purchase order and/or Datasheet as applicable]; 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 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 customer, 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 9001:2015, 8.1 and 8.2).

### **6 Control of nonconforming products and services**

Nonconformance with specified requirements identified by or to supplier prior to or during the delivery of the products and services shall be corrected such that the specified requirements are satisfied or the customer'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).

### **7 Evidence (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.

The supplier 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
<b>1</b>	<b>Planning and control activities</b>				
1.1	Supplier's quality plan as per ISO 9001, 8.1 and ISO 10005	H	R	-	-
1.2	Supplier's Inspection and test planning document as per ISO 9001, 8.1 and ISO 10005	H	R	-	-
1.3	Supplier's Pre-Inspection/Pre-production planning	H	R	-	-
<b>2</b>	<b>Design and development activities</b>				
2.1	Design and development planning				
2.1.1	Supplier's general arrangement drawing for the transformer A.1.1(a to x)	H	H	H	H
2.1.2	Manufacturer's datasheet for the transformer A.1.1(a to x)	H	H	H	H
2.2	Manufacturing process				
2.2.3	Review of supplier's iron core assembly for the transformer	W	W	-	-
2.2.4	Review of supplier's winding assembly for the transformer	W	W	-	-
<b>3</b>	<b>Control of external supply</b>				
3.1	Review of supplier's external supplied items such as steel for core and tank, winding conductors and insulation, radiators, tap changers, accessories, insulating liquid etc.	W	R	-	-
<b>4</b>	<b>Production and service provision</b>				
4.1	Sub-assembly				
4.1.1	Review of Core and winding pre tanking inspection	W	R	-	-
4.2	Inspection and testing				
4.2.2	Routine tests at supplier's works (11.1.1 Para 17) (11.1.2.1.k) (11.1.2.1.l) (11.1.2.1.m) (11.1.2.1.n) (11.1.2.1.o) (11.1.2.1.p) (11.1.2.1.q) (11.4 Para 8) (11.4 Para 9) (5.7.3 Para 6) (7.1.5 Para 10) (7.1.5 Para 11) (7.1.5 Para 2) (7.1.5 Para 3) (7.1.5 Para 4) (7.1.5 Para 5) (7.1.5 Para 6) (7.1.5 Para 7) (7.1.5 Para 8) (7.1.5 Para 9) (7.2.1 Para 1) (7.2.1 Para 2) (7.2.1 Para 3) (7.2.4 Para 1) (7.2.4 Para 2) (7.2.4 Para 3) (7.2.4 Para 4) (7.2.4 Para 5) (7.2.4 Para 6) (7.2.4 Para 7) (7.2.4 Para 8) (7.2.4 Para 9) (8.1 Para 1) (8.1 Para 3) (8.2 q) (8.3 l) (9.1.1 Para 2) (9.1.1 Para 3) (9.2 Para 3) (9.2 Para 4) (9.3 Para 8) 11.1.1(Para 1) 11.1.1(Para 11.a) 11.1.1(Para 11.b) 11.1.1(Para 11.c) 11.1.1(Para 14) 11.1.1(Para 2) 11.1.1(Para 4) 11.1.1(Para 9) 11.1.2.1.a 11.1.2.1.b 11.1.2.1.c; 11.1.2.1.d; 11.1.2.1.e; 11.1.2.1.f; 11.1.2.1.g; 11.1.2.1.h; 11.1.2.1.i; 11.1.2.1.j; 11.1.2.2 11.12(Para 1) 11.12(Para 2) 11.12(Para 3) 11.2.1(Para 1) 11.2.2(Para 1) 11.2.2(Para 2) 11.2.3(Para 1) 11.2.3(Para 2) 11.3 11.4(Note 2) 11.4(Para 1) 11.4(Para 2) 11.4(Para 4) 11.4(Para 5) 11.4(Para 6) 11.4(Para 7) 11.5(Note 2) 11.5(Para 1) 11.5(Para 10) 11.5(Para 2) 11.5(Para 3) 11.5(Para 4) 11.5(Para 5) 11.5(Para 6) 11.5(Para 7) 11.5(Para 8) 11.7; 11.8 5.7.4.1.1; 8.2(a to p) 8.3(Para 1) 8.3.(d to k) 8.3.a; 8.3.b(Para 1) 8.3.b(Para 2) 8.3.c(Para 1) 8.3.c(Para 2)	W	S	R	R

	8.3.c(Para 3) 9.1.1(Para 1) 9.2(Para 1) 9.2(Para 2) 9.5 9.6.1.1; 9.6.1.10; 9.6.1.3; 9.6.1.4; 9.6.1.6; 9.6.1.7.1; 9.6.1.7.2; 9.6.1.7.3; 9.6.1.7.4; 9.6.1.8.1; 9.6.1.8.2; 9.6.1.8.3; 9.6.1.8.4; 9.6.1.9; 9.6.10.1; 9.6.10.2; 9.6.11; 9.6.13.1; 9.6.13.2; 9.6.15.2; 9.6.15.3; 9.6.15.4; 9.6.16.2; 9.6.16.3.2; 9.6.16.3.4; 9.6.16.3.5; 9.6.16.3.6; 9.6.16.3.7.3; 9.6.18; 9.6.4.1; 9.6.4.2; 9.6.5.1; 9.6.5.2; 9.6.5.3; 9.6.5.5; 9.6.6.1; 9.6.6.2; 9.6.6.3; 9.6.6.5; 9.6.7.1; 9.6.7.2; 9.6.7.4; 9.6.7.6; 9.6.7.7; 9.6.7.8; 9.6.8.1; 9.6.8.2; 9.6.9.1				
4.2.3	Type tests performed by supplier, in absence of certificate (11.1.1 Para 17) (11.1.3.f) (11.1.4 Para 3) (6.6.b Para 4) 11.1.1(Para 1) 11.1.1(Para 11.a) 11.1.1(Para 11.b) 11.1.1(Para 11.c) 11.1.1(Para 14) 11.1.1(Para 2) 11.1.1(Para 4) 11.1.3.a 11.1.3.b 11.1.3.c 11.1.3.d 11.1.3.e 6.6(Note 1) 6.6(Note 2) 6.6.a 6.6.b(Para 1) 6.6.b(Para 2) 6.6.b(Para 3)	W	W	W	W
4.2.4	Special tests performed by vendor, if specified (11.1.1 Para 17) (11.1.4 Para 1) (11.1.4 Para 3) (11.6 Para 9) 11.1.1(Para 14) 11.1.1(Para 2) 11.1.1(Para 4) 11.1.4.a; 11.1.4.b; 11.1.4.c; 11.1.4.e; 11.1.4.f; 11.1.4.g; 11.1.4.i; 11.1.4.j; 11.1.4.k; 11.1.4.l; 11.1.4.m; 11.1.4.o; 11.1.4.p; 11.10(Para 1) 11.10(Para 2) 11.10(Para 3) 11.10(Para 4) 11.10(Para 5) 11.10(Para 7) 11.10(Para 8) 11.10(Para 9) 11.11(Para 2) 11.11(Para 3) 11.6(Note 3) 11.6(Para 2) 11.6(Para 3) 11.6(Para 4) 11.6(Para 5) 11.6(Para 6) 11.6(Para 7) 11.6(Para 8) 11.9(Para 10) 11.9(Para 3) 11.9(Para 5) 11.9(Para 6) 11.9(Para 7) 11.9(Para 9) 9.6.7.8	W	W	R	R
<b>5</b>	<b>Release of product or service</b>				
5.1	Verify conformance to the PO				
5.1.1	Review the handling, preservation and packaging of the transformer before release 9.5	W	R	R	-
5.1.2	Review of supplier's final documentation as per IRS	H	H	R	R
	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 of this document.				

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