International Association of Oil & Gas Producers

SPECIFICATION
S-704Q

June
2020

Quality Requirements for High Voltage Three Phase Cage Induction Motors

JIP33
JOINT INDUSTRY PROGRAMME

Revision history

VERSION	DATE	PURPOSE
0.1	June 2020	Issued for Public Review

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 2014)

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Introduction

The purpose of this quality requirements specification (QRS) is to define quality management requirements for the procurement of high voltage three phase cage induction motors in accordance with IOGP S-704, Supplementary Specification to IEC 60034-1 High Voltage Three Phase Cage Induction Motors, 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 data sheet or purchase order.

This QRS shall be used in conjunction with the supplementary requirements specification (IOGP S-704), the information requirements specification (IOGP S-704L) and the equipment data sheet (IOGP S-704D) 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 high voltage motors to IOGP S-704 Supplementary Specification to IEC 60034-1 High Voltage Three Phase Cage Induction Motors including:

a) manufacturer 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-704 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*

IEC 60034-1:2017, *Rotating electrical machines - Part 1: Rating and performance*

IOGP S-704, *Supplementary Specification to IEC 60034-1 High Voltage Three Phase Cage Induction Motors*

ISO 9001, *Quality management systems - Requirements*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in IOGP S-704 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 referred to as assessment) includes but is not limited to review, inspection, verification and validation activities.

NOTE 2 Assessment activities may be undertaken at a manufacturer/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 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 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 manufacturer 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 manufacturer’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 manufacturer shall demonstrate that the quality management arrangements established for the supply of products and services conform to ISO 9001, 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 manufacturer 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 the data sheet. See Annex A.

5.2.4

Manufacturer 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 manufacturer 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

The manufacturer shall maintain traceability of sub-assembly components to the original component manufacturer tag / serial number and where applicable, associated certification. See ISO 9001, 8.5.2.

7 Control of nonconforming products and services

Nonconformance with specified requirements identified by or to the manufacturer 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**				
1.1	Quality planning (ISO 9001, 8.1 and ISO 10005)	H	W	R	S
1.2	Inspection and testing planning (ISO 9001, 8.1 and ISO 10005)	H	W	R	S
1.3	Pre-production readiness review	H	W	W	S
2	**Design and development activities**				
2.1	Ex certificate (15.1.2)	R	R	R	R
2.2	Design calculation (11.7.3, 8.6.2.3.2, 9.12.1.4)	H	-	-	-
2.3	Weldability testing	W	-	-	-
2.4	Welding procedure qualification	W	-	-	-
2.5	Non-destructive testing process and personnel qualification	W	-	-	-
3	**Control of external supply**				
3.1	External supply scope, risk assessment and controls (ISO 9001, 8.4)	H	W	R	S
3.2	Nominated sub-suppliers and services review	H	W	R	S
4	**Production and service provision**				
4.1	Sub-assembly				
4.1.1	Rotor lamination assembly	W	S	S	-
4.1.2	Brazing of short circuit rings (11.3.2.4)	W	S	S	-
4.1.3	Stator lamination assembly	W	S	S	-
4.1.4	Production of winding coils (11.3.2.4, 11.3.2.5, 11.3.2.6, 11.3.2.7, 11.3.2.8)	W	S	S	-
4.1.5	End winding connections and bracing (11.3.2.4)	W	S	S	-
4.1.6	Winding impregnation (11.3.2.1)	W	S	S	-
4.1.7	Enclosure welding (Table 16C)	W	S	S	-
4.1.8	Surface preparation (Table 16C)	W	S	S	-
4.2	Inspection and testing				
4.2.1	Testing as per S-704 (9.1.1.1, Table 16A, Table 16B)	H	H	W	R
4.2.2	Special testing identified in the data sheet and as per S-704 (Table 16C)	H	H	W	R
4.2.3	Non-destructive testing of welded enclosure	H	W	-	-
4.2.4	Positive material identification of all components where a material has been specified in S-704 (11.3.1.1, 11.3.1.6, 11.3.1.8, 11.3.3.1, 11.3.5.1, 11.5.2, 11.5.5)	H	R	-	-

4.2.5	Rotor balancing (11.3.3.2, 11.3.3.3, 11.3.3.4)	H	W	W	S
4.2.6	Winding diagnostic testing prior to impregnation (11.3.2.1)	H	W	-	-
5	**Release of product or service**				
5.1	Handling, preservation and packaging (6.6)	W	S	S	-
5.2	Final inspection and equipment release	H	H	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 of this document.					

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