

Quality Requirements for Battery Energy Storage Systems (BESS) (IEC)

Public Review Draft

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 specify quality management requirements and the proposed extent of purchaser intervention activities for the procurement of battery energy storage systems (BESSs) in accordance with IOGP S-753 for application in the petroleum and natural gas industries.

Purchaser intervention activities are identified through the selection of one of four conformity assessment system (CAS) levels based on a risk and criticality assessment. The applicable CAS level is specified by the purchaser in the procurement data sheet (PDS) or purchase order.

The IOGP S-753 specification documents follow a common structure (as shown below) comprising a specification, also known as a technical requirements specification (TRS), a PDS, an information requirements specification (IRS) and this QRS. These four specification documents, together with the purchase order, define the overall technical specification for procurement.



JIP33 Specification for Procurement Documents Quality Requirements Specification (QRS)

This QRS is to be applied in conjunction with the specification, the PDS and the IRS, referred to in this document as IOGP S-753, IOGP S-753D and IOGP S-753L respectively. Further information on the purpose of these documents and the order of precedence for their use is provided in the introduction of the specification.

1 Scope

This QRS specifies quality management requirements for the supply of BESSs to IOGP S-753 including:

- a) supplier quality management system (QMS) requirements;
- b) purchaser conformity assessment (surveillance and inspection) activities;
- c) traceability requirements.

2 Normative references

For the purpose of this document, the documents referenced in IOGP S-753 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 62620, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for use in industrial applications*

IEC TS 62933-3-1:2018, *Electrical energy storage (EES) systems – Part 3-1: Planning and performance assessment of electrical energy storage systems – General specification*

IOGP S-753, *Supplementary Specification to IEC TS 62933-3-1 for Battery Energy Storage Systems (BESS)*

ISO 9000:2015, *Quality management systems — Fundamentals and vocabulary*

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, definitions and abbreviated terms

3.1 Terms and definitions

For the purpose of this document, the terms and definitions given in IOGP S-753 and ISO 9000:2015 (normative to ISO 9001:2015) and the following shall apply.

3.1.1 conformity assessment

demonstration that specified requirements are fulfilled

Note 1 to entry: "Conformity assessment" is also referred to as "assessment".

Note 2 to entry: Conformity assessment includes review, inspection, verification and validation activities.

Note 3 to entry: Conformity assessment activities may be undertaken at supplier/sub-supplier premises, virtually by video link, desktop sharing, etc. or by review of information.

**3.1.2
conformity assessment system
CAS**

system that provides different levels of purchaser interventions to assess and verify supplier conformance to specified requirements

Note 1 to entry: CAS level A applies to the highest risk and associated extent of verification. CAS level D is the lowest.

**3.1.3
hold point
H**

<conformity assessment> point in the chain of activities beyond which an activity shall not proceed without the approval of the purchaser or purchaser's representative

**3.1.4
witness point
W**

<conformity assessment> point in the chain of activities at which the supplier shall notify the purchaser or purchaser's representative before proceeding

Note 1 to entry: The operation or process may proceed without witness if the purchaser does not attend after the agreed notice period.

**3.1.5
surveillance
S**

<conformity assessment> observation, monitoring or review, by the purchaser or purchaser's representative, of an activity, operation, process, product or associated information

**3.1.6
review
R**

<conformity assessment> review of the supplier's records, procedures and supporting information to verify and/or validate conformance to requirements

3.2 Abbreviated terms

BESS	battery energy storage system
BMS	battery management system
CAS	conformity assessment system
FAT	factory acceptance testing
FGS	fire and gas system
IRS	information requirements specification
ITP	inspection and test plan
PDS	procurement data sheet
QMS	quality management system
QRS	quality requirements specification

SAT site acceptance testing

TRS technical requirements specification

4 Quality requirements

4.1 Quality management system (QMS)

The supplier shall operate and maintain a quality management system (QMS) that conforms with ISO 9001, ISO 29001, API Specification Q1 or an equivalent QMS standard.

4.2 Conformity assessment system (CAS)

4.2.1

The CAS provides different levels of assessment of supplier 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 the supplier's performance and re-assessment of risk.

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

4.2.2

Quality plans and inspection and test plans shall include provision for purchaser intervention activities based on the CAS level selected in the PDS or purchase order. See Table A.1.

4.2.3

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

4.2.4

If any subcontracted or scope of supply occurs outside of the primary supplier location, it shall include interventions within the primary inspection and test plan (ITP) or secondary ITP. It is discouraged to use "hold" (H) within Table A.1, section 3 and recommended to use "surveillance" (S).

5 Certification and traceability

Material certification and traceability shall be maintained in accordance with IEC TS 62933-3-1.

6 Evidence — conformance records

Documents and information shall be provided for in accordance with IOGP S-753L.

Annex A (normative)

Purchaser conformity assessment requirements

Table A.1 defines four CAS levels or levels of purchaser assessment.

Table A.1 — Purchaser conformity assessment requirements

Purchaser assessment activities		CAS			
		A	B	C	D
1	Operational planning and control activities				
1.1	Attend pre-inspection/pre-production meeting	H	H	W	W
2	Design and development activities				
2.1	Attend type testing (if type test certificates are not available) (IOGP S-753, 7.1, 8.1, 8.3.1.1, Table 9)	H	H	H	H
2.2	Attend final design review meeting	H	H	W	W
3	Externally provided products and services (outsourced)				
3.1	No applicable activities	-	-	-	-
4	Production and service provision				
4.1	Final tests, including factory acceptance test (FAT)				
4.1.1	Attend performance testing of batteries as per IEC 62620 (if factory internal test records are not reviewed/available)	H	W	W	W
4.1.2	Parameter testing of at least one array or block of the BESS				
4.1.2.1	Attend actual energy capacity test as per IEC TS 62933-2-1:2018, 6.2.1 (IOGP S-753, 5.1, 5.4.2)	H	W	W	W
4.1.2.2	Attend the input and output power rating test as per IEC TS 62933-2-1:2018, 6.2.2	H	W	W	W
4.1.2.3	Attend roundtrip efficiency test as per IEC TS 62933-2-1:2018, 6.2.3	H	W	W	W
4.1.2.4	Attend system response test for step response time and ramp rate as per IEC TS 62933-2-1:2018, 6.2.5	H	W	W	W
4.1.2.5	Attend auxiliary power consumption test as per IEC TS 62933-2-1:2018, 6.2.6	H	W	W	W
4.1.2.6	Attend self-discharge test as per IEC TS 62933-2-1:2018, 6.2.7	H	W	W	W
4.1.2.7	Attend rated voltage and frequency range test as per IEC TS 62933-2-1:2018, 6.2.8	H	W	W	W
4.1.3	Implementation testing on at least one array of block of BESS				
4.1.3.1	Attend visual inspection test as per IEC TS 62933-2-1:2018, 6.4.1 (IOGP S-753, 1, 5.2.2.4, 12.1, 12.2, 12.4, 12.5, 4.2.2, 5.2.2.1, 7.2, 7.3, 7.4, 7.5, 7.7, 8.2.1, 8.2.3, 8.3.1, 8.3.2, 8.4, 9.1, 9.2, Table 10, Table 11)	H	W	W	W
4.1.3.2	Attend continuity and validity of conductors test as per IEC TS 62933-2-1:2018, 6.4.2	H	W	W	W
4.1.3.3	Attend earthing test as per IEC TS 62933-2-1:2018, 6.4.3	H	W	W	W
4.1.3.4	Attend insulation test as per IEC TS 62933-2-1:2018, 6.4.4	H	W	W	W
4.1.3.5	Attend protective and switching device test as per IEC TS 62933-2-1:2018, 6.4.5	H	W	W	W
4.1.3.6	Attend equipment and basic function test as per IEC TS 62933-2-1:2018, 6.4.6	H	W	W	W
4.1.3.7	Attend available energy test as per IEC TS 62933-2-1:2018, 6.4.8	H	W	W	W
4.1.4	Attend the functional testing of subsystems on at least one array or block of the BESS (fire and gas system, thermal management and battery management system) (IOGP S-753, 7.6, 8.3.1, 8.4, 9.1, 9.2)	H	W	W	W

Table A.1 (continued)

Purchaser assessment activities		CAS			
		A	B	C	D
5	Final inspection				
5.1	Verify loose ship item, spares and special tools as applicable	W	W	S	-
5.2	Verify handling, preservation and packaging (IOGP S-753, 12.1, 12.2, 12.3, 12.4, 12.5)	W	W	S	R
5.3	Release equipment	H	H	H	H
6	Site acceptance testing (SAT)				
6.1	Attend the performance testing of the whole BESS assembly as per IEC TS 62933-2-1:2018, 6.3	H	H	H	H
6.2	Parameter testing of the whole BESS assembly				
6.2.1	Attend actual energy capacity test as per IEC TS 62933-2-1:2018, 6.2.1 (IOGP S-753, 5.4.2)	H	H	H	H
6.2.2	Attend the input and output power rating test as per IEC TS 62933-2-1:2018, 6.2.2 (IOGP S-753, 5.4.2)	H	H	H	H
6.2.3	Attend roundtrip efficiency test as per IEC TS 62933-2-1:2018, 6.2.3 (IOGP S-753, 5.4.2)	H	H	H	H
6.2.4	Attend system response test for step response time and ramp rate as per IEC TS 62933-2-1:2018, 6.2.5 (IOGP S-753, 5.4.2)	H	H	H	H
6.2.5	Attend auxiliary power consumption test as per IEC TS 62933-2-1:2018, 6.2.6 (IOGP S-753, 5.4.2)	H	H	H	H
6.2.6	Attend self-discharge test as per IEC TS 62933-2-1:2018, 6.2.7 (IOGP S-753, 5.4.2)	H	H	H	H
6.2.7	Attend rated voltage and frequency range test as per IEC TS 62933-2-1:2018, 6.2.8 (IOGP S-753, 5.4.2)	H	H	H	H
6.3	Implementation testing of the whole BESS assembly				
6.3.1	Attend visual inspection test as per IEC TS 62933-2-1:2018, 6.4.1	H	H	H	H
6.3.2	Attend continuity and validity of conductors test as per IEC TS 62933-2-1:2018, 6.4.2	H	H	H	H
6.3.3	Attend earthing test as per IEC TS 62933-2-1:2018, 6.4.3	H	H	H	H
6.3.4	Attend insulation test as per IEC TS 62933-2-1:2018, 6.4.4	H	H	H	H
6.3.5	Attend protective and switching device test as per IEC TS 62933-2-1:2018, 6.4.5	H	H	H	H
6.3.6	Attend equipment and basic function test as per IEC TS 62933-2-1:2018, 6.4.6	H	H	H	H
6.3.7	Attend grid connection compatibility test as per IEC TS 62933-2-1:2018, 6.4.7	H	H	H	H
6.3.8	Attend available energy test as per IEC TS 62933-2-1:2018, 6.4.8	H	H	H	H
6.3.9	Attend available EMC immunity test as per IEC TS 62933-2-1:2018, 6.4.9	H	H	H	H
6.3.10	Attend optional test, project-specific requirements (to be performed only when requested)	H	H	H	H
6.4	Attend the functional testing of the BESS subsystems as per the SAT test procedure on the whole BESS assembly.	H	H	H	H

Table A.1 (continued)

Purchaser assessment activities	CAS			
	A	B	C	D
<p>Key</p> <ul style="list-style-type: none"> - No intervention performed H Hold point W Witness point R Review S Surveillance 				

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