

Supplementary Specification to API Standard 671 for Special-purpose Couplings

Public Review Draft

Revision history

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1.1	July 2023	Issued for Public Review
1.0	May 2020	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).

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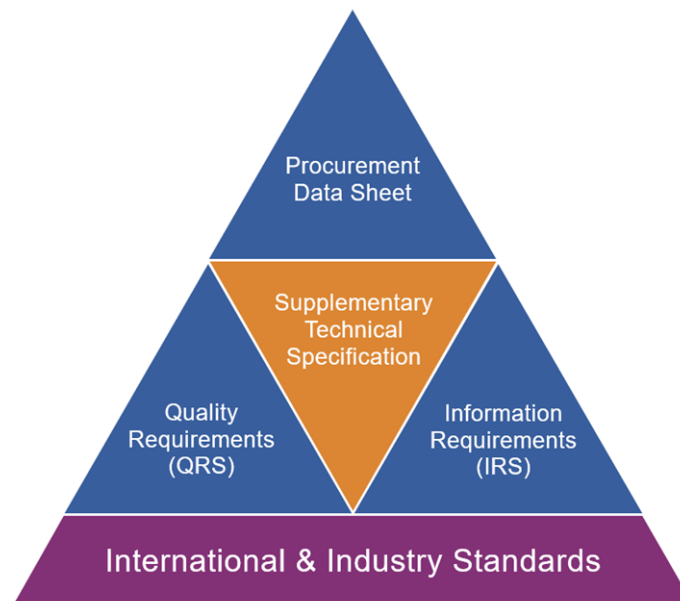
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Introduction

The purpose of this specification is to define a minimum common set of requirements for the procurement of special-purpose couplings in accordance with API Standard 671, Fifth Edition, August 2020, Special-purpose Couplings for Petroleum, Chemical and Gas Industry Services, for application in the petroleum and natural gas industries.

This specification follows a common document structure comprising the four documents as shown below, which together with the purchase order define the overall technical specification for procurement.



JIP33 Specification for Procurement Documents Supplementary Technical Specification

This specification is to be applied in conjunction with the supporting procurement data sheet, information requirements specification (IRS) and quality requirements specification (QRS) as follows.

IOGP S-700: Supplementary Specification to API Standard 671 for Special-purpose Couplings

This specification defines the technical requirements for the supply of the equipment and is written as an overlay to API Standard 671, following the API Standard 671 clause structure. Clauses from API Standard 671 not amended by this specification apply as written to the extent applicable to the scope of supply. Modifications to API Standard 671 defined in this specification are identified as Add (add to clause or add new clause), Replace (part of or entire clause) or Delete.

IOGP S-700D: Procurement Data Sheet for Special-purpose Couplings (API)

The procurement data sheet defines application specific requirements, attributes and options specified by the purchaser for the supply of equipment to the technical specification. The procurement data sheet may also include fields for supplier provided information attributes subject to purchaser's technical evaluation. Additional purchaser supplied documents may also be incorporated or referenced in the procurement data sheet to define scope and technical requirements for enquiry and purchase of the equipment.

IOGP S-700L: Information Requirements for Special-purpose Couplings (API)

The IRS defines the information requirements, including contents, format, timing and purpose to be provided by the supplier. It may also define specific conditions which invoke information requirements.

IOGP S-700Q: Quality Requirements for Special-purpose Couplings (API)

The QRS defines quality management system requirements and the proposed extent of purchaser conformity assessment activities for the scope of supply. Purchaser conformity assessment activities are defined through the selection of one of four generic conformity assessment system (CAS) levels on the basis of evaluation of the associated service and supply chain risks. The applicable CAS level is specified by the purchaser in the data sheet or in the purchase order.

The terminology used within this specification and the supporting procurement data sheet, IRS and QRS follows that of API Standard 671 and is in accordance with ISO/IEC Directives, Part 2 as appropriate.

The procurement data sheet and IRS are published as editable documents for the purchaser to specify application specific requirements. The supplementary specification and QRS are fixed documents.

The order of precedence (highest authority listed first) of the documents shall be:

- a) regulatory requirements;
- b) contract documentation (e.g. purchase order);
- c) purchaser defined requirements (procurement data sheet, IRS, QRS);
- d) this specification;
- e) API Standard 671.

1 Scope

Replace second sentence of second paragraph with

This specification modifies only content applicable to metallic flexible element type couplings.

2 Normative references

Add to first paragraph

The following documents are referred to in the text of this specification, the procurement data sheet (IOGP S-700D) or the IRS (IOGP S-700L) in such a way that some or all of their content constitutes requirements of this specification.

Add to section

IEC 60079 (all parts), *Explosive atmospheres*

IOGP S-715, *Supplementary Specification to Norsok M-501 Coating and Painting for Offshore, Marine, Coastal and Subsea Environments*

ISO 80079-36, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements*

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

NFPA 70, *National Electrical Code*

4 Requirements

4.1 Units of Measure

Replace first sentence of first paragraph with

The specified units of measurement (SI or USC) shall be used in all data, drawings and maintenance dimensions.

Delete second sentence

5 Coupling Selection

5.2

Add new section

5.2.3

Metallic flexible-element special-purpose couplings shall have a minimum service life of 20 years.

Add new section

5.2.4

The design life calculations of the coupling and coupling-to-shaft juncture shall take into account the frequency of starts per unit of time.

6 Coupling Design

6.7

In first sentence of first paragraph, replace "the rated operating point and the corresponding speed" with

all operating points and the corresponding speeds

6.13

Delete "If specified" from first sentence

Add after first paragraph

For motor driven units and generators, transient events shall include the following:

- phase to phase short circuit;
- phase to ground short circuit;
- motor breaker re-closure;
- faulty synchronization to the grid.

8 Coupling Requirements

8.1 Metallic Flexible-element Couplings

8.1.6

8.1.6.2

Delete list item d)

Add new section

8.1.7

The coupling and coupling guard shall not use an external cooling system.

8.6 Hubs

8.6.4 Alternate Hub Design

Delete section 8.6.4

8.12 Dynamics

8.12.1

Delete NOTE

8.12.2

Delete ", or at least 1.5 times using a more rigorous analysis based on actual geometry (for example, finite-element analysis)" from first sentence

Delete second sentence

9 Balance

9.3 Balance Criteria

9.3.5 Component Balance

9.3.5.4

In first sentence, replace "except for" with

including

Delete second sentence

9.3.5.6

In first sentence, replace "or" with

and

In first sentence, replace "shaft" with

rotor

9.3.6 Assembly Check Balance

In second sentence of first paragraph, replace "or" with

and

In second sentence of first paragraph, replace "shaft" with

rotor

9.3.7 Assembly Balance

9.3.7.4

In first sentence, replace "or" with

and

In first sentence, replace "shaft" with

rotor

9.3.7.5

Delete section 9.3.7.5

9.3.11 Balance Mandrels

9.3.11.4

Replace "should" with

shall

9.3.11.6

In second paragraph, replace "should" with

shall

9.4 Trim Balance Holes

9.4.1

Delete "If specified," from first sentence

10 Materials

10.5

Delete second sentence

Delete third sentence

11 Accessories

Add new section

11.4

The hydraulic pump shall be rated for at least the hydraulic pressures required for installation and removal of hydraulically fitted hubs.

Add new section

11.5

The pressure rating of hoses and fittings shall be equal to or greater than the rating pressure of the hydraulic pump.

12 Manufacturing Quality, Inspection, Testing, and Preparation for Shipment

12.1 Manufacturing Quality

12.1.2

Replace first sentence with

Repair of defects by welding or plating shall not be allowed.

Delete second sentence

12.3 Inspection

12.3.5

Delete fourth sentence

12.5 Preparation for Shipment

12.5.5

Replace second sentence with

The packing container shall be marked with the tag number, shipping weight and purchase order number.

Add to section

The markings on the packing container shall be 75 mm (3 in.) minimum character height.

Add new section

12.5.10

Markings shall be included in the detailed coupling drawing.

Annex G (informative)

Example of the Determination of Potential Unbalance

G.3 Balancing

In list item a), replace "ISO 1940-1:2003" with

ISO 21940-11:2016

In list item b), replace "ISO 1940-1:2003" with

ISO 21940-11:2016

In list item c), replace "ISO 1940-1:2003" with

ISO 21940-11:2016

In NOTE, replace "ISO 1940-1:2003" with

ISO 21940-11:2016

Annex H **(normative)**

Coupling Guards

H.2 General Requirements for All Guards

H.2.12

Add to first paragraph

If specified, the guard shall be provided with protection preventing personnel from contact with the guard when the maximum enclosure/guard surface temperature at maximum continuous speed is greater than 60 °C (140 °F).

H.2.13

In first sentence, replace "H.2.13" with

H.2.12

Delete second sentence

H.2.17

Delete section H.2.17

Annex K

(normative)

Procedure for Residual Unbalance Check

K.4 Residual Unbalance Check

K.4.1 General

K.4.1.1

Delete NOTE

K.4.2 Procedure

K.4.2.1

Delete NOTE

K.4.2.3

Replace section (including NOTE) with

Before starting the residual unbalance check, the balancing machine's readings shall be stable with no faulty sensors or displays.

Annex L **(normative)**

Torque Measuring System

L.2 Cyclic Torque (Torsional) Monitoring Capability (If Specified)

Replace list item b) with

- b) accuracy of torsional measurement;

Replace list item c) with

- c) units of measurement;

L.4 Accuracy

Replace second sentence of fourth paragraph with

The degradation in accuracy of the torque measuring system with respect to time shall be provided.

Add to section

If specified, the torque measuring system shall have a self-test feature to assist in determining the degradation of the accuracy of the torque measuring system.

Delete NOTE 1

L.5 Effect of Rotordynamics

Replace section with

Changes to the mass elastic properties of the coupling resulting from the incorporation of the torque meter shall be included in the system rotordynamics.

L.10 Additional Information

Add to list item e)

in accordance with Figure L.1

Add new Figure L.1

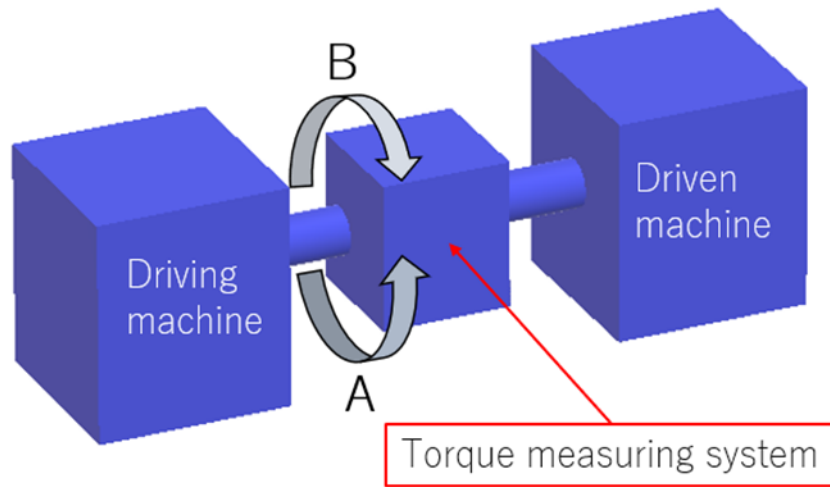


Figure L.1—Coupling Direction of Rotation and Power Flow

Bibliography

Add to start of Bibliography

The following documents are informatively cited in the text of this specification, the procurement data sheet (IOGP S-700D) or the IRS (IOGP S-700L).

Add to Bibliography

- [6] EN 10204, *Metallic products - Types of inspection documents*
- [7] ISO 9001, *Quality management systems — Requirements*
- [8] ISO 10005, *Quality management — Guidelines for quality plans*
- [9] ISO 10474, *Steel and steel products — Inspection documents*
- [10] ISO 21940-11:2016, *Mechanical vibration — Rotor balancing — Part 11: Procedures and tolerances for rotors with rigid behaviour*
- [11] ISO/IEC 17000, *Conformity assessment — Vocabulary and general principles*

Delete from Bibliography

- [1] ISO 1940-1:2003, *Mechanical vibration — Balance quality requirements for rotors in a constant (rigid) state — Part 1: Specification and verification of balance tolerances*

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