

Supplementary Specification to API Standard 671 for Special-purpose Couplings

Revision history

VERSION	DATE	PURPOSE
2.0	April 2024	Second Edition
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).

This second edition cancels and replaces the first edition published in May 2020.

Due to technical writing requirements leading to extensive changes, this second edition should be treated as a new document.

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Introduction

The purpose of the IOGP S-700 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.

The IOGP S-700 specification documents follow a common structure (as shown below) comprising a specification, also known as a technical requirements specification (TRS), a procurement data sheet (PDS), an information requirements specification (IRS) and a quality requirements specification (QRS). These four specification documents, together with the purchase order, define the overall technical specification for procurement.



JIP33 Specification for Procurement Documents Supplementary Technical Requirements Specification (TRS)

This specification is to be applied in conjunction with the supporting PDS, IRS and QRS as follows.

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

This specification defines 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. Modifications to API Standard 671 defined in this specification are introduced by a description that includes the type of modification (i.e. Add, Replace or Delete) and the position of the modification within the clause.

NOTE Lists, notes, tables, figures, equations, examples and warnings are not counted as paragraphs.

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

The PDS defines application-specific requirements. The PDS is applied during the procurement cycle only and does not replace the equipment data sheet. The PDS may also include fields for supplier-provided information required as part of the purchaser's technical evaluation. Additional purchaser-supplied documents may also be incorporated or referenced in the PDS 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 information requirements for the scope of supply. The IRS includes information content, format, timing and purpose to be provided by the supplier, and may also define specific conditions that invoke the 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 PDS or in the purchase order.

The specification documents follow the editorial format of API Standard 671 and, where appropriate, the drafting principles and rules of ISO/IEC Directives Part 2.

The PDS and IRS are published as editable documents for the purchaser to specify application-specific requirements. The TRS and QRS are fixed documents.

The order of precedence of documents applicable to the supply of the equipment, with the highest authority listed first, shall be as follows:

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

1 Scope

Add to second paragraph

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 this specification, the PDS (IOGP S-700D) or the IRS (IOGP S-700L) in such a way that some or all of their content constitutes requirements of these specification documents.

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

NFPA 70, *National Electrical Code*

3 Terms, Definitions, Acronyms, and Abbreviations

3.1 Terms and Definitions

3.1.50

spacer gap length

Add new NOTE 2

NOTE 2 "Spacer gap length" is also referred to as "distance between flange faces (DBFF) (cold)".

3.2 Acronyms and Abbreviations

Add to section

CAS conformity assessment system

DBFF distance between flange faces

IRS information requirements specification

PDS procurement data sheet

QRS quality requirements specification

TRS technical requirements specification

4 Requirements

4.1 Units of Measure

Replace section with

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

5 Coupling Selection

5.2

Add new section

5.2.3

Metallic flexible-element special-purpose couplings shall have a design life of at least 20 years.

NOTE Couplings are selected in accordance with the application and designed for infinite life under design operating conditions. Abnormal operating conditions can lead to premature coupling failure.

6 Coupling Design

6.7

In first sentence, replace "determined based on the torque required by the driven machine at the rated operating point and the corresponding speed rather than at the normal operating point (per 6.6a) using Equation (5)" with

the highest calculated value of T_s for all operating points and corresponding speeds, including the future conditions, using Equation (5)

6.13

Delete "If specified," from first sentence

In first sentence, replace "a specified transient torque" with

the specified maximum transient torque

Add after first paragraph

For equipment trains with electric motor drivers or electrical 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.

NOTE The coupling includes design features described in 8.1.6.

8.6 Hubs

8.6.4 Alternate Hub Design

Delete section 8.6.4

8.12 Dynamics

8.12.1

In first sentence, replace "single element convoluted diaphragm coupling" with

special-purpose coupling

Delete NOTE

8.12.2

Delete "assuming infinitely stiff supports" from first sentence

In first sentence, replace "a more rigorous analysis based on actual geometry (for example, finite-element analysis)" with

finite-element analysis based on actual geometry

Replace second sentence with

The vendor shall perform the lateral natural frequency analysis and provide details of the assumptions made in the calculations.

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 does" 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 does" with

and

In first sentence, replace "shaft" with

rotor

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 greater than or equal to 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

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

Add new section

12.5.10

Identification 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 list item d) 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 to prevent personnel from contacting 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

Replace second sentence with

The vendor shall calculate the maximum enclosure temperature at the maximum continuous speed.

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 readings of the balancing machine 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 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 rotordynamic analysis of the drive train.

L.10 Additional Information

Add to list item e)

in accordance with Figure L.1

Add new Figure L.1

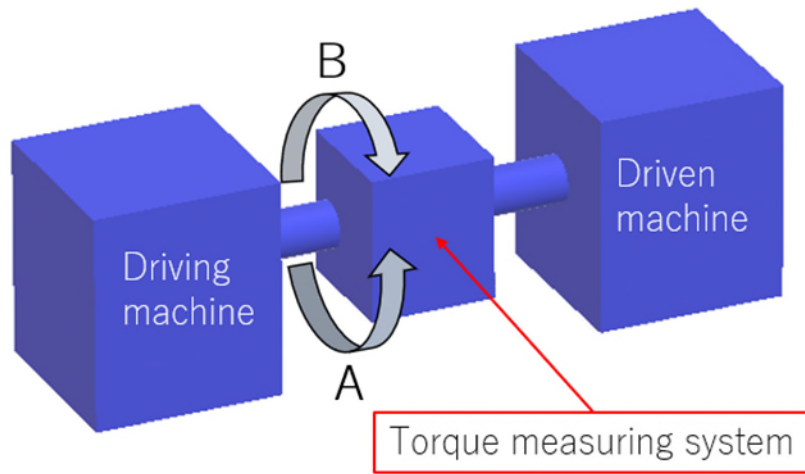


Figure L.1 — Coupling Direction of Rotation and Power Flow

Bibliography

Add to start of Bibliography

The following documents are informatively cited in the text of this specification, API Standard 671, the PDS (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*
- [12] ISO/IEC 17020:2012, *Conformity assessment — Requirements for the operation of various types of bodies performing inspection*
- [13] ISO/IEC Directives, Part 2, *Principles and rules for the structure and drafting of ISO and IEC documents*

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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