SLOVENSKI STANDARD
oSIST prEN ISO 13679:2018

01-oktober-2018

Industrija za proizvodnjo nafte in zemeljskega plina - Postopki za preskušanje spojev za zaščitne in proizvodne (dvižne) cevi (ISO/DIS 13679:2018)

Petroleum and natural gas industries - Procedures for testing casing and tubing connections (ISO/DIS 13679:2018)

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Industries du pétrole et du gaz naturel - Procédures de test des connexions pour tubes de cuvelage et de production (ISO/DIS 13679:2018)

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Ta slovenski standard je istoveten z: **prEN ISO 13679**

ICS:

75.180.10	Oprema za raziskovanje, vrtanje in odkopavanje	Exploratory, drilling and extraction equipment
75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment

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DRAFT INTERNATIONAL STANDARD

ISO/DIS 13679

ISO/TC **67**/SC **5** Secretariat: **JISC**

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Petroleum and natural gas industries — Procedures for testing casing and tubing connections

Industries du pétrole et du gaz naturel — Procédures de test des connexions pour tubes de cuvelage et de production

ICS: 75.200; 75.180.10

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 067, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 05, *Casing, tubing and drill pipe*.

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This second edition cancels and replaces the first edition (ISO 13679:2002), which has been technically revised.

The main changes compared to the previous edition are as follows:

— New specimen geometries, e.g. XH-XL have been added

— All Connection Assessment Level(s) test requirements and sequences have been revised

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Introduction

The technical requirements of ISO 13679:2002 and API Recommended Practice (RP) 5C5 had been identical; in January 2017, API RP 5C5 was technically revised. The purpose of this revision is to bring this International Standard up-to-date by referencing the current version of API RP 5C5, including some supplementary content.

This International Standard is part of a process to provide reliable tubing and casing connections for the oil and natural gas industry which are fit for purpose. It has been developed based on improvements to ISO 13679:2002 and proprietary test procedures, with input from leading users, manufacturers and testing consultants from around the world. This International Standard represents the knowledge of many years of testing and qualification experiences.

The experimental validation of connection test load envelope and failure limit loads is relevant to design of tubing and casing for the oil and natural gas industries. Tubing and casing are subject to loads which include internal pressure, external pressure, axial tension, axial compression, bending torsion, transverse forces and temperature changes. The magnitude and combination of these loads result in various pipe body and connection failure modes. Although pipe body test and limit loads are well understood in general, the same cannot be stated for the connection. These failure modes and loads are generally different and often less than that of the pipe. Consequently, experimental validation is required.

The validation of test and limit loads requires testing at the extremes of performance parameters to these defined loads. Testing at the extremes of the performance parameters assures that the production population that falls within these limits meets or exceeds the performance of the test population. Thread connection performance parameters include dimensional tolerances, mechanical properties, surface treatment, make-up torque and the type and amount of thread compound. For typical proprietary connections, worst-case tolerances are known and defined in this International Standard. For other connections designs, analysis is required to define worst-case tolerance combinations.

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It is necessary that users of this International Standard be aware that further or differing requirements can be needed for individual applications. This International Standard is not intended to inhibit a vendor from offering, or a purchaser from accepting, alternate equipment or engineering solutions for the individual application. This is particularly applicable when there is innovative or developing technology. Where an alternative is offered, it is the responsibility of the vendor to identify any variations from this International Standard and provide details.

For specific applications that are not evaluated by the tests herein, supplementary tests can be appropriate. It is necessary that the user and manufacturer discuss well applications and limitations of the connection being considered.

Representatives of users and/or other third party personnel are encouraged to monitor the tests. ISO 13679 covers the testing of connections for the most commonly encountered well conditions. Not all possible service scenarios are included. For example, the presence of a corrosive fluid, which can influence the service performance of a connection, is not considered.

This International Standard includes various provisions. These are identified using certain verbal forms:

— SHALL is used to indicate requirements that strictly need to be followed in order to conform to this International Standard and from which no deviation is permitted.

— SHOULD is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

— MAY is used to indicate a course of action permissible within the limits of the document.

— CAN is used to indicate statements of possibility and capability, whether material, physical or causal.

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Petroleum and natural gas industries — Procedures for testing casing and tubing connections

1 Scope

This International Standard specifies tests to perform to determine the galling tendency, sealing performance and structural integrity of casing and tubing connections. The words “casing” and “tubing” apply to the service application and not to the diameter of the pipe.

This document is a supplement to API RP 5C5:2017, the requirement of which are applicable with the additions and exclusions specified in this Standard.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Recommended Practice (RP) 5C5:2017, *Procedures for Testing Casing and Tubing Connections*

ISO 3183, *Petroleum and natural gas industries — Steel pipe for pipeline transportation systems*

ISO 11960, *Petroleum and natural gas industries — Steel pipes for use as casing or tubing for wells*

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3 Terms and definitions

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For the purposes of this document, the terms and definitions given in API RP 5C5:2017 and the following apply.

3.1
Near-yield load effect(s)[1]
Cyclic growth of plastic strain range in a cyclically softening material at stresses below the material yield strength

3.2
Nominal connection performance envelope
The nominal connection performance envelope presents the manufacturer’s claimed connection performance envelope that is based on the pipe’s minimum performance

4 Supplements to API RP 5C5:2017

4.1 General Requirements

The requirements specified in API RP 5C5:2017 shall apply, with the additions and deletions specified in the following clauses. Clauses 4.4, 4.5, and 4.6 of this Standard are the additions to API RP 5C5:2017. Finally, the Bibliography provides one additional reference to API RP 5C5:2017.

4.2 Scope

Replace Clause 1 of API RP 5C5:2017 with Clause 1 of this Standard.

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4.3 Normative References

Replace API Specification 5CT, *Specification for Casing and Tubing* with ISO 11960, *Petroleum and natural gas industries — Steel pipes for use as casing or tubing for wells*.

Replace API Specification 5L, *Specification for Line Pipe* with ISO 3183, *Petroleum and natural gas industries — Steel pipe for pipeline transportation system*.

4.4 Nominal connection performance envelope

This International Standard requires the development and reporting of the nominal connection performance envelope that is claimed by the connection manufacturer using the specified geometrical and material parameters, e.g. ISO 11960 specified outside diameter, specified wall thickness, and specified minimum material yield based on grade. This nominal connection performance envelope is equivalent to the connection evaluation envelope (CEE) that has been adjusted to reflect these ISO specified attributes of the casing/tubing and shall be reported in the executive summary (section a) and connection specification (section d) portions of the test report.

4.5 Anisotropic reference curves

This International Standard recognizes that isotropic material behaviour is not exhibited by all Oil Country Tubular Goods (OCTG) and that the nominal pipe body VME curve (API RP 5C5:2017 Annex D, curve 1) and the test specimen pipe body actual VME curve (API RP 5C5:2017 Annex D, curve 4) explicitly reflect the isotropic material assumption. To provide an appropriate context for connection testing with anisotropic materials, this International Standard recommends that the manufacturer develop and report the nominal pipe body yield curve and test specimen pipe body actual yield curves using anisotropic yield criterion, e.g. Hill's conventional anisotropic yield criterion or other criteria to account for observed (compression) yield properties, in place of the isotropic material curves. The connection manufacturer shall document the methodology for the development of these anisotropic yield curves and report the methodology and results in Section 7a of the connection test report.

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4.6 Near-yield loading effects

In tubular-connection systems, i.e. connection test specimens, cyclic loading to stress levels approaching the tubular material's yield strength may cause plastic deformation (plastic strain) that increases in magnitude with each load cycle. The resulting accumulation of plastic strain may affect the functionality of a tubular-connection system or lead to its structural failure, which has been observed in material property and full-scale tests conducted in support of casing/tubing-connection evaluations. These aspects of casing/tubing material behaviour, and their manifestations in tubular-connection systems, are referenced as near-yield loading effects.

The interactions among variables impacting the near-yield loading effects (tubular-connection architecture, material properties, and loading) are complex; in general, the near-yield loading effect severity depends on:

— uncertainty of the material yield estimates (ambient and elevated temperatures)

— strain rate

— applied cyclic stress amplitude

— multi-axial stress state in the tubular system

— stress-strain response (yield and elastic limit envelopes)

— cyclic softening tendency

— ratcheting tendency

— thermomechanical load history of the tubular material

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