PD ISO/PAS 12835:2013

BSI Standards Publication

Qualification of casing connections for thermal wells

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National foreword

This Published Document is the UK implementation of ISO/PAS 12835:2013.

The UK participation in its preparation was entrusted to Technical Committee PSE/17, Materials and equipment for petroleum, petrochemical and natural gas industries.

A list of organizations represented on this committee can be obtained on request to its secretary.

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ISBN 978 0 580 81415 0

ICS 75.180.10; 75.200

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 28 February 2014.

Amendments issued since publication

Date	Text affected

PD ISO/PAS 12835:2013

PUBLICLY AVAILABLE SPECIFICATION

ISO/PAS 12835

First edition
2013-12-15

Qualification of casing connections for thermal wells

Qualification des raccordements de boîtiers pour les puits thermiques

Reference number
ISO/PAS 12835:2013(E)

Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 5, *Casing, tubing and drill pipe*.

Introduction

This Thermal Well Casing Connection Evaluation Protocol (TWCCEP) provides procedures for assessment and thereby enables evaluation of suitability of threaded casing connections for service in intermediate or production casing strings of thermal recovery wells. The TWCCEP defines such wells as those with operating temperatures that cyclically vary between minimum values appreciably below 180°C and maximum values that range from 180°C to 350°C, in which the casing string is cemented and the primary axial loading is strain-based.

Throughout this document, a casing connection subject to evaluation is referred to as candidate connection. A candidate connection denotes a product with unique design features and production specifications for size, weight, and component materials (including pin, box, and interfacial components).

The TWCCEP assesses the candidate connection's galling resistance, structural integrity and sealability under loads typical for connection assembly and thermal-well service. The TWCCEP does not address impacts of external pressure, incomplete lateral pipe support, rotational fatigue, formation-induced shear, or environmentally-induced corrosion or cracking.

The TWCCEP's evaluation procedure includes analysis and full-scale testing. In the analysis, worst-case combinations of the connection geometry and material properties are determined and specifications for test specimens are derived. In the full-scale tests, those specimens are subjected to loading representative of thermal well operations. While the TWCCEP aims to enable a statistically significant full-scale test, it does not demand a rigorous check of a true statistical placement of the tested sample responses relative to field connection performance, and thus inherently assumes that the test specimens are representative of subsequent field connections. For this reason, only connections with the same design parameters as the candidate connection should be considered representative of the connection assessed under this protocol.

The extensive effort involved in replicating thermal well field conditions in a laboratory environment limits the extent of physical testing that can reasonably be undertaken in an evaluation program. This protocol balances technical rigor and practicality to provide a baseline level of confidence in the candidate connection's performance. Connection users should consider the scope of this evaluation and appropriate additions to address operation-specific conditions. Successful field use of a connection meeting the requirements of this protocol does not preclude an operator's need to employ appropriate product quality assurance measures and field operating practices.

The TWCCEP is the culmination of a thorough review of factors contributing to performance of casing connections in thermal well applications. This protocol has been developed using input from operators' descriptions of field practices, manufacturers' feedback on connection design and production, available literature, knowledge of past connection qualification programs, and additional analytical and experimental work performed in support of the protocol development. The TWCCEP is intended to be maintained and refined as new findings surface.

PUBLICLY AVAILABLE SPECIFICATION ISO/PAS 12835:2013(E)

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1 Scope

ISO/PAS 12835 is intended for assessment of casing connections for those field applications in which the design of the casing-connection system is strain-based, and in which primary axial loading of the casing-connection system driven by constrained thermal expansion, and in which that primary loading exceeds the casing-connection system's yield envelope. Consequently, ISO/PAS 12835 should be considered as a protocol that is complementary to ISO 13679, which applies to classic elastic-design applications.

ISO/PAS 12835 describes the structure of the Thermal Well Casing Connection Evaluation Protocol (TWCCEP) and provides guidelines for its use by new or repeat TWCCEP users, whose familiarity with the TWCCEP provisions might vary. Clause 6 describes fundamental assumptions adopted in the TWCCEP.

NOTE The term "user" refers to a party that uses the TWCCEP in a connection evaluation program. That party might or might not be the same party as a later user of the evaluated connection in a field application.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the cited edition applies. For undated references, the latest editions of the reference document apply.

ASTM A370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

ASTM E8, *Standard Test Methods for Tension Testing of Metallic Materials*

ASTM E21, *Standard Test Methods for Elevated-Temperature Tension Tests of Metallic Materials*

ASTM E831-06, *Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis*

ISO 9001, *Quality management systems — Requirements*

ISO 11960, *Petroleum and natural gas industries — Steel pipe for use as casing and tubing for wells*[1)]

ISO 13679:2002, *Petroleum and natural gas industries — Procedures for testing casing and tubing connections*[2)]

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1
ambient temperature
ambient temperature in the facility where a physical testing task is executed

1) Based on API Specification 5CT.

2) Based on API Specification 5C5.