ICS 75.200 SLOVENSKÁ TECHNICKÁ NORMA Jún 2019

STN	**Ropný, petrochemický a plynárenský priemysel Kvalifikačné skúšky a preberacie podmienky ochranných náterov pod izoláciou (ISO 19277: 2018)**	**STN EN ISO 19277** 45 0032

Petroleum, petrochemical and natural gas industries - Qualification testing and acceptance criteria for protective coating systems under insulation (ISO 19277:2018)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 05/19

Obsahuje: EN ISO 19277:2018, ISO 19277:2018

128766

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 19277

December 2018

ICS 75.200

English Version

Petroleum, petrochemical and natural gas industries - Qualification testing and acceptance criteria for protective coating systems under insulation (ISO 19277:2018)

Industries du pétrole, de la pétrochimie et du gaz naturel - Essais de qualification des systèmes de revêtement protecteurs sous isolation (ISO 19277:2018)

Erdöl-, petrochemische und Erdgasindustrie - Qualifikationsprüfungen und Abnahmekriterien für Beschichtungssysteme unter Isolierung (ISO 19277:2018)

This European Standard was approved by CEN on 26 November 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN ISO 19277:2018 E

EN ISO 19277:2018 (E)

Contents

Page

European foreword

This document (EN ISO 19277:2018) has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries" in collaboration with Technical Committee CEN/TC 12 “Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries” the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 19277:2018 has been approved by CEN as EN ISO 19277:2018 without any modification.

INTERNATIONAL STANDARD

ISO 19277

First edition
2018-12

Petroleum, petrochemical and natural gas industries — Qualification testing and acceptance criteria for protective coating systems under insulation

Industries du pétrole, de la pétrochimie et du gaz naturel — Essais de qualification des systèmes de revêtement protecteurs sous isolation

Reference number
ISO 19277:2018(E)

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Published in Switzerland

Contents

Page

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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Unprotected carbon steel in insulated service with the presence of water and concentrating contaminants from the atmosphere or surrounding sources can cause accelerated corrosion and lead to severe metal loss. Additionally, unprotected austenitic and duplex stainless steels can suffer external chloride-induced stress corrosion cracking if contaminates, such as chlorides from the atmosphere and or the insulation, are present at the steel surface. Therefore, steel structures under insulation are normally protected to prevent corrosion-related damage during the operational life required of the equipment.

There are different ways of protecting steel structures from corrosion under insulation. This document deals with protection by use of coating when used as part of a system, including insulation and cladding materials, which can work together to prevent corrosion under insulation (CUI). All components of the corrosion prevention system are important in achieving adequate corrosion protection. This document only deals with the coating part of the corrosion protection system with focus on typical CUI coating environments. Further, this document focuses on accelerated testing protocols and acceptance criteria, so that interested parties can make informed decisions.

In order to ensure effective corrosion protection of steel structures and equipment, it is necessary for owners of such structures, planners, consultants, companies carrying out corrosion protection work, inspectors of protective coatings and manufacturers of coating materials to have at their disposal state-of-the-art information in a concise form on corrosion protection by coating systems. Such information has to be as complete as possible, unambiguous and easily understandable to avoid difficulties and misunderstandings between the interested parties with the practical implementation of protection work.

This document is intended to give the abovementioned information to people who have some technical knowledge of coatings and the process operations of the equipment. It is assumed that the user of this document is familiar with other relevant International Standards, in particular those dealing with surface preparation, inspection/testing of coatings, and relevant regulations.

Future parts of this document are planned to be developed and can include other subjects like higher temperature, cyclic and intermittent service, testing of coatings for maintenance and repair, tape-applied coating materials, etc.

INTERNATIONAL STANDARD **ISO 19277:2018(E)**

Petroleum, petrochemical and natural gas industries — Qualification testing and acceptance criteria for protective coating systems under insulation

1 Scope

This document describes various corrosion under insulation (CUI) environments in refineries and other related industries and environments, and establishes CUI environmental categories including operating temperature ranges from −45 °C to 204 °C for topside and aboveground service only. This document specifies both established and other test methods for the assessment of coatings used for prevention of CUI for each given environment. This document also provides acceptance criteria for each CUI environment.

NOTE The test results and acceptance criteria can be considered an aid in the selection of suitable coating systems. For service or peak temperatures below −45 °C an optional cryogenic test can be incorporated and for over 204 °C testing acceptance criteria can be agreed between interested parties. Additional or other test and acceptance measures are possible, but require particular agreement between the interested parties.

This document covers spray-applied coatings applied on new carbon and austenitic stainless steel for use in CUI service. This document does not cover testing of sacrificial coatings, such as inorganic zinc, as these coatings can be consumed quickly in wet environments. Developing accelerated corrosion testing for what can be continuous wet service with sacrificial coatings is beyond the scope of this document.

"Non-through porosity" thermal spray aluminium coatings with greater than 250 µm dry film thickness can be tested and qualified in accordance with this document. This document does not cover tape and sheet applied products for use in preventing CUI.

This document does not deal with other aspects of coating degradation, such as those caused by abrasion, erosion, ultraviolet degradation or other methods that can exist given specific environment and construction methods.

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.

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 1513, *Coatings and varnishes — Examination and preparation of samples for testing*

ISO 2409, *Coatings and varnishes — Cross-cut test*

ISO 2812-2, *Coatings and varnishes — Determination of resistance to liquids — Part 2: Water immersion method*

ISO 4624, *Coatings and varnishes — Pull-off test for adhesion*

ISO 4628-2, *Coatings and varnishes — Evaluation of degradation of coating coatings — Designation of intensity, quantity and size of common types of defect — Part 2: Designation of degree of blistering*

ISO 4628-3, *Coatings and varnishes — Evaluation of degradation of coating coatings — Designation of intensity, quantity and size of common types of defect — Part 3: Designation of degree of rusting*

ISO 4628-4, *Coatings and varnishes — Evaluation of degradation of coating coatings — Designation of intensity, quantity and size of common types of defect — Part 4: Designation of degree of cracking*

ISO 4628-5, *Coatings and varnishes — Evaluation of degradation of coating coatings — Designation of intensity, quantity and size of common types of defect — Part 5: Designation of degree of flaking*

ISO 4628-8, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 8: Assessment of degree of delamination and corrosion around a scribe*

ISO 7384, *Corrosion tests in artificial atmospheres — General requirements*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 12944-6, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 6: Laboratory performance test methods and associated assessment criteria*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

ISO 19840, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Measurements of, and acceptance criteria for, the thickness of dry films on rough surfaces*