



SLOVENSKI STANDARD SIST EN ISO 24817:2017

01-november-2017

Nadomešča:
SIST EN ISO 24817:2015

Petrokemična industrija ter industrija za predelavo nafte in zemeljskega plina - Popravila cevovodov s kompozitnimi materiali - Ocenitev in načrtovanje, montaža, preskušanje in nadzor (ISO 24817:2017)

Petroleum, petrochemical and natural gas industries - Composite repairs for pipework - Qualification and design, installation, testing and inspection (ISO 24817:2017)

Erdöl-, petrochemische und Erdgasindustrie - Reparatur von Rohrleitungen mit Verbundwerkstoffen - Bewertung und Ausführung, Montage, Test und Inspektion (ISO 24817:2017)

Industries du pétrole, de la pétrochimie et du gaz naturel - Réparations en matériau composite pour canalisations: Conformité aux exigences de performance et conception, installation, essai et inspection (ISO 24817:2017)

Ta slovenski standard je istoveten z: EN ISO 24817:2017

ICS:

75.180.20 Predelovalna oprema Processing equipment

SIST EN ISO 24817:2017 en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/a656bc76-12c9-4371-8e80-b05c65a9f40d/sist-en-iso-24817-2017>

EUROPEAN STANDARD

EN ISO 24817

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2017

ICS 75.180.20

Supersedes EN ISO 24817:2015

English Version

Petroleum, petrochemical and natural gas industries - Composite repairs for pipework - Qualification and design, installation, testing and inspection (ISO 24817:2017)

Industries du pétrole, de la pétrochimie et du gaz naturel - Réparations en matériau composite pour canalisations - Conformité aux exigences de performance et conception, installation, essai et inspection (ISO 24817:2017)

Erdöl-, petrochemische und Erdgasindustrie - Reparatur von Rohrleitungen mit Verbundwerkstoffen - Bewertung und Ausführung, Montage, Test und Inspektion (ISO 24817:2017)

This European Standard was approved by CEN on 5 September 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword.....	3

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/a656bc76-12c9-4371-8e80-b05c65a9f40d/sist-en-iso-24817-2017>

European Foreword

This document (EN ISO 24817:2017) 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 March 2018 and conflicting national standards shall be withdrawn at the latest by March 2018.

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.

This document supersedes EN ISO 24817:2015.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 24817:2017 has been approved by CEN as EN ISO 24817:2017 without any modification.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/a656bc76-12c9-4371-8e80-b05c65a9f40d/sist-en-iso-24817-2017>

INTERNATIONAL
STANDARDISO
24817Second edition
2017-08

**Petroleum, petrochemical and natural
gas industries — Composite repairs
for pipework — Qualification and
design, installation, testing and
inspection**

*Industries du pétrole, de la pétrochimie et du gaz naturel —
Réparations en matériau composite pour canalisations — Conformité
aux exigences de performance et conception, installation, essai et
inspection*

ITEH STANDARD PREVIEW
(standards.iteh.ai)
Full standard available at
<https://standards.iteh.ai/catalog/standards/sist-en-iso-24817-2017>
4371-8e80-b05c65a9f40d/sist-en-iso-24817-2017

Reference number
ISO 24817:2017(E)

© ISO 2017

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/a656bc76-12c9-4371-8e80-b05c65a9f40d/sist-en-iso-24817-2017>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols and abbreviated terms	6
4.1 Symbols.....	6
4.2 Abbreviated terms.....	9
5 Applications	9
6 Summary of key issues	11
7 Qualification and design	13
7.1 Repair feasibility assessment.....	13
7.2 Repair class.....	14
7.3 Repair design lifetime.....	14
7.4 Required data.....	15
7.4.1 Background.....	15
7.4.2 Original equipment design data.....	15
7.4.3 Maintenance and operational histories.....	15
7.4.4 Service condition data.....	15
7.4.5 Repair system qualification data.....	16
7.5 Design methodology.....	17
7.5.1 Overview.....	17
7.5.2 Environmental compatibility.....	19
7.5.3 Design temperature effects.....	19
7.5.4 Design based on substrate load sharing (defect type A).....	21
7.5.5 Design based on repair laminate allowable strains (defect type A).....	23
7.5.6 Design based on repair-allowable stresses determined by performance testing (defect type A).....	24
7.5.7 Design of repairs for through-wall defects (defect type B).....	25
7.5.8 Axial extent of repair.....	28
7.5.9 Optional design considerations.....	30
7.5.10 Dent and/or gouge type defects.....	34
7.5.11 Fretting type defects.....	34
7.5.12 Delamination or blister type defects.....	34
7.5.13 Repair of other components.....	35
7.5.14 Design output.....	38
7.6 Re-qualification of the repair system.....	38
7.6.1 Overview.....	38
7.6.2 For type A defect repairs.....	38
7.6.3 For type B defect repairs.....	38
8 Installation	39
8.1 Storage conditions.....	39
8.2 Documentation prior to repair application.....	39
8.2.1 Method statement.....	39
8.2.2 Work pack.....	39
8.3 Installer qualifications.....	40
8.4 Installation procedure.....	40
8.5 Repair completion documentation.....	41
8.6 Live repairs.....	43
8.7 Repair of clamps, piping components, tanks, or vessels.....	43
8.8 Environmental considerations.....	43

ISO 24817:2017(E)

9	Testing and inspection	43
9.1	General	43
9.2	Allowable defects for the repair system	44
9.3	Repair of defects within the repair system	47
9.4	Inspection methods	48
9.5	Repair system maintenance and remedial options	48
9.5.1	Overview	48
9.5.2	Condition of the repair - visual inspection	48
9.5.3	Condition of the pipe substrate	49
9.5.4	Remedial options	49
9.5.5	Extension (revalidation) of repair design lifetime	49
9.5.6	Future modifications	50
10	System testing	50
11	Decommissioning	51
Annex A (normative)	Design data sheet	52
Annex B (normative)	Qualification data	55
Annex C (normative)	Short-term pipe spool survival test	59
Annex D (normative)	Measurement of γ_{LCL} for through-wall defect calculation	61
Annex E (normative)	Measurement of performance test data	64
Annex F (normative)	Measurement of impact performance	67
Annex G (normative)	Measurement of the degradation factor	68
Annex H (informative)	Axial extent of repair look-up table	70
Annex I (normative)	Installer qualification	72
Annex J (informative)	Installation requirements and guidance	75
Annex K (informative)	Design considerations	77
Annex L (informative)	Management of the integrity of composite repair systems to pipework and vessels	82
Bibliography		86

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 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 the following URL: 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*, Subcommittee SC 6, *Processing equipment and systems*.

This second edition cancels and replaces the first edition (ISO 24817:2015), which has been technically revised.

Introduction

The objective of this document is to ensure that pipework, pipelines, tanks and vessels repaired using composite systems that are qualified, designed, installed and inspected using this document will meet the specified performance requirements. Repair systems are designed for use within the petroleum, petrochemical and natural gas industries, and also within utility service applications. The main users of this document will be plant and equipment owners of the pipework and vessels, design contractors, suppliers contracted to provide the repair system, certifying authorities, installation, maintenance and inspection contractors.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/a656bc76-12c9-4371-8e80-b05c65a9f40d/sist-en-iso-24817-2017>

Petroleum, petrochemical and natural gas industries — Composite repairs for pipework — Qualification and design, installation, testing and inspection

1 Scope

This document gives requirements and recommendations for the qualification and design, installation, testing and inspection for the external application of composite repair systems to corroded or damaged pipework, pipelines, tanks and vessels used in the petroleum, petrochemical and natural gas industries.

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 75-3, *Plastics — Determination of temperature of deflection under load — Part 3: High-strength thermosetting laminates and long-fibre-reinforced plastics*

ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

ISO 527-4, *Plastics — Determination of tensile properties — Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites*

ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)*

ISO 10952, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Determination of the resistance to chemical attack for the inside of a section in a deflected condition*

ISO 11357-2, *Plastics — Differential scanning calorimetry (DSC) — Part 2: Determination of glass transition temperature and glass transition step height*

ISO 11359-2, *Plastics — Thermomechanical analysis (TMA) — Part 2: Determination of coefficient of linear thermal expansion and glass transition temperature*

ISO 14692, *Petroleum and natural gas industries — Glass-reinforced plastics (GRP) piping*

ASTM C581, *Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass-Reinforced Structures Intended for Liquid Service*

ASTM D543, *Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents*

ASTM D696, *Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between Minus 30°C and 30°C with a Vitreous Silica Dilatometer*

ASTM D1598, *Standard Test Method for Time-to-Failure of Plastic Pipe under Constant Internal Pressure*

ASTM D1599, *Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings*

ASTM D2583, *Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor*

ASTM D2992, *Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings*