
Naftna in plinska industrija, vključno z nizkoogljično energijo - Zunanje prevleke za cevovode, zakopane v zemljo ali potopljene v vodo, v sistemih cevovodnega transporta - 2. del: Enoplastne epoksidne prevleke, nataljene na podlago (ISO 21809-2:2026)

Oil and gas industries including lower carbon energy - External coatings for buried or submerged pipelines used in pipeline transportation systems - Part 2: Single layer fusion-bonded epoxy coatings (ISO 21809-2:2026)

Sample Document

Industries du pétrole et du gaz, y compris les énergies à faible teneur en carbone - Revêtements externes des conduites enterrées ou immergées utilisées dans les systèmes de transport par conduites - Partie 2: Revêtements monocouche à base de résine époxydique appliquée par fusion (ISO 21809-2:2026)

Ta slovenski standard je istoveten z: EN ISO 21809-2:2026

ICS:

25.220.99	Druge obdelave in prevleke	Other treatments and coatings
75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment

SIST EN ISO 21809-2:2026

en,fr,de

Sample Document

get full document from standards.iteh.ai

EUROPEAN STANDARD

EN ISO 21809-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2026

ICS 75.200

Supersedes EN ISO 21809-2:2014

English Version

Oil and gas industries including lower carbon energy -
External coatings for buried or submerged pipelines used
in pipeline transportation systems - Part 2: Single layer
fusion-bonded epoxy coatings (ISO 21809-2:2026)

Industries du pétrole et du gaz, y compris les énergies
à faible teneur en carbone - Revêtements externes des
conduites enterrées ou immergées utilisées dans les
systèmes de transport par conduites - Partie 2:
Revêtements monocouche à base de résine époxydique
appliquée par fusion (ISO 21809-2:2026)

This European Standard was approved by CEN on 14 February 2026.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



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

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

© 2026 CEN All rights of exploitation in any form and by any means reserved
worldwide for CEN national Members.

Ref. No. EN ISO 21809-2:2026 E

Contents	Page
European foreword.....	3

Sample Document

get full document from standards.iteh.ai

European foreword

This document (EN ISO 21809-2:2026) has been prepared by Technical Committee ISO/TC 67 "Oil and gas industries including lower carbon energy" in collaboration with Technical Committee CEN/TC 459/SC 10 "Steel tubes, and iron and steel fittings" the secretariat of which is held by UNI.

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 August 2026, and conflicting national standards shall be withdrawn at the latest by August 2026.

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 21809-2:2014.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO 21809-2:2026 has been approved by CEN as EN ISO 21809-2:2026 without any modification.

Sample Document

get full document from standards.iteh.ai



**International
Standard**

ISO 21809-2

**Oil and gas industries including
lower carbon energy — External
coatings for buried or submerged
pipelines used in pipeline
transportation systems —**

**Part 2:
Single-layer fusion-bonded epoxy
coatings**

Industries du pétrole et du gaz, y compris les énergies à faible teneur en carbone — Revêtements externes des conduites enterrées ou immergées utilisées dans les systèmes de transport par conduites —

Partie 2: Revêtements monocouche à base de résine époxydique appliquée par fusion

**Third edition
2026-02**

Sample Document

get full document from standards.iteh.ai

Sample Document

get full document from standards.iteh.ai



COPYRIGHT PROTECTED DOCUMENT

© ISO 2026

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2026 – All rights reserved

ISO 21809-2:2026(en)

Contents

Page

Foreword	v
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.....	6
5 General requirements	7
5.1 Rounding.....	7
5.2 Conformity to requirements.....	7
6 Information supplied by the purchaser	7
6.1 General information.....	7
6.2 Additional information.....	8
7 Coating classification	8
8 Qualification processes	9
8.1 General.....	9
8.2 Qualification scheme.....	9
8.3 Coating qualification (CQ).....	10
8.3.1 General.....	10
8.3.2 Properties of epoxy powder.....	11
8.3.3 Requirements for epoxy powder.....	12
8.3.4 Repair material.....	13
9 Application of coating	13
9.1 General.....	13
9.2 Surface preparation.....	14
9.2.1 Initial evaluation and surface preparation.....	14
9.2.2 Abrasive blast cleaning.....	14
9.2.3 Surface dust contamination.....	14
9.2.4 Surface cleanliness and pretreatment.....	14
9.3 Coating application and curing temperature.....	15
9.3.1 General.....	15
9.3.2 Recycled powder.....	15
9.4 Coating thickness.....	15
9.5 Cutback.....	15
10 Qualification of coating application and coating system	16
10.1 General.....	16
10.2 Application procedure specification (APS).....	16
10.3 Inspection and testing plan (ITP).....	17
10.4 Procedure qualification trial (PQT).....	17
10.5 Coating system qualification (CSQ).....	18
10.6 Pre-production trial (PPT).....	19
10.7 Inspection and testing during production.....	19
10.8 Minimum requirements for qualification and production.....	20
11 Inspection and testing	23
11.1 General.....	23
11.2 Testing of incoming epoxy powder.....	23
11.3 In-process and finished product testing requirements.....	23
11.3.1 General.....	23
11.3.2 Holiday inspection.....	23
11.3.3 Production test rings.....	24
11.4 Test results.....	24

ISO 21809-2:2026(en)

12	Repair of coated pipe	25
12.1	General.....	25
12.2	Repair of holidays.....	25
12.2.1	Pinholes and small holidays.....	25
12.2.2	Large defects.....	25
12.2.3	Inspection of repaired area.....	25
12.3	Stripping and recoating.....	25
13	Markings	25
13.1	General.....	25
13.2	Required markings.....	25
14	Handling and storage in the coating area	26
14.1	Handling.....	26
14.2	Storage.....	26
15	Test reports and inspection documents	26
15.1	General.....	26
15.2	Common requirements for reports.....	27
15.3	Specific requirements for test reports.....	28
15.4	Specific requirements for sampling reports.....	28
15.5	Reporting statements of conformity.....	28
15.6	Reporting opinions and interpretations.....	29
15.7	Amendments to reports.....	29
Annex A	(normative) Inspection of thickness	30
Annex B	(normative) Holiday detection test	31
Annex C	(normative) Cure time of the epoxy powder	33
Annex D	(normative) Thermal analysis of epoxy powder and cured coating film	36
Annex E	(normative) Resistance to impact of the coating	43
Annex F	(normative) Dry adhesion test	45
Annex G	(normative) Particle size of epoxy powder	46
Annex H	(normative) Cathodic disbondment test	47
Annex I	(normative) Flexibility of the coating	56
Annex J	(normative) Gel time of the epoxy powder	58
Annex K	(normative) Total volatile or moisture content of the epoxy powder — Mass loss	60
Annex L	(normative) Hot-water adhesion of the coating	62
Annex M	(normative) Density of the epoxy powder	64
Annex N	(normative) Interface contamination of the coating	66
Annex O	(normative) Porosity of the coating	70
	Bibliography	72

ISO 21809-2:2026(en)

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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

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, *Oil and gas industries including lower carbon energy*, Subcommittee SC 2, *Pipeline transportation systems*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 459/SC 10, *Steel tubes, and iron and steel fittings*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 21809-2:2014), which has been technically revised.

The main changes are as follows:

- inclusion of new classifications for materials with glass transitions greater than 115 °C;
- inclusion of a qualification scheme;
- harmonization with the other parts of the ISO 21809 series;
- renumbering and rearranging of the annexes;
- changes in various annexes.

A list of all the parts in the ISO 21809 series can be found on the ISO website.

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.

Sample Document

get full document from standards.iteh.ai

Oil and gas industries including lower carbon energy — External coatings for buried or submerged pipelines used in pipeline transportation systems —

Part 2: Single-layer fusion-bonded epoxy coatings

1 Scope

This document specifies the requirements for qualification, application, inspection, testing handling and storage of materials for plant application of single-layer fusion-bonded epoxy (FBE) coatings applied externally for the corrosion protection of bare steel pipe for use in pipeline transportation systems for oil and gas industries as defined in ISO 13623.

NOTE Pipes coated in accordance with this document are considered suitable for additional protection by means of cathodic protection.

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 8130-2, *Coating powders — Part 2: Determination of density by gas comparison pycnometer (reference method)*

ISO 8130-3, *Coating powders — Part 3: Determination of density by liquid displacement pycnometer*

ISO 8501-1, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

ISO 8502-3, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 3: Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)*

ISO 8502-6, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 6: Extraction of water soluble contaminants for analysis (Bresle method)*

ISO 8502-9, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 9: Field method for the conductometric determination of water-soluble salts*

ISO 8503-4, *Preparation of steel substrates before application of paints and related products — Surface roughness characteristics of blast-cleaned steel substrates — Part 4: Method for the calibration of ISO surface profile comparators and for the determination of surface profile — Stylus instrument procedure*

ISO 8503-5, *Preparation of steel substrates before application of paints and related products — Surface roughness characteristics of blast-cleaned steel substrates — Part 5: Replica tape method for the determination of the surface profile*

ISO 21809-2:2026(en)

ISO 10474, *Steel and steel products — Inspection documents*

ISO 11124 (all parts), *Preparation of steel substrates before application of paints and related products — Specifications for metallic blast-cleaning abrasives*

ISO 11126 (all parts), *Preparation of steel substrates before application of paints and related products — Specifications for non-metallic blast-cleaning abrasives*

ISO 11357-1, *Plastics — Differential scanning calorimetry (DSC) — Part 1: General principles*

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

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

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

ISO 80000-1, *Quantities and units — Part 1: General*

EN 10204, *Metallic products — Types of inspection documents*

ASTM D4285, *Standard Test Method for Indicating Oil or Water in Compressed Air*

ASTM D4940, *Standard Test Method for Conductimetric Analysis of Water Soluble Ionic Contamination of Blasting Abrasives*

SSPC-AB 1, *Mineral and Slag Abrasives*

SSPC-AB 2, *Cleanliness of Recycled Ferrous Metallic Abrasives*

SSPC-AB 3, *Ferrous Metallic Abrasive*

SSPC-PA2, *Procedure for Determining Conformance to Dry Coating Thickness Requirements*

SSPC-SP 1, *Solvent cleaning*

SSPC-Guide 15, *Field Methods for Extraction and Analysis of Soluble Salts on Steel and Other Nonporous Substrates*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

adhesion

bond between coating and substrate

3.2

application procedure specification

APS

document describing procedures, methods, equipment and tools used for coating application

ISO 21809-2:2026(en)

3.3

applicator

company that undertakes the coating application

Note 1 to entry: The coating application shall be in accordance with this document.

3.4

batch

quantity of material produced in a continuous manufacturing operation using raw materials of the same source and grade

3.5

batch certificate

document provided by the *manufacturer* (3.17) that contains the results of specific tests or analysis, including test methodology, performed on a defined lot of the manufacturer's product and corresponding conformity ranges for each coating system

3.6

coating qualification

CQ

qualification of the coating materials properties carried out by the *manufacturer* (3.17) before the *coating system qualification* (3.7)

3.7

coating system qualification

CSQ

qualification of application method, applied coating system and subsequent inspection or testing of its properties, to confirm that the *APS* (3.2) is adequate to produce a coating with the specified properties

3.8

cutback

length of pipe left uncoated at each end for joining purposes

3.9

design temperature

temperature, that can be endured by a *pipeline* (3.24) (component) during operation, including maximum and minimum temperatures, likely to be reached during transport, storage, handling, installation, upset conditions and operation

Note 1 to entry: The design temperature range of the coating can be narrower than that specified for the steel pipe material.

3.10

dummy pipe

pipe having the same outside diameter and wall thickness of the project pipes

Note 1 to entry: Dummy pipes and coated dummy pipes shall be representative of the production and shall be coated in accordance with approved *APS* (3.2).

3.11

end user

company (or companies) that owns or operates *pipeline(s)* (3.24)

Note 1 to entry: There can be a combination of ownership and operating.

3.12

glass transition

reversible change in an amorphous polymer or in amorphous regions of a partially crystalline polymer from (or to) a viscous or rubbery condition to (or from) a hard and relatively brittle one