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Entwurf

Einsprüche bis 2012-11-17
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DIN EN ISO 21809-2:2008-04
und
DIN EN ISO 21809-2
Berichtigung 1:2009-09

**Erdöl und Erdgasindustrie –
Umhüllungen für erd- und wasserverlegte Rohrleitungen in
Transportsystemen –
Teil 2: Einschicht-Epoxipulverbeschichtungen (ISO/DIS 21809-2:2012);
Englische Fassung prEN ISO 21809-2:2012**

Petroleum and natural gas industries –
External coatings for buried or submerged pipelines used in pipeline transportation
systems –

Part 2: Single Layer Fusion-bonded epoxy coatings (ISO/DIS 21809-2:2012);
English version prEN ISO 21809-2:2012

Industries du pétrole et du gaz naturel –

Revêtements externes des conduites enterrées ou immergées utilisées dans les systèmes
de transport par conduites –

Partie 2: Revêtements à base de résine époxydique appliquée par fusion
(ISO/DIS 21809-2:2012);
Version anglaise prEN ISO 21809-2:2012

Anwendungswarnvermerk

Dieser Norm-Entwurf mit Erscheinungsdatum 2012-09-03 wird der Öffentlichkeit zur Prüfung und
Stellungnahme vorgelegt.

Weil die beabsichtigte Norm von der vorliegenden Fassung abweichen kann, ist die Anwendung dieses
Entwurfes besonders zu vereinbaren.

Stellungnahmen werden erbeten

- vorzugsweise als Datei per E-Mail an nagas@din.de in Form einer Tabelle. Die Vorlage dieser Tabelle
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- oder in Papierform an den Normenausschuss Gastechnik (NAGas) im DIN, 53058 Bonn,
Postfach 14 03 62 (Hausanschrift: Josef-Wirmer-Str. 1 - 3, 53123 Bonn).

Die Empfänger dieses Norm-Entwurfs werden gebeten, mit ihren Kommentaren jegliche relevanten
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Gesamtumfang 60 Seiten

Normenausschuss Gastechnik (NAGas) im DIN
Normenausschuss Erdöl- und Erdgasgewinnung (NÖG) im DIN

Nationales Vorwort

Dieser Norm-Entwurf (prEN ISO 21809-2:2012) wurde von der WG 14 „External pipeline protective coatings“ (Sekretariat: ANSI, Vereinigte Staaten von Amerika) im Technischen Komitee ISO/TC 67 „Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries“ (Sekretariat: NEN, Niederlande) in Zusammenarbeit mit dem Technischen Komitee ECISS/TC 110 „Stahlrohre und Fittings für Eisen- und Stahlrohre“ (Sekretariat: UNI, Italien) erarbeitet.

Das zuständige deutsche Gremium ist der Arbeitsausschuss NA 032-02-09 AA „Außenkorrosion“ im Normenausschuss Gastechnik (NAGas). Der Arbeitsausschuss NA 109-00-02 AA „Fernleitungssysteme“ im Normenausschuss Erdöl- und Ergasgewinnung (NÖG) hat an diesem Dokument mitgearbeitet.

Dieses Dokument enthält unter Berücksichtigung des Präsidialbeschlusses 1/2004 nur die englische Originalfassung des Entwurfes prEN ISO 21809-2:2012. Nur der Abschnitt Begriffe und Definitionen wurde übersetzt.

Änderungen

Gegenüber DIN EN ISO 21809-2:2008-04 und DIN EN ISO 21809-2 Berichtigung 1:2009-09 wurden folgenden Änderungen vorgenommen:

- a) technische Überarbeitung.

3 Begriffe und Definitionen

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe.

3.1

Beschichter

Unternehmen, welches Umhüllungen nach diesem Teil der ISO 21809 herstellt

3.2

Charge

Menge des Materials in einem kontinuierlichen Fertigungsprozess mit Rohstoffen aus gleicher Herkunft und gleichbleibender Qualität

3.3

Chargenzeugnis

Analysenzertifikat der Charge des Herstellers

3.4

Nach Vereinbarung

im Einvernehmen zwischen Hersteller und Besteller

3.5

Prüfzeugnis nach "Typ 2.1"

Konformitätsbescheinigung nach "Typ 2.1"

ausgestelltes Dokument nach ISO 10474:1991 oder EN 10204:2004, welches die Einhaltung der für die Bestellung festgelegten Anforderungen ohne jegliche Erwähnung von Testergebnissen bestätigt

3.6

Rückschnitt

Endenausführung

verbleibendes unbeschichtetes Rohrende

3.7

Glasübergang

reversible Änderung in einem amorphen Polymer oder in amorphen Bereichen eines teilkristallinen Polymers von (oder zu) einem viskosen oder gummiartigen Zustand bis zu (oder von) einem harten und relativ spröden Zustand

[ISO 11357-2:1999]

3.8

Glasübergangstemperatur

ungefährer Mittelpunkt der Temperaturspanne, an welchem der Glasübergang auftritt

ANMERKUNG Die zugeordnete Glasübergangstemperatur, T_g , kann in Abhängigkeit der spezifischen Eigenschaften und der gewählten Messmethode und Messbedingungen variieren

[ISO 11357-2:1999]

3.9

Fehlstelle

Umhüllungsdiskontinuität, die elektrische Leitfähigkeit aufweist, wenn eine bestimmte Spannung aufgebracht wird

3.10

im Labor beschichtete Prüfkörper

Prüfkörper aus Laborherstellung

3.11**Hersteller**

Unternehmen, welches für die Herstellung der Umfüllungsmaterialien verantwortlich ist

3.12**Herstellerspezifikationen**

Dokument, das die Eigenschaften, Prüfanforderungen und Anwendungsempfehlungen für die Umfüllungsmaterialien angibt

3.13**Äquivalente Länge zum Rohrdurchmesser**

Länge entlang der Rohrachse, welche dem Rohraußendurchmesser entspricht

3.14**Rohrleitung**

Einrichtung zum Durchleiten von flüssigen Medien einschließlich Rohr, Molchschleusen, Komponenten und Zubehör und Absperrarmaturen

[ISO 13623:2000]

3.15**Rohrleitungssystem**

Rohrleitungen mit dazugehörigen Anlagenteilen wie Verdichter- oder Pumpstationen, Leitstellen, Mess- und Regelstationen, Speichersysteme, Überwachungs- und Datenverarbeitungssysteme (SCADA), Sicherheitssysteme, Korrosionsschutz-Systeme sowie weitere Einrichtungen oder Gebäude, welche zum Transport von Flüssigkeiten verwendet werden

3.16**Besteller**

Unternehmen, welches für die Festlegung der Bestellanforderungen verantwortlich ist

3.17**Prüfbericht**

Dokument, das die quantitativen Testergebnisse der Tests in Übereinstimmung mit den Anforderungen dieses Teils von ISO 21809 beinhaltet

3.18**Prüfring**

aus dem Herstellungsprozess entnommen beschichtete Probe

3.19**Abnahmeprüfzeugnis 3.1.B****Abnahmeprüfzeugnis 3.1**

Herstellerbescheinigung, ausgestellt und unterschrieben durch eine vom Hersteller berechnigte Person, nach ISO 10474 oder EN 10204 mit den Ergebnissen der Prüfung von beschichteten Rohren

3.20**Designtemperaturbereich**

Temperaturbereich einschließlich maximalen und minimalen Temperaturen, die bei Transport, Handhabung, Installation und Betrieb erreicht werden

3.21**Pulverrecyclematerial**

FBE-Pulver, das automatisch und kontinuierlich in das Zuführsystem zurückgeführt wird

3.22**Pulverregenerat**

Pulver, welches aus dem Verwertungssystem entweicht oder auf den Boden verschüttet wird

3.23

Pulverlieferumfang

Menge an Pulver, welche in einem einzigen Behälter transportiert wird

3.24

Endverbraucher

Unternehmen und/oder Betreiber, welches(r) die Umhüllung kauft und einsetzt

3.25

Herstellerspezifikationen

Dokument, das die Eigenschaften, Prüfanforderungen und Anwendungsempfehlungen für die Umhüllungsmaterialien angibt

3.26

Vorfertigungs-Qualitätssicherungsprüfung

PQT

(en: procedure qualification trial)

Aufbringen einer Beschichtung und anschließende Inspektion/Prüfung der geforderten Eigenschaften, um sicherzustellen, dass die APS erfüllt werden, durchgeführt vor dem Beginn der Produktion

— Leerseite —

Petroleum and natural gas industries — External coatings for buried or submerged pipelines used in pipeline transportation systems — Part 2: Single Layer Fusion-bonded epoxy coatings (ISO 21809-2:2012)

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Foreword

The text of ISO 21809-2:2012 has been prepared by Technical Committee ISO/TC 67 “Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries” of the International Organization for Standardization (ISO) and has been taken over as prEN ISO 21809-2:2012 by Technical Committee ECISS/TC 110 “Steel tubes, and iron and steel fittings” the secretariat of which is held by UNI.

This document is currently submitted to parallel Enquiry.

This document will supersede EN ISO 21809-2:2007.

Endorsement notice

The text of ISO 21809-2:2012 has been approved by CEN as a prEN ISO 21809-2:2012 without any modification.

Introduction

Users of this part of ISO 21809 should be aware that further or differing requirements might be needed for individual applications. This part of ISO 21809 is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This can be particularly applicable if there is innovative or developing technology. If an alternative is offered, the vendor should identify any variations from this part of ISO 21809 and provide details.

1 Scope

This part of ISO 21809 specifies the requirements for qualification, application, testing and handling 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 the petroleum and natural gas industries as defined in ISO 13623.

NOTE Pipes coated in accordance with this part of ISO 21809 are considered suitable for additional protection by means of cathodic protection.

2 Normative references

The following referenced documents are indispensable for the application 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 2815, *Paints and varnishes -- Buchholz indentation test*

ISO 8130-2, *Coating powders — Part 2: Determination of density by gas comparison pyknometer (referee method)*

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

ISO 8501-1:2007, *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 paint 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 soluble contaminants for analysis — The 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 10474:1991, *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 11127-6, *Preparation of steel substrates before application of paints and related products -- Test methods for non-metallic blast-cleaning abrasives -- Part 6: Determination of water-soluble contaminants by conductivity measurement*

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

ISO 13623:2000, *Petroleum and natural gas industries — Pipeline transportation systems*

ISO 80000-1:2009, *Quantities and units — Part 1: General*

EN 10204:2004, *Metallic products — Types of inspection documents*

AS 3894.6, *Site testing of protective coatings - Determination of residual contaminants*

ASTM D4060, *Standard test method for abrasion resistance of organic coatings by the taber abraser*

ASTM D4920, *Standard terminology relating to conditioning, chemical, and thermal properties*

SSPC-AB 1¹⁾, *Mineral and Slag Abrasives*

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

SSPC-AB 3, *Ferrous Metallic Abrasive*

SSPC-SP 1, *Solvent cleaning*

3 Terms and definitions

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

3.1

applicator

company that undertakes the coating application in accordance with the provisions of this part of ISO 21809

3.2

batch

quantity of epoxy powder produced using the same formulation and raw materials of the same source during a continuous production run of not more than 8 h

3.3

batch certificate

certificate of analysis issued by the manufacturer

3.4

by agreement

agreed between manufacturer and purchaser

[ISO 14313:2007]

3.5

certificate of compliance with the order "2.1"

declaration of compliance with the order "type 2.1"

document issued according to ISO 10474:1991 or EN 10204:2004 stating compliance with the purchase order for coated pipes, but without mention of any test results, issued in accordance with the purchasing requirements

3.6

cutback

length of pipe left uncoated at each end for joining purposes

3.7

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

[ISO 11357-2:1999]

¹⁾ SSPC: The Society for Protective Coatings, 40 24th Street, 6th Floor, Pittsburg. PA 15222-4656, USA.

3.8

glass transition temperature

approximate midpoint of the temperature range over which the glass transition takes place

NOTE The assigned glass transition temperature, T_g , can vary, depending on the specific property and on the method and conditions selected to measure it.

[ISO 11357-2:1999]

3.9

holiday

coating discontinuity that exhibits electrical conductivity when exposed to a specific voltage

3.10

laboratory-coated test specimen

specimen taken from a laboratory-prepared panel

3.11

manufacturer

company responsible for the manufacture of coating material(s)

3.12

manufacturer's specification

document that specifies the characteristics, test requirements and application recommendations for the coating materials

3.13

pipe diameter length

any length along the pipe axis equal to the specified outside diameter of the pipe

3.14

pipeline

those facilities through which fluids are conveyed, including pipe, pig traps, components and appurtenances, up to and including the isolating valves

[ISO 13623:2000]

3.15

pipeline transportation system

pipeline with compressor or pump stations, pressure control stations, flow control stations, metering, tankage, supervisory control and data acquisition system (SCADA), safety systems, corrosion protection systems, and any other equipment, facility or building used in the transportation of fluids

3.16

purchaser

company responsible for providing the product order requirements

3.17

test report

document that provides the quantitative test results for tests conducted in accordance with the requirements of this part of ISO 21809

3.18

test ring

sample taken from production-coated pipe

3.19

Inspection certificate "3.1.B"

Inspection certificate 3.1 "type 3.1"

document in accordance with ISO 10474:1991 or EN 10204:2004 giving the results of the testing of coated pipes, supplied and signed by a representative of the applicator authorized to issue such documents

3.20

design temperature range

temperature range including maximum and minimum temperatures likely to be reached during transport, handling, storage, installation and operation

3.21

powder recycle

FBE powder that has been automatically and continuously recycled in the delivery system

3.22

powder reclaim

Powder that has escaped the powder recovery system or has been spilled on the floor

3.23

powder shipment

Amount of powder transported in one container

3.24

end user

Company(s) who is/are owning and / or operating the pipeline system

3.25

manufacturer's specification

Document which specifies the characteristics, test requirements and application recommendations for the coating material

3.26

procedure qualification trial

Application of a coating and subsequent inspection/testing of its properties, to confirm that the APS is adequate to produce a coating with the specified properties, carried out prior to the start of production

4 Symbols and abbreviated terms

4.1 Symbols

C	percentage conversion of FBE coating
d	thickness
ΔH	exothermic heat of reaction
M	mass
R	mandrel radius
T_g	glass transition temperature in degrees Celsius ($^{\circ}\text{C}$)
ΔT_g	variation of the glass transition temperature in degrees Celsius ($^{\circ}\text{C}$)
w_{ep}	mass fraction of the epoxy power retained on a sieve, expressed as a percent of total sample
w_{m}	mass fraction of moisture, expressed as a percent

4.2 Abbreviations

APS	application procedure specification
d.c.	direct current
DSC	differential scanning calorimetry
FBE	fusion-bonded epoxy
HRC	Rockwell "C" scale hardness
ID	inner diameter

ITP	inspection and testing plan
NPS	nominal pipe size
OD	outer diameter
ppd	per pipe diameter
PQT	procedure qualification trial

5 General requirements

5.1 Rounding

Unless otherwise stated in this part of ISO 21809, to determine conformance with the specified requirements, observed or calculated values shall be rounded to the nearest unit in the last right-hand place of figures used in expressing the limiting value, in accordance with ISO 80000-1:2009, Annex B, Rule A.

NOTE For the purposes of this provision, the rounding method of ASTM E29 is equivalent to ISO 80000-1:2009, Annex B, Rule A.

5.2 Compliance to standard

A quality system and an environmental management system should be applied to assist compliance with the requirements of this part of ISO 21809.

NOTE ISO/TS 29001 gives sector-specific guidance on quality management systems and ISO 14001 gives guidance on the selection and use of an environmental management system.

The applicator shall be responsible for complying with all of the applicable requirements of this part of ISO 21809. It shall be permissible for the purchaser to make any investigation necessary in order to be assured of compliance by the applicator and to reject any material and/or coating that does not comply.

6 Information supplied by the purchaser

6.1 General information

The purchase order shall include the following information:

- a) number of this part of ISO 21809 and year of publication (ISO 21809-2:20xx);
- b) pipe quantity, outside diameter, minimum wall thickness, minimum, maximum and nominal length, grade of steel;
- c) bare pipe standard or specification designation, e.g. ISO 3183;
- d) minimum thickness and maximum permissible thickness of the coating;
- e) cutback length and tolerances for both ends of pipe;
- f) maximum and minimum pipeline design temperatures (°C);
- g) type of certificate of compliance;
- h) pipe line installation methods for offshore (reel lay, Slay, Jlay etc.).

6.2 Additional information

The purchase order shall specify which of the following provisions apply for the specific order item:

- a) additional surface treatments;
- b) plant and process inspection by the purchaser;
- c) increased test ring length;
- d) test ring location;
- e) test frequency for additional test rings;
- f) additional markings;
- g) handling procedures;
- h) storage procedures;
- i) waiver of test reports;
- j) maximum allowable preheating temperature;
- k) applicator qualification requirements;
- l) other special requirements;
- m) pipe tracking and traceability of pipes to coating materials;
- n) permissible number coating repairs if different from Clause 11;
- o) documentation and schedule for supply of documents;
- p) purchaser approval of APS;
- q) inspection and testing plan and/or daily log;
- r) inspection of incoming pipe;
- s) pipe end protection;
- t) surface pre-treatments if any;
- u) PQT requirements;
- v) protection against adverse weather conditions during storage.

7 Coating materials

7.1 Epoxy powder

7.1.1 General

The applicator shall use epoxy powder that is

- a) certified by the powder manufacturer to be in accordance with the requirements of 7.1.2 and 8.1, and compatible with the requirements of 9.2, 9.3 and 9.4
- b) powder batches shall be identified by the powder manufacturer with the following:
 - manufacturer's name,
 - product number / description,
 - product temperature range (maximum and minimum)
 - mass of material,
 - batch number/ manufacturing identification number,
 - location of manufacture,