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Petroleum, petrochemicals and natural gas industries — External corrosion protection of risers by coatings and linings —

Part 1: Elastomeric coating systems — Polychloroprene or EPDM

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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, definitions and abbreviated terms	3
3.1 Terms and definitions	3
3.2 Abbreviated terms	5
4 Pre-work requirements	6
4.1 General	6
4.2 Health, safety and environmental (HSE)	6
4.3 Qualification of coating/lining application and inspection personnel	6
5 Materials	7
5.1 General requirements	7
5.2 Material requirements	8
5.3 Materials packing, handling and storage	9
5.4 Coating materials	9
6 Bare pipes transportation, handling and storage	10
6.1 Transportation and handling of pipes	10
6.2 Storage of pipes	10
7 Surface preparation.....	10
7.1 General	10
7.2 Pipe imperfections/damages removal.....	11
7.3 Contaminants removal.....	11
7.4 Abrasive blast cleaning	11
8 Coating application for risers.....	12
8.1 General	12
8.2 Priming and coating on abrasive blast cleaned surface	13
8.3 Polychloroprene or EPDM application and vulcanization.....	14
8.4 Manual coating application on clamps, guides, bolt holes, inner sections of flanges and pipe section used for modifications at worksites	15
8.5 Coating application of field joints.....	15
8.6 Coating repair	16
9 Inspection and testing	16
9.1 General	16
9.2 Testing of elastomer properties.....	16
9.3 Inspection/testing of coated pipes	18
9.4 Inspection and testing of field joint coating	20
9.5 Test reports and certificate of compliance	20
10 Coating damage/defect repair.....	20
10.1 Defect acceptance criteria	20
10.2 Repair procedures	21
11 Handling and stacking of coated pipes.....	21
12 Quality requirements.....	22
13 Documentation	22
Annex A (informative) Contents in a batch certificate	23

Annex B (normative) Physical properties of polychloroprene or EPDM elastomer 24

Annex C (normative) Riser pipe external coating progress chart 26

Bibliography 28

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Foreword

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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. www.iso.org/directives

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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](#)

ISO 18797-1 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*.

ISO 18797 consists of the following parts, under the general title *Petroleum, petrochemical and natural gas industries — External corrosion protection of risers by coatings and linings*:

- *Part 1: Elastomeric coating systems-polychloroprene or EPDM*
- *Part 2: Maintenance and field repair*

Introduction

This part of ISO 18797 is based on GSO 2273. This International Standard defines the minimum technical requirements for the external corrosion protection of risers by coatings and linings based on elastomeric coating systems-polychloroprene, EPDM or equivalent elastomeric coatings that are employed in the oil and gas industry and provides technical guidance for developing local standards and specifications in order to ensure compliance in coating and lining material selection and performance with contract requirements.

Users of this International Standard should be aware that further or differing requirements can be needed for individual applications. This International Standard is not limiting the contractor and/or manufacturer from proposing or company from accepting alternative engineering solutions for the individual application. This can be particularly applicable where there is innovative or developing technology. Where an alternative is proposed, the specification issuer should identify any deviations from this International Standard and provide details.

This International Standard does not incorporate any form of passive fireproofing requirements or any related compatibility issues. Any requirements with regards to passive fireproofing should be addressed separately.

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Petroleum, petrochemical and natural gas industries — External corrosion protection of risers by coatings and linings — Part 1: Elastomeric coating systems-polychloroprene or EPDM

1 Scope

This International Standard specifies the minimum requirements for materials selection, surface preparation, application, inspection, testing, qualification and acceptance criteria of external coating for steel risers pipes used in the splash zone, their field joints and clamps/guides, using an elastomeric protective coating based on polychloroprene, EPDM or equivalent. This is applicable for new construction and repair of applied pipes before installation. Maintenance requirements and field repairs is covered in Part-2.

This International Standard also specifies the requirements for transportation, handling and storage of riser pipes before and after surface preparation and coating 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 edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 34 (all parts), *Rubber, vulcanized or thermoplastic — Determination of tear strength*

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 813, *Rubber, vulcanized or thermoplastic — Determination of adhesion to rigid substrate - 90 Degrees peel method*

ISO 814, *Rubber, vulcanized or thermoplastic — Determination of adhesion to metal — Two-plate method*

ISO 815-1, *Rubber, vulcanized or thermoplastic, Determination of compression set — Part 1: At ambient or elevated temperatures*

ISO 815-2, *Rubber, vulcanized or thermoplastic, Determination of compression set — Part-2: At low temperatures*

ISO 1431-1, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 2781, *Rubber, vulcanized or thermoplastic — Determination of density*

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

ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*

ISO 7619-1, *Rubber, vulcanized or thermoplastic — Determination of indentation hardness — Part 1: Durometer method (Shore hardness)*

ISO 8501-1, *Preparation of steel substrate 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* Note: SSPC SP10 is equivalent to ISO 8501-1

ISO 8502-2, *Preparation of steel substrate before application of paints and related products — Tests for the assessment of surface cleanliness — Part 2: Laboratory determination of chloride on cleaned surfaces*

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 8502-4, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 4: Guidance on the estimation of the probability of condensation prior to paint application*

ISO 8502-5, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 5: Measurement of chloride on steel surfaces prepared for painting (ion detection tube method)*

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

ISO 8502-9, *Preparation of steel substrate 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 8503-2, *Preparation of steel substrate before application of paints and related products — Surface roughness characteristics of blast-cleaned steel substrates — Part 2: Method for grading of surface profile of abrasive blast-cleaned steel — Comparator procedure*

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, *Steel and steel products — Inspection documents*

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

EN 12664, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Dry and moist Products of medium and low thermal resistance*

EN 14879-4: *Organic coating systems and linings of protection of industrial apparatus and plants against corrosion caused by aggressive media – Part 4: Linings on metallic components*

ISO 21457, *Petroleum, petrochemical and natural gas industries — Materials selection and corrosion control for oil and gas production systems*

ISO 21809-3, *Petroleum and natural gas industries — External coatings for buried or submerged pipelines used in pipeline transportation systems — Part 3: Field joint coatings*

ISO 29601, *Paints and varnishes -- Corrosion protection by protective paint systems — Assessment of porosity in a dry film*

API RP 5LW, *Recommended practice for transportation of line pipe on barges and marine vessels*

API RP 5L1, *Recommended practice for railroad transportation of the pipe*

ASTM D2084, *Standard test method for rubber property — Vulcanization using oscillating disc cure meter*

ASTM D4285, *Standard test method for indicating oil or water in compressed air*

ASTM D5894, *Standard practice for cyclic salt fog/UV exposure of painted metal, (alternating exposures in a fog/dry cabinet and a UV/condensation cabinet)*

SSPC-AB 2, *Cleanliness of recycled ferrous metallic abrasive*

SSPC-PA 2, *Coating application standard No.2 — Procedure for determining conformance to dry coating thickness requirements*

SSPC-SP 1, *Surface preparation specification No.1 — Solvent cleaning*

SSPC-SP 10/NACE No. 2, *Joint surface preparation standard — Near white metal blast cleaning*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

3.1.1

atmospheric zone

areas of offshore structures and riser pipes that extend upward from the splash zone up to top decks of the platform which are exposed to sun, wind sprays and rains

3.1.2

applicator

organization appointed by contractor/client to perform application of coatings/linings on riser pipes as per project procedures prepared in accordance with this International Standard

3.1.3

contractor

organization appointed by the client to perform the works in accordance with this International Standard

3.1.4

client

organization for which professional services are rendered or person that receives a product

3.1.5

dew point

temperature at which moisture in air will condense out on to a solid surface, like blast cleaned metal surface or newly coated surfaces

3.1.6

dust

loose fine particulate matter present on a steel surface prepared for rubber lining, arising from blast cleaning or other grinding activities or from worksite environments

3.1.7

elastomeric coatings

flexible skins, permanently bonded to risers and structures

Note 1 to entry: Elastomeric coatings are designed and developed to withstand aggressive environment or conditions affecting platform structures and risers in marine splash zones. These provide add on durability to designed life to structures and risers in offshore environment, while providing resistance to sea water ingress, ozone oxidation, erosion and abrasion.

3.1.8

ethylene propylene diene monomer

EPDM

elastomeric compound or synthetic rubber applied as a protective coating on riser pipes in splash zones to withstand erosion of riser pipe material caused by continuous exposure to sea water and wave actions

Note 1 to entry: EPDM provides resistance to outdoor and high temperature services in the range of $-350\text{ }^{\circ}\text{C}$ to $1\ 200\text{ }^{\circ}\text{C}$.

3.1.9

flash rusting

slight rust formation on a freshly blast cleaned carbon steel surfaces due to humidity in air and if not painted within four hours from start of blasting

3.1.10

holiday

discontinuity in a protective coating (cracks, pinholes, voids, etc.) that exhibits electrical conductivity when exposed to specific voltage

Note 1 to entry: Holiday also means a small defect in the lining that would permit corrosion of substrate under service conditions for which lining is designed. The term can be considered synonymous with cracks or mechanical damages occurred in rubber lining, while in services.

3.1.11

manufacturer

organization responsible for the manufacture of coating material(s)

3.1.12

platform

offshore structure used to accommodate oil and gas wells related production equipment, pipelines and living quarters

3.1.13

production batch

one loading capacity of the internal mixer used for preparing the mixed rubber prior to forming strip of sheet

3.1.14

polychloroprene

light yellow synthetic rubber compound obtained by polymerization of chloroprene

Note 1 to entry: Polychloroprene is commonly known as neoprene compound.

Note 2 to entry: Polychloroprene is applied as a protective coating on riser pipes in splash zones and below to withstand erosion of riser pipe material caused by continuous exposure to sea water and wave actions. It provides resistance to outdoor and services temperature in the range of $-35\text{ }^{\circ}\text{C}$ to $90\text{ }^{\circ}\text{C}$.

3.1.15**riser**

section of pipeline carrying crude/gas between ocean floor and upper decks of platform on offshore structures

3.1.16**shore hardness**

methods for determining the hardness of materials by means of durometer

3.1.17**site**

lands and waters and other places on, under, in or through which the works are to be carried out and any other lands, waters or places provided by the client for the purposes of the contract together with any other places designated in the contract

3.1.18**splash zone**

external surfaces of an offshore structure or pipeline that are, periodically wet and dry by the influence of the astronomical tides, winds and waves. The limits are as defined by the contract specifications

3.1.19**surface profile**

micro-roughness of surface generally expressed as an average of height of highest peaks relative to lowest valleys sometime referred to as amplitude

3.1.20**vulcanization**

curing of elastomeric materials by chemical reaction under heat and pressure to improve strength and elasticity of applied rubber lining

3.1.21**works**

activities to be executed in accordance with the contract, as defined in the specified conditions and including both permanent and temporary activities

3.2 Abbreviated terms

µm	micrometer (microns)
ASTM	American Society for Testing and Materials
BS	British Standard
DFT	Dry Film Thickness
HSE	Health, safety and environment
ITP	Inspection Test Plan
MS	Method Statement
MSDS	Material Safety Data Sheet
NACE	National Association of Corrosion Engineers
NPS	Nominal Pipe Size
pphm	parts per hundred million