

**Stålrör och rördelar för land- och vattenbelagda  
rörledningar – Utvändig beläggning av polyuretan-  
och polyuretanmodifierade material**

**Steel tubes and fittings for onshore and offshore  
pipelines – External liquid applied polyurethane  
and polyurethane-modified coatings**

ICS 23.040.99; 25.220.60

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EUROPEAN STANDARD  
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English version

**Steel tubes and fittings for onshore and offshore pipelines -  
External liquid applied polyurethane and polyurethane-modified  
coatings**

Tubes et raccords en acier pour canalisations enterrées et  
immergées - Revêtements externes en polyuréthane ou  
polyuréthane modifié liquides

Stahlrohre und -formstücke für On- und Offshore-verlegte  
Rohrleitungen - Umhüllung (Außenbeschichtung) mit  
Polyurethan und polyurethan-modifizierten Materialien

This European Standard was approved by CEN on 11 April 2002.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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

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## Foreword

This document EN 10290:2002 has been prepared by Technical Committee ECISS/TC 29 "Steel tubes and fittings for steel tubes", 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of an identical text or by endorsement, at the latest by February 2003, and conflicting national standards shall be withdrawn at the latest by February 2003.

The annexes A to L are normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

**EN 10290:2002 (E)****1 Scope**

This European Standard specifies the requirements of liquid applied external coating, polyurethane (PUR) and polyurethane-modified (PUR-MOD), for the corrosion protection of tubes and pipeline fittings.

The coating in this standard can be applied to longitudinally or spirally welded and to seamless steel tubes and fittings used for the construction of pipelines for conveying liquids or gases.

In accordance with the elongation properties, if the component has to be cold bent the coating shall be applied after bending unless otherwise approved by the purchaser.

The coating shall consist normally of one layer of liquid product, applied by brush or by an airless spray technique.

Other application methods can be recommended by the product manufacturer, in accordance with the kind of product (spatula, injection, spreading, etc.).

This coating can be used for the protection of buried or submerged steel tubes for service at the following temperatures and with two thickness classes A (1 000 µm) and B (1 500 µm) based on the following combination. Lower thickness can be agreed between the coating manufacturer and the purchaser.

- type 1 : - 20 °C to 40 °C, thickness class A or B
- type 2 : - 20 °C to 60 °C, thickness class B
- type 3 : - 20 °C to 80 °C, thickness class B

Other temperatures can be agreed; in this case, tests shall be carried out at the required temperature.

In this standard the word components is used for tubes and fittings.

Frequencies of tests on fittings shall be agreed by the parties at the ordering stage.

Components coated with these types of coatings may be further protected by means of cathodic protection.

**2 Normative references**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendments or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 10021, *General technical delivery requirements for steel and iron products*.

EN 24624, *Paints and varnishes - Pull-off test (ISO 4624:1978)*.

ISO 527, *Plastics - Determination of tensile properties*.

EN ISO 868, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868:1985)*.

EN ISO 2808, *Paints and varnishes - Determination of film thickness (ISO 2808:1997)*.

EN 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 8501-1:1988)*.



### 3 Terms, definitions and symbols

#### 3.1 Terms and definitions

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

##### 3.1.1

**product manufacturer**

supplier of the two liquid components in a condition suitable for application to the product to be coated

##### 3.1.2

**coater**

responsible for applying the multi-component liquid material to the components to be coated in accordance with the provisions of this European Standard or the special requirements given in the tender specification and in the order

##### 3.1.3

**purchaser**

company that buys the coated products

#### 3.2 Symbols

$R_z$  : roughness parameter (the average roughness from five successive evaluation areas defined in accordance with ISO 4287-1), expressed in microns (  $\mu\text{m}$ );

$R_s$  : specific electrical insulation resistance of the coating, expressed in ohms square metres ( $\Omega\cdot\text{m}^2$ ).

### 4 Coating materials

#### 4.1 General

The multi-component liquid coating is generally composed of a polyol and an isocyanate.

The polyol and isocyanate should have different colours allowing the verification of the correct mixing and checking the uniformity of the colour of the mixed product.

The coating is considered cured when it has attained the hardness recommended by the product manufacturer (see Table 1).

This standard calls for the use of substances and/or procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and in no way absolves the user from statutory obligations relating to health and safety at any range.

#### 4.2 Technical specification

The technical specification drawn up by the product manufacturer shall contain as a minimum the information detailed in Table 1. Test methods shall be given for any test detailed in Table 1.

If required at the time of enquiry and/or order the following option can apply:

Option 1 An infra-red scan obtained with a KBr standard disk shall be supplied as agreed for each pack (polyol, isocyanate and cured product), so that the purchaser or the coater can compare it with the reference scan of the material supplied.

Table 1 - Contents of data sheets and certificates

Elements	Technical data	Test certificate
Date of issue	x	x
Name of manufacturer	x	x
Name, use and type of product	x	x
Type of polyol	x	x
Type of isocyanate	x	x
Factory of origin		x
Batch or production lot number	a	x
Date of manufacture and use by date	a	x
Colour	b	x
Physical state of the delivered product	a	x
Methods of application	x	
Solids by volume	x	
Solids by weight	x	
Theoretical coverage per m <sup>2</sup> for nominal thickness	x	
Size of container	a	x
Shelf life	a	x
Storage conditions	x	
Pot-life	x	x
Surface preparation	x	
Recommended instructions for application	x	
Recommended repair material(s)	x	
Mixing instructions	x	
Recommended dry film thickness	x	
Typical thickness applicable in one layer	x	
Minimum and maximum overcoating time	x	
Range of tube service temperature	x	
Range of application temperature (ambient, tube and product) and humidity	x	
Specific curing – Requirements	x	
Shore "D" hardness at (23 ± 2) °C	x	
Time at (23 ± 2) °C to achieve Shore "D" hardness at curing	x	
Time at (23 ± 2) °C at Shore "D" hardness before handling	x	
Viscosity	a	x
Density	x <sup>b</sup>	x <sup>a</sup>
Impact resistance	x	
Pull-off test adhesion at (23 ± 2) °C	x	
Cathodic disbondment at (23 ± 2) °C	x	
Specific electrical insulation resistance	x	
Thermal ageing	x	
Flexibility	x	
Elongation	x	
Test methods described in the present standard shall be used. In any case test methods used shall be mentioned for any test. The acceptable limits shall be mentioned in the test certificate.		
<sup>a</sup> Required for the polyol and isocyanate.		
<sup>b</sup> Required for the polyol, isocyanate and for the mixed product.		

### 4.3 Packaging

All materials supplied for coating operations shall be suitably marked giving, as a minimum, the following details:

- product manufacturer's name;
- name of material;
- application method;
- batch number;
- date of manufacture and use-by date;
- recommended storage conditions;
- colour of the material.

### 4.4 Quality assurance

The product manufacturer shall carry out quality inspection so that he guarantees the consistent quality of the products and maintains the properties listed in Table 1.

If the product manufacturer has a quality control service approved by the coater, he shall provide a test certificate, on the understanding that the record of the results of his inspection is made available to the coater for checking where necessary. The inspection shall be carried out on every batch of material.

For specific requirements the purchaser can ask for additional information at the time of enquiry and order.

## 5 Information to be supplied by the purchaser

### 5.1 Mandatory

The purchaser shall state in his enquiry and order the following minimum information:

- tubes and components coated in accordance with this European Standard shall be designated by reference to this standard followed by the base material, the thickness class and the service temperature of the coating. If applicable, the reference to the standard for the component to which the coating is applied shall be added to this designation ;

EXAMPLE: 5 000 meters of tubes - EN 10224 of 406, 4-4, 0

external coating EN 10290, PUR, class A, Type 3

- base material (PUR or PUR-MOD);
- thickness class of the coating A or B (see 7.2);
- service temperature Type (1, 2 or 3);
- cut back at the ends (for fittings);
- maximum number and dimension of repairs (not including repairs due to destructive tests).

The components coated in accordance with this European Standard shall be designated by:

- the reference to this standard;
- the base material (PUR or PUR-MOD);