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**Cevi, fittingi in pribor iz nodularne litine - Zunanji nanos cementne malte na cevi -  
Zahteve in preskusne metode**

Ductile iron pipes, fittings and accessories - External cement mortar coating for pipes -  
Requirements and test methods

Rohre, Formstücke und Zubehör aus duktilem Gusseisen - Zementmörtelumhüllung von  
Rohren - Anforderungen und Prüfverfahren

Tuyaux, raccords et accessoires en fonte ductile - Revêtement extérieur en mortier de  
ciment pour tuyaux - Prescriptions et méthodes d'essai

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**Ta slovenski standard je istoveten z: EN 15542:2008**

**ICS:**

23.040.10	Železne in jeklene cevi	Iron and steel pipes
23.040.40	Kovinski fittingi	Metal fittings

**SIST EN 15542:2008****en,de**

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EUROPEAN STANDARD

EN 15542

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2008

ICS 23.040.01

English Version

## Ductile iron pipes, fittings and accessories - External cement mortar coating for pipes - Requirements and test methods

Tuyaux, raccords et accessoires en fonte ductile -  
Revêtement extérieur en mortier de ciment pour tuyaux -  
Prescriptions et méthodes d'essai

Rohre, Formstücke und Zubehör aus duktilem Gusseisen -  
Zementmörtelumhüllung von Rohren - Anforderungen und  
Prüfverfahren

This European Standard was approved by CEN on 7 February 2008.

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Management Centre: rue de Stassart, 36 B-1050 Brussels

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## Foreword

This document (EN 15542:2008) has been prepared by Technical Committee CEN/TC 203 “Cast iron pipes, fittings and their joints”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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## Introduction

This European Standard is in conformity with the general requirements already established by CEN/TC 164 in the field of water supply (e.g. potable water) and CEN/TC 165 in the field of waste water.

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by this European Standard:

- a) this European Standard provides no information as to whether the product may be used without restriction in any of the member states of the EU or EFTA;
- b) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

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**EN 15542:2008 (E)****1 Scope**

This European Standard defines the requirements and test methods applicable to factory applied cement mortar coatings for the external corrosion protection of ductile iron pipes conforming to EN 545, EN 598 and EN 969 for use at operating temperatures up to 50 °C, and for soil conditions according to Annex D.2 of EN 545:2006.

Special activities on site such as joint protection, tapping, clamping, etc. could affect the corrosion protection properties of the cement mortar coating. These operations should be covered in the laying instructions supplied by the manufacturers of pipes, clamps, house connection saddles, etc. and any relevant users' procedures. Such instructions are not part of this European Standard.

**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.

EN 197-1, *Cement - Part 1: Composition, specifications and conformity criteria for common cements*

EN 197-2, *Cement - Part 2: Conformity evaluation*

EN 545:2006, *Ductile iron pipes, fittings, accessories and their joints for water pipelines - Requirements and test methods*

EN 598, *Ductile iron pipes, fittings, accessories and their joints for sewerage applications - Requirements and test methods*

EN 969, *Ductile iron pipes, fittings, accessories and their joints for gas pipelines - Requirements and test methods*

EN 13055-1, *Lightweight aggregates - Part 1: Lightweight aggregates for concrete, mortar and grout*

EN 14020-1, *Reinforcements - Specification for textile glass rovings - Part 1: Designation*

EN 14020-2, *Reinforcements - Specification for textile glass rovings - Part 2: Methods of test and general requirements*

EN ISO 527-1, *Plastics - Determination of tensile properties - Part 1: General principles (ISO 527-1:1993 including Corr 1:1994)*

EN ISO 527-2, *Plastics - Determination of tensile properties - Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2:1993 including Corr 1:1994)*

EN ISO 1183-1, *Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1:2004)*

EN ISO 4624:2003, *Paints and varnishes - Pull-off test for adhesion (ISO 4624:2002)*

ISO 695, *Glass - Resistance to attack by a boiling aqueous solution of mixed alkali - Method of test and classification*

ISO 719, *Glass - Hydrolytic resistance of glass grains at 98 °C - Method of test and classification*

ISO 2591-1, *Test sieving - Part 1: Methods using test sieves of woven wire cloth and perforated metal plate*

ISO 3310-1, *Test sieves - Technical requirements and testing - Part 1: Test sieves of metal wire cloth*

### 3 Terms and definitions

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

#### 3.1

##### **ductile iron**

cast iron used for pipes, fittings and accessories in which graphite is present substantially in spheroidal form

#### 3.2

##### **cement mortar coating**

multi-layer external coating system for ductile iron pipes, principally consisting of the two following layers:

- zinc coating;
- cement mortar layer.

Polymer additive, primer, pigments, surface tissue or top coatings may be used according to the method of application of the coating used by the different manufacturers

#### 3.3

##### **zinc coating**

coating intended to protect the ductile iron and applied to the pipe by means of a thermal spraying process

#### 3.4

##### **primer**

two-component resin which cures by exposure to moisture and serves as adhesive to the cement mortar layer

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#### 3.5

##### **cement mortar layer**

blast furnace slag cement mortar system reinforced with fibres. It may be polymer modified and/or pigmented, and may be covered with a layer of surface tissue

#### 3.6

##### **fibres**

inert plastic fibres, e.g. polypropylene fibres, or alkali resistant glass fibres, e.g. AR-glass fibres, or special E-glass fibres which are used to reinforce the cement mortar layer

#### 3.7

##### **pigments**

material added to the fresh cement mortar in order to identify the medium to be transported

#### 3.8

##### **polymer additive**

organic material added to the fresh cement mortar in order to improve the workability and to reduce the water/cement ratio and to improve the performance of the cement mortar layer

#### 3.9

##### **surface tissue**

polyolefin tissue in form of strip with a net-like structure, which may be applied to the cement mortar layer

#### 3.10

##### **top coating**

coating applied to the cement mortar layer in order to identify the medium to be transported

**EN 15542:2008 (E)****3.11****minimum coating thickness**

lower limit specified for the cement mortar coating thickness

**3.12****impact strength**

impact energy which a coating can withstand without damage under defined test conditions

**3.13****bond strength**

force per unit area, applied perpendicular to the surface, which is necessary to separate the coating from its substrate

**3.14****performance test**

test which is done once and is repeated according to a schedule or after relevant change of raw material supplier or relevant change in process application

**3.15****routine test**

test carried out to control the manufacturing process with a frequency defined by the manufacturer

**4 Ordering information**

The following information shall be supplied to the manufacturer by the purchaser:

Ductile iron pipes according to EN 545, EN 598 or EN 969, but coated with cement mortar coating by reference to this European Standard.

EXAMPLE 5 000 m of ductile iron pipe DN 300 according to EN 545; external cement mortar coating according to EN 15542.

**5 Technical requirements****5.1 Zinc coating**

The zinc coating shall comply with the requirements specified in EN 545, EN 598 or EN 969 whereby the mean mass of zinc per unit area of not less than 200 g/ m<sup>2</sup> shall apply and the purity of the zinc used shall be at least 99,99 %. The zinc coating shall be dry and free from dirt, oil and grease.

**5.2 Primer film thickness**

When measured by one or both methods indicated in 7.1.2, the primer, if applicable, shall be applied to a mean thickness between 80 µm and 150 µm.

**5.3 Fresh cement mortar composition**

The requirements specified for fresh cement mortar refer to the condition of the mortar upon application. For testing purposes, samples shall be taken immediately before the material is to be applied. Fresh cement mortar is characterized by the sand/cement mixing ratio,  $v$ , the water/cement ratio,  $w$ , and the fibre content,  $f$  (fibres/fresh mortar) expressed as percentage. When tested in accordance with the method in 7.1.3, the requirements in respect to the composition as listed in Table 1 shall be met.

Table 1 — Requirements of the fresh mortar composition

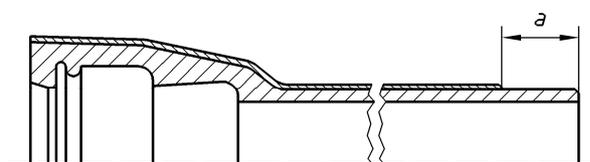
Polymer modification	Sand/cement $v$	Water/cement $w$	Fibre content $f$
without	$\leq 1$	$\leq 0,35$	$0,8 \leq f \leq 3,5$
with	$\leq 2$	$\leq 0,35$	$\leq 2$

#### 5.4 Fresh cement mortar layer thickness

The nominal thickness of the fresh cement mortar layer shall be 5 mm with individual minimum values of 3 mm when measured according to 7.1.4.

#### 5.5 Pipe ends

The spigot shall be not covered by the cement mortar coating over a free length "a" (see Figure 1).



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Figure 1 — Pipe end

The uncoated spigot length "a" depends on the type of joint. It is the responsibility of the manufacturer to define the appropriate uncoated length for each type of joint.

The pipe ends surfaces not covered by the cement mortar coating (spigot, front end of socket and internal section of socket) shall be coated with filled bituminous paint or other suitable coating(s). Where such coatings are in contact with water intended for human consumption, these shall comply with the relevant requirements stated in the introduction of this European Standard.

Pipe ends shall be inspected according to 7.1.5.

NOTE The pipe parts not covered by cement mortar will be protected after laying using appropriate measures, e.g. rubber sleeves, which are covered by the manufacturers laying instructions and are not within the scope of this standard.

#### 5.6 Appearance of cured cement mortar coating

The cement mortar coating shall adhere to the pipe surface and shall be free of hollow areas. The cured coating shall not exhibit any chipping nor any loose sand particles. Protruding grains of sand and fibres, as well as hairline cracks, are permitted. Appearance shall be inspected according to 7.1.6.

#### 5.7 Thickness of cured cement mortar coating

The thickness of the cured cement mortar coating is the sum of the thickness of the zinc coating, the primer if applied, the cement mortar layer and the surface tissue if applied. When measured by the method indicated in 7.1.7, the nominal thickness of the cement mortar coating shall be 5 mm with individual minimum values of 3 mm.