

Organic coating systems and linings for protection of industrial apparatus and plants against corrosion caused by aggressive media - Part 6: Combined linings with tile and brick layers

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 14879-6:2010 sisaldab Euroopa standardi EN 14879-6:2009 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 28.02.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 16.12.2009.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 14879-6:2010 consists of the English text of the European standard EN 14879-6:2009.

This standard is ratified with the order of Estonian Centre for Standardisation dated 28.02.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 16.12.2009.

The standard is available from Estonian standardisation organisation.

ICS 25.220.60

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute Estonian Standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: +372 605 5050; E-mail: info@evs.ee

ICS 25.220.60

English Version

Organic coating systems and linings for protection of industrial apparatus and plants against corrosion caused by aggressive media - Part 6: Combined linings with tile and brick layers

Systèmes des revêtements organiques pour la protection des appareils et installations industriels contre la corrosion par des fluides agressifs - Partie 6 : Revêtements rapportés associés à des couches de carreaux et de briques

Beschichtungen und Auskleidungen aus organischen Werkstoffen zum Schutz von industriellen Anlagen gegen Korrosion durch aggressive Medien - Teil 6: Kombinierte Auskleidung mit Plattierungen (Plattenlagen) und Ausmauerungen

This European Standard was approved by CEN on 24 October 2009.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 General.....	7
4.1 Steel vessels and apparatus.....	7
4.1.1 Calculating the dimensions of brick-lined steel vessels	7
4.1.2 Dimensional tolerances (for steel and non-ferrous vessels)	9
4.1.3 Construction of steel vessels.....	9
4.1.4 Installation of brick-lined vessels	10
4.1.5 Leak tests	10
4.1.6 Repairs and modifications.....	10
4.2 Concrete vessels and apparatus.....	10
4.2.1 Calculating the dimensions of brick-lined concrete vessels	10
4.2.2 Dimensional tolerances	10
4.2.3 Requirements to the concrete construction	10
4.3 Substrate preparation	10
4.4 Sealing layer.....	10
4.5 Service layer.....	11
4.5.1 Bedding and jointing mortar/cement.....	11
4.5.2 Jointing materials for expansion joints.....	17
4.5.3 Semi-finished products	17
4.6 Combined lining system	20
4.7 Selection criteria	21
4.7.1 Type and frequency of fluid loading	21
4.7.2 Thermal loading	22
4.7.3 Changes in temperature.....	22
4.7.4 Mechanical loading.....	22
4.7.5 Weather factors.....	23
4.8 Materials manufacturer	23
4.9 Applicator	23
4.10 Application	23
4.10.1 Sealing layers.....	23
4.10.2 Service layer.....	24
4.10.3 General requirements.....	27
4.11 Protected objects.....	27
5 Requirements.....	27
5.1 Fluid load, chemical resistance and tightness	27
5.2 Thermal loading	27
5.3 Temperature change loading.....	28
5.4 Mechanical loading.....	28
5.5 Anti-slip protection.....	29
5.6 Crack bridging.....	29
5.7 Adhesion strength	29
5.8 Ageing behaviour.....	29
5.9 Weathering behaviour	29
5.10 Concrete compatibility	29
5.11 Behaviour in cleaning and neutralization processes.....	29
5.12 Capability of dissipating static charges	29
5.13 Behaviour in fire.....	30
6 Testing	30
6.1 General.....	30
6.2 Receiving inspection of coating/lining materials	30
6.2.1 Inspection of materials, components and their markings.....	30
6.2.2 Checking storage conditions	30

6.3	Testing of combined lining systems during application.....	30
6.3.1	Ambient conditions	30
6.3.2	Sealing layer	31
6.3.3	Service layer	31
6.3.4	Documentation	31
6.4	Suitability testing.....	31
6.4.1	General	31
6.4.2	Testing of combined linings.....	32
Annex A	(informative) Selection criteria for surface protection systems	36
A.1	Load profiles and suitable surface protection systems for floors and walls.....	36
A.2	Load profiles and suitable surface protection systems for collecting basins.....	37
A.3	Load profiles and suitable protection for production plant floors.....	38
A.4	Load profiles and suitable protection for collecting basins, gutters, channels, pipes, etc.	39
A.5	Load profiles and suitable protection for containers	40
Annex B	(normative) Overview of verification of suitability for combined linings	41
Annex C	(normative) Testing the dissipation capability.....	42
C.1	General	42
C.1.1	Dissipation resistance	42
C.1.2	Ground dissipating resistance.....	42
C.2	Testing the dissipation resistance of test samples	42
C.2.1	Instruments	42
C.2.2	Test procedure.....	42
C.2.3	Test report.....	42
C.3	Measuring the ground dissipation resistance on the laid surface protection system	43
C.3.1	Instruments	43
C.3.2	Preparation.....	43
C.3.3	Test procedure.....	43
C.3.4	Test report.....	44
Annex D	(normative) Test methods for tolerances and limit deviations	45
D.1	Scope and purpose	45
D.2	Tolerances and limit deviations.....	45
D.2.1	Cylindrical vessel	45
D.2.2	Flat-sided vessels.....	47
D.3	Test methods	47
D.3.1	General	47
D.3.2	Cylindrical vessel, cylindrical part	47
D.3.3	Shop-fabricated cylindrical vessel, flat base	49
D.3.4	Flat-sided vessels, angular horizontal projection (Determination of the flatness of the faces)	50
Annex E	(informative) A-deviations	52
Bibliography	53

Foreword

This document (EN 14879-6:2009) has been prepared by Technical Committee CEN/TC 360 "Project Committee - Coating systems for chemical apparatus and plants against corrosion", the secretariat of which is held by DIN.

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 June 2010, and conflicting national standards shall be withdrawn at the latest by June 2010.

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.

EN 14879, *Organic coating systems and linings for protection of industrial apparatus and plants against corrosion caused by aggressive media*, consists of the following parts:

- *Part 1: Terminology, design and preparation of substrate*
- *Part 2: Coatings on metallic components*
- *Part 3: Coatings on concrete components*
- *Part 4: Linings on metallic components*
- *Part 5: Linings on concrete components*
- *Part 6: Combined linings with tile and brick layers*

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.

1 Scope

This European Standard describes the requirements for and methods of testing of combined systems with tile and brick layers which are applied to concrete or metallic process engineering equipment that will come in contact with chemical substances (liquids, solids and gases). The requirements specified here may be used for the purposes of quality control (e.g. as agreed between the contract partners or having been given by national regulations¹⁾).

The standard applies to systems which serve one or more of the following purposes:

- to protect the component from adverse effects of aggressive substances;
- to protect waters (e.g. ground water) against hazardous substances;
- to protect the charge from becoming contaminated by components released from the substrate material;
- to achieve a particular surface quality.

The described combined systems can be used for concrete or metallic process engineering equipment that will come into contact with chemical substances.

The combined system is a combination of:

- a coating according to EN 14879-2 or EN 14879-3 with an additional layer of tiles or bricks embedded in cement mortar, resin based mortar and/or potassium silicate mortar as an adhesive bonding cement (referred to simply as cement in this standard); or
- a lining according to EN 14879-4 or EN 14879-5 with an additional layer of tiles or bricks embedded in cement mortar, resin based mortar and/or potassium silicate mortar as an adhesive bonding cement (referred to simply as cement in this standard).

For design and preparation of substrate, see EN 14879-1.

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 206-1, *Concrete – Part 1: Specification, performance, production and conformity*

EN 13501-1:2007, *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests*

EN 14879-1:2005, *Organic coating systems and linings for protection of industrial apparatus and plants against corrosion caused by aggressive media – Part 1: Terminology, design and preparation of substrate*

EN 14879-2:2006, *Organic coating systems and linings for protection of industrial apparatus and plants against corrosion caused by aggressive media – Part 2: Coatings on metallic components*

EN 14879-3:2006, *Organic coating systems and linings for protection of industrial apparatus and plants against corrosion caused by aggressive media – Part 3: Coatings on concrete components*

1) For the purposes of this standard, the contract partners are the coating material, lining, mortar, tiles and bricks manufacturers, the component manufacturer, the person(s) responsible for applying the coating, lining, mortar, tiles and bricks, and the client ordering the finished component(s).

EN 14879-4:2007, *Organic coating systems and linings for protection of industrial apparatus and plants against corrosion caused by aggressive media – Part 4: Linings on metallic components*

EN 14879-5:2007, *Organic coating systems and linings for protection of industrial apparatus and plants against corrosion caused by aggressive media – Part 5: Linings on concrete components*

EN ISO 291, *Plastics – Standard atmospheres for conditioning and testing (ISO 291:2008)*

EN ISO 10545-12, *Ceramic tiles – Part 12: Determination of frost resistance (ISO 10545-12:1995, including Technical Corrigendum 1:1997)*

IEC 60093:1980, *Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials*

IEC 60167, *Methods of test for the determination of the insulation resistance of solid insulating materials*

3 Terms and definitions

For the purposes of this document, the following terms and definitions in addition to those of EN 14879-1:2005, EN 14879-2:2006, EN 14879-3:2006, EN 14879-4:2007 and EN 14879-5:2007 apply.

3.1

combined lining system

combined lining system applied as a protection against chemical, mechanical and thermal loading

NOTE Such systems comprise a sealing layer and a service layer (see Figure 1). Taken together, the two layers provide a more effective protection than each layer would provide on its own.

3.2

sealing layer

bottom layer of the combined lining system that is applied to the concrete or metal surface

NOTE It serves both as a primer (promoting adhesion) and as a layer which is impervious to liquids.

3.3

service layer

top layer of the combined lining system, which is made of tiles or bricks bonded to the sealing layer by means of mortar or cement

NOTE It serves to protect the sealing layer from the direct contact with chemical, mechanical and thermal loads.

3.4

semi-finished product

tile, brick, also in other shapes

EXAMPLES Pipes, nozzles.

3.5

jointing mortar

mortar or cement used to fill the joints between the semi-finished products

3.6

bedding mortar

mortar or cement used to form the bed between the sealing layer and the surfacing units

3.7

bed joint

layer of mortar between the sealing layer and the service layer