



SLOVENSKI STANDARD

SIST EN 12878:2000

01-januar-2000

Pigmenti za obarvanje gradbenih materialov na osnovi cementa in/ali apna - Specifikacije in metode preskušanja

Pigments for the colouring of building materials based on cement and/or lime -
Specifications and methods of test

Pigmente zum Einfärben von zement- und/oder kalkgebundenen Baustoffen -
Anforderungen und Prüfverfahren

Pigments de coloration des matériaux de construction à base de ciment et/ou de chaux -
Spécifications et méthodes d'essai

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Ta slovenski standard je istoveten z: EN 12878:1999

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91.100.10	Cement. Mavec. Apno. Malta	Cement. Gypsum. Lime. Mortar

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12878

June 1999

ICS 87.060.10; 91.100.10

English version

Pigments for the colouring of building materials based on cement and/or lime - Specifications and methods of test

Pigments de coloration des matériaux de construction à base de ciment et/ou de chaux - Spécifications et méthodes d'essai

Pigmente zum Einfärben von zement- und/oder kalkgebundenen Baustoffen - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 13 May 1999.

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 Central Secretariat 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 Central Secretariat 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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 298 "Pigments and extenders", 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 December 1999, and conflicting national standards shall be withdrawn at the latest by December 1999.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Annexes A and B are informative.

1 Scope

This European Standard specifies the requirements (see clause 4) and the methods of test for pigments to be used in the colouring of building materials based on cement and/or lime.

Pigments for this purpose may be single pigments, blends of pigments, or blends of pigments and extenders, in powder or granular form, or aqueous preparations.

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 below. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the appropriate publication referred to applies.

EN 196-1:1994

Methods of testing cement – Part 1: Determination of strength

EN 196-3

Methods of testing cement – Part 3: Determination of setting time and soundness

prEN 197-1

Cement – Part 1: Composition, specifications and conformity criteria for common cements

ENV 459-1

Building lime – Part 1: Definitions, specifications and conformity criteria

EN 459-2

Building lime – Part 2: Test methods

EN 934-2

Admixtures for concrete, mortar and grout – Part 2: Concrete admixtures – Definitions and requirements

EN 10204

Metallic products – Types of inspection documents

EN ISO 787-3

General methods of test for pigments and extenders – Part 3: Determination of matter soluble in water - Hot extraction method (ISO 787-3:1979)

EN ISO 787-9

General methods of test for pigments and extenders – Part 9: Determination of pH value of aqueous suspension (ISO 787-9:1981)

ISO 787-7

General methods of test for pigments and extenders – Part 7: Determination of residue on sieve – Water method – Manual procedure

ISO 787-13

General methods of test for pigments – Part 13: Determination of water-soluble sulfates, chlorides and nitrates

ISO 1158

Plastics – Vinyl chloride homopolymers and copolymers – Determination of chlorine



ISO 3310-1

Test sieves – Technical requirements and testing – Part 1: Test sieves of metal wire cloth

ISO 9277

Determination of the specific surface area of solids by gas adsorption using the BET method

3 Definitions

For the purposes of this European Standard, the following definitions apply:

3.1 pigment: A substance, generally in the form of fine particles, which is practically insoluble in the application medium and for which the sole purpose is to colour cement- and/or lime-based building materials.

3.2 extender: A inorganic substance, generally in the form of fine particles, which is practically insoluble in the application medium and has no inherent colour properties.

3.3 single pigment: A pigment that is of singular (chemical) composition. Single pigments contain no substances other than those originating from the pigment manufacturing process.

NOTE: Surface treatment of the primary pigment particles is considered as a part of the pigment manufacturing process.

3.4 pigment blend: A blend of at least two single pigments, or at least one single pigment and an extender.

3.5 aqueous pigment preparation: A preparation in which a pigment (single pigment or pigment blend) is dispersed in water, with or without a dispersion or other agent.

These preparations shall not influence the concrete properties as detailed in tables 1 to 4.

NOTE: Examples of agents are:

- dispersants;
- binding agents (resins);
- solvents;
- wetting agents;
- or combinations thereof.

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3.6 pigment in granular form: A preparation in which a pigment (single pigment or pigment blend) is converted into granules, by the use of the binding agent which retains the integrity of the granule.

These preparations shall not influence the concrete properties as detailed in tables 1 to 4.

3.7 reference sample; standard pigment: A sample of a single pigment or a blend (powder, or preparation) retained by the interested parties for comparison for the evaluation of the product properties (e. g. colour).

4 Requirements

The requirements for pigments for pure lime mortar shall be agreed between the interested parties on the basis of ENV 459-1 and be tested in accordance with EN 459-2.

4.1 Composition of the pigments

The main constituents of the pigments typically belong to one of the following classes of compounds:

- synthetic or natural oxides and hydroxides of iron;
- oxides of chromium, titanium and manganese;
- complex inorganic pigments, for example combinations of the above mentioned metal oxides and hydroxides with cobalt, aluminium, nickel and antimony oxides and hydroxides;
- ultramarine pigments;
- phthalocyanine blue and green;
- elemental carbon (shall be regarded as an inorganic pigment);
- blends of the above materials (which may also include extenders).

Where dispersion agents, binding agents and/or grinding aids are used, their total content should be equal to or less than 5 % (m/m), based on solids.

The stability of a pigment with respect to colour shall be linked to the intended end use conditions (see table 5).

The solids content, as a percentage (%) of aqueous preparations, shall be declared by the manufacturers.

NOTE: Information on International Standards for particular pigments is given in Annex B.

4.2 Sampling

The sample taken for initial and biennial tests shall be representative of the pigment, traceable and clearly labelled. The quantity taken shall be not less than 4 times the amount required for testing and the remainder shall be retained for not less than 2 years.

Samples taken for quality control purposes shall be representative.

4.3 Testing of single pigments

4.3.1 Initial test

The fundamental suitability of a single pigment [defined by its chemical formula, for example chrome oxide green (Cr_2O_3), iron oxide (Fe_2O_3) etc.] shall be proven by the manufacturer by an initial test carried out by a nationally approved laboratory.

The tests on single pigments shall be conducted in the form in which they are being introduced to the market (powder, granulate or aqueous preparation).

When pigments are supplied in non-powder forms only those with the highest amount of given dispersing, binding or other agents need to be tested.

The requirements for the single pigment initial test and the test methods to be used are specified in tables 1 and 2.

An initial test is required if given types of dispersing, binding or other agents are changed or the amounts are increased.

For blends of single pigments - with or without extenders - in any of the three forms (powder, granulate or aqueous preparation), the tests shall be performed with the single pigments which form the blend.

4.3.2 Biennial testing

The testing once every two years is performed as described in 4.3.1 with the exception of the determination of principle ingredients.

The test shall be performed by a nationally approved laboratory.

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4.4 Quality control

Within the framework of quality control of finished products as delivered, the characteristics given in tables 3 and 4 shall be tested at least once per batch.

The conformity of pigments with the requirements of this standard shall be proven by the issue of the specific test report in accordance with EN 10204 (see clause 12).

4.5 Additional requirements

Additional requirements to be agreed between the interested parties and the test methods to be used are listed in table 5.

TABLE 2: Requirements for the initial and biennial test on single pigments for the colouring of structural steel reinforced concrete ¹⁾

Pigment property	Requirement	Test method
Influence on setting time:		
Initial setting time min	min. 60	5.2
Final setting time min	max. 720	5.2
Maximum difference between the initial setting times of mixes with and without pigment min	60	5.2
Influence on 28 day compressive strength of the mortar, expressed as % strength loss, based on the unpigmented mix	max. 8	5.3
Matter soluble in water ^{2) 3)} (hot extraction method) %	max. 0,5	6.1
Content of water-soluble halides and other anions precipitated by Ag ⁺ ⁴⁾ %	max. 0,10	6.2
Total chlorine content determined as chloride ⁵⁾ %	max. 0,10	7
Principal ingredients (initial test only)	Determine in accordance with the relevant pigment standard (see Annex B). Where no standard exists, up-to-date analytical procedures have to be used.	
<p>¹⁾ Where a pigment is used in prestressed reinforced concrete, it is to be proven that it will not have any deleterious effect on the steel.</p> <p>²⁾ For pigment blends, evidence of compliance is calculated from data recorded for constituent single pigments.</p> <p>³⁾ When pigments are supplied in non-powder forms matter soluble in water may be up to 4 %, based on the solids content of the preparation, providing that it conforms to EN 934-2; the effect category in EN 934-2 shall be recorded in the specific test report.</p> <p>⁴⁾ Where pigment blends, pigment/extender mixtures, or granulates or aqueous preparations thereof, are used in excess of 5 % based on cement, the total content of halides and of anions precipitated by Ag⁺ which are admitted into the concrete should not exceed 0,005 % based on the cement.</p> <p>⁵⁾ If the initial test shows no significant difference between total chlorine content and water-soluble halides content only the latter need to be performed biennially.</p>		

TABLE 3: Requirements for pigments as delivered for the colouring of non- structural unreinforced building materials based on cement and/or lime ¹⁾

Pigment property	Requirement	Test method
Matter soluble in water ²⁾ (hot extraction method) %	max. 5	6.1
Relative colour strength against the standard %	100 ± 5	8.2, 8.3 or 8.4
<p>¹⁾ Including road concrete without steel reinforcement.</p> <p>²⁾ For pigment blends, evidence of compliance is calculated from data recorded for constituent single pigments.</p>		

TABLE 4: Requirements for pigments as delivered for the colouring of structural steel reinforced concrete ¹⁾

Pigment property	Requirement	Test method
Matter soluble in water ^{2) 3)} (hot extraction method) %	max. 0,5	6.1
Content of water-soluble halides and other anions precipitated by Ag ⁺ ⁴⁾ %	max. 0,10	6.2
Total chlorine content determined as chloride ⁵⁾ %	max. 0,10	7
Relative colour strength against the standard %	100 ± 5	8.2, 8.3 or 8.4
<p>¹⁾ Where a pigment is used in prestressed reinforced concrete, it shall be proven that it will not have any deleterious effect on the steel.</p> <p>²⁾ For pigment blends, evidence of compliance is calculated from data recorded for constituent single pigments.</p> <p>³⁾ When pigments are supplied in non-powder forms matter soluble in water may be up to 4 %, based on the solids content of the preparation, providing that it conforms to EN 934-2; the effect category in EN 934-2 shall be recorded in the specific test report.</p> <p>⁴⁾ Where pigment blends, pigment/extender mixtures, or granulates or aqueous preparations thereof, are used in excess of 5 % based on cement, the total content of halides and of anions precipitated by Ag⁺ which are admitted into the concrete should not exceed 0,005 % based on the cement.</p> <p>⁵⁾ If the initial test shows no significant difference between total chlorine content and water-soluble halides content only the latter need to be performed biennially.</p>		