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Mavčna veziva in mavčni notranji ometi - 2. del: Preskusne metode

Gypsum binders and gypsum plasters - Part 2 : Test methods

Gipsbinder und Gips-Trockenmörtel - Teil 2: Prüfverfahren

Plâtres et enduits à base de plâtre pour le bâtiment - Partie 2: Méthodes d'essai

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Gypsum binders and gypsum plasters - Part 2: Test methods

Liants-plâtres et enduits à base de plâtre pour le bâtiment - Partie 2: Méthodes d'essai

Gipsbinder und Gips-Trockenmörtel - Teil 2: Prüfverfahren

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 13279-2:2014) has been prepared by Technical Committee CEN/TC 241 “Gypsum and gypsum based products”, 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of an identical text or by endorsement, at the latest by July 2014, and conflicting national standards shall be withdrawn at the latest by July 2014.

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This document supersedes EN 13279-2:2004.

This document on gypsum binders and gypsum plasters, EN 13279, *Gypsum binders and gypsum plasters*, consists of two parts:

— *Part 1: Definitions and requirements;*

— *Part 2: Test methods.*

This document for gypsum binders and gypsum plasters uses European standardized test methods as far as possible and where this was not applicable other appropriate proven test methods have been used.

This document includes an informative Annex A concerning water retention.

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

Introduction

Figure 1 shows the family of gypsum binders and gypsum plasters

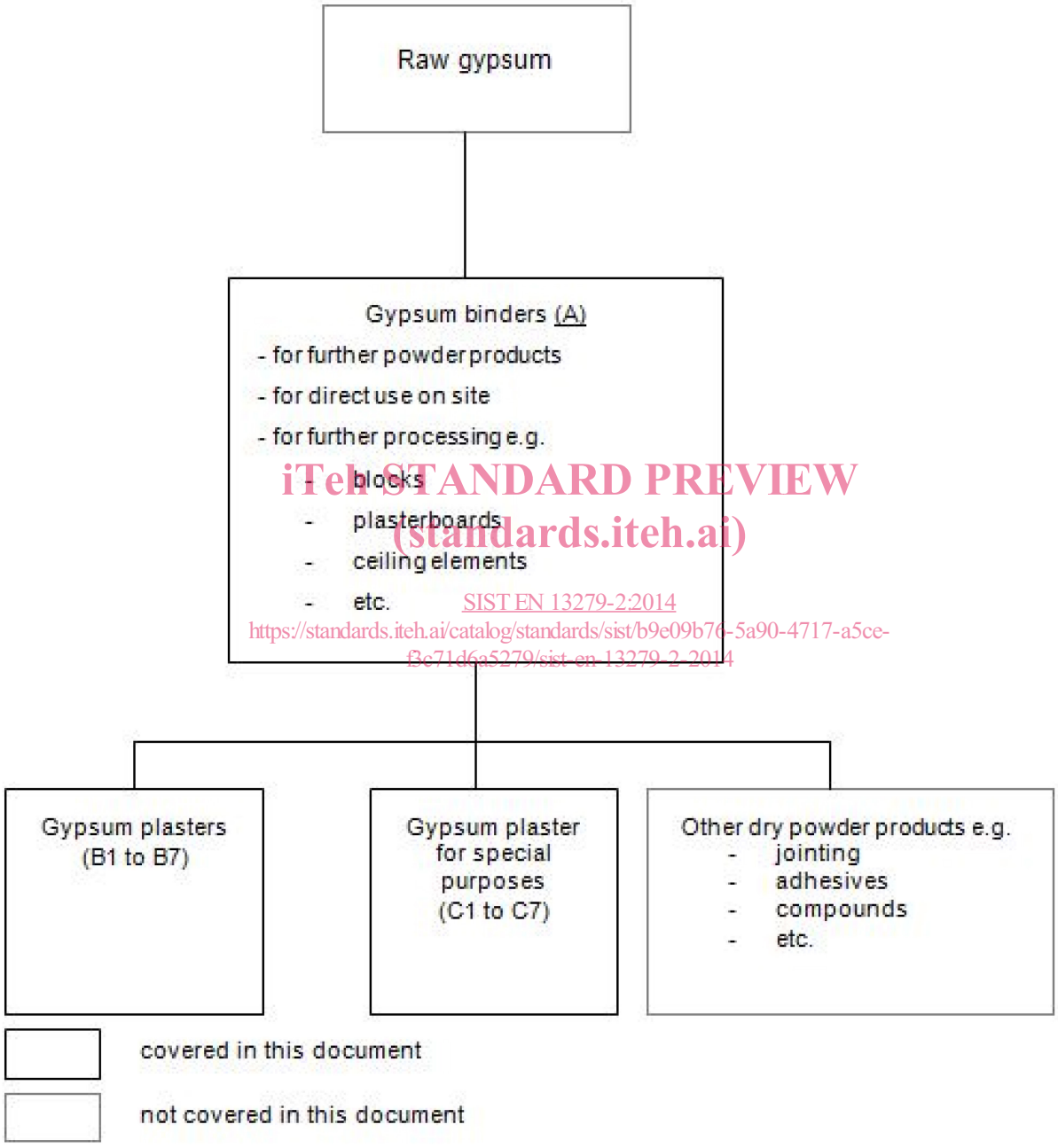

Figure 1 — Family of gypsum biners and gypsum plasters

1 Scope

This European Standard describes the reference test methods for all gypsum binders and gypsum plasters covered by EN 13279-1.

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 referenced, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 196-1:2005, *Methods of testing cement - Part 1: Determination of strength*

EN 196-7, *Methods of testing cement - Part 7: Methods of taking and preparing samples of cement*

EN 459-2:2010, *Building lime - Part 2: Test methods*

EN 932-1, *Tests for general properties of aggregates - Part 1: Methods for sampling*

ISO 565, *Test sieves - Metal wire cloth, perforated metal plate and electroformed sheet - Nominal sizes of openings*

3 Test conditions and sampling

3.1 Test atmosphere (reference test)

Temperature of the test room, the equipment and the materials (plaster, water): (23 ± 2) °C

Relative humidity of the air: (50 ± 5) %

3.2 Sampling

Sampling shall be carried out in accordance with EN 196-7.

Sample granular material in accordance with the procedures given in EN 932-1 for aggregates taking into account the need to minimise moisture and carbon dioxide absorption.

The spot sample size shall be (8 ± 3) kg.

The test sample prior to testing shall be kept in hermetically sealed containers.

3.3 Preparation of the sample

Before carrying out tests, the mass of the sample shall be homogenised.

Before carrying out chemical analyses, a representative sample of (50 ± 5) g shall be taken and be ground to a particle size of ≤ 0,1 mm.

3.4 Water

The water used for reference tests and chemical analyses shall be distilled or deionised.

3.5 Appliances and apparatus

The apparatus used for gauging and the moulds used for preparing the test pieces, shall be free from leaks and shall be manufactured from a water resistant material which is non reactive to calcium sulphate (e.g. glass, brass, stainless steel, hardened steel, hard rubber and plastics). Soft plastic and rubber materials shall not be used.

Since the characteristics of plasters are strongly influenced by the presence of particles of calcium sulphate dihydrate which can influence the setting time, all the equipment used in the tests shall be kept in a perfect state of cleanliness.

4 Test methods for gypsum binders and gypsum plasters (including special purposes)

4.1 Sieve analysis (Fineness)

4.1.1 Apparatus

a) Control sieves conforming to ISO 565:

   1) 5 000 µm, only for gypsum bricklaying plaster (C2);

   2) 200 µm and 100 µm for fibrous gypsum plaster elements (C1, C7);

   3) 1 500 µm for fibrous plaster works and thin coat plaster (C1, C6);

b) wooden or plastic spatula;

c) balance accurate to ± 0,1 g;

d) desiccator.

4.1.2 Determination of particles retained on 5 000 µm sieves (see 4.1.1 a))

4.1.2.1 Procedure

From the hermetically sealed laboratory sample weigh 500 g ± 25 g and pass through a 5 000 µm sieve (see 4.1.1 a)), crushing any soft lumps with a spatula. Weigh the residue and examine any hard particles retained on the sieve.

Repeat the procedure on a second sample.

Expression of results

Express the mass retained on the sieve as a percentage of the total sample. Take the mean of the two results and record it in the test report.

4.1.3 Determination of particles retained on 200 µm and 100 µm sieves

4.1.3.1 Procedure

Take approximately 200 g from the hermetically sealed sample and dry it to constant mass[1)] at (40 ± 2) °C. Cool in a desiccator to room temperature. Weigh 50 g ± 5 % and transfer to the test sieve.

Hold the sieve in one hand, slightly tilted, and shake it, allowing it to strike the other hand on each movement at a rate of approximately 125 times per minute, so that the plaster always spreads out evenly.

Every 25 movements turn the sieve through 90 degrees. After 1 min weigh the residue and return to the sieve. Continue sieving until the mass of plaster passing the sieve in 1 min does not exceed 0,4 g.

After sieving for 3 min, brush any fine material adhering to the inner surface of the sieve frame onto the wire screen. Sieving is continued until the plaster passing the sieve in 1 min does not exceed 0,2 g. The underside of the wire screen surface is then brushed, and the brushings rejected, before the residue retained on the sieve is weighed. For the 100 µm sieve the test is carried out in the same way and with the same limits as for the 200 µm sieve.

Repeat the procedure on a second sample.

4.1.3.2 Expression of results

Express the mass retained on the sieve as a percentage of the total sample. Take the mean of the two results for each of the sieve sizes and compare with the requirements.

4.2 Determination of sulphur trioxide content and calculation of equivalent calcium sulfate

NOTE This test method applies to all types of plasters.

4.2.1 Principle

The calcium sulfate is decomposed by digestion with hydrochloric acid solution. Insoluble constituents are removed by filtration. The sulfate in the filtrate is determined gravimetrically as barium sulfate.

4.2.2 Apparatus

a) Sieve 0,1 mm mesh;

b) 250 ml and 400 ml beakers;

c) rapid filtration funnels;

d) muffle furnace;

e) vitreosil ignition crucible, porosity 4 or porous porcelain or silica crucible;

f) filter paper capable of retaining particles greater than 2,5 µm;

g) balance to an accuracy of 0,001 g;

h) desiccator.

[1)] Constant mass is defined as two successive weighings 24 h apart, differing by less than 0,1 %.

4.2.3 Reagents

a) Hydrochloric acid solution: 2 mol/l HCl;

b) barium chloride: (10 % solution).

4.2.4 Procedure

The sample is ground until it passes through a sieve with a mesh of 0,1 mm.

0,5 g of the sample dried at 40 °C shall be boiled with 30 ml HCl 1:1 and 150 ml distilled H_2O for 15 min to 20 min in a 250 ml beaker. Then it shall be filtered through a quantitative filter (red band) into a 400 ml beaker and washed with hot deionised water. The solution shall be boiled, and while stirring it SO_3 shall be precipitated with 25 ml 10 % barium chloride, brought to the boil, and then allowed to stand for at least 12 h.

The solution shall be filtered through a quantitative filter (red band) and washed using hot deionised water, until it is free of chloride. The filter residue shall be left to incinerate slowly in the crucible and ignited at 800 °C until constant weight is achieved, then be cooled in a desiccator and weighed.

The test shall be repeated.

4.2.5 Expression of results

4.2.5.1 Calculation of SO_3

The sulfate content expressed as SO_3 is calculated in percent from the Formula (1):

$$SO_3 = \frac{BaSO_4 \times 0{,}343 \times 100}{m_p} \quad (1)$$

where

$BaSO_4$ is the mass of the barium sulfate $BaSO_4$, in g;

m_p is the mass of the sample, in g.

4.2.5.2 Calculation of equivalent calcium-sulfate

The equivalent calcium-sulfate is calculated in percent from the Formula (2):

$$SO_3 \text{ x } 1{,}7 = CaSO_4 \quad (2)$$

4.3 Determination of the water/plaster ratio

NOTE There are no corresponding requirements in EN 13279–1.

4.3.1 Sprinkling method

This method is used for gypsum binders.

4.3.1.1 Principle

Determination of the mass of the gypsum binder in grams which can be saturated when it is sprinkled into 100 g of water.

4.3.1.2 Apparatus

a) Cylindrical glass container with 66 mm internal diameter and 66 mm height and with markings at a height of 16 mm and 32 mm above the inner surface of the base;

b) chronometer;

c) balance, accurate to ± 0,1 g.

4.3.1.3 Procedure

Pour 100 g of water into the glass container, while taking care not to wet the upper part of the cylindrical wall. Determine the mass m_0 within ± 0,5 g. The total time for the following procedure shall be (120 ± 5) s. First sprinkle the plaster evenly over the surface of the water in such a way, that after 30 s the gypsum paste has reached the first marking and has reached the second marking after 60 s. Continue the sprinkling until the gypsum paste has reached approximately 2 mm below the surface of the water after (90 ± 10) s. During the following 20 s to 40 s, sufficient binder is sprinkled on to the surface of the water and the rim of the glass container that the water surface disappears. Any small dry islands of binder, which appear during the operation should be saturated at the end of 3 s to 5 s.

In the case of binder which tends to settle slowly, the level marks may not be reached within the required time. In this case, the binder shall be sprinkled so that it falls only on to those areas of the water, which are free from binder and not on to binder which has already been sprinkled. The sprinkling time is to be stated.

Before weighing remove surplus plaster from the rim of the glass container. Determine the mass m_1, within ± 0,5 g. The test method is repeated at least twice. Calculate the mean sprinkled quantity.

4.3.1.4 Expression of results

The water/plaster ratio R is given by Formula (3):

$$R = \frac{100}{m_1 - m_0} \quad (3)$$

where

m_0 is mass of glass container + mass of water, in g;

m_1 is mass of glass container + mass of water + mass of plaster, in g.

4.3.2 Dispersal method

4.3.2.1 General

This method is used for gypsum binders and gypsum plasters with fluid consistency by measuring the flow of the mixture when a mould filled with the mixture is removed.

4.3.2.2 Principle

Determination of the mass of the gypsum binder or gypsum plaster (in grams) that will produce a mixture of given consistency.

4.3.2.3 Apparatus

a) A bowl for mixing, together with a mixing spatula made from a non-reactive material;