



SLOVENSKI STANDARD
SIST EN 26873:2000
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Dentistry - Dental gypsum products (ISO 6873:1983)

Dentistry - Dental gypsum products (ISO 6873:1983)

Zahnheilkunde - Dentalgipse (ISO 6873:1983)

Art dentaire - Produits dentaires à base de gypse (ISO 6873:1983)

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ICS:

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English version

Dentistry - Dental gypsum products (ISO 6873:1983)

Art dentaire - Produits dentaires à base de gypse (ISO 6873:1983) Zahnheilkunde - Dentalgipse (ISO 6873:1983)

This European Standard was approved by CEN on 1991-11-15 and is identical to the ISO standard as referred to.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

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MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO
Urad RS za standardizacijo in meroslovje
LJUBLJANA

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PREVZET PO METODI RAZGLASITVE

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Page 2
EN 26873:1991

FOREWORD

This European Standard has been taken over by CEN/TC 55 "Dental products" from the work of ISO/TC 106 "Dentistry" of the International Organization for Standardization (ISO).

Following the positive result of the Primary Questionnaire procedure, CEN/TC 55 decided to submit this document to the CEN Members for formal vote. The standard was approved.

National standards identical to this European Standard shall be published at the latest by 92-05-18 and conflicting national standards shall be withdrawn at the latest 92-05-18.

In accordance with the Common CEN/CENELEC Rules the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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ENDORSEMENT NOTICE

The content of this European Standard is identical with the International Standard ISO 6873 "Dentistry - Dental gypsum products" published in 1983.

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International Standard



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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Dental gypsum products

Produits dentaires à base de gypse

First edition — 1983-11-01

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Price based on 8 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6873 was developed by Technical Committee ISO/TC 106, *Dentistry*, and was circulated to the member bodies in March 1982.

It has been approved by the member bodies of the following countries :

| | | |
|---------------------|-----------------------|----------------|
| Austria | India | Sweden |
| Belgium | Japan | Switzerland |
| Canada | Mexico | United Kingdom |
| China | Netherlands | USA |
| Czechoslovakia | New Zealand | USSR |
| Egypt, Arab Rep. of | Norway | |
| Germany, F.R. | South Africa, Rep. of | |

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Australia
France

Dental gypsum products

0 Introduction

This International Standard aims to enable users of dental gypsum products to obtain materials that are efficacious. The requirements have been designed to delineate satisfactory materials and rule out unsatisfactory ones. It is expected that both the manufacturer and user can use this International Standard as a basis for producing or obtaining satisfactory products and results.

1 Scope and field of application

This International Standard gives a classification of, and specifies requirements for, gypsum products used for dental purposes such as for making oral impressions, models, casts or dies. It also specifies the test methods to be employed to determine compliance with these requirements.

2 Reference

ISO 1302, *Technical drawings — Method of indicating surface texture on drawings*.

3 Definition

testing consistency: That consistency obtained with a water/powder ratio by mass which gives a slump pat diameter or cone penetration meeting the property requirements given in the table.

4 Classification

The four types of gypsum products used in dentistry and specified in this International Standard shall be classified as follows:

Type 1: Impression plaster

Type 2: Plaster

Type 3: Stone

Type 4: Stone, high strength

5 Requirements

5.1 Composition

The material shall be composed essentially of finely powdered hemihydrate of calcium sulphate and necessary modifiers.

5.2 Flavour

The material shall not be flavoured unless stated otherwise on the container.

5.3 Properties

The material shall be uniform and free from foreign matter and lumps and when mixed according to the manufacturers instructions shall produce a homogenous mix.

NOTE — Colouring matter as such is not regarded as foreign matter.

The material shall comply with the requirements for testing consistency, pouring time, setting time, setting expansion and compressive strength as specified in the table. In addition to being within the limits listed in the table, pouring and setting times shall also be within $\pm 20\%$ of the times stated by the manufacturer.

Pouring and setting times shall be measured from the moment of initial contact of the powder with water.

5.4 Fracture (Type 1)

When broken in accordance with 7.6 two minutes after the setting time (7.4), type 1 impression plaster shall break with a clean fracture and be readily reassembled to form the shape and size of the original unbroken specimen.

5.5 Reproduction of detail

The material shall be capable of reproducing a continuous 0,02 mm step for the full diameter of the mould in at least two of three specimens prepared as described in 7.8.

ISO 6873-1983 (E)

6 Sampling, test conditions and preparation of test specimens

6.1 Sampling

Sufficient standard packages of the material shall be obtained to provide at least 5 kg of sample. The sample shall be stored in a moisture proof container for subsequent testing.

6.2 Test conditions

The preparation of test specimens and the test procedures shall be conducted at 23 ± 2 °C and a relative humidity of 50 ± 5 %. The testing equipment and sample container shall be conditioned at this temperature and relative humidity for at least 10 h prior to the test being carried out. The distilled water and sodium citrate solution (7.2.1) shall be maintained at 23 ± 2 °C.

6.3 Mixing

6.3.1 Apparatus

6.3.1.1 Clean, scratch free tapered rubber or plastic bowl of about 130 mm diameter at the top.

6.3.1.2 Spatula, having a stiff, round-edged blade 19 to 25 mm wide and 90 to 130 mm long.

6.3.2 Procedure

Mix the dry powder with sufficient distilled water in the following manner to produce a mix of testing consistency.

Pour the water into the mixing bowl (6.3.1.1). Begin timing from the moment at which powder and water first make contact. Add the dry powder to the water over a period of 10 s.

Allow the mix to soak for 20 s.

Spatulate the mix for 30 s for type 1 materials and for 60 s for type 2, 3 and 4 materials. Spatulate using a circular stirring motion at a rate of approximately two turns per second.

Transfer the mix immediately to the moulds or testing apparatus.

7 Test methods

7.1 Inspection

Determine compliance with the requirements given in 5.1, 5.4 and 5.5 by visual inspection (without magnification unless otherwise stated).

7.2 Testing consistency

7.2.1 Material

Gauging liquid composed of 0,3 % solution of sodium citrate in distilled water.

NOTE — Only use the 0,3 % sodium citrate solution for the determination of testing consistency. Use distilled water in the preparation of all specimens for determining other properties. Take care to avoid contamination of testing equipment with the sodium citrate solution. Use separate mixing equipment, if possible.

7.2.2 Types 1 and 2

Determine the testing consistency of type 1 impression plaster and type 2 plaster by a slump method using the following apparatus and procedure.

7.2.2.1 Apparatus

7.2.2.1.1 Clean, dry, cylindrical mould, having a length of 50,0 mm and an inside diameter of 35,0 mm constructed from a corrosion resistant, non-absorbent material.

7.2.2.1.2 Clean, dry, smooth glass plate, with sides of at least 100 mm.

7.2.2.1.3 Means of measuring the major and minor diameters of the slumped mix.

7.2.2.2 Procedure

Add 100 g of the sample to the test quantity of the gauging liquid and mix as described in 6.3. Place the mould (7.2.2.1.1) upright on the centre of the glass plate (7.2.2.1.2). Completely fill the mould and level off the mix flush with the top of the mould. Rest the plate on a surface that is free of vibration.

After 2 min from the start of mixing, lift the mould vertically from the plate at a rate of approximately 10 mm/s and allow the mix to slump or spread over the plate.

After 3 min from the start of mixing, determine the major and minor diameters of the slumped mix to the nearest millimetre. Take the average of six diameters (three mixes) as a measure of consistency. If the result does not meet the requirement given in the table, repeat the test with more or less gauging liquid until the required testing consistency is obtained.

7.2.3 Types 3 and 4

Determine the testing consistency for types 3 and 4 stones by a cone penetration method using the following apparatus and procedure.

7.2.3.1 Apparatus

Cone penetrometer, an example of which is shown in figure 1. Use a rod and plunger (B and G) and additional weight (A) such that the total mass is $100 \pm 0,1$ g.

7.2.3.2 Procedure

Clean the plunger, mould, and base plate (figure 1) and apply a thin coat of lubricant to the upper surface of the base plate in order to prevent leaks during the test.

NOTE — Petroleum jelly is a suitable lubricant.

Add 300 g of the sample to the test quantity of the gauging liquid and mix as described in 6.3. Pour the mix into the conical ring mould (large end uppermost) and work the mix slightly to remove air bubbles. Commence penetration and record results at 3 min, 4 min and 5 min after the start of the mixing as follows :

Level the mix flush with the top of the ring mould before each penetration.

Wipe the conical plunger clean with a damp cloth, then lower the plunger to the surface of the sample and approximately the centre of the mould. Lock the rod in position with the lock screw.

Read the scale and release the plunger quickly.

After 15 s, read the scale again. Take the difference in scale readings as the penetration.

Take the average of nine penetrations (three mixes) as a measure of consistency. If the result does not meet the requirement given in the table, repeat the test with more or less gauging liquid until the required testing consistency is obtained.

7.3 Pouring time

Test as described in 7.2.2 or 7.2.3 with the exception that the cylinder is separated from the plate and that the penetration is made at the pouring time specified in the table. Calculate the average result of three mixes to determine the slump pat diameter or cone penetration. The gypsum product is deemed to comply with the requirement for pouring time if a slump pat diameter or cone penetration is within the limits specified in the table, obtained when the material is mixed to the testing consistency using distilled water.

7.4. Setting time

7.4.1 Apparatus

Vicat needle apparatus

NOTE — An example of a suitable apparatus is shown in figure 1.

Use a rod and needle (B and F) and additional weight (A) such that the total mass is $300 \pm 0,3$ g.

7.4.2 Procedure

Add 300 g of the sample to that quantity of distilled water required to achieve the standard testing consistency determined in 7.2.2.2 or 7.2.3.2 and mix as described in 6.3. Fill the mould completely and level the specimen flush with the top of the mould. Beginning 1 min or 2 min prior to the anticipated setting time (usually at the loss of gloss or excess water), allow the needle to penetrate the mix at 15 s intervals as follows :

a) Move the mould to allow the next penetration to be in a new area.

b) Wipe the needle clean and then bring its tip into contact with the surface of the mix and lock the rod in position with the lock screw.

c) Read the scale and release the rod quickly. Record the setting time as the total time from the start of mixing to the time when the needle first fails to penetrate the specimen to a depth of at least 2 mm. Calculate the average value of two tests and report to the nearest 15 s.

7.5 Setting expansion

7.5.1 Apparatus

Extensometer constructed from materials which are corrosion resistant and non-absorbent.

NOTE — An example of a suitable apparatus is shown in figure 2.

7.5.2 Procedure

Position the stopper to provide a trough of not less than 100 mm in length. Add 300 g of the sample to that quantity of distilled water required to achieve the standard testing consistency as determined in 7.2.2.2 or 7.2.3.2 and mix as described in 6.3. Fill the trough completely with the mix and measure the gauge length. Minimize evaporation of moisture by placing a rubber dam over the specimen. For type 1 impression plaster, take the initial reading immediately after filling the trough. For the other three types of gypsum product, take the initial reading at 1 min before the setting time (see 7.4).

Allow one end of the specimen to expand unrestrained for 2 h. Take the final reading and determine the change in length to the nearest 0,01 mm. Calculate the setting expansion as a percentage of the original gauge length to the nearest 0,01 %.

Carry out two such tests. Calculate the average value of two tests and report to the nearest 0,01 %.

7.6 Fracture

Add 300 g of type 1 impression plaster to that quantity of distilled water required to achieve the standard testing consistency as determined in 7.2.2.2 and mix as described in 6.3. Pour the mix into a mould which will form a specimen approximately $25 \text{ mm} \times 12 \text{ mm} \times 3 \text{ mm}$. Two minutes after the setting time (7.4), break the specimen by hand into two pieces approximately $12 \text{ mm} \times 12 \text{ mm} \times 3 \text{ mm}$. Evaluate as described in 5.4.

7.7 Compressive strength

7.7.1 Apparatus

7.7.1.1 Clean, dry, split moulds, sufficient to produce five specimens, each having a diameter of $20 \pm 0,2$ mm and a length of $40 \pm 0,4$ mm constructed from a corrosion resistant material.

7.7.1.2 Glass plates, sufficient to cover the top and bottom of each mould.

7.7.1.3 Compressive strength tester, adjusted to a rate of loading of $10 \pm 1,5$ kN/min or a crosshead speed of $1 \pm 0,2$ mm/min.