SLOVENSKI STANDARD
SIST EN 542:1998

01-februar-1998

Lepila - Določanje gostote

Adhesives - Determination of density

Klebstoffe - Bestimmung der Dichte

Adhésifs - Détermination de la masse volumique

Ta slovenski standard je istoveten z: **EN 542:1994**

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English version

Adhesives - Determination of density

Adhésifs - Détermination de la masse volumique

Klebstoffe - Bestimmung der Dichte

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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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Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 193 "Adhesives", 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of an identical text or by endorsement, at the latest by May 1995, and conflicting national standards shall be withdrawn at the latest by May 1995.

According to the CEN/CENELEC Internal Regulations, 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, United Kingdom.

1 Scope

This European Standard defines two methods for the determination of density which are applicable to all adhesives.

One procedure is used for adhesives in liquid form and the other one for solid, very viscous or pasty adhesives.

2 Normatives 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 hereafter. 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 publication referred to applies.

EN 1066 [1] Adhesives - Sampling

EN 1067 [1] Adhesives - Examination and preparation of samples for testing

3 Principle

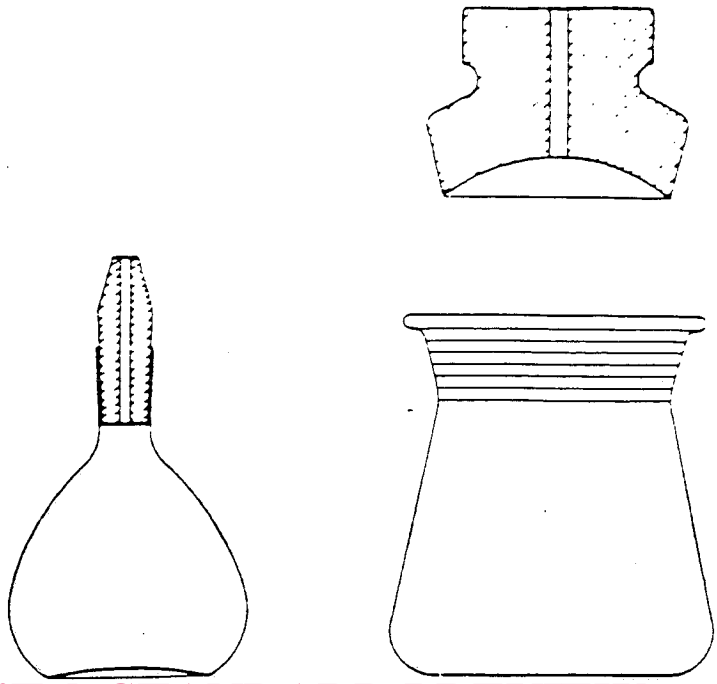
The density (mass of a unit volume) of the sample is measured at 23 °C as the ratio of the mass of the given volume of adhesive to the mass of the same volume of a reference liquid having a known density multiplied by its density.

4 Apparatus

Usual laboratory apparatus including the following :

4.1 A glass pyknometer having a volume between 20 ml and 100 ml. Suitable pyknometers are Hubbard or Gay - Lussac types (figure 1).

[1] In course of preparation



Gay - Lussac pyknometer Hubbard pyknometer

Figure 1 : Suitable pyknometers

Metal pyknometers can be used as alternative.

4.2 Thermometer graduated in divisions of 0,1 °C and accurate to 0,2 °C.

4.3 Constant-temperature water bath capable of maintaining a temperature within ± 0,5 °C of the test temperature.

4.4 Analytical balance accurate to 0,1 mg.

5 Sampling

Take a representative sample of the adhesive to be tested in accordance with EN 1066 and homogenize as described in EN 1067.

6 Procedure for liquid adhesives

6.1 Clean the pyknometer (4.1) thoroughly. Rinse it with water and a solvent leaving no residue on evaporation. Dry it.

6.2 Condition the clean dry pyknometer (4.1) at (23 ± 0,5) °C in the water bath (4.3) until equilibrium has been attained, dry the outside of the pyknometer and weigh it (m_0). If maximum accuracy is required, the cleaning, drying and weighing should be continued until the difference between two successive weighings does not exceed 0,5 mg.

6.3 Fill the pyknometer (4.1) with freshly distilled water at (23 ± 1) °C and place the filled pyknometer in the water bath (4.3) at (23 ± 0,5)°C to reach equilibrium. Remove the pyknometer from the water bath, dry the outside of the pyknometer and reweigh to the nearest 0,1 mg (m_1).

6.4 Fill the clean dry pykometer with the adhesive and clean any residue of adhesive from the outside of the pyknometer by wiping with absorbent material moistened with a suitable solvent and thoroughly dry by wiping with clean absorbent material.

6.5 Place the filled pyknometer (4.1) in the water bath (4.3) at (23 ± 0,5) °C for at least half an hour to reach the equilibrium. Remove the pyknometer from the water bath and thoroughly dry by wiping with clean absorbent material.

Reweigh the pyknometer to the nearest 0,1 mg (m_2).

6.6 Expression of results

Calculate the density (in grams per centimetre cube) of the adhesive at the test temperature by means of the following equation 1 :

$$\rho = \frac{m_2 - m_0}{m_1 - m_0} \times \rho_w \qquad (1)$$

where :

ρ is the density of the adhesive at the test temperature ;

m_0 is the mass (in grams) of the empty pyknometer ;

m_1 is the mass (in grams) of pyknometer plus the water ;

m_2 is the mass (in grams) of pyknometer and test sample ;

ρ_w is the density of water in grams per centimetre cube at the test temperature (see note)

NOTE : the density of water at 23 °C may be taken as 0,9975 g/cm^3.

7 Procedure for solid, pasty or very viscous adhesives

7.1 Clean the pyknometer (4.1) thoroughly. Rinse with water and a solvent having no residue on evaporation. Dry it.

7.2 Condition the clean dry pyknometer (4.1) at (23 ± 0,5) °C in the water bath (4.3) until equilibrium has been attained, dry the outside of the pyknometer and weigh it (m_0). If maximum accuracy is required, the cleaning drying and weighing should be continued until the difference between two successive weighings does exceed 0,5 mg.

7.3 Fill the pyknometer (4.1) with a liquid having a known density (ρ_{lv}) The liquid shall react in no way with the adhesive to be tested and shall not dissolve it.

Place the filled pyknometer in the water bath (4.3) at (23 ± 0,5) °C to reach equilibrium. Remove the pyknometer from the water bath, dry the outside of the pyknometer and reweigh to the nearest 0,1 mg (m_1).

7.4 Empty the pyknometer, clean and dry it thoroughly. Place about 5 g of the solid adhesive to be tested into the pyknometer and weigh it (m_2).

7.5 Fill the pyknometer (4.1) containing the solid sample with the liquid having the known density ρ_{lv}. Place the filled pyknometer in the water bath (4.3) at (23 ± 0,5) °C for at least half an hour to reach the equilibrium. Remove the pyknometer from the water bath and thoroughly dry by wiping with clean absorbent material.

Reweigh the pyknometer to nearest 0,1 mg (m_3).

7.6 Expression of results

Calculate the density (in grams per centimetre cube) of the adhesive at the test temperature by means of the following equation 2 :

$$\rho = \frac{m_2 - m_0}{m_2 - m_0 + m_1 - m_3} \times \rho_{lv} \qquad (2)$$

where :

ρ is the density of the adhesive at the test temperature ;

m_0 is the mass (in grams) of the empty pyknometer ;

m_1 is the mass (in grams) of pyknometer plus the liquid of density ρ_{lv} ;

m_2 is the mass (in grams) of pyknometer and solid test sample ;

m_3 is the mass (in grams) of the pyknometer filled with the solid test sample and liquid having ρ_{lv} of density ;

ρ_{lv} is the density (in grams per centimetre cube) of reference liquid.

8 Precision

When this method is used with the test temperature controlled to within ± 0,5 °C, the following levels of precision should be obtained :

a) repeatability - The difference between results obtained by the same operator with the same apparatus under constant operating conditions on identical test material should not exceed 0,001 g/cm^3.

b) reproducibility - The difference between two results obtained by different operators in different laboratories on identical test material should not exceed 0,001 g/cm^3.

9 Test report

The test report shall include :

a) a reference to this European Standard ;

b) the type and designation of the adhesive tested ;

c) the test temperature ;

d) the result of the test i.e. the individual results and the mean where appropriate ;

e) any modification to the procedure described and any circumstances which may have affected the results ;

f) the date of the test.