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मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

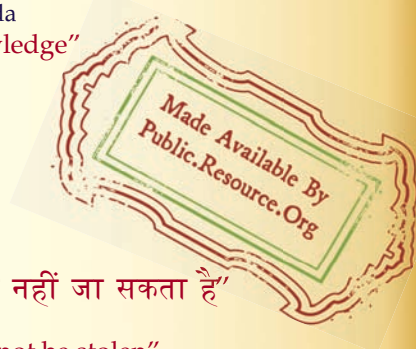
IS 101-1-7 (1987): Methods of sampling and test for paints, varnishes and related products, Part 1: Test on liquid paints (general and physical), Section 7: Mass per 10 litres [CHD 20: Paints, Varnishes and Related Products]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

METHODS OF SAMPLING AND TEST FOR PAINTS,
VARNISHES AND RELATED PRODUCTS

PART 1 TEST ON LIQUID PAINTS (GENERAL AND PHYSICAL)

Section 7 Mass per Ten Litres

(Third Revision)

1. Scope — Prescribes a method for determination of mass per 10 litres of liquid paints and related products by pycnometer or a mass per volume cup.

2. Definition — For the purpose of this standard, the mass per 10 litres is determined at a specified temperature, and is expressed in kg/10 litres or in grams per millilitre.

3. Apparatus

3.1 Pycnometer — Of capacity 20 to 100 ml as shown in Fig. 1, 2 and 3.

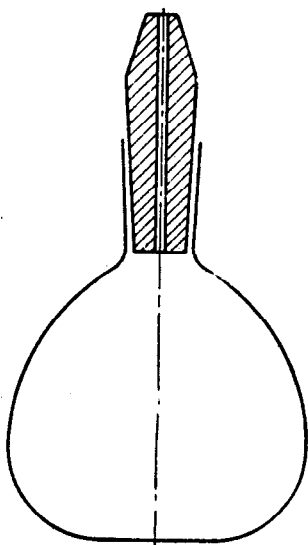


FIG. 1 GAY-LUSSAC PYCNOMETER

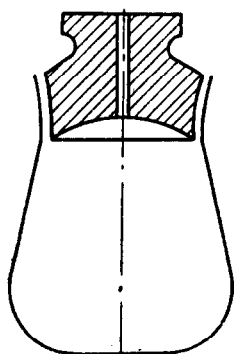
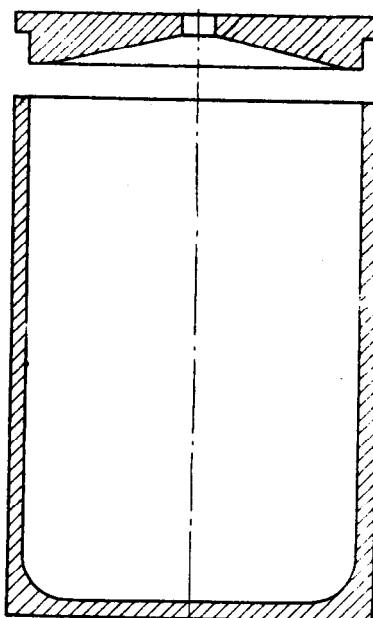


FIG. 2 HUBBARD PYCNOMETER

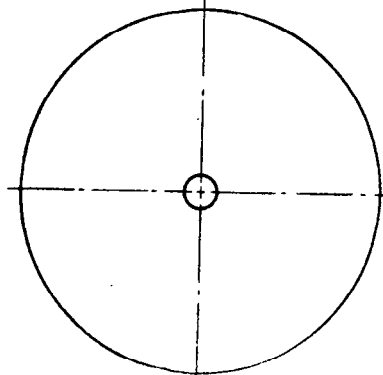


FIG. 3 METAL PYCNOMETER

3.2 Thermometer — Graduated in divisions of 0.1°C and accurate to 0.2°C.

3.3 Water-Bath or Constant Temperature Room — Capable of being maintained within ±2°C.

3.4 Analytical Balance — Accurate to 0.2 mg.

4. Sampling — A representative sample of the product to be tested shall be taken as prescribed in IS : 101 (Part 1/Sec 1) - 1986 'Methods of sampling and test for paints, varnishes and related products : Part 1 Tests on liquid paints (general and physical), Section 1 Sampling (*third revision*)'.

5. Procedure — Clean the pycnometer suitably (*see* Note 1). Thoroughly dry the pycnometer. Allow the pycnometer to attain room temperature and weigh it. Fill the pycnometer with distilled water at a temperature not more than 1°C below the standard temperature ($27 \pm 2^\circ\text{C}$). Stopper or cap the pycnometer leaving the overflow orifice open. Every care shall be taken to prevent the formation of bubbles in the pycnometer. Place the pycnometer in the constant temperature water-bath or place it in the constant temperature room until the temperature of the pycnometer and its contents is constant. Remove the overflow by wiping with absorbent material (*see* Note 2) and thoroughly dry the outside of the pycnometer by wiping with absorbent material. Do not remove any subsequent overflow (*see* Note 3). Immediately weigh the filled apparatus to the nearest 0.001 percent of its mass (*see* Note 4).

Note 1 — If it is a glass pycnometer, use chromic acid, distilled water and a solvent. If it is a metal pycnometer, use solvent which leaves no residue on evaporation.

Note 2 — A paper tissue is recommended for this purpose.

Note 3 — Handling the pycnometer with bare hands will increase the temperature and cause more overflow from the overflow orifice and will also leave finger prints, hence, handling only with tongs and with hands protected by clean, dry absorbent material is recommended.

Note 4 — Immediate and rapid weighing of the filled pycnometer is recommended in order to minimize loss in mass due to evaporation and overflow subsequent to the first wiping after attainment of temperature.

Repeat the above procedure using the product in place of distilled water. Remove any residues of paint from the outside of the pycnometer by wiping with absorbent material moistened with a suitable solvent and thoroughly dry by wiping with a clean absorbent material.

When using glass pycnometers with pigmented products, difficulties may be experienced in removing residual pigments, especially from ground-glass surfaces. Such residues may be removed by ultrasonic vibration in a water or solvent bath. To minimize errors, joints shall be firmly seated. For accurate determination, glass pycnometers are preferred. Metal pycnometers are generally used for determination of mass in kg/10 litres for production control purposes. If the sample retains air bubbles, which do not readily disperse on standing, the methods described in this standard are unsuitable.

6. Calculations

6.1 Calculation of Volume of the Pycnometer — Calculate the volume of pycnometer in millilitres as follows:

$$V = \frac{m_1 - m_0}{d}$$

where

V = volume in ml of pycnometer,
 m_1 = mass in g of pycnometer and water,
 m_0 = mass in g of the empty pycnometer, and
 d = density of water at 27°C in g/ml (0.996 5 g/ml).

6.2 Calculation of Density — Calculate the density of the product in g/ml at the test temperature (27°C) by the following formula:

$$d_t = \frac{m_2 - m_0}{V}$$

where

d_t = density of the product at test temperature (27°C),
 m_2 = mass in g of the pycnometer and product,
 m_0 = mass in g of empty pycnometer, and
 V = volume in ml of the pycnometer at 27°C.

6.3 Calculation of Mass in kg/10 Litres of Material — Calculate mass in kg / 10 litres of the material from 6.2 by multiplying the results by 10.

6.4 Precision — With accurate control of temperature at $\pm 0.5^{\circ}\text{C}$ level, it is possible to achieve the following precision.

6.4.1 Repeatability — The difference between two successive results obtained by the same operator within a short time interval, with the same apparatus under constant operating conditions on identical test material, shall not exceed 0.000 6 g/ml at the 95 percent confidence level.

6.4.2 Reproducibility — The difference between single and independent results obtained by different operators in different laboratories on identical test material shall not exceed 0.001 2 g/ml at the 95 percent confidence level.

6.4.3 In case of some liquid paint products, especially those showing structure viscosity or thixotropy, the above precision limits may not be obtainable.

EXPLANATORY NOTE

This standard is one of a series dealing with sampling and testing of paints, varnishes and related products. This standard supersedes 25 of IS : 101-1964.

In the preparation of this standard, considerable assistance has been derived from ISO 2811-1974 'Paints and varnishes — Determination of density', published by the International Organization for Standardization (ISO).