ISO 787 – 11 General Methods of Test for Pigments and Extenders — Part 11 : Determination of Tamped Volume and Apparent Density After Tamping – Testing Equipment

Description

3 Apparatus

Ordinary laboratory apparatus and

3.1 Sieve, of diameter 100 or 200 mm, with a nominal mesh aperture of 500 µm, complying with the requirements of ISO 665.

3.2 Tamping volumeter (see the figure), composed of the following items.

3.2.1 Measuring cylinder of capacity 250 ml, complying with the requirements of ISO 4788, fitted with a suitable stopper, and with graduation marks at 2 ml intervals.

3.2.2 Holder for the measuring cylinder (3.2.1), with 3haft, The total mass of the cylinder, stopper and shaft shall be 670 ± 45 g.

3,2.3 Cam, which lifts the shaft with the measuring cylinder once per revolution and which has a rotational frequency of 250 ± 15 r/min.

3.2.4 Anvil, so placed that the raised shaft falls from a height of 3 + 0,1 mm over the anvil.

3.2.5 Revolution counter, to count the number of revolutions of the cam.

3.2.6 Sleeve, to guide the shaft, constructed of a suitable material to give minimum friction,

NOTE — The apparatus should be so constructed that, without undue free play, the friction between the shaft and the sleeve is as low as possible without the use of a lubricant.

3.3 Oven, capable of being maintained at 105 ± 2 °C.

3.4 Balance, accurate to 0,5 g or better,

3.5 Desiccator

4 Sampling

Take a representative sample of the material to be tested as described in ISO 842.

5 Procedure

Carry out the procedure in duplicate.

5,1 Test portion

Take sufficient of the sample to carry out two determinations (about 500 ml), dry it in the oven (3.3) at 105 ± 2 °C for 2 h and allow it to cool in the desiccator (3,5).

NOTE — It may be convenient to take a pre-determined mass of material such that it occupies the specified volume, and add this to the tared cylinder.

Pass the dried material through the sieve (3.1) to disperse any agglomerates and add it to the graduated measuring cylinder

(3.2.1) (previously weighed to the nearest 0,5 g) so that no air pockets are formed. This may be achieved by tilting and turning the cylinder about its long axis whilst adding the material.

When 200 ± 10 ml of the material have been added, weigh the cylinder and the sample to the nearest 0,5 g (see the note). Tap the cylinder gently until the surface of the material is approximately horizontal. Replace the stopper.

NOTE — It may be convenient to take a pre-determined mass of material Buch that it occupies the specified volume, and add this to the tared cylinder.

5,2 Determination

Place the cylinder in the holder (3.2.2) of the tamping volumeter (3.2) and tamp it for approximately 1 260 revolutions of the cam (3,2,3), Read off the volume of the material to the nearest 1 ml.

NOTE — If the surface of the material is no longer horizontal after tamping, it should nevertheless be possible to estimate the volume to the nearest 1 ml.

Continue tamping in steps of approximately 1250 revolutions, reading off the volume of the material after each step, until the difference between the volume at the end of two successive steps of 1250 tampings Is less than 2 ml. Record the final value as the volume of the material after tamping.

If the two determinations differ by more than 10 ml, repeat the whole procedure (clause 5).

6 Expression of results

6.1 Calculation

Calculate the tamped volume by the equation

$$v_t = \frac{100\ V}{m_1 - m_0}$$

Calculate the apparent density after tamping by the equation

$$\varrho_t = \frac{100}{v_t} = \frac{m_1 - m_0}{V}$$

where

m_0 is the mass, in grams, of the empty cylinder;

m_1 is the mass, in grams, of the cylinder and material;

V is the volume, in millilitres, of the material after tamping;

v_t is the tamped volume, in millilitres per 100 g, of the material;

ϱ_t is the apparent density, in grams per millilitre, of the material after tamping.

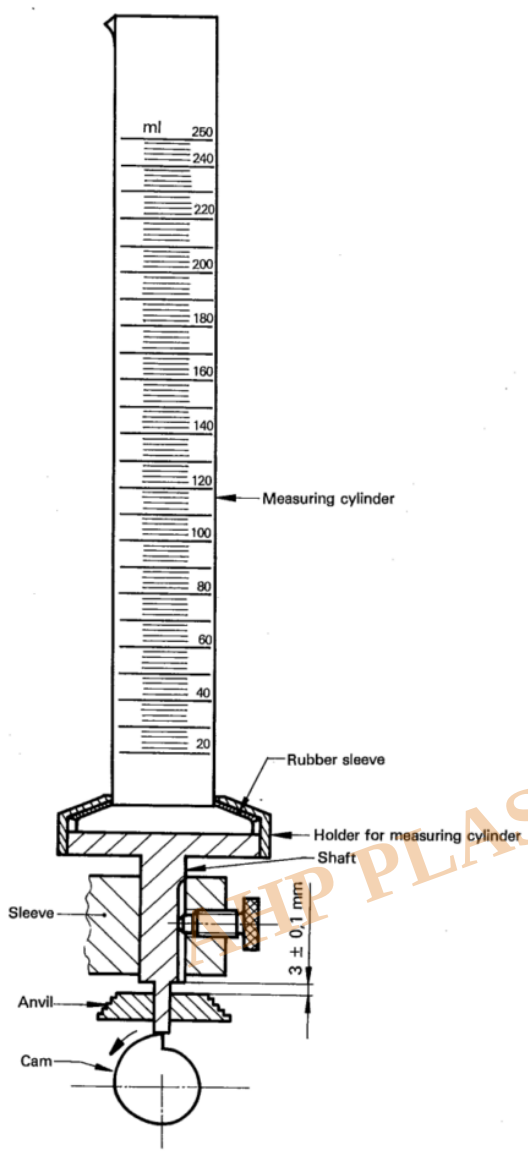

Figure — Tamping volumeter

Tamped Volume & Apparent Density Tester

- According to ISO 787-11
- Determine tapped density and apparent density
- Stroke height 3 + 0,1 mm
- Measuring cylinder 250mL
- Cam speed 250 ± 15 r/min
- Digital revolution counter
- Digital set of number of revolutions
- Sieve, of diameter 100 or 200 mm, with a nominal mesh aperture of 500 µm is included
- Power 220VAC
- Other equipment such as balance, oven, desiccator, …. will be quoted separately in case of customer need

Category

1. Equipment for Standards
2. Standards