

**International Standard****787/11**

H-15-17

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

## **General methods of test for pigments and extenders — Part 11 : Determination of tamped volume and apparent density after tamping**

*Méthodes générales d'essai des pigments et matières de charge — Partie 11 : Détermination du volume massique apparent et de la masse volumique apparente après tassement*

**First edition — 1981-10-01**

**UDC 667.622 : 531.755**

**Ref. No. ISO 787/11-1981 (E)**

**Descriptors :** paints, pigments, tests, chemical analysis, determination, density measurement, volume, voltmeters.

Price based on 3 pages

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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 787/11 was developed by Technical Committee ISO/TC 35, *Paints and varnishes*, and was circulated to the member bodies in January 1980.

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

Australia	Ireland	Romania
Austria	Israel	South Africa, Rep. of
Brazil	Italy	Spain
China	Kenya	Sweden
Egypt, Arab Rep. of	Korea, Rep. of	Switzerland
France	Netherlands	United Kingdom
Germany, F. R.	New Zealand	USSR
Hungary	Norway	
India	Poland	

No member body expressed disapproval of the document.

This International Standard cancels and replaces ISO Recommendation R 787/11-1970, of which it constitutes a technical revision.

The purpose of this International Standard is to establish a series of general test methods for pigments and extenders which are suitable for all or many of the individual pigments and extenders for which specifications might be required. In such cases, a cross-reference to the general method should be included in the International Standard relating to that pigment or extender, with a note of any detailed modifications which might be needed in view of the special properties of the product in question.

Technical Committee ISO/TC 35, *Paints and varnishes*, decided that all the general methods should be published as they become available, as parts of a single International Standard, in order to emphasize the relationship of each to the whole series.

The Technical Committee also decided that, where two or more procedures were widely used for determining the same or a similar characteristic of a pigment or extender, there would be no objection to including more than one of them in the ISO series. In such cases it will, however, be essential to state clearly in a specification which method is to be used and, in the test report, which method has been used.

Parts of the series already published are as follows :

- Part 1 : Comparison of colour of pigments
- Part 2 : Determination of matter volatile at 105 °C
- Part 3 : Determination of matter soluble in water — Hot extraction method
- Part 4 : Determination of acidity or alkalinity of the aqueous extract
- Part 5 : Determination of oil absorption value
- Part 6 : Determination of residue on sieve — Oil method
- Part 7 : Determination of residue on sieve — Water method — Manual procedure
- Part 8 : Determination of matter soluble in water — Cold extraction method
- Part 9 : Determination of pH value of an aqueous suspension
- Part 10 : Determination of density — Pyknometer method
- Part 11 : Determination of tamped volume and apparent density after tamping
- Part 13 : Determination of water-soluble sulphates, chlorides and nitrates
- Part 14 : Determination of resistivity of aqueous extract
- Part 15 : Comparison of resistance of coloured pigments of similar types to light from a specified light source
- Part 16 : Comparison of relative tinting strength (or equivalent colouring value) and colour on reduction in linseed stand oil using the automatic muller
- Part 17 : Comparison of lightening power of white pigments
- Part 18 : Determination of residue on sieve — Water method — Mechanical flushing procedure
- Part 19 : Determination of water-soluble nitrates — Salicylic acid method
- Part 20 : Comparison of ease of dispersion — Oscillatory shaking method
- Part 21 : Comparison of heat stability of pigments using a stoving medium
- Part 22 : Comparison of resistance to bleeding of pigments
- Part 23 : Determination of density (using a centrifuge to remove entrained air)
- Part 24 : Determination of relative tinting strength of coloured pigments and relative scattering power of white pigments — Photometric method

# General methods of test for pigments and extenders — Part 11 : Determination of tamped volume and apparent density after tamping

## 0 Introduction

This document is a part of ISO 787, *General methods of test for pigments and extenders*.

## 1 Scope and field of application

This part of ISO 787 specifies a general method of test for determining the tamped volume and the apparent density after tamping of a sample of pigment or extender.

NOTE — When this general method is applicable to a given pigment or extender, only a cross-reference to it should be included in the International Standard relating to that pigment or extender, with a note of any detailed modification which may be needed in view of the special properties of the material in question. Only when this general method is not applicable to a particular material should a special method for determination of tamped volume and apparent density after tamping be specified.

## 2 References

ISO 565, *Test sieves — Woven metal wire cloth and perforated plate — Nominal sizes of apertures*.

ISO 842, *Raw materials for paints and varnishes — Sampling*.

ISO 4788, *Laboratory glassware — Graduated measuring cylinders*.

## 3 Apparatus

Ordinary laboratory apparatus and

**3.1 Sieve**, of diameter 100 or 200 mm, with a nominal mesh aperture of 500  $\mu\text{m}$ , complying with the requirements of ISO 565.

NOTE — If necessary or specified, it is permissible to use sieves with other nominal mesh apertures or diameters. It is, however, recommended that the nominal mesh aperture chosen should correspond to one of the principal sizes given in ISO 565.

**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 shaft. The total mass of the cylinder, stopper and shaft shall be  $670 \pm 45$  g.

**3.2.3 Cam**, which lifts the shaft with the measuring cylinder once per revolution and which has a rotational frequency of  $250 \pm 15$  r/min.

**3.2.4 Anvil**, so placed that the raised shaft falls from a height of  $3 \pm 0,1$  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  $105 \pm 2$  °C.

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

**3.5 Desiccator**, containing an efficient desiccant.

## 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  $105 \pm 2$  °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  $200 \pm 10$  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 such 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 1 250 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 1 250 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 1 250 tappings 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

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

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;

$\rho_t$  is the apparent density, in grams per millilitre, of the material after tamping.

Take the mean of two determinations and report the result to the nearest 1 ml/100 g or 0,01 g/ml respectively.

### 6.2 Precision

No precision data are currently available.

## 7 Test report

The test report shall contain at least the following information :

- a) the type and identification of the product tested;
- b) a reference to this International Standard (ISO 787/11);
- c) the result of the test as indicated in clause 6;
- d) any deviation, by agreement or otherwise, from the procedure specified;
- e) the date of the test.

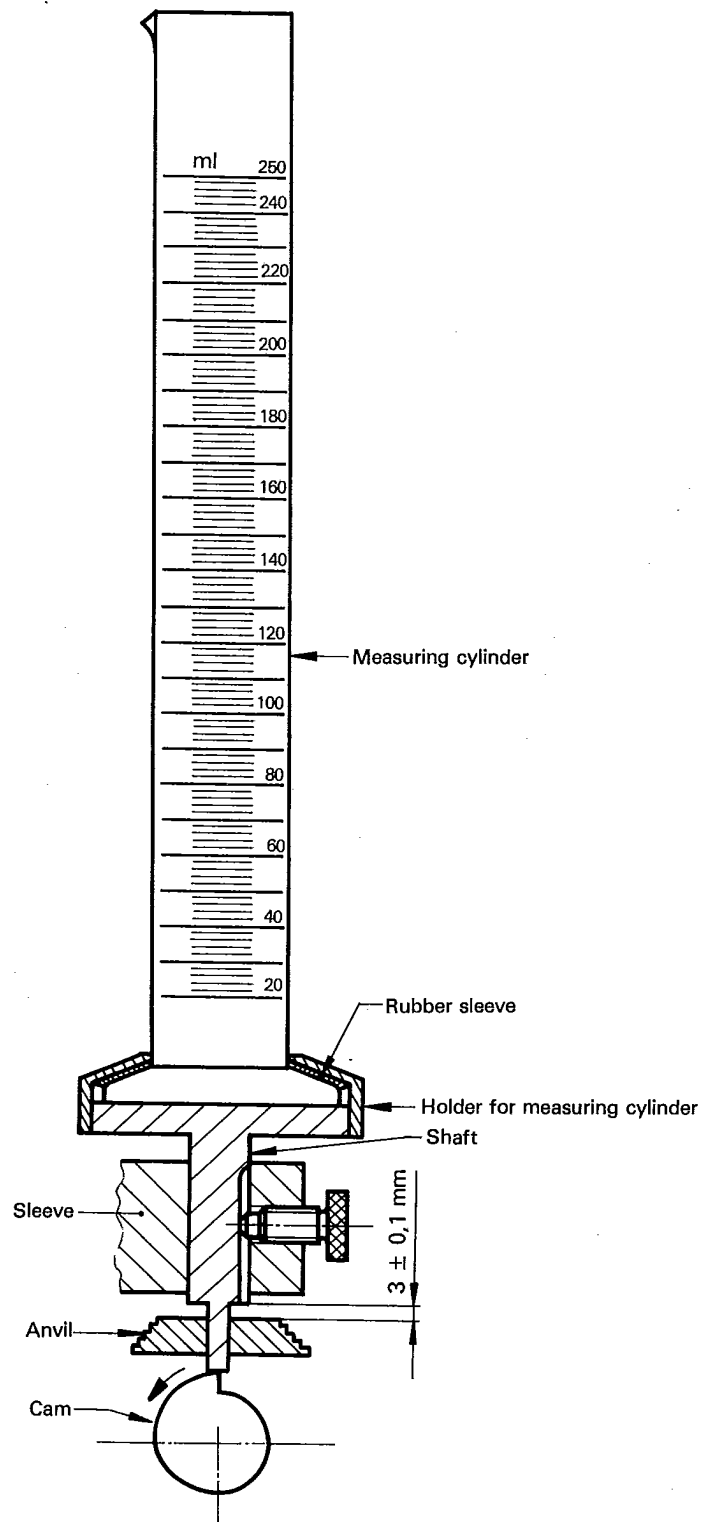


Figure — Tamping volumeter