INTERNATIONAL STANDARD

ISO 787-17

Second edition
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General methods of test for pigments and extenders —

Part 17: Comparison of lightening power of white pigments

Méthodes générales d'essai des pigments et matières de charge —

Partie 17: Comparaison du pouvoir éclaircissant des pigments blancs

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 787 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 787-17 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 2, *Pigments and extenders*.

This second edition cancels and replaces the first edition (ISO 787-17:1973), of which it constitutes a minor (editorial) revision.

ISO 787 consists of the following parts, under the general title *General methods of test for pigments and extenders*:

- *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 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 to light of coloured pigments of similar types*
- *Part 16: Determination of relative tinting strength (or equivalent colouring value) and colour on reduction of coloured pigments — Visual comparison method*
- *Part 17: Comparison of lightening power of white pigments*
- *Part 18: Determination of residue on sieve — Mechanical flushing procedure*
- *Part 19: Determination of water-soluble nitrates (Salicylic acid 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 methods*

— *Part 25: Comparison of the colour, in full-shade systems, of white, black and coloured pigments — Colorimetric method*

General methods of test for pigments and extenders —

Part 17: Comparison of lightening power of white pigments

1 Scope

This part of ISO 787 specifies a general method of test for comparing the lightening (reducing) power of a white pigment with the lightening power of an agreed sample of the same type.

Two procedures (A and B) are described. Procedure A is quicker than procedure B and is suitable for testing one sample of pigment; procedure B is better for testing several samples, and especially if a pigment of unknown lightening power is being tested.

NOTE When this general method is applicable to a given pigment, a cross-reference to it will simply be included in the International Standard relating to that pigment, with a note of any detailed modification which may be needed in view of the special properties of the pigment in question. Only when this general method is not applicable to a particular pigment will a special method for comparison of lightening power of white pigments be specified.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 787. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 787 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 788, *Ultramarine pigments for paints*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

3 Reagent

3.1 Blue paste, with the following composition:

— castor oil, medicinal quality: 500 g

— precipitated calcium sulfate, $CaSO_4 \cdot 2H_2O$: 475 g

— ultramarine blue complying with ISO 788: 5 g

— treated natural earth[1)]: 20 g

The paste shall be prepared as follows:

Mix the treated natural earth in a beaker with sufficient of the castor oil to give a uniform paste and then gradually stir in the remaining castor oil. Heat the mixture so obtained to a temperature of 50 °C and, after maintaining this temperature for about 15 min, stir in the ultramarine blue and calcium sulfate, adding them in small amounts.

1) A prepared bentonite is a suitable material.

Disperse thoroughly the paste obtained, by passing through a roller mill or other suitable machine, and stir to homogenize the paste thoroughly, heating it if necessary.

Store the paste in airtight containers, preferably with screw caps.

4 Apparatus

4.1 Palette knife, with a tapered steel blade of the approximate dimensions 140 mm to 150 mm long, 20 mm to 25 mm wide at its widest point and not less than 12,5 mm wide at its narrowest point.

4.2 Glass slide, clear and colourless, 150 mm × 50 mm or other suitable size.

4.3 Automatic muller, with ground-glass plates, preferably water-cooled, of diameter 180 mm to 250 mm, to which a variable but known force of up to about 1 000 N may be applied. If the automatic muller does not have water-cooled plates, care shall be taken that temperature variation does not occur during the grinding operation. The driven glass plate should preferably have a speed of rotation of between 70 r/min and 120 r/min and the apparatus should preferably have an arrangement for pre-setting the number of revolutions in multiples of 25.

4.4 Plate, of ground glass or marble, for use when an automatic muller is not available.

4.5 Balance, accurate to ± 0,001 g.

4.6 Hand muller.

5 Sampling

The sample of pigment used for the test shall be taken in accordance with the provisions of ISO 15528.

6 Procedure

6.1 Procedure A (see clause 1)

6.1.1 Incorporation of the white pigment into the blue paste by means of the automatic muller

Weigh, to the nearest 1 mg, 5 g of the blue paste (3.1) and place it in the middle of the clean lower plate of the muller (4.3). Weigh, to the nearest 1 mg, the quantity (m_0) of the agreed reference pigment indicated in Table 1 and incorporate it into the blue paste by gently working with the palette knife (4.1). When the white pigment has been wetted, spread the paste in a circle of approximately 50 mm diameter around the centre of the lower plate and clean the palette knife by drawing it across the top plate. Close the muller plates, apply a force of about 1 000 N and grind in four stages of 25 revolutions, picking up the paste with the same palette knife and transferring it to the centre of the plate after each stage.

When the grinding has been completed, remove the paste and store it on a palette.

6.1.2 Incorporation of the white pigment into the blue paste by means of a hand muller or palette knife

Weigh, to the nearest 1 mg, 5 g of the blue paste and place it on the ground-glass or marble plate (4.4). Weigh, to the nearest 1 mg, the quantity (m_0) of the agreed reference pigment indicated in Table 1 and disperse it using the palette knife or a hand muller for 5 min with as little of the blue paste as possible, to obtain a smooth paste. Add the remainder of the blue paste, a little at a time, to the rubbed-out mixture and thoroughly mix with the palette knife or hand muller, scraping up the paste frequently to ensure thorough mixing.

Remove the paste, as prepared, from the plate and store it on a palette.

Table 1

Reference pigment	Quantity to be taken m_0 g
Zinc oxide or lithopone 30 %	0,500
High-grade zinc sulfide	0,200
Titanium dioxide	0,100

6.1.3 Procedure for the comparison

Treat the test sample (see clause 5) in exactly the same manner as in 6.1.1 or 6.1.2, and determine the quantity of pigment (m_1) which gives an intensity of colour equal to that of the paste of the agreed reference pigment.

Spread the two pastes made with the test sample and with the agreed reference pigment in the same direction on the glass slide (4.2) in opaque strips not less than 25 mm wide with touching edges not less than 40 mm long. Compare the pastes for intensity of colour by examining the two strips in diffuse daylight through the glass, and on the surface, immediately after application. Where good daylight is not available, make the comparison in artificial daylight.

6.2 Procedure B (see clause 1)

6.2.1 Incorporation of the white pigment into the blue paste by means of the automatic muller

Prepare a series of standard pastes from the agreed reference pigment, with the quantities indicated in Table 2 and using the following procedure in each case:

Weigh, to the nearest 1 mg, 5 g of the blue paste (3.1) and place it in the middle of the clean lower plate of the muller (4.3). Weigh, to the nearest 1 mg, one of the stated quantities of the agreed reference pigment indicated in Table 2 and incorporate it into the blue paste by gently working with the palette knife (4.1). When the pigment has been wetted, spread the paste in a circle of approximately 50 mm diameter around the centre of the lower plate and clean the palette knife by drawing it across the top plate. Close the muller plates, apply maximum force and grind in four stages of 25 revolutions, picking up the paste with the same palette knife and transferring it to the centre of the plate after each stage.

When the grinding has been completed, remove the paste from the plate and store it on a palette.

Repeat the above procedure using in turn each of the other stated quantities of white pigment (see Table 2) and store the pastes on a palette.

Table 2

Quantities to be taken of agreed reference pigment			Relative lightening power of test sample (see 7.2)
Zinc oxide or lithopone 30 % ZnS g	High-grade zinc sulfide g	Titanium dioxide g	%
0,400	0,160	0,080	80
0,450	0,180	0,090	90
0,500	0,200	0,100	100
0,550	0,220	0,110	110
0,600	0,240	0,120	120