International Standard 787/1

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General methods of test for pigments and extenders — Part 1: Comparison of colour of pigments

Méthodes générales d'essai des pigments et matières de charge — Partie 1: Comparaison de la couleur des pigments

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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 787/1 was developed by Technical Committee ISO/TC 35, *Paints and varnishes*, and was circulated to the member bodies in June 1980.

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

Australia	Ireland	Poland
Austria	Israel	Romania
Brazil	Italy	South Africa, Rep. of
Canada	Kenya	Sweden
China	Korea, Rep. of	Switzerland
Egypt, Arab Rep. of	Netherlands	United Kingdom
India	Norway	USSR

The member bodies of the following countries expressed disapproval of the document on technical grounds:

France
Germany, F.R.

This International Standard cancels and replaces ISO Recommendation R 787/1-1968, of which it constitutes a technical revision.

Printed in Switzerland

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 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 : 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 1: Comparison of colour of pigments

0 Introduction

This document is a part of ISO 787, *General methods of test for pigments and extenders*. ISO/R 787/1 was published in July 1968. This revision differs from the 1968 edition in that

a) the colour comparison is carried out using the procedure described in ISO 3668, and

b) the binder is not specified.

1 Scope and field of application

1.1 This part of ISO 787 specifies a general method of test for comparing the colour of a coloured pigment with that of an agreed sample.

1.2 Either of the procedures described in clause 6 is acceptable but the method using an automatic muller is the reference method.

NOTE — When this general method is applicable to a given pigment, only a cross-reference to it should be included in the International Standard relating to that pigment, with a note of any detailed modifications which may be needed in view of the special properties of the material in question. Only when the procedures given in this general method are not applicable to a particular material should a special method for comparison of colour be specified.

2 References

ISO 150, *Raw, refined and boiled linseed oil for paints and varnishes — Specifications and methods of test.*

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

ISO 3668, *Paints and varnishes — Visual comparison of the colour of paints.*

3 Binder

The binder used shall be agreed between the interested parties. If no binder is specified or agreed, linseed oil, complying with the requirements of the refined grade specified in ISO 150, should be used.

4 Apparatus

Ordinary laboratory apparatus, and

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

4.2 Substrate, minimum area 150 mm × 50 mm. Choose a substrate according to the binder used and the method of colour comparison. If a glass panel is used, it shall be clear and colourless.

4.3 Burette, with a delivery such that 1 ml of the binder contains about 35 drops.

4.4 Muller.

Either of the following may be used:

4.4.1 Automatic muller, with ground glass plates, preferably water cooled, of diameter 180 to 250 mm, to which a variable but known force of up to about 1 kN may be applied. The driven glass plate shall have a rotational frequency of between 70 and 120 r/min and the apparatus should have an arrangement for pre-setting the number of revolutions in multiples of 25.

NOTE — If the automatic muller does not have water-cooled plates, care should be taken that temperature variations do not occur during the grinding operation.

4.4.2 Hand muller, with a diameter of 70 to 75 mm.

4.5 Plate, of ground glass or marble, for use when the automatic muller (4.4.1) is not available.

5 Sampling

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

6 Procedure

6.1 Procedure using an automatic muller

6.1.1 Test portion

Take a quantity of pigment for the test such that, when mixed with a sufficient quantity of the binder to obtain the dispersion, the resulting paste extends almost to the edges of the plates of the muller. Weigh the test portion to the nearest 1 mg.

6.1.2 Preparation of pigment dispersion

Transfer the test portion (6.1.1) to the clean lower plate of the automatic muller (4.4.1). Run a number of drops of the binder (clause 3) from the burette (4.3) on to the blade of the palette knife (4.1) and, using the blade, mix the binder and pigment. Add more drops of binder as necessary to produce a paste with a suitable consistency for milling.

When the pigment has become uniformly wetted, spread the paste in a band approximately 50 mm wide about half-way between the centre and rim of the lower plate and clean the palette knife by drawing it across the upper plate. Close the muller plates, apply a force of about 1 kN and grind the paste in stages of 50 revolutions for each stage, picking up the paste with the palette knife and returning it to the 50 mm wide band after each stage.

NOTE — The applied force and the number of stages depend on the pigment tested, and should be the same for the pigment under test and the agreed sample.

When the grinding has been completed, add a further few drops of the binder to obtain a suitable consistency, close the muller plates and grind the paste for a further 25 revolutions. Remove the paste from the plate and store it.

Take a similar amount of the agreed sample of pigment and prepare a paste in the same way at a consistency equivalent to that used in treating the test portion, even if more or less binder may be required to achieve this consistency.

6.1.3 Colour comparison

Compare the colour of the test portion with that of the agreed sample by spreading the two prepared pastes in the same direction on the substrate (4.2) in opaque strips not less than 25 mm wide with touching edges not less than 40 mm long. Compare the colour by examining the strips in diffuse daylight on the surface or, by agreement between the interested parties, through the glass, immediately after application, using the procedure described in ISO 3668. Where good daylight is not available, make the comparison in artificial daylight, using the procedure described in ISO 3668.

NOTE — By agreement between the interested parties, a suitable colorimeter may also be used for making the comparison.

6.2 Procedure using a hand muller or palette knife

6.2.1 Test portion

Weigh, to the nearest 1 mg, between 0,1 and 1,0 g, depending on the oil absorption value of the pigment under test.

6.2.2 Preparation of pigment dispersion

Transfer the test portion (6.2.1) to the glass or marble plate (4.5). Run a number of drops of the binder (clause 3) from the burette (4.3) on to the blade of the palette knife (4.1) and, using the blade, mix the binder and pigment. Add more drops of binder as necessary to produce a paste with a suitable consistency for milling.

When the pigment has become uniformly wetted with binder, start rubbing with the palette knife (4.1) or hand muller (4.4.2) using a backwards and forwards motion. The rubbing should spread the mixture over an area approximately 200 mm × 75 mm. After 100 rubs (one rub consisting of one forward plus one backward motion), scrape the pigment/binder mixture into a heap at the centre of the plate, making sure that any unground pigment is removed from the knife blade.

Repeat the rubbing-out operation using a further 100 rubs and then add a further few drops of the binder to obtain a suitable consistency. Mix well until the paste is homogeneous, and transfer it to one corner of the plate. Clean the rest of the plate thoroughly.

Take a similar amount of the agreed sample of pigment and prepare a paste in the same way at a consistency equivalent to that used in treating the test portion, even if more or less binder may be required to achieve this consistency.

6.2.3 Colour comparison

Compare the colour of the test portion with that of the agreed sample of pigment as described in 6.1.3.

7 Test report

The test report shall contain at least the following information:

a) the type and identification of the pigment tested;

b) a reference of this International Standard (ISO 787/1);

c) the binder used;

d) the procedure used (automatic muller, hand muller or palette knife);

e) the details of the procedure used when comparing the colours of the strips (see 6.1.3);

f) the result of the test expressed as colour equal to, or different from, that of the agreed sample of pigment;

g) any deviation, by agreement or otherwise, from the test procedure specified;

h) the date of the test.