INTERNATIONAL STANDARD

ISO 8780-5

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Pigments and extenders — Methods of dispersion for assessment of dispersion characteristics —

Part 5:
Dispersion using an automatic muller

Pigments et matières de charge — Méthodes de dispersion pour évaluer la dispersibilité —

Partie 5: Dispersion à l'aide d'une broyeuse automatique à plateaux

Reference number
ISO 8780-5:1990(E)

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.

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.

International Standard ISO 8780-5 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*.

ISO 8780 consists of the following parts, under the general title *Pigments and extenders — Methods of dispersion for assessment of dispersion characteristics*:

— *Part 1: Introduction*

— *Part 2: Dispersion using an oscillatory shaking machine*

— *Part 3: Dispersion using a high-speed impeller mill*

— *Part 4: Dispersion using a bead mill*

— *Part 5: Dispersion using an automatic muller*

— *Part 6: Dispersion using a triple-roll mill*

Annex A forms an integral part of this part of ISO 8780.

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INTERNATIONAL STANDARD ISO 8780-5:1990(E)

Pigments and extenders — Methods of dispersion for assessment of dispersion characteristics —

Part 5:
Dispersion using an automatic muller

1 Scope

This part of ISO 8780 specifies a method for the dispersion of pigments and extenders using an automatic muller. It is suitable for comparing small samples in the quality control of pigments. This part of ISO 8780 is for use in conjunction with the methods of assessment described in ISO 8781, using an agreed binder system of high viscosity free from volatile solvents. It should be read in conjunction with ISO 8780-1.

This method is restricted to high-viscosity mill bases. The results obtained are not for comparison with dispersibility results obtained using other methods of dispersion.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8780. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8780 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 842:1984, *Raw materials for paints and varnishes — Sampling.*

ISO 8780-1:1990, *Pigments and extenders — Methods of dispersion for assessment of dispersion characteristics — Part 1: Introduction.*

ISO 8781-1:1990, *Pigments and extenders — Methods of assessment of dispersion characteristics — Part 1: Assessment from the change in tinting strength of coloured pigments.*

ISO 8781-2:1990, *Pigments and extenders — Methods of assessment of dispersion characteristics — Part 2: Assessment from the change in fineness of grind.*

ISO 8781-3:1990, *Pigments and extenders — Methods of assessment of dispersion characteristics — Part 3: Assessment from the change in gloss.*

3 Required supplementary information

For any particular application, the test method specified in this part of ISO 8780 needs to be completed by supplementary information. The items of supplementary information are given in annex A.

4 Apparatus

Ordinary laboratory apparatus and glassware, together with the following:

4.1 Automatic muller, with ground-glass plates (see clause 8, third paragraph). The plates shall be of diameter 180 mm to 250 mm to which a variable and known force of up to 1 kN may be applied. The driven plate shall be capable of rotating at between 70 r/min and 120 r/min and the apparatus shall have an arrangement for pre-setting the number of revolutions in multiples of 25.

4.2 Spatula, with flexible steel or plastic blade.

5 Binder system

The binder system shall be agreed on between the interested parties. The test report shall state the binder, the solvent and the concentration of the binder in the solvent, as well as giving information on the rheological properties (for example viscosity) of the binder system.

The same batch of binder system shall be used for all tests in the same series.

NOTE 1 To improve the precision of the method, it is recommended that binder systems free from volatile solvents are used.

6 Sampling

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

7 Mill base composition

The flow characteristics of a mill base depend on the binder demand of the pigment, its concentration in the mill base and the rheological properties of the binder system. Preliminary experiments shall therefore be carried out to ascertain a suitable mill base composition.

In order to compare the dispersibilities of different pigments, it is important that the flow characteristics of the mill bases are similar and that mill bases are in the form of a sticky paste. This may necessitate the use of mill bases of different compositions.

Typical pigment concentrations are:

a) pigments of low binder demand — pigment concentration 65 % (*m*/*m*);

b) pigments of medium binder demand — pigment concentration 40 % (*m*/*m*);

c) pigments of high binder demand — pigment concentration 25 % (*m*/*m*).

8 Procedure

If there are no water-cooled plates, take care that the temperature during the dispersion operation does not rise by more than 10 °C.

Pre-condition new muller plates by milling a pigment in a suitable binder (system) for 1 000 revolutions with a load applied to the plates. Remove and discard the paste.

Before use, check that the surfaces of each plate have an even, opaque appearance and are free from score marks and polished areas.

8.1 Dispersion

Weigh out agreed amounts of the binder system (clause 5) and pigment.

The amounts weighed depend on the size of the muller plates. If the paste exudes from the edges of the plates during dispersion, the amount of the mill base shall be reduced appropriately.

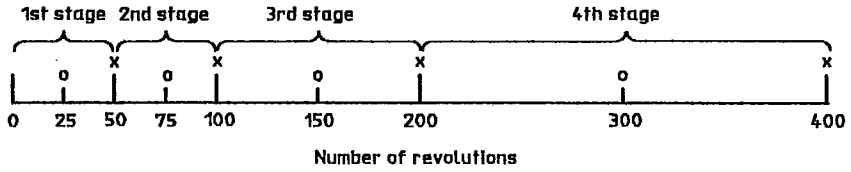
If the criterion for assessing the dispersion characteristics is to be the evaluation of the development of tinting strength (see ISO 8781-1), the masses of the pigment and of the binder system shall be determined to within 0,5 %. For other methods of assessment (for example fineness of grind, see ISO 8781-2, and change of gloss, see ISO 8781-3), wider tolerance ranges may be agreed on.

Place the binder system in the centre of the lower plate of the automatic muller (4.1). Sprinkle the pigment into the binder and mix together, using the minimum effort, with the aid of the spatula (4.2). Distribute the paste at several points at a distance of about 35 mm from the centre of the lower plate or spread it in the form of a ring with an internal diameter of 40 mm and an external diameter of 100 mm.

NOTE 2 It is advisable to lay a paper ring of the requisite shape as a pattern beneath the lower plate.

Clean the spatula as much as possible by wiping it on the face of the upper plate of the muller.

Close the plates of the muller and grind the mixture under an agreed load at an agreed rotational frequency and for an agreed number of revolutions in several successive stages (for example 50, 100, 200 and 400 revolutions, as shown in figure 1). Mid-way through each stage (for example after 25, 75, 150 or 300 revolutions), and at the end of each stage, homogenize the mill base by scraping together with the spatula, mixing (using minimum effort) and redistributing it as described above. Take a test portion at the end of each stage as agreed.



Key :

o homogenize

x homogenize and take a test portion as agreed.

Figure 1 — Example of grinding schedule

When more than two test portions, or a test portion amounting to 15 % of the paste, have been taken, repeat the procedure on fresh mill base mixtures for each grinding stage.

8.2 Stabilization

If necessary, for example if the mill base is not stable enough, stabilize each test portion after its removal from the mill base by adding, for example, more binder and/or special additives. The procedure shall be agreed on between the interested parties.

9 Test report

The test report shall contain at least the following information:

a) all details necessary to identify the product tested;

b) a reference to this part of ISO 8780;

c) the items of supplementary information referred to in annex A;

d) any deviation from the procedure specified;

e) the date(s) of the test.

Annex A
(normative)

Required supplementary information

The items of supplementary information listed in this annex shall be supplied as appropriate to enable the method to be carried out.

The information required should preferably be agreed between the interested parties and may be derived, in part or totally, from an international or national standard or other document related to the product under test.

a) Type and complete details of the automatic muller (see 4.1).

b) Binder system (see clause 5).

c) Composition of the mill base (see clause 7) and its temperature (see clause 8).

d) Dispersion conditions (load on the muller plates, and rotational frequency and number of revolutions of the plates) (see 8.1).

e) Stabilization procedure (see 8.2).

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Descriptors: paints, pigments, extenders, dispersibility, dispersing.

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