INTERNATIONAL STANDARD

ISO 8781-3

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Pigments and extenders — Methods of assessment of dispersion characteristics —

Part 3:
Assessment from the change in gloss

Pigments et matières de charge — Méthodes d'évaluation de la dispersibilité —

Partie 3: Évaluation à partir de la variation du brillant spéculaire

Reference number
ISO 8781-3:1990(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 8781-3 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*.

ISO 8781 consists of the following parts, under the general title *Pigments and extenders — Methods of assessment of dispersion characteristics*:

— *Part 1: Assessment from the change in tinting strength of coloured pigments*

— *Part 2: Assessment from the change in fineness of grind*

— *Part 3: Assessment from the change in gloss*

Annex A forms an integral part of this part of ISO 8781.

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Introduction

The development of specular gloss of a pigment in a dispersion is dependent primarily on the amount of work done in the preparation of the dispersion of the pigment in a binder system and the ratio of pigment to the binder system. The ease with which the ultimate specular gloss of a dried coating of the dispersion is achieved may therefore be used to assess the dispersion characteristics of the pigment. Thus, if the ultimate specular gloss can be attained easily, the pigment is considered to be readily dispersible.

The method described consists essentially of three steps:

a) preparation in stages of a range of dispersions of the pigment in accordance with an appropriate part of ISO 8780;

b) preparation of dried films of the dispersions and measurement of the specular gloss;

c) determination of the rate of development of the specular gloss as a function of the amount of work done (the latter is related to the incremental stages of dispersion).

The rate of development of specular gloss is assessed graphically.

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Pigments and extenders — Methods of assessment of dispersion characteristics —

Part 3:
Assessment from the change in gloss

1 Scope

This part of ISO 8781 specifies a method for assessing, on the basis of specular gloss, the dispersion characteristics of pigments which have been dispersed by one of the methods of dispersion described in ISO 8780. It should be read in conjunction with ISO 8780-1.

The method is of general use for comparing similar pigments, for example a test pigment against an agreed reference pigment.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8781. 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 8781 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 2813:—[1], *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20 degrees, 60 degrees and 85 degrees.*

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

ISO 8780-2:1990, *Pigments and extenders — Methods of dispersion for assessment of dispersion characteristics — Part 2: Dispersion using an oscillatory shaking machine.*

ISO 8780-3:1990, *Pigments and extenders — Methods of dispersion for assessment of dispersion characteristics — Part 3: Dispersion using a high-speed impeller mill.*

ISO 8780-4:1990, *Pigments and extenders — Methods of dispersion for assessment of dispersion characteristics — Part 4: Dispersion using a bead mill.*

ISO 8780-5:1990, *Pigments and extenders — Methods of dispersion for assessment of dispersion characteristics — Part 5: Dispersion using an automatic muller.*

ISO 8780-6:1990, *Pigments and extenders — Methods of dispersion for assessment of dispersion characteristics — Part 6: Dispersion using a triple-roll mill.*

3 Principle

The pigment under test and, if provided, the agreed reference pigment are each dispersed in stages under specified conditions in an agreed binder system. After each incremental dispersion stage, a portion of the mill base is taken and made into a composition that is applied to a substrate and dried or stoved.

The specular gloss of each dried film is determined as described in ISO 2813. The gloss values are plotted graphically as a function of the dispersion stage (expressed for instance as time, number of revolutions of a muller or number of passes through a triple-roll mill). From the graph, the dispersion work

1) To be published. (Revision of ISO 2813:1978)

necessary to obtain an agreed specular reflection value is determined.

4 Required supplementary information

For any particular application, the test method specified in this part of ISO 8781 needs to be completed by supplementary information. The items of supplementary information are given in annex A.

5 Apparatus

Ordinary laboratory apparatus and glassware, together with the following:

5.1 Substrate, for example glass panels for paint coatings and art paper for printing inks.

5.2 Applicator, suitable for applying a coat of uniform thickness on the substrate (5.1), for example a spray gun, film applicator or proofing press.

5.3 Glossmeter, complying with the requirements of ISO 2813 and having the agreed angle of incidence and reflectance.

5.4 Ventilated oven (if required).

6 Procedure

6.1 Preparation of pigment dispersion

6.1.1 Dispersion

Disperse each pigment sample in the agreed binder system at the agreed concentration using one of the methods described in ISO 8780.

For the purpose of plotting the gloss development curve as described in clause 7, take sufficient material from the mill base at each of the agreed stages of dispersion to permit preparation of films for gloss measurement.

If removal of portions of the mill base causes a significant change in the conditions of dispersion, for example by altering the ratio of mill base to grinding spheres, a separate mill base shall be made up for each dispersion stage and each of these mill bases shall be dispersed under identical conditions.

NOTE 1 Guidance is given with regard to the "agreed dispersion stage" in the relevant part of ISO 8780.

6.1.2 Adjustment of the composition of the mill base

If the composition of the mill base does not correspond to that for the intended final coating, add the required ingredients until it is obtained. This is achieved by thorough stirring, preferably with a high-speed impeller. The stirring shall not be so vigorous as to affect the state of dispersion. Select the procedure and the sequence of addition so that flocculation or separation is avoided.

6.2 Preparation of films for gloss measurement

6.2.1 Application of coating

The conditions of application have a significant effect on the gloss and shall therefore be the subject of agreement between the interested parties and be strictly observed.

Apply the portion of mill base, adjusted if necessary as described in 6.1.2, as soon as possible to the substrate under the agreed conditions, ensuring that the surface of the film is free from any imperfection.

NOTE 2 The degree of dispersion, and thus the gloss, may still undergo changes as a result of flocculation, rewetting, etc. Consequently, the ease of dispersion as determined by the method specified in this part of ISO 8781 is also an indication of the stability of the pigment/binder system.

6.2.2 Drying or stoving

The conditions under which the coating is dried or stoved may have an effect on the gloss and shall be the subject of agreement between the interested parties and be strictly observed.

Dry or stove the coated substrate under fume-free conditions or in the oven (5.4) under the agreed conditions. During drying or stoving, all coated substrates in one and the same test series shall have the same orientation — either vertical or horizontal.

6.3 Gloss measurements

After drying or stoving, measure the gloss values of the specimens in triplicate as described in ISO 2813 and calculate the mean of the three results. Keep the geometric conditions constant within the same series of measurements (for the same gloss development curve).

NOTE 3 For the measurement of prints, an angle of 45° is preferred (though this angle is not specified by ISO 2813).

If the target gloss level is not attained after the last of the specified dispersion stages, proceed as instructed in 7.2.