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Pigments and extenders — Methods of dispersion and assessment of dispersibility in plastics —

Part 1: General introduction

Pigments et matières de charge — Méthodes de dispersion et évaluation de l'aptitude à la dispersion dans les plastiques — Partie 1: Généralités

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 256, *Pigments, dyestuffs and extenders*.

ISO 23900 consists of the following parts, under the general title *Pigments and extenders — Methods of dispersion and assessment of dispersibility in plastics*:

— *Part 1: General introduction*

— *Part 2: Determination of colouristic properties and ease of dispersion in plasticized polyvinyl chloride by two-roll milling*

— *Part 3: Determination of colouristic properties and ease of dispersion of black and colour pigments in polyethylene by two-roll milling*

— *Part 4: Determination of colouristic properties and ease of dispersion of white pigments in polyethylene by two-roll milling*

— *Part 5: Determination by filter pressure value test*

— *Part 6: Determination by film test*

Pigments and extenders — Methods of dispersion and assessment of dispersibility in plastics —

Part 1: General introduction

1 Scope

This part of ISO 23900 provides an introduction to the various parts of ISO 23900 which describe methods for dispersing pigments and extenders in plastics materials in order to determine their dispersion characteristics and colouristic properties.

Methods of assessing dispersion characteristics are described in the subsequent parts of ISO 23900.

The various procedures described permit comparison to be made between similar pigments (for example between a test sample and an agreed reference pigment). The results provide an indication of relative dispersibility under practical conditions of use, provided that the test procedure and plastics material selected are appropriate.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 23900-2, *Pigments and extenders — Methods of dispersion and assessment of dispersibility in plastics — Part 2: Determination of colouristic properties and ease of dispersion in plasticized polyvinyl chloride by two-roll milling*

ISO 23900-3, *Pigments and extenders — Methods of dispersion and assessment of dispersibility in plastics — Part 3: Determination of colouristic properties and ease of dispersion of black and colour pigments in polyethylene by two-roll milling*

ISO 23900-4, *Pigments and extenders — Methods of dispersion and assessment of dispersibility in plastics — Part 4: Determination of colouristic properties and ease of dispersion of white pigments in polyethylene by two-roll milling*

ISO 23900-5, *Pigments and extenders - Methods of dispersion and assessment of dispersibility in plastics — Part 5: Determination by filter pressure value test*

ISO 23900-6, *Pigments and extenders - Methods of dispersion and assessment of dispersibility in plastics — Part 6: Determination by film test*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
dispersibility
ease and extent to which pigments or extenders can, by wetting, elimination of air and by mechanical disagglomeration, be distributed homogeneously in a plastics material under standardized conditions of processing

Note 1 to entry: Dispersibility is generally assessed in terms of colour strength development, colouristic properties and frequency and size of agglomerates.

3.2
ease of dispersion
DH
measure of the rate at which or the degree to which a pigment or extender achieves a given level of dispersion when dispersed in a plastics material

3.3
aggregate
primary particles so joined together that they cannot be broken down during normal pigment/extender dispersing processes

3.4
agglomerate
primary particles or aggregates or a mixture of the two so joined together that they may be broken down during normal pigment/extender dispersing processes

4 Methods of dispersion and methods of assessment

4.1 Preliminary agreements

Agreement shall be reached between the interested parties on:

a) the plastics material to be used;

b) the method of dispersion;

c) the assessment method;

as all of these influence the results.

4.2 Plastics materials

A large variety of plastics materials is available with greatly differing properties. It is therefore not possible, in this part of ISO 23900, to stipulate which plastics material shall be used. In other parts of ISO 23900, general indications are given as to the relevance of the procedures described to the most commonly used plastics materials.

4.3 Methods of dispersion

There are many differences in the equipment and processing conditions used in practice for dispersing pigments and extenders in plastics materials. It is therefore not possible to specify a single procedure for dispersing a pigment for testing purposes. In other parts of ISO 23900, general indications are given as to the relevance in practice of the procedure described.

4.4 Methods of assessment

There are different methods of characterizing dispersibility of pigments in plastics materials. These are specified in the relevant parts of ISO 23900.

5 Procedures

5.1 Determination of colouristic properties and ease of dispersion in plasticized polyvinyl chloride by two-roll milling

Using a two-roll mill, the pigment under test is dispersed at (160 ± 5) °C in the basic compound. The milled sheet obtained in this way is then subjected to the higher shearing forces resulting from two-roll milling at (130 ± 5) °C. The resulting increase in colour strength is a measure of the ease of dispersion $DH_{PVC\text{-}P}$.

The detailed procedure is specified in ISO 23900-2.

5.2 Determination of colouristic properties and ease of dispersion of black and colour pigments in polyethylene by two-roll milling

Using a two-roll mill, the pigment under test is dispersed at an appropriate temperature in the polymer. The milled sheet obtained in this way is then subjected to the higher shearing forces resulting from two-roll milling at a narrower gap width. The resulting increase in colour strength is a measure of the ease of dispersion DH_{PE}.

The detailed procedure is specified in ISO 23900-3.

5.3 Determination of colouristic properties and ease of dispersion of white pigments in polyethylene by two-roll milling

Using a two-roll mill, the pigment under test is dispersed at an appropriate temperature in the polymer. The milled sheet obtained in this way is then subjected to the higher shearing forces resulting from two-roll milling at a narrower gap width. The resulting increase in tinting strength is a measure of the ease of dispersion DH_{PE}.

The detailed procedure is specified in ISO 23900-4.

5.4 Determination of dispersibility of pigments by filter pressure value test

The increase in pressure when pressing a pigmented polymer of defined composition through a filter pack in an extruder under defined conditions is a measure of the dispersibility of the pigment under test.

The detailed procedure is specified in ISO 23900-5.

5.5 Determination of dispersibility of pigments by film test

The assessment based on the size and frequency of agglomerates in a pigmented polymer film of defined composition and thickness is a measure of the dispersibility of the pigment under test. The method can be used both for transparent and non-transparent films.

The detailed procedure is specified in ISO 23900-6.

6 Precision

Statements on precision of the methods are given in the subsequent parts of ISO 23900. These will generally be limited by the dependence of the results on the choice of plastics material and the method of dispersion employed.

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