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General methods of test for pigments and extenders —

Part 14: Determination of resistivity of aqueous extract

Méthodes générales d'essai des pigments et matières de charge —
Partie 14: Détermination de la résistivité de l'extrait aqueux

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 256, *Pigments, dyestuffs and extenders.*

This third edition cancels and replaces the second edition (ISO 787-14:2002), which has been technically revised. The main changes compared to the previous edition are as follows:

— in Clause 3, a reference to ISO 18451-1 has been added;

— methanol as wetting agent has been replaced by ethanol;

— the former Clause 6 “Determination of cell constant” including Figure 1 has been replaced by Clause 7 “Preparation of conductivity meter”;

— the procedure has been replaced by a new method: it is no longer distinguished between hydrophilic and hydrophobic pigments;

— the text has been editorially revised and the normative references has been updated.

A list of all parts in the ISO 787 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

General methods of test for pigments and extenders —

Part 14:
Determination of resistivity of aqueous extract

1 Scope

This document specifies a general method of test for determining the electric resistivity (specific electric resistance) or the specific electric conductivity, respectively, of the aqueous extract of a pigment. The method is applicable to all pigments and extenders, except pigments that are soluble in water.

The resistivity of the aqueous extract of a pigment is considered as a property independent of the amount of water-soluble matter. If agreed, a cold extraction method can be used.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 18451-1, *Pigments, dyestuffs and extenders — Terminology — Part 1: General terms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18451-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Reagents

4.1 Water, specific resistivity not less than 2 500 Ω · m or specific conductivity below 4 µS/cm, respectively.

4.2 Ethanol, specific resistivity preferable not less than 2 500 Ω · m or specific conductivity below 4 µS/cm, respectively.

4.3 Conductivity calibration solution (e.g. potassium chloride)**.**

5 Apparatus

5.1 Centrifuge, or ultra-centrifuge, if necessary.

5.2 Filter paper, fine textured.

5.3 Cylinder, approximately 35 mm wide by 125 mm high, or other container suitable for use with the conductivity cell.

5.4 Conductivity meter, with temperature measurement and its compensation.

5.5 Conductivity cell, having a cell constant K of approximately 1.

6 Sampling

Take a representative sample of the product to be tested according to ISO 15528.

7 Preparation of the conductivity meter

The conductivity meter and the conductivity cell are calibrated using a suitable conductivity calibration solution. In case of insufficient congruence of equipment display and calibration record, the measuring equipment shall be adjusted by correcting the cell constant K.

8 Procedure

An aqueous extract of a pigment suspension shall be prepared before performing the conductivity measurement.

The water-wettability of the pigment shall be tested beforehand. In case of low wettability, the pigment shall be wetted using as much ethanol as necessary to obtain a soft paste. This paste is subsequently transferred into a suspension by adding water.

The pigment concentration of the suspension shall be adjusted in the range of 5 % to 10 % (mass fraction).

For the extraction, the suspension shall be heated up. The heating time depends on the temperature applied: 100 °C for 5 min, 60 °C for at least 30 min. For homogenization, the suspension shall be stirred or shaken continuously. A cold extraction at room temperature is also possible. If used, this should be included in the test report with the extraction duration.

Loss of mass during the warm extraction shall be adjusted by adding water to keep the pigment concentration at a constant level.

Filter the suspension after tempering through a fine textured filter paper (5.2). Separation of solid content may also be done by a centrifuge using clean test-glasses. In this case, the overlaying liquid is to be filtered through a filter paper by decanting.

For performing the measurement, fill the obtained filtrate into the cylinder (5.3) and place the conductivity cell in it. Move the cell slowly up and down to remove all air bubbles.

The temperature of determination should preferably be 23 °C but a different temperature may be agreed between the parties provided that the necessary corrections are made to take account of the differences in temperature. Other measuring temperatures shall be reported.

Adjust the temperature slowly to 23 °C. The measuring cell shall be adjusted upright in the middle of the cylinder, the measuring opening (vent) around 10 mm below the surface of the liquid. Subsequently, the measurement can be started at (23,0 ± 0,5) °C.

In case the conductivity of the water applied without pigment and after being flown through the filter is larger than that given in 4.1, this result is used as blank value. The result of the conductivity measurement is then given by the difference of the conductivity of the filtrate and the water (blank value). The resistivity is the reciprocal value of the conductivity.