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Aluminium pigments for paints —

Part 1: General aluminium pigments

Pigments d'aluminium pour peintures —

Partie 1: Pigments d'aluminium généraux

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

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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 of 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 www.iso.org/iso/foreword.html.

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

This first edition of ISO 1247-1, together with ISO 1247-2, cancels and replaces ISO 1247:1974, which has been technically revised. It also incorporates the Amendment ISO 1247:1974/Amd 1:1982.

The main changes compared to the previous edition are as follows:

— an introduction has been added, giving the reasons for the division;

— Clause 3, Terms and definitions, has been added and the terms “non-volatile-matter” and “hiding power” have been included;

— a distinction between surface-treated and surface-untreated aluminium pigments has been introduced in Clause 4 and 5;

— former subclause 4.2, Classes, has been deleted;

— “matter volatile at 105 °C” has been substituted by “non-volatile-matter”;

— former Clause 6, Packing, has been deleted;

— Clause 7, Sampling, has been reduced to a reference to ISO 15528;

— the requirements and test methods of “pigment specific surface area”, “particle size distribution” and “hiding power” and the corresponding test methods have been added to Table 1 and Table 1 has been renamed “Requirements and test methods”;

— the test method for “manganese” has been deleted from the metallic impurities in Table 1;

— the flame atomic absorption spectrometric method has been introduced to determine metal impurities;

— former Clause 13, Test for absence of leafing power, has been deleted;

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— Table 3, test portions, has been deleted;

— Clause 16, Determination of hiding power, has been added;

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

A list of all parts in the ISO 1247 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.

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Introduction

Since the beginning of the new millennium, with the progress in technology and product development, there is a boom of new types of aluminium pigments which, serving as heat-resistant or rust-proof coatings or as colorants, find their ways into applications in a wide range of industrial sectors. Aluminium pigments can be conveniently divided into two groups according to their forms: general aluminium pigments produced in a milling process and vacuum metallized aluminium pigments (VMP) (see ISO 1247-2). As the technical requirements are different for aluminium pigments used in different fields, it is necessary to develop an international standard for each of the two groups.

To meet the needs in the marketing of aluminium pigments, characteristics such as "particle size distribution" and "hiding power", as well as their corresponding testing methods, are introduced in this document.

To improve the safety of the aluminium pigments, the organic solvents and auxiliary agents of low flashpoints have been substituted by reagents with high flashpoints, the "matter volatile at 105 °C" has been replaced by "non-volatile-matter", for which testing methods are developed according to ISO 3251.

The previous edition (i.e. ISO 1247:1974) uses different spectrophotometric methods to determine the content of lead, iron and copper, and the ethylenediamine tetraacetic acid (EDTA) titration method to determine zinc. These methods are cumbersome to operate. The method used to determine lead involves the use of potassium cyanate, a highly toxic agent seldom used since the 1990s, and the method used to determine zinc is applicable only to samples with a total zinc content of 0,10 % or above, and does not suit the status quo of the aluminium pigment industry. While these old methods are retained in this document, the flame atomic absorption spectrometric method is introduced as a new option for the determination of the above-mentioned metallic impurities. This method is faster, operation-friendly, has a wider range of detection, and is gaining more and more popularity.

To use as little toxic reagent as possible, this document resorts to using 2-Butoxyethanol or n-butyl acetate to replace acetone, which, as material likely to be used for making illegal drugs, is now forbidden or restricted by many countries.

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Aluminium pigments for paints —

Part 1:
General aluminium pigments

1 Scope

This document specifies the requirements and corresponding test methods for aluminium pigments suitable for use in paints including:

a) general, decorative and protective paints, and

b) special finishing paints.

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 385, *Laboratory glassware — Burettes*

ISO 648, *Laboratory glassware — Single-volume pipettes*

ISO 793, *Aluminium and aluminium alloys — Determination of iron — Orthophenanthroline photometric method*

ISO 795, *Aluminium and aluminium alloys — Determination of copper content — Oxalyldihydrazide photometric method*

ISO 808, *Aluminium and aluminium alloys — Determination of silicon — Spectrophotometric method with the reduced silicomolybdic complex*

ISO 1042, *Laboratory glassware — One-mark volumetric flasks*

ISO 1784, *Aluminium alloys — Determination of zinc — EDTA titrimetric method*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 9277, *Determination of the specific surface area of solids by gas adsorption — BET method*

ISO 13320, *Particle size analysis — Laser diffraction methods*

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

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

ISO 18451-2, *Pigments, dyestuffs and extenders — Terminology — Part 2: Classification of colouring materials according to colouristic and chemical aspects*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18451-1, ISO 18451-2 and the following apply.

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ISO and IEC maintain terminology 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/

3.1
non-volatile matter
NV
residue by mass obtained by evaporation under specified conditions

Note 1 to entry: Instead of the term "non-volatile matter" different terms, such as solid, dry residue, dry matter, solid matter, stoving residue are being used commonly with the respective abbreviations. The term "non-volatile matter" which is also applied in ISO 3251 should be used together with the abbreviation "NV" instead of these terms.

[SOURCE: ISO 4618:2014, 2.176]

3.2
hiding power
ability of a pigmented medium to hide the colour or the colour differences of a substrate

[SOURCE: ISO 18314-2:2015, 2.1.6]

4 Description

Aluminium pigments are composed of finely divided aluminium metal. The particles of aluminium metal are lamellar in shape when examined microscopically. It is typically divided by the predominant flake shape into "cornflake" (flakes with predominantly ragged and uneven flake shape) and "silverdollar" (flakes with predominantly round and smooth surface).

The material may be in the form of a powder or a paste and have leafing or non-leafing characteristics and the surface of the aluminium flakes may be untreated or treated by technical processing.

Mica and other adulterants shall be absent. If, in solution of the sample in hydrochloric acid as described in 15.3.3, a non-fatty residue is obtained, the residue shall be examined.

5 Classification

This document covers four types of general aluminium pigments, as follows:

— Type 1: aluminium powder, leafing, surface untreated or treated;

— Type 2: aluminium paste, leafing, surface untreated or treated;

— Type 3: aluminium powder, non-leafing, surface untreated or treated;

— Type 4: aluminium paste, non-leafing, surface untreated or treated.

NOTE Untreated refers to milled aluminium pigments with necessary milling agents. Treated refers to the involvement of an additional process to modify the aluminium surface in order to protect the pigments, for example encapsulation

6 Requirements and test methods

The material shall have the characteristics given in the appropriate column of Table 1.

The liquid contained in paste pigment shall be agreed between the interested parties.

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