

International Standard



4620

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Cadmium pigments — Specifications and methods of test

Pigments de cadmium — Spécifications et méthodes d'essai

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ISO 4620-1986 (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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4620 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Cadmium pigments — Specifications and methods of test

1 Scope and field of application

This International Standard specifies the requirements and the corresponding methods of test for cadmium pigments suitable for general use.

2 References

ISO 385/1, *Laboratory glassware — Burettes — Part 1: General requirements.*

ISO 648, *Laboratory glassware — One-mark pipettes.*

ISO 787, *General methods of test for pigments and extenders —*

Part 1: Comparison of colour of pigments.

Part 2: Determination of matter volatile at 105 °C.

Part 5: Determination of oil absorption value.

Part 7: Determination of residue on sieve — Water method — Manual procedure.

Part 8: Determination of matter soluble in water — Cold extraction method.

Part 9: Determination of pH value of an aqueous suspension.

Part 16: Determination of relative tinting strength (or equivalent colouring value) and colour on reduction of coloured pigments — Visual comparison method.

Part 20: Comparison of ease of dispersion (oscillatory shaking method).

Part 21: Comparison of heat stability of pigments using a stoving medium.

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

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

ISO 3696, *Water for laboratory use — Specifications.*¹⁾

ISO 3856, *Paints and varnishes — Determination of "soluble" metal content —*

Part 1: Determination of lead content — Flame atomic absorption spectrometric method and dithizone spectrophotometric method.

Part 2: Determination of antimony content — Flame atomic absorption spectrometric method and Rhodamine B spectrophotometric method.

Part 3: Determination of barium content — Flame atomic emission spectrometric method.

Part 4: Determination of cadmium content — Flame atomic absorption spectrometric method and polarographic method.

Part 6: Determination of total chromium content of the liquid portion of the paint — Flame atomic absorption spectrometric method.

Part 7: Determination of mercury content of the pigment portion of the paint and of the liquid portion of water-dilutable paints — Flameless atomic absorption spectrometric method.

*Part 8: Determination of selenium content — Flame atomic absorption spectrometric method and X-ray fluorescence method.*²⁾

*Part 9: Determination of arsenic content — Atomic absorption and silver diethyldithiocarbamate spectrometric methods.*¹⁾

ISO 4793, *Laboratory sintered (fritted) filters — Porosity grading, classification and designation.*

ISO 6713, *Paints and varnishes — Preparation of acid extracts from paints in liquid or powder form.*

1) At present at the stage of draft.

2) In preparation.

3 Definition

cadmium pigment: An inorganic coloured pigment consisting predominantly of cadmium sulfide or of mixed crystals of cadmium sulfide and cadmium selenide, in which the cadmium may be partially replaced by zinc.

NOTES

1 To adjust the relative tinting strength and/or to obtain certain application properties, cadmium pigments may contain colourless additives.

2 Cadmium pigments are characterized by a very low solubility in water and diluted acids and by a very high heat stability.

3 Yellow cadmium pigments consist mainly of mixed crystals of cadmium sulfide and zinc sulfide (Pigment yellow No. 37, part 2, ref. 77 199)¹⁾ or of cadmium sulfide (Pigment orange No. 20, part 2, ref. 77 199).¹⁾

Orange to maroon cadmium pigments consist mainly of mixed crystals of cadmium sulfide and cadmium selenide (Pigment red No. 108, part 2, ref. 77 202¹⁾).

4 Classification

This International Standard specifies the following three types of pigment, which shall be free from organic materials, other coloured inorganic pigments and brightening agents:

Type 1: Cadmium pigments, concentrated. These pigments contain not more than 30 % (*m/m*) of extenders to adjust their relative tinting strength.

Type 2: Cadmium pigments, extended. These pigments contain not more than 70 % (*m/m*) of extenders to facilitate processing.

Type 3: Cadmium pigments, unextended. These are essentially pure and do not contain any extenders.

NOTE — Type 1 and type 2 pigments are generally suitable for use in paints, plastics, rubber, etc. Type 3 pigments are mainly suitable for use in ceramics.

5 Required characteristics and their tolerances

5.1 For cadmium pigments complying with this International Standard, the essential requirements are specified in table 1 and the conditional requirements are referred to in table 2. For the conditional requirements to be specified, prior agreement between the interested parties is necessary.

5.2 The agreed reference pigment, which is referred to in table 2, shall conform with the requirements specified in table 1.

6 Sampling

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

7 Determination of total cadmium and zinc contents

NOTE — The method given in this clause allows the separate determination of the alkali earth metals present. However, it should be used only for cadmium pigments with a zinc content greater than 5 %. For pigments with lower zinc contents, a suitable atomic absorption spectrometric method should be agreed between the interested parties.

7.1 Principle

Dissolution of a test portion in hydrochloric acid and nitric acid. After neutralization, addition of potassium cyanide and titration of the alkali earth metals with EDTA solution. Addition of formaldehyde solution to destroy the cadmium and zinc cyanide complexes. Titration of the sum of cadmium and zinc ions with EDTA solution. Destruction of the cadmium-EDTA complex in the titrated solution with sodium diethyldithiocarbamate and precipitation of the cadmium with ammonia solution. Back-titration of the excess of EDTA corresponding to the cadmium, with magnesium sulfate solution.

7.2 Reagents

During the analysis, use only reagents of recognized analytical grade and only water of at least grade 3 purity according to ISO 3696.

WARNING — Use the reagents in accordance with the appropriate health and safety regulations.

7.2.1 Hydrochloric acid, approximately 37 % (*m/m*), ρ approximately 1,18 g/ml.

7.2.2 Hydrochloric acid, diluted, $c(\text{HCl})$ approximately 0,1 mol/l.

7.2.3 Nitric acid, approximately 65 % (*m/m*), ρ approximately 1,40 g/ml.

7.2.4 Sodium hydroxide, 10 % (*m/m*) solution.

7.2.5 Ammonia solution, approximately 25 % (*m/m*), ρ approximately 0,91 g/ml.

7.2.6 EDTA, standard volumetric solution, $c(\text{EDTA}) = 0,1 \text{ mol/l}$.

Dissolve 37,225 g of disodium ethylenediamine-tetraacetate dihydrate (EDTA disodium salt) in water in a 1 000 ml one-mark volumetric flask, dilute to the mark and mix well.

1) Classification according to the Colour Index. The Colour Index is published by the Society of Dyers and Colourists, Bradford, England and the American Association of Textile Chemists and Colorists, Lowell, Mass. (USA), revised edition 1971.