SLOVENSKI STANDARD
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Cinkovi pigmenti v prahu za barve - Specifikacije in preskusne metode (ISO/DIS 3549:2023)

Zinc dust pigments for paints - Specifications and test methods (ISO/DIS 3549:2023)

Zinkstaub-Pigmente für Beschichtungsstoffe - Anforderungen und Prüfverfahren (ISO/DIS 3549:2023)

Pigments à base de poussière de zinc pour peintures - Spécifications et méthodes d'essai (ISO/DIS 3549:2023)

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Zinc dust pigments for paints — Specifications and test methods

Pigments à base de poussière de zinc pour peintures — Spécifications et méthodes d'essai

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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 35, *Paints and varnishes*, Subcommittee SC 2, *Pigments and extenders* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 298, *Pigments and extenders*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 3549:1995), which has been technically revised.

The main changes are as follows:

— three types (I, II and III) of zinc dust pigments have been introduced with different requirements;

— inductively coupled plasma-optical emission spectroscopy (ICP-OES) has been added as an analytical technique used for elemental analysis;

— the nominal size of sieve aperture has been changed from 125 µm – 90 µm – 45 µm to 125 µm – 75 µm – 45 µm;

— CAS numbers have been added to the reagents;

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

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.

Zinc dust pigments for paints — Specifications and test methods

1 Scope

This document specifies the requirements and corresponding test methods for zinc dust pigments suitable for use in protective coatings.

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 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

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

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

ISO 22036, *Soil quality — Determination of trace elements in extracts of soil by inductively coupled plasma — Atomic emission spectrometry (ICP - AES)*

ISO 80369-7, *Small-bore connectors for liquids and gases in healthcare applications — Part 7: Connectors for intravascular or hypodermic applications*

3 Terms and definitions

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

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 https://www.electropedia.org/

3.1
zinc dust pigment
fine grey powder of essentially spheroidal particles, mainly consisting of metallic zinc

Note 1 to entry: Zinc dust pigments for paints can vary in their metallic zinc content, chemical purity, particle shape, particle size distribution, mean and maximum diameter, etc. These variations are all likely to have an influence on the zinc dust behaviour in paints with regard to parameters such as dispersibility, fineness of grind, reactivity, electrical conductivity and packing properties.

4 Required characteristics and tolerances

4.1 For zinc dust pigments complying with this document, the essential requirements are specified in Table 1 and Table 2.

Table 1 — Composition of zinc dust pigment

Characteristic	Unit	Requirement			Test method
		Type I	Type II	Type III	
Total zinc content	% (mass fraction)	min. 98	min. 98	min. 99	See Clause 7
Metallic zinc content	% (mass fraction)	min. 94	min. 94	min. 97	See Clause 8
Lead (Pb) content	% (mass fraction)	max. 0,1	max. 0,01	max. 0,002	See Clause 9[1)]
Cadmium (Cd) content	% (mass fraction)	max. 0,03	max. 0,01	max. 0,001	See Clause 9[1)]
Iron (Fe) content	% (mass fraction)	max. 0,005	max. 0,005	max. 0,002	See Clause 9[1)]
Arsenic (As) content	% (mass fraction)	max. 0,0005	max. 0,0005	max. 0,0005	See Clause 10[1)]
Chloride (Cl) content)	% (mass fraction)	max. 0,005	max. 0,005	max. 0,005	See Clause 11
Matter insoluble in acid	% (mass fraction)	max. 0,05	max. 0,05	max. 0,05	See Clause 12

1) Other suitable methods as induction coupled plasma (ICP-OES or ICP-MS) method may be agreed between the interested parties.

NOTE If the zinc oxide content is required, this can be calculated by multiplying the difference between the total zinc content and the metallic zinc content by 1,2447.

Table 2 — Residue on sieve

Nominal size of sieve aperture µm	Residue on sieve % (mass fraction)	Test method
125	max. 0,01	See Clause 6
75	max 0,1	
45	max. 0,5	

4.2 Requirements for other physical properties (surface area, particle size distribution, etc.) and the choice of reference pigment to which these properties refer shall be the subject of agreement between the interested parties. Particle size and/or particle size distribution data as D10, D50, shall be given with reference to measurement method and test conditions.

4.3 The reference pigment shall also comply with the requirements given in Table 1 and Table 2.

4.4 Inductively coupled plasma–optical emission spectroscopy (ICP-OES) is an analytical technique used for elemental analysis. The ICP-OES instrument is used in atomic spectroscopy, and during analysis the sample is decomposed by intense heat into a cloud of hot gases containing free atoms and ions of the element(s) of interest. The high temperatures cause significant amounts of collisional excitation and ionization of the sample atoms. Once the atoms or ions are in their excited state, they can decay to lower states through thermal or radiative (emission) energy transitions. During ICP-OES analysis the intensity of the light emitted at specific wavelengths is measured and used to determine the concentration of the element(s) of interest. In ICP-OES analysis the thermal excitation sources can populate a large number of different energy levels for several different elements at the same time. All of

the excited atoms and ions can then emit their characteristic radiation at the same time. This results in the flexibility to choose from several different emissions concurrently and allows detection of multiple elements concurrently.

Sample preparation is very similar to atomic absorption (AA, see Clause 9 and Clause 10) with a variant. (0,500 0 ± 0,000 2) g of sample is dissolved in 100 ml 5 % (volume fraction) HNO_3 69 %. For very resistant samples an additional 10 % (volume fraction) HCl 30 % may be used in combination with microwave digestion. The 5 g/l solutions are further diluted (1/200) with 5 % (volume fraction) HNO_3 while adding 50 µg/l of Sc, Y, Rh and Lu as internal standards. ICP measurement and standard preparation could be derived from the ISO 22036 standard.

5 Sampling

Take a representative sample of the product to be tested, as described in ISO 15528:2020.

WARNING — The sample shall on no account be dried before testing, and any portion of the sample not used shall not be returned to the sample container after having been manipulated.

6 Determination of residue on sieve

6.1 Principle

A suitable test portion of the sample is passed through an air-jet sieve apparatus having sieves with nominal mesh apertures of 45 µm, 75 µm and 125 µm. The residue on each of these sieves is determined.

6.2 Apparatus

6.2.1 Sieves, circular, with a sieving area of diameter 200 mm and with nominal mesh apertures of 45 µm, 75 µm and 125 µm, complying with ISO 565. A transparent lid shall be provided to cover the sieve during use.

6.2.2 Air-jet sieve apparatus (see Figure 1), consisting of a cylindrical casing which contains a sieve (see 6.2.1). The base of the casing has an outlet (to which an extractor fan is connected) and an air inlet to permit the injection of air.

The air inlet is connected to a jet rotating at 20 min^{-1} to 25 min^{-1} and consists of a slot-shaped nozzle located beneath and very close to the sieve (see Figure 1). When the jet rotates, it blows air continuously through the sieve, preventing the powder particles from settling. The air is extracted through the outlet, drawing the finer particles through the sieve. The flow of air is controlled by adjusting a slot at the outlet.

The vacuum obtained shall be 1 250 Pa or better.