
Lithopone pigments — General requirements and methods of testing

Lithopone pour peintures — Exigences générales 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 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. (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 256, *Pigments, dyestuffs and extenders*.
ISO 473:2019

This third edition cancels and replaces the second edition (ISO 473:1982), which has been technically revised. The main changes compared to the previous edition are as follows:

- a new specification of lithopone with a 20 % zinc sulphide (ZnS) content (lithopone 20 %) has been included;
- a new method of test, Method B (Na₂EDTA titration method) has been introduced;
- the text of the document has been editorially revised.

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.

Introduction

Over the last decade, requirements such as the hiding power for exterior coatings have become less stringent with a view to reducing cost. In addition, there is a growing demand in the international exterior coatings market for lithopone with a 20 % total zinc sulphide (ZnS) content rather than the more expensive lithopone with a 30 % or 60 % total zinc sulphide content (hereinafter referred to as lithopone 20 %, lithopone 30 % and lithopone 60 %, respectively). The previous edition of this document provided for only two specifications of lithopone, namely lithopone 30 % and lithopone 60 %. To avoid confusion and disputes related to the transportation, release and clearance of lithopone 20 %, it has been included as a third specification in this document.

The determination of the total zinc content in lithopone using the potassium hexacyanoferrate titration method is rather complicated to operate and apt to fail. With such a test method, fluctuations in the temperature of the solution may be experienced and it is difficult to read the titration end point. Therefore, the Na₂EDTA direct titration method has been added to this document, which is time-saving and easier to operate, and with a proven accuracy. This testing method is based on Reference [2].

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Lithopone pigments — General requirements and methods of testing

WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

1 Scope

This document specifies the requirements and the corresponding test methods for three types of lithopone pigments.

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 787-1, *General methods of test for pigments and extenders — Part 1: Comparison of colour of pigments*

ISO 787-2, *General methods of test for pigments and extenders — Part 2: Determination of matter volatile at 105 °C*

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ISO 787-3, *General methods of test for pigments and extenders — Part 3: Determination of matter soluble in water — Hot extraction method*

ISO 787-4, *General methods of test for pigments and extenders — Part 4: Determination of acidity or alkalinity of the aqueous extract*

ISO 787-5, *General methods of test for pigments and extenders — Part 5: Determination of oil absorption value*

ISO 787-7, *General methods of test for pigments and extenders — Part 7: Determination of residue on sieve — Water method — Manual procedure*

ISO 787-17, *General methods of test for pigments and extenders — Comparison of lightening power of white pigments*

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

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

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/>

3.1 lithopone 20 %
white pigment consisting of approximately 20 % zinc sulphide (ZnS), the balance being made up mainly of barium sulphate (BaSO₄)

Note 1 to entry: The material is a calcined co-precipitate.

3.2 lithopone 30 %
white pigment consisting of zinc sulphide (ZnS) and barium sulphate (BaSO₄) in approximately equimolecular proportions

Note 1 to entry: The material is a calcined co-precipitate.

3.3 lithopone 60 %
white pigment consisting of approximately 60 % zinc sulphide (ZnS), the balance being made up mainly of barium sulphate (BaSO₄)

Note 1 to entry: The material is a calcined co-precipitate.

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4 Marking and labelling

Lithopone with a content of about 20 %, 30 % or 60 % of zinc sulphide should be marked or labelled as such.

5 Required characteristics and their tolerances

Lithopone pigments shall have the characteristics shown in [Table 1](#).

The sample agreed between the interested parties, to which reference is made in [Table 1](#), shall be one and the same and shall comply with all the requirements specified for the pigment under test.

Table 1 — Required characteristics and their tolerances

Characteristic	Unit	Requirement	Test method
Total zinc, calculated as zinc sulphide	% (mass fraction)		Clause 7
Lithopone 30 %		≥ 28	
Lithopone 60 %		≥ 58	
Lithopone 20 %		≥ 18	
Zinc oxide	% (mass fraction)	≤ 1	Clause 8
Sum of total zinc, calculated as zinc sulphide, and barium sulfate	% (mass fraction)	≥ 99	Clause 7
Matter volatile at 105 °C	% (mass fraction)	≤ 0,5	ISO 787-2

Table 1 (continued)

Characteristic	Unit	Requirement	Test method
Matter soluble in water	% (mass fraction)	≤ 0,5	ISO 787-3
Residue on sieve (63 µm)	% (mass fraction)	≤ 0,1	ISO 787-7
Colour	—	Closely matching that of the agreed sample	ISO 787-1
Alkalinity of the aqueous extract	ml of 0,1 mol/l	Closely matching that of the agreed sample	ISO 787-4
Oil absorption value	g/100 g	To be agreed between the interested parties	ISO 787-5
Lightening power	%	To be agreed between the interested parties	ISO 787-17
Hiding power	—	To be agreed between the interested parties	To be agreed between the interested parties

6 Sampling

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

7 Determination of barium sulfate and total zinc content

7.1 General

Two methods of test, Method A and Method B, are provided for the determination of the total zinc content. Method A shall be referred to in cases of dispute.

7.2 Method A

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7.2.1 Principle

Dissolve the zinc sulphide (ZnS) and zinc oxide (ZnO) in the sample with hydrochloric acid. Add sulphuric acid to maintain a certain acidity (pH 1,5 to pH 3,0). Separate the solid from the liquid. Use the weight method to determine the content of the barium sulfate. Use diphenylamine as indicator and potassium hexacyanoferrate(II) as titrant to determine the total zinc content.

7.2.2 Reagents

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

7.2.2.1 Hydrochloric acid, concentrated, approximately 37 % (mass fraction), ρ approximately 1,19 g/ml.

7.2.2.2 Hydrochloric acid solution, diluted 1 + 2.

Add 1 part by volume of concentrated hydrochloric acid ([7.2.2.1](#)) to 2 parts by volume of water.

7.2.2.3 Sulphuric acid, concentrated, approximately 96 % (mass fraction), ρ approximately 1,84 g/ml.

7.2.2.4 Sulphuric acid solution, diluted 1 + 8.

Add carefully 1 part by volume of concentrated sulphuric acid ([7.2.2.3](#)) to 8 parts by volume of water.