



SLOVENSKI STANDARD
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Ultramarinski pigmenti (ISO 788:2021)

Ultramarine pigments (ISO 788:2021)

Ultramarin-Pigmente (ISO 788:2021)

Pigments d'outremer (ISO 788:2021)

Ta slovenski standard je istoveten z: prEN ISO 788

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INTERNATIONAL STANDARD

**ISO
788**

Second edition
2021-06

Ultramarine pigments

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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 second edition cancels and replaces the first edition (ISO 788:1974), which has been technically revised.

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

- the title of the standard has been changed from “Ultramarine pigments for paints” to “Ultramarine pigments”;
- the test method of free sulfur has been changed to iodometric method;
- the requirements for free sulfur, water soluble matter and sieve residue are stricter;
- the limitation of the contents of elements and the test methods have been added;
- the requirements and test methods for resistance to light and resistance to bleeding have been added;
- the normative references have been updated and the text 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.

Ultramarine pigments

1 Scope

This document specifies the requirements and corresponding test methods for artificial ultramarine pigments in plastics, paints, rubbers, etc.

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*

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

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 787-9, *General methods of test for pigments and extenders — Part 9: Determination of pH value of an aqueous suspension*

ISO 787-10, *General methods of test for pigments and extenders — Part 10: Determination of density — Pyknometer method*

ISO 787-15, *General methods of test for pigments and extenders — Part 15: Comparison of resistance to light of coloured pigments of similar types*

ISO 787-16, *General methods of test for pigments and extenders — Part 16: Determination of relative tinting strength (or equivalent colouring value) and colour on reduction of coloured pigments — Visual comparison method*

ISO 787-22, *General methods of test for pigments and extenders — Part 22: Comparison of resistance to bleeding of pigments*

ISO 787-24, *General methods of test for pigments and extenders — Part 24: Determination of relative tinting strength of coloured pigments and relative scattering power of white pigments — Photometric methods*

ISO 787-25, *General methods of test for pigments and extenders — Part 25: Comparison of the colour, in full-shade systems, of white, black and coloured pigments — Colorimetric method*

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

ISO 1248:2006, *Iron oxide pigments — Specifications and methods of test*

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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*

EN 14469-4, *Pigments and extenders — Testing of colouring materials in plasticized polyvinyl chloride (PVC-P) — Part 4: Determination of bleeding of colouring materials*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18451-1 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 <https://www.electropedia.org/>

3.1 ultramarine pigments
inorganic pigments made from kaolin, sodium carbonate and sulfur, etc., by calcining at high temperature in closed kilns

4 Classification

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According to the content of free sulfur, ultramarine pigments are classified into two types:

- Type A: maximum 0,05 % (mass fraction) free sulfur; <https://standards.iteh.ai/catalog/standards/sist/0d20d97a-8d1a-4b52-8f34-30340100210000-pr-en-iso-788-2021>
- Type B: maximum 0,20 % (mass fraction) free sulfur; <https://standards.iteh.ai/catalog/standards/sist/0d20d97a-8d1a-4b52-8f34-30340100210000-pr-en-iso-788-2021>

5 Requirements and test methods

5.1 Appearance

The pigments should be in the form of powder without any visible impurities.

5.2 Technical requirements

5.2.1 For the ultramarine pigments, the basic requirements shall be as specified in [Table 1](#) and the conditional requirements shall be as specified in [Table 2](#).

Table 1 — Basic requirements for ultramarine pigments

Characteristic	Unit	Requirement		Test method
		Type A	Type B	
Matter soluble in water (hot extraction method)	% (mass fraction)	max. 1,0	max. 1,5	ISO 787-3
Residue on sieve (mesh aperture 63 µm, water method)	% (mass fraction)	max. 0,1	max. 0,5	ISO 787-7
Free sulfur	% (mass fraction)	max. 0,05	max. 0,20	Clause 7
Matter volatile at 105 °C	% (mass fraction)	max. 1,0		ISO 787-2
Density at 23 °C	g/cm ³	2,23 to 2,40		ISO 787-10
Organic colouring matter	—	negative test		ISO 1248:2006, Clause 11

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Table 2 — Conditional requirements for ultramarine pigments

Characteristic	Unit	Requirement	Test method
pH value of aqueous suspension	—	to be agreed between the interested parties	ISO 787-9
Colour	—	to be agreed between the interested parties	ISO 787-1 or ISO 787-25
Relative tinting strength	—	to be agreed between the interested parties	ISO 787-16 or ISO 787-24
Oil absorption value ^a	—	to be agreed between the interested parties	ISO 787-5
Resistance to light	—	to be agreed between the interested parties	ISO 787-15
Resistance to bleeding	—	to be agreed between the interested parties	ISO 787-22 or EN 14469-4

^a The oil absorption value of the ordinary commercial grades is usually between 30 ml and 40 ml per 100 g of pigment.

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5.2.2 The ultramarine pigments shall meet the requirements for the limitation of elements shown in [Table 3](#).

Table 3 — Requirements for the limitation of elements^a

Characteristic	Unit	Requirement	Test method
Hg content	mg/kg	max. 1	Clause 8
Cd content	mg/kg	max. 5	
Se content	mg/kg	max. 10	
As content	mg/kg	max. 10	
Cr content	mg/kg	max. 50	
Pb content	mg/kg	max. 50	
Sb content	mg/kg	max. 50	
Ba content	mg/kg	max. 200	

^a When the requirements of this document are not stricter than the relevant national laws and regulations, it shall be subjected to the national laws and regulations.

6 Sampling

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

7 Determination of free sulfur

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7.1 Principle

The free sulfur in the sample reacts with anhydrous sodium sulfite. The production of sodium thiosulfate is determined by the iodometric method.

7.2 Reagents and materials

Use only reagents of recognized analytical grade and water of at least grade 3 as specified in ISO 3696.

7.2.1 Sodium sulfite, anhydrous, CAS-No 7757-83-7.

7.2.2 Formaldehyde solution. Dissolve 8 ml formaldehyde solution [37,0 % to 40,0 % (mass fraction), CAS-No 50-00-0] and dilute to 100 ml.

7.2.3 Acetic acid solution, 30 % (volume fraction). Dissolve 30 ml acetic acid [99,5 % (mass fraction), $\rho = 1,42$ g/ml, CAS-No 64-19-7] in water and dilute to 100 ml.

7.2.4 Iodine solution. Weigh 0,13 g iodine (CAS-No 7553-56-2) and 0,35 g potassium iodide (CAS-No 7681-11-0) and dissolve in 100 ml water, transfer into a brown bottle and dilute to 1 000 ml.

7.2.5 Sodium thiosulfate standard titration solution, $c(\text{Na}_2\text{S}_2\text{O}_3) = 0,1$ mol/l.

7.2.6 Soluble starch solution, 5 g/l.

7.2.7 Sodium thiosulfate standard titration solution, $c(\text{Na}_2\text{S}_2\text{O}_3) = 0,002$ mol/l. Dilute the sodium thiosulfate standard titration solution ([7.2.5](#)) with water.