BRITISH STANDARD

BS 1851:1978
ISO 591:1977

Specification for

Titanium dioxide pigments for paints

UDC 667.622.11 – 120.2:661.882.22 – 14

Cooperating organizations

The Pigments, Paints and Varnishes Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

British Colour Makers' Association*
Department of Industry, Chemicals and Textiles Division
Department of Industry, Laboratory of the Government Chemist
Department of the Environment, Building Research Establishment
Department of the Environment (PSA)
Institution of Corrosion Technology
London Transport Executive
Ministry of Defence*
National Federation of Builders' and Plumbers' Merchants
Oil and Colour Chemists' Association*
Paint Research Association
Paintmakers' Association of Great Britain Ltd.*
Post Office
Royal Institute of British Architects
Society of Chemical Industry
Titanium Pigment Manufacturers' Technical Committee*
White Lead Manufacturers' Association*
Zinc Development Association*
Zinc Pigment Development Association*

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

Amalgamated Society of Painters and Decorators
Chemical Industries Association
Paint Manufacturers' and Allied Trades' Association

This British Standard, having been prepared under the direction of the Pigments, Paints and Varnishes Standards Committee, was published under the authority of the Executive Board on 30 June 1978

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The following BSI references relate to the work on this standard:
Committee reference PVC/1
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Amendments issued since publication

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Contents

National foreword

This British Standard has been prepared under the direction of the Pigments, Paints and Varnishes Standards Committee. It was first published in 1952 and revised in 1967 in conjunction with BS 239, BS 254, BS 296, BS 338 and BS 637. It is identical with ISO 591:1977 "*Titanium dioxide pigments for paints*", which was prepared by Technical Committee 35, Paints and varnishes, of the International Organization for Standardization (ISO), with the active participation and approval of the United Kingdom.

Terminology and conventions. The text of the international standard has been approved as suitable for publication, without deviation, as a British Standard. Some terminology and certain conventions are not identical with those used in British Standards; attention is especially drawn to the following.

Wherever the words "International Standard" appear, referring to this standard, they should be interpreted as "British Standard".

The comma has been used throughout as a decimal marker. In British Standards it is current practice to use a full point on the baseline as a decimal marker.

Cross references. The following international standards are referred to in the text, and for each there is a corresponding British Standard; these are as listed below:

International standard	Corresponding British Standard
	BS 3483:1974 *Methods of testing pigments for paints*
ISO/R 787-I:1968	Part A1 *Comparison of colour* (Technically equivalent)
ISO/R 787-II:1968	Part B6 *Determination of matter volatile at 105 °C* (Technically equivalent)
ISO/R 787-III:1968	Part C1 *Determination of matter soluble in water (hot extraction method)* (Technically equivalent)
ISO/R 787-V:1968	Part B7 *Determination of oil absorption value* (Technically equivalent)
ISO/R 787-IX:1970	Part C4 *Determination of pH value of an aqueous suspension* (Technically equivalent)
ISO 787-XIV:1973	Part C5 *Determination of resistivity of aqueous extract* (Technically equivalent)
ISO 787-XVII:1973	Part A5 *Comparison of lightening power of white pigments* (Technically equivalent)
ISO 787-XVIII:1973	Part B4 *Determination of residue on sieve (water method) using a mechanical flushing procedure* (Technically equivalent)
ISO 842:1974	BS 4726:1971 *Methods for sampling raw materials for paints and varnishes* (Technically equivalent)

Additional information. The Table in this standard defines certain of the required characteristics by comparison with an *agreed sample*. This term, which is not defined in the international standard, is applied to a material agreed upon by the interested parties for use as a reference standard. Each *agreed sample* as mentioned in the Table should be one and the same material; it should comply with all the requirements specified for the pigment under test.

Water. Water complying with the requirements of **7.2** is specified in BS 3978:1966 "*Water for laboratory use*".

NOTE **Textual error.** When adopting the text of the international standard, the printing error given below was noticed. It has been corrected in this British Standard and has been reported to Technical Committee 35, Paints and varnishes, of the International Organization for Standardization (ISO) in a proposal to amend the text of the international standard.
Note * * below the Table on page 2: "... Parts I and VII ..." is deleted and replaced by "... Parts I and XVII ...".

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 4, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope and field of application

This International Standard specifies the requirements and the corresponding methods of test for titanium dioxide pigments, suitable for use in paints and related products.

2 References

ISO 787, *General methods of test for pigments.*

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

3 Description

The material shall consist essentially of titanium dioxide (TiO_2) of the anatase or the rutile crystal structure, as determined by X-ray examination. The material shall be in the form of a soft dry powder or in such a condition that it may be readily reduced thereto by crushing under a palette knife, without any grinding action.

4 Classification

4.1 Types

This International Standard covers two types of titanium dioxide pigments as follows:

Type A: Anatase type

Type R: Rutile type

4.2 Grades

The pigments are further classified into the following grades:

Grade A1 **Grade A2**	Type A
Grade R1 **Grade R2** **Grade R3**	Type R

5 Required characteristics and their tolerances

Titanium dioxide pigments shall have the characteristics indicated for their type and grade in the Table. The requirement for matter volatile at 105 °C after preconditioning shall only apply if this characteristic is specified by the interested parties or in a contract.

6 Sampling

A representative sample of the pigment to be tested shall be taken as specified in ISO 842.

7 Determination of titanium dioxide content

7.1 Interferences

Chromium, vanadium, molybdenum and niobium impurities may affect the results of this determination; these impurities may be present in commercial pigments, but normally in very small quantities only.

7.2 Reagents

All reagents shall be of analytical grade. The water used shall be distilled water or water of equivalent purity.

7.2.1 *Ammonium sulphate*

7.2.2 *Carbon dioxide* or *nitrogen*.

7.2.3 *Sulphuric acid,* concentrated (ρ 1,84 g/ml).

7.2.4 *Sulphuric acid,* 100 g/l solution.

7.2.5 *Sulphuric acid,* 40 g/l solution.

7.2.6 *Sulphuric acid,* 20 g/l solution.

7.2.7 *Potassium thiocyanate,* 100 g/l solution.

7.2.8 *Zinc amalgam,* 3 % (*m*/*m*) prepared as follows:

CAUTIONARY NOTE — The following operations shall be carried out in a fume cupboard.

Place 50 ml of mercury in a small porcelain dish on a steam bath and cover the surface of the mercury with the sulphuric acid solution (**7.2.6**). Add 20 to 30 g of zinc in small granules. Stir from time to time and replenish the dilute acid with water as required. When all the solid zinc has disappeared, allow the amalgam to cool and stand for several hours.

Finally, filter through a Gooch crucible with no asbestos pad. Preserve the amalgam in a small bottle under the sulphuric acid solution (**7.2.6**). 50 ml of it will serve for many reductions and, when exhausted, may be reactivated by adding further quantities of zinc in the same way.

7.2.9 *Ammonium iron(III) sulphate,* 0,062 5 N standard volumetric solution, standardized against a sample of known titanium dioxide content (TiO_2) by the procedure given in **7.4**.