



उत्पाद मैनुअल
पिगमेंट संबंधी अनुप्रयोगों के लिए टाइटेनियम डाईऑक्साइड
भारतीय मानक 411: 2026 के अनुसार

PRODUCT MANUAL
FOR
TITANIUM DIOXIDE FOR
PIGMENTARY APPLICATIONS
ACCORDING to IS 411: 2026

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification.

1.	मानक संख्या IS No.	:	IS 411: 2026
	शीर्षक Title	:	पिगमेंट संबंधी अनुप्रयोगों के लिए टाइटेनियम डाईऑक्साइड Titanium Dioxide for Pigmentary Applications - Specification.
	संशोधनों की संख्या No. of amendments	:	Nil
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific requirement. <i>Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/Factory Surveillance.</i>
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer to Annex-A .

c)	नमूने का परिमाण Sample Quantity	500 g + 500 g (for optional requirements, if applicable) <i>Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (in case of market surveillance, effort may be made to procure the required quantity of product sample, as far as possible since raw material sample may not be available in market)</i>
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	Type, Grade and Optional requirements <i>Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.</i>
3.	परीक्षण उपकरणों की सूची List of Test Equipment	: Please refer to Annex-B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	: Please refer to Annex-C
5.	एक दिन में संभावित परीक्षण Possible tests in a day	
	Description, Anatase/Rutile content, TiO ₂ content, Matter soluble in water, Volatile matter, pH of pigment slurry, Resistivity of aqueous extract, Oil absorption, Residue on sieve, Copper, Iron and Relative density. <i>Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies(OSAs) during factory inspection to provide ready reference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.</i>	
6.	लाइसेंस का दायरा/Scope of the Licence:	
	“Licence is granted to use Standard Mark as per IS 411: 2026 with the following scope:	
	Name of the product	Titanium Dioxide for Pigmentary Applications
	Grades	A1 / A2 / A3 / R1 / R2 / R3 / R4 / R5 / R6 / R7
	Optional Requirement	As applicable from Table 3.

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ANNEX - A
GROUPING GUIDELINES

IS 411 classifies the product, Titanium Dioxide for Pigmentary Applications under following 02 types and each type is further classified into grades as following:

Type A (Anatase)

- a. Grade A₁
- b. Grade A₂
- c. Grade A₃

Type R (Rutile)

- a. Grade R₁
- b. Grade R₂
- c. Grade R₃
- d. Grade R₄
- e. Grade R₅
- f. Grade R₆
- g. Grade R₇

Each sample shall be tested for each type i.e. Type A (Anatase) and Type R (Rutile).

- In Type A: Each grade to be tested to be covered in the scope of the licence.
- In Type R:

<i>S.No.</i>	<i>Sample tested</i>	<i>Coverage of other grades</i>
1.	R ₁	R ₂ , R ₃ , R ₄ and R ₅
2.	R ₂	R ₃ , R ₄ and R ₅
3.	R ₃	R ₄ and R ₅
4.	R ₄	R ₅
5.	R ₆	R ₃ , R ₄ and R ₅

Scope of licence shall be restricted based on the manufacturing and testing facilities available.

During operation of licence, samples of each variety covered in the scope of licence, shall be tested in rotation, to the extent possible

ANNEX - B
List of Test Equipment

(INDICATIVE LIST, FOR GUIDANCE ONLY)

Cl. No.	Test	Method of Test	Test Facilities
5.1 / Table 1 (i) / Table 2 (i)	Description / Anatase Content / Rutile Content	Annex B	1. X-Ray Diffractometer with operating conditions as specified in B-2 2. Reagents and Interferences 3. Mortar and Pestle 4. Ignition arrangement (above 700 °C) 5. Hydraulic press
Table 1 (ii) / Table 2 (ii)	Titanium dioxide content	Aluminium Reduction Method	1. Delivery Tube (as per C-2.2.1) 2. Hot Plate 3. Weighing balance L.C. 0.001 g 4. Glassware including 500 ml capacity Long Necked flask 5. Reagents 6. Carbon Dioxide
		UV-Vis Spectropho- meter	1. UV-Vis spectrophotometer 2. Weighing balance 3. Reagents 4. Glassware including watch glass 5. Hot plate 6. Timer
Table 1 (iii)	Matter soluble in water	Hot / Cold extraction	1. Colloid Filter 2. Glassware 3. Desiccator 4. Evaporating Dish 5. Oven 6. Balance 7. Reagent
Table 1 (iv) / Table 2 (iii)	Volatile matter	IS 33	1. Weighing bottle as per Cl. 8.1.1, IS 33 : 1992 2. Oven 3. Weighing Balance 4. Desiccator
Table 1 (v) / Table 2 (viii)	pH of pigment slurry	IS 33	1. Glass container 2. pH Measuring Device 3. Balance
Table 1 (vi) / Table 2 (iv)	Resistivity of aqueous extract	Annex D	1. Reagents 2. Conductivity Cell 3. Cylinder 4. Digital Conductivity Meter
Table 1 (vii) / Table 2 (vii)	Oil absorption	IS 33	1. Linseed oil 2. Plate 3. Palette Knife 4. Glassware 5. Balance

			6. Reagent 7. Timer
Table 1 (viii) / Table 2 (vi)	Relative density	IS 33	1. Pyknometer 2. Vacuum Desiccator 3. Vacuum Pump or other apparatus 4. Water Bath 5. Balance 6. Reagent 7. Glassware
Table 1 (ix) / Table 1 (x) / Table 2 (v)	Residue on 45 / 150 micron	IS 33	1. Sieve 2. Brush 3. Sintered Glass Crucible 4. Oven 5. Balance 6. Wash bottle 7. Glassware 8. Oven
Table 1 (xi)	Copper	Annex E	1. Reagent 2. Weighing Balance 3. Hot plate 4. Glassware 5. Timer
Table 1 (xii)	Iron	Annex F	1. Reagent 2. Weighing Balance 3. Hot plate 4. Glassware 5. Timer 6. Filter paper
Table 1 (xiii) / Table 2 (ix)	Lead	IS 101 (Part 8/Sec 5)	Any one of the following five methods may be used: a) Electrolysis method; b) Molybdate method; c) Sulphide method; d) Atomic Absorption Spectroscopy method (AAS); and e) Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES).
Table 3 (i)	Mass colour	Annex G	1. Reagents and Materials 2. Alkyd /Acrylic Resin Medium 3. Pigments 4. Pigment-Volume-Concentration 5. Driers 6. Film application 7. Glassware 8. Ball-mill 9. Hegman gauge 10. Milling Vessel 11. White card or some other preferred substrate
Table 3 (ii)	Tinting / Reducing strength	IS 33	1. Automatic Muller 2. Pallete Knife or Spatula 3. Glass slides 4. Films of Plastic Material

			5. Film applicator 6. Balance 7. Reagent
Table 3 (iii)	Resistance to chalking	Annex H	1. Reagents and Materials 2. Alkyd /Acrylic Resin Medium 3. Pigments 4. Pigment-Volume-Concentration 5. Driers 6. Film application 7. Glassware 8. Ball-mill 9. Hegman gauge 10. Milling Vessel 11. White card or some other preferred substrate 12. Arrangement for Sun exposure 13. Wood Panel (or of any other material) 14. Black Cloth 15. 100 g load 16. Disc of soft rubber
Table 3 (iv)	Scattering power	Annex J	1. Black pigment paste 2. Weighing Balance 3. Automatic muller 4. Spatula 5. Grinding arrangement with specified force 6. Agreed reference sample 7. Paste film holders 8. Spectrophotometer
Table 3 (v)	Toxic heavy metals contents	IS 2851	1. Glassware including filter, desiccator etc. 2. Reagents including potassium cyanide solution 3. Weighing Balance 4. Platinum Dish 5. pH measuring/control arrangement 6. Hydrogen sulphide gas 7. Filter 8. Oven 9. Timer

The above list is indicative only and may not be treated as exhaustive.

ANNEX – C**SCHEME OF INSPECTION AND TESTING****1. QUALITY ASSURANCE PLAN**

1.1 It is expected that during operation of BIS licence, manufacturers will implement a Quality Assurance Plan (QAP) i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan (QAP) defining the control unit (i.e. lot/batch etc.), the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and declare the arrangement for testing i.e. whether in-house or subcontracting/sharing for each applicable test and submit the same to BIS Branch Office for information. The manufacturer shall comply with the QAP and maintain test records in accordance with para 2.1.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: *the entire quantity of the material produced in one day under similar conditions of manufacture shall constitute a control unit.*

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in [Table 1](#). Manufacturer has the discretion of declaring their own levels of control or accept the levels of control given in this document.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan.

2. ENSURING COMPLIANCE THROUGH TESTING- manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard for which they may have in-house test facilities. However, there is no obligation to maintain in-house laboratory. Licensee may use alternative arrangements for tests of the production as per the declared QAP. Various alternatives are available for operation of BIS certification as given below and the relevant guidelines for availing such relaxations by the manufacturers, as amended from time to time, are to be referred:

- i) Shared testing resources like common facility,
- ii) Cluster based testing facility,
- iii) Sub-contracting to outside laboratories which may either be:
 - a) BIS recognised/empanelled laboratories, or
 - b) Any accredited laboratory as per ISO/IEC 17025

2.1 TEST RECORDS- The manufacturers shall maintain test records for the tests carried out (either in-house or at a sub-contracted or at shared test facility) to establish conformity of the product to the Standard for operation of licence. For the tests being subcontracted or

conducted at a shared test facility, test results issued by the laboratories or test facilities, shall be made available for inspection by BIS.

3. PACKING AND MARKING - The Standard Mark, as given in the Schedule of the licence, shall be stencilled/printed on each packing of Titanium Dioxide for Pigmentary Applications or printed on the label applied to it, as the case may be, provided always that the material in each container to which this mark is thus applied, conform to every requirement of the specification.

3.1 Packing and marking shall be done as per the provision of the Indian Standard. In addition, the following details shall be mentioned on each packing legibly and indelibly:

a) BIS Licence No. CM/L _____.

b) BIS website details: "For BIS certification details please visit www.bis.gov.in"

4. REJECTION - The production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1
(Recommended Levels of Control by BIS - For Guidance Only)

(1)				(2)	
Test Details				Levels of Control	
<i>Clause</i>	<i>Requirement</i>	<i>Test Methods</i>		<i>No. of Sample</i>	<i>Frequency</i>
		<i>Clause</i>	<i>Reference</i>		
5.1	Description	5.1	IS 411	One	Each Control unit
Table 1 (i) / Table 2 (i)	Anatase Content / Rutile Content	Annex B	IS 411	One	-do-
Table 1 (ii) / Table 2 (ii)	Titanium dioxide content	Annex B	IS 411	One	-do-
Table 1 (iii)	Matter soluble in water	-	IS 33	One	-do-
Table 1 (iv) / Table 2 (iii)	Volatile matter	-	IS 33	One	-do-
Table 1 (v) / Table 2 (viii)	pH of pigment slurry	-	IS 33	One	-do-
Table 1 (vi) / Table 2 (iv)	Resistivity of aqueous extract	Annex D	IS 411	One	-do-
Table 1 (vii) / Table 2 (vii)	Oil absorption	-	IS 33	One	-do-

Table 1 (viii) / Table 2 (vi)	Relative density	-	IS 33	One	-do-
Table 1 (ix) / Table 1 (x) / Table 2 (v)	Residue on 45 / 150 micron	-	IS 33	One	-do-
Table 1 (xi)	Copper	Annex E	IS 411	One	-do-
Table 1 (xii)	Iron	Annex F	IS 411	One	-do-
Table 1 (xiii) / Table 2 (ix)	Lead	-	IS 101 (Part 8/Sec 5)	One	Once in a Month
Table 3 (i)	Mass colour	Annex G	IS 411	One	-do-
Table 3 (ii)	Tinting / Reducing strength	-	IS 33	One	-do-
Table 3 (iii)	Resistance to chalking	Annex H	IS 411	One	-do-
Table 3 (iv)	Scattering power	Annex J	IS 411	One	-do-
Table 3 (v)	Toxic heavy metals contents	-	IS 2851	One	-do-

Note: Representative samples of the material shall be drawn as prescribed in IS 33.