



उत्पाद मैनुअल
धनायनित परिवर्तित बिटुमिन इमल्शन
IS 17016:2018 के अनुसार

**Product Manual for
Cationic Modified Bitumen Emulsion
According to IS 17016: 2018**

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.	भारतीय मानक संख्या IS No.	:	IS 17016:2018
	शीर्षक Title	:	धनायनित परिवर्तित बिटुमिन इमल्शन Cationic Modified Bitumen Emulsion
	संशोधनों की संख्या No. of amendments	:	02
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Any suitable grade of bitumen as given in IS 73 or modified bitumen as given in IS 15462 with or without addition of suitable flux, shall be used. For modification in aqueous phase, modifier shall be Styrene Butadiene Rubber (SBR) as per IS 11356 (Part-2) or natural rubber as per IS 4588. 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.
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Sample of each grade shall be drawn for testing to cover in the scope of the licence.

c)	नमूने का परिमाण Sample Quantity	:	6 Liters 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)
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	:	Grade Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex- A
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex- B
5.	एक दिन में संभावित परीक्षण Possible tests in a day		
	All tests, except Storage Stability after 24 h can be carried out in a day. However, since testing facility is not available in any BIS/BIS recognized lab, complete testing has to be carried out in the Factory for certification and during surveillance. 02 days inspection required for complete testing. 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.		
6.	लाइसेंस का दायरा /Scope of the Licence:		
	IS 17016: 2018 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेंस निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है □Licence is granted to use Standard Mark as per IS 17016: 2018 with the following scope:		
7.	उत्पाद का नाम Name of the product		Cationic Modified Bitumen Emulsion
	Grade		QSME and/or RSME and/or SSME

ANNEX – A

LIST OF TEST EQUIPMENTS
(INDICATIVE LIST, FOR GUIDANCE ONLY)

Major test equipment required to test as per requirements of Indian Standard.

Sr. No.	Tests used in with Clause Reference	Test Equipment
1.	Residue on 600 Micron IS Sieve, Table 1 Sr. No i	600 Micron IS Sieve — A circular sieve approximately 100 mm diameter and 40 mm height. Metal or Glass Dish — A small metal or glass dish about 110 mm in diameter (such as a clock glass) Oven — A well ventilated oven thermostatically controlled to 100 to 110°C Balances — 250 g accurate to 0.01 g and 10 kg capacity accurate to 1 g. Container — A clean, weighed, 1.5-litre container. Distilled Water Solvents – Xylene and Acetone
2.	Viscosity by Saybolt Furol Viscometer, Table 1 Sl No ii	Saybolt Furol Viscometer as per Annex A of IS 3117 Thermostatically controlled bath Oil tube Thermometers Timing device Withdrawal tube or Pipette
3	Coagulation of emulsion at low temperature, Table 1 Sl no iii	Water Bath, thermostatically controlled, Glass boiling tube 600 micron IS sieve Beakers, 600 ml capacity Solution - One percent solution of cetrimide in N/10 hydrochloric acid Solvents – Xylene and Acetone
4	Storage stability after 24, Table 1 Sl no iv	Cylinders — Two 500-ml glass cylinders, with pressed or moulded glass bases and cork or glass stoppers, having an outside diameter of 50 ± 5 mm and having 5 ml graduations. Glass Pipette — A 60-ml siphon glass tube pipette. Balance — 500 g capacity accurate to 0.1 g.

		Glass Beakers — Three glass breakers of 600 or 1000 ml capacity, made of borosilicate glass. Glass Rods, with flame polished ends, 6.5 ± 0.5 mm diameter and 175 ± 5 mm in length. Oven — Thermostatically controlled, capable of maintaining temperature of $163 \pm 2.8^{\circ}\text{C}$.
5	Particle charge, Table 1 Sr No v	Current Source — A 12 V battery. Rheostat, of 2000 Ohm capacity. Ammeter of preferable range of 20 mA or any suitable ammeter to accurately measure 4 mA. Stainless Steel Plates — Two, 25×75 mm size. Glass Container, of 500 ml capacity
6	Miscibility with water, , Table 1 Sr no vi	400 ml beaker, Thermometer, Distilled water, Measuring cylinder
7	Residue by Evaporation, Table 1, Sr No. (vii) (a)	Glass Beakers — Low form of 1000 ml capacity made of borosilicate glass. Glass Rods, with flame polished 6.5 ± 0.5 mm in diameter and 175 ± 0.5 mm in length. Balance — 500 g capacity accurate to 0.1 g. Oven — Thermostatically controlled at a temperature of $163 \pm 2.8^{\circ}\text{C}$.
8	Penetration, Table 1, Sr No. (vii) (b)	Container - A metal or glass cylindrical, flat bottom container as per IS 1203 Needle -A straight, highly polished, cylindrical, stainless steel rod, with conical and parallel portions co-axial, having shape and dimensions as per IS 1203. Water Bath – thermostatically controlled Transfer Dish - A small dish or tray. provided with some means which ensure a firm bearing and prevent the rocking of the container and of such capacity as will ensure complete immersion of the container during the test.

		Penetration Apparatus - Any apparatus which will allow the needle to penetrate without appreciable friction, and which is accurately calibrated to yield results in tenths of millimeter Thermometer (Range : 0 to 44 °C, L.C. – 0.2 °C) Time Device
9	Ductility, Table 1, Sr No. ((vii) (c)	Ductility apparatus consisting of ductility mould as per IS 1208 (Part-1), Water bath (Thermostatically controlled), Testing machine (for pulling the briquette of bituminous material apart), Thermometer (Range : 0 to 44 °C, L.C. – 0.2 °C) Knife or Spatula Brass Plate
10	Softening point, Table 1, Sr No. (vii) (d)	Ring and ball apparatus , Steel balls, Brass rings and support, Ball guides , Thermometer - Low Temperature: Range - (- 2°C to 80°C), LC- 0.2°C; High Temperature : Range - (30 to 200 °C), LC- 0.5 °C Beaker, Stirrer, Water bath, Oven, Metal Plate, Glycerine, Dextrin, Knife, Forceps
11	Elastic Recovery, Table 1, Sr No. (vii) (e)	Ductility Machine and Moulds as per IS 1208 and Fig. 1 , Thermometer – Any standard thermometer (ASTM 63 °C) of equivalent range and accuracy, Scissors, Scale, Water bath
12	Polymer Content, Table 1, Sr No. (vii) (f)	Weighing Balance
13	Stability to mixing with Cement, Table 1, Sr No. (vii) (g)	Sieve — A 1.40 mm IS Sieve approximately 100 mm in diameter and 40 mm in height and 150 micron IS Sieve approximately 200 mm in diameter. Metal Dish — A round-bottomed metal utensil of approximately 500-ml capacity. Steel Rod — A steel rod with rounded ends 13 mm in diameter. Balance — 250 g capacity accurate to 0.1 g.

		Graduated Cylinder of 100 ml capacity. Shallow Pan of 100-mm diameter and of about 50-ml capacity. Oven — A well-ventilated oven controlled at 110°C.
14	Mixing Time, Table 1, Sr No. (vii) (h)	Stainless steel bowl, Spatula, Beakers, Measuring cylinder, spoon and Balance

Note: The above is an indicative list for the purpose of guidance only

ANNEX- B 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: For the purpose of this scheme, the Cationic Modified Bitumen Emulsion of the same grade produced in a shift 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 license and Licence Number (i.e. CM/L...) shall be incorporated suitably on each container and / or printed on the label applied to the container; provided that the material in each container to which this mark is thus applied conforms to every requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 Additional Marking requirements: Additionally, the following may be indicated on an accompanying label/tag or on each container and / or printed on the label applied to the container.

a) “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)				(3)		(4)
TEST DETAILS				LEVELS OF CONTROL		REMARKS
Clause	Requirements	Test Method		No. of Samples	Frequency	
		Clause	Reference			
4.1	Bitumen /modified bitumen	–	IS 73/ IS 15462	One	One consignment	See Note
4.3	Modifier	–	IS 11356 (Part-2) / IS 4588	One	One consignment	See Note
6.1	Homogeneity	6.1	IS 17016	One	Each Month	
6.2 & Table 1	Requirement of Cationic Modified Bitumen Emulsion					
(i)	Residue on 600 µm Sieve	Annex-B	IS 8887	One	Each Control Unit	–
(ii)	Viscosity by saybolt furol viscometer, at 25°C, seconds	IS 8887	IS 8887	One	Each Control Unit	–
(iii)	Coagulation of emulsion at low temperature	Annex-C	IS 8887	One	Each Control Unit	–
(iv)	Storage stability after 24 h	Annex-D	IS 8887	One	Each Control Unit	–
(v)	Particle charge	Annex-E	IS 8887	One	Each Control Unit	–
(vi)	Miscibility with water	Annex-H	IS 8887	One	Each Control Unit	–
(vii)	Test on residue					

(a)	Residue by evaporation	Annex-J	IS 8887	One	Each Control Unit	–
(b)	Penetration at 25°C, 100g, 5 s	IS 1203	IS 1203	One	Each Control Unit	–
(c)	Ductility at 27°C	IS 1208 (Part-1)	IS 1208 (Part-1)	One	Each Control Unit	–
(d)	Softening point	IS 1205	IS 1205	One	Each Control Unit	–
(e)	Elastic recovery	IS 15462	IS 15462	One	Each Control Unit	–
(f)	Polymer content	To be reported	To be reported	One	Each Control Unit	–
(g)	Stability to mixing with cement	IS 8887	IS 8887	One	Each Control Unit	Applicable to SSME Grade only
(h)	Mixing time	Annexure B	IS 17016	One	Each Control Unit	Applicable to QSME Grade only

Note: Conformity of raw materials to the requirement of the specification may be established through either of the following or a combination of the same (No testing is required if the material is ISI marked):

- i. Test report from a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau
- ii. Material manufacturer's test certificate
- iii. In house factory test report