भारतीय मानक

Indian Standard

IS 14699 : 2024

वस्त्र प्रसंस्करण सहायक सामग्री — वस्त्र उद्योग के लिए ट्राइमेथाइलोल मेलामाइन फॉर्मल्डेहाइड रेजिन — विशिष्टि

(पहला पुनरीक्षण)

Textile Auxiliaries — Trimethylol Melamine Formaldehyde Resin for Textile Industry — Specification

(First Revision)

ICS 59.040

भारतीय मानक ब्यूरो
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January 2024 **Price Group 4**

Textile Speciality Chemicals and Dyestuffs Sectional Committee, TXD 07

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Textile Speciality Chemicals and Dyestuffs Sectional Committee had been approved by the Textiles Division Council.

Melamine formaldehyde resins are used in textile finishing to impart durable press and wash-and-wear properties to textile fabrics and garments. These are used for making wool resistant to shrinkage and felting; for providing dimensional stability to cotton and rayon; and stiffness to nylon. These also contribute rot resistance to cotton and are finding increasing acceptance as binders for non-woven fabrics and in pigment printing of textiles. When used in conjunction with fire-retardants, these enhance the durability of flame-retardant finishes. When used with water repellents, these increase wash fastness of water repellents. These are expensive in comparison to urea-formaldehyde resins and increase chlorine retention of the fabrics during bleaching but the acid which is formed during ironing is readily neutralized by the basicity of the compound. Thus the fibre degradation due to acid is avoided. However, bleached fabric becomes yellow. Melamine - formaldehyde resins tend to cure very rapidly and hence are not suitable for deferred cure durable-press finish.

As the performance of a resin/treated fabric depends upon a large number of variables, differing from mill to mill and from time to time, it is not possible to cover the performance requirements in the standard. However, important requirements to check the quality have been specified in the standard.

This standard was first published in 1999. The first revision of the standard has been made in the light of experience gained since its publication and to incorporate the following major changes:

a) Title of the standard has been modified;
b) The relevant method for estimation of free formaldehyde prescribed in IS 14563 has been specified in place of the methods detailed in the annexure of the earlier version;
c) Visual appearance of the resin has been specified;
d) Packing, marking and sampling clauses have been modified; and
e) References to Indian Standard have been updated.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TEXTILE AUXILIARIES — TRIMETHYLOL MELAMINE FORMALDEHYDE RESIN FOR TEXTILE INDUSTRY — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements for trimethylol melamine formaldehyde resin solution used in textile industry.

2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards:

IS No.	*Title*
IS 1070 : 2023	Reagent grade water — Specification (*fourth revision*)
IS 13948 : 1994	Textile auxiliaries — Urea-formaldehyde resin — Specification
IS 1390 : 2022/ ISO 3071 : 2020	Textiles — Determination of *p*H of aqueous extract (*third revision*)
IS 14563 (Part 1) : 2021/ISO 14184-1 : 2011	Textiles — Determination of formaldehyde: Part 1 Free and hydrolysed formaldehyde water extraction method (*first revision*)

3 REQUIREMENTS

3.1 General Requirements

The resin solution shall be in the form of white to pale yellow, clear transparent to translucent, free from turbidity and settled impurities when well shaken solution transferred from carboy to a glass beaker is examined visually.

3.2 Specific Requirements

Trimethylol melamine formaldehyde shall meet the requirements given in Table 1.

3.3 Identification

3.3.1 If, in order to compare the IR spectra or thin layer chromatograph, a sample is agreed upon and sealed between the buyer and the seller, the supply shall be in conformity with the sample. The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

3.3.2 *Infra-Red (IR) Spectra*

The IR spectra of aqueous resin solution when prepared by the method agreed to between the buyer and the seller shall match with that of the sealed sample.

Table 1 Trimethylol Melamine Formaldehyde — Specific Requirements

(*Clause* 3.2)

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Appearance	Clear colourless liquid	Visual
ii)	Total solid content *percent* (*m*/*m*)	50 ± 2.5	Annex B of IS 13948
iii)	*p*H	7 to 8	IS 1390
iv)	Free formaldehyde content, percent	2	IS 14563 (Part 1)
v)	Total formaldehyde content, percent	83.3 ± 2	Annex D of IS 13948
vi)	Nitrogen to formaldehyde molar ratio	1 to 1.3	Annex F of IS 13948

3.3.3 *Thin Layer Chromatograph (TLC)*

The thin layer chromatograph pattern of the resin solution when prepared by the method prescribed in Annex A shall match with that of the sealed sample.

NOTE — IR spectra method is more reliable and accurate.

4 PACKING

The resin solution shall be packed in waterproof packages of suitable size so as to allow normal handling and transport and which prevent dirt, dust or vapours to reach the solution. Details of packing shall be as agreed to between the buyer and seller.

5 MARKING

5.1 Each package shall be marked with the following:

a) Name of the material;
b) Manufacturer's name, initials or trade-mark, if any;
c) Net weight of the package;
d) Total solid content, percent;
e) Batch No. or Lot No.;
f) Month and year of manufacture; and
g) Any other statutory requirement as required by the law in force or as agreed between buyer and purchaser.

5.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

6 SAMPLING AND CRITERIA FOR CONFORMITY

6.1 Lot

The quantity of melamine-formaldehyde resin solution of one definite composition delivered to a buyer against one dispatch note shall constitute a lot.

6.2 Unless otherwise agreed to between the buyer and the seller, the number of packages to be selected from a lot at random shall be as given below.

Table 2 Sample Size

(*Clause* 6.2)

Sl No.	Lot Size	Sample Size
(1)	(2)	(3)
i)	2 to 15	2
ii)	16 to 25	3
iii)	26 to 50	4
iv)	51 to 100	5
v)	101 to 150	6
vi)	151 to 300	7
vii)	301 and above	8

6.3 Draw from each package selected in **6.2**, the required quantity of the resin solution by a suitable sampling instrument from at least three different parts and mix them thoroughly to get a composite sample of desired mass.

6.4 The resin solution shall be declared as conforming to the requirements of the standard if all the composite samples prepared as in **6.3** meet the relevant requirements specified in **3.1** to **3.3**.

ANNEX A

(*Clause* 3.3.3)

PREPARATION OF THIN LAYER CHROMATOGRAPH (TLC)

A-1 PRINCIPAL

A-1.1 N-Methylol resin is converted into corresponding methyl ethers using methanolic hydrochloric acid, which are more stable than the corresponding parent N-methylol resin. These offer more effective utilization of chromatographic substrate and resolve better thus making it possible to identify individual patterns (chromatographs) with greater ease.

A-2 PROCEDURE

A-2.1 Conversion of N-Methylol Resin into its Methyl Ether

A-2.1.1 Take above 0.1 g of resin solution in a test tube and add to it 5 ml of methanolic hydrochloric acid prepared by adding required quantity of concentrated hydrochloric acid to methyl alcohol so as to yield 0.1 N hydrochloric acid in methanol. Shake the mixture for about 5 minutes and then place in boiling water bath for about 30 seconds.

A-2.2 Preparation of TLC Plates

A-2.2.1 Coat the thoroughly cleaned and dried glass plates of uniform thickness measuring 200 mm × 200 mm, with silica gel (G60) slurry (15 g of silica gel in 60 ml of distilled water) using spreader set so as to give 2 500 µm thickness. Dry the plates in air for about 30 minutes and then activate them at 110 °C for 30 minutes in an oven. Store the plates over silica gel in a desiccator.

A-2.3 Preparation of Chromatographs

A-2.3.1 Apply methyl ether of resin (about 20 mg) as obtained in **B-2.1.1** onto the TLC plate by means of capillary pipette and chromatograph them in a chromatographic tank lined with filter papers saturated with eluent mixture and equilibrated for 15 minutes to 20 minutes. Develop the chromatograph by allowing eluent mixture to travel to a height of 100 mm.

NOTE — Although several eluent mixtures such as acetone; water (96 : 4), acetone: ethyl acetate: water (15 : 4 : 1); acetone; chloroform: water (15 : 4 : 1) are suitable, the eluent mixture, acetone: chloroform: water (15 : 4 : 1) is reported to work better.

A-2.3.2 Expose the developed chromatographs to iodine vapours in a separate tank for detecting the spots.

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Textile Speciality Chemicals and Dyestuffs Sectional Committee, TXD 07

Organization	*Representative(s)*
Department for Jute and Fibre Technology Institute of Jute Technology University of Calcutta, Kolkata	PROF A. K. SAMANTA (***Chairperson***)
Ahmedabad Textile Industry's Research Association, Ahmedabad	SHRIMATI DEEPALI PLAWAT SHRIMATI FAHIMUNNISA KHATIB (*Alternate*)
Ama Herbals Laboratories Pvt Ltd, Lucknow	SHRI Y. A. SHAH
Archroma India Pvt Limited, Mumbai	SHRI RAJESH RAMAMURTHY SHRIMATI PRACHI NARVEKAR (*Alternate*)
Atul Limited (Colors Business), Valsad	SHRI RAJARAM JAMDADE SHRI ARINDAM CHAKRABORTY (*Alternate*)
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Central Institute for Research on Cotton Technology, Mumbai	DR SUJATA SAXENA DR A. S. M. RAJA (*Alternate*)
Department for Jute and Fibre Technology Institute of Jute Technology University of Calcutta, Kolkata	DR D. DAS
Global Organic Textile Standard, (GOTS), Thane	SHRI RAHUL BHAJEKAR MISS PRACHI GUPTA (*Alternate*)
Indian Jute Industries Research Association, Kolkata	DR S. K. CHAKRABARTI SHRI SANDIP BASU (*Alternate*)
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Shree Pushkar Chemicals & Fertilizers Ltd, Mumbai	DR N. N. MAHAPATRA
Textiles Committee, Mumbai	SHRI KARTIKEYA DHANDA SHRIMATI SHILPI CHAUHAN (*Alternate*)
The Arvind Mills Limited, Ahmedabad	SHRI RAJARSHI GHOSH SHRI UMASANKAR MAHAPATRA (*Alternate*)
The Bombay Textile Research Association, Mumbai	DR PADMA S. VANKAR SHRI M. P. SATHIANARAYANAN (*Alternate*)

Organization	*Representative(s)*
The South India Textile Research Association, Coimbatore	DR PRAKASH VASUDEVAN SHRI S. SIVAKUMAR (*Alternate*)
The Synthetic and Art Silk Mills Research Association, Mumbai	SHRIMATI (DR) MANISHA MATHUR SHRIMATI ASHWINI SUDAM (*Alternate*)
U P Textile Technology Institute, Kanpur	DR ARUN KUMAR PATRA DR SHUBHANKAR MAITY (*Alternate*)
Wool Research Association, Thane	SHRIMATI (DR) MRINAL CHOUDHARI
BIS Directorate General	SHRI J. K. GUPTA, SCIENTIST 'E'/DIRECTOR AND HEAD (TEXTILES) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI HIMANSHU SHUKLA
SCIENTIST 'B'/JOINT DIRECTOR
(TEXTILES), BIS

Bureau of Indian Standards

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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Amend No.	Date of Issue	Text Affected

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