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"जानने का अधिकार, जीने का अधिकार"
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"The Right to Information, The Right to Live"

"पुराने को छोड़ नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartrhari—Nitisatakam
“Knowledge is such a treasure which cannot be stolen"
Indian Standard

TRIMETHYLOL MELAMINE FORMALDEHYDE RESIN FOR TEXTILE INDUSTRY — SPECIFICATION

ICS 59.080.01, 71.100.40
FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Textile Sizing and Finishing Materials Sectional Committee had been approved by the Textile Division Council.

Various uses, advantages and disadvantages of melamine formaldehyde resins used in textile finishing are given in Annex A. 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.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2:1960 'Rules for rounding off numerical values (revised)'.

Indian Standard

TRIMETHYLOL MELAMINE FORMALDEHYDE RESIN
FOR TEXTILE INDUSTRY — SPECIFICATION

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

2 REFERENCES
The following standards 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 editions of the standards indicated below:

<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1070 : 1992</td>
<td>Water for general laboratory use (third revision)</td>
</tr>
<tr>
<td>1390 : 1983</td>
<td>Methods for determination of pH value of aqueous extracts of textile materials (first revision)</td>
</tr>
<tr>
<td>13948 : 1994</td>
<td>Textile auxiliaries — Urea formaldehyde resin — Specification</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Characteristic</th>
<th>Requirement</th>
<th>Method of Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Total solid content, percent (%m/m)</td>
<td>50 ± 2.5</td>
<td>Annex B of IS 13948</td>
<td></td>
</tr>
<tr>
<td>ii) pH</td>
<td>7 to 8</td>
<td>IS 1390</td>
<td></td>
</tr>
<tr>
<td>iii) Free-formaldehyde content, percent</td>
<td>2</td>
<td>Annex C of IS 13948</td>
<td></td>
</tr>
<tr>
<td>iv) Total formaldehyde content, percent</td>
<td>83.3 ± 2</td>
<td>Annex D of IS 13948</td>
<td></td>
</tr>
<tr>
<td>v) Nitrogen to formaldehyde molar ratio</td>
<td>1 to 1.3</td>
<td>Annex F of IS 13948</td>
<td></td>
</tr>
</tbody>
</table>

3.3.3 Thin Layer Chromatograph (TLC)
The thin layer chromatograph pattern of the resin solution when prepared by the method prescribed in Annex B 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 suitable size waterproof packages so that no dirt, dust or vapours reach the solution.

5 MARKING
5.1 Each package shall be marked with the following:
   a) Name of the material,
   b) Net weight of the package,
   c) Total solid content, percent,
   d) Indication of source of manufacture, and
   e) Month and year of manufacture.

5.2 BIS Certification Marking
Each package may also be marked with the Standard Mark.

5.2.1 The use of the Standard Mark is governed by
the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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 despatch 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>
<thead>
<tr>
<th>Lot Size</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 15</td>
<td>3</td>
</tr>
<tr>
<td>16 to 25</td>
<td>4</td>
</tr>
<tr>
<td>26 to 50</td>
<td>5</td>
</tr>
<tr>
<td>51 to 100</td>
<td>7</td>
</tr>
<tr>
<td>101 and above</td>
<td>10</td>
</tr>
</tbody>
</table>

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

(Foreword)

USES, ADVANTAGES AND DISADVANTAGES OF MELAMINE FORMALDEHYDE RESIN

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.
ANNEX B
(Claude 3.3.3)
PREPARATION OF THIN LAYER CHROMATOGRAPH (TLC)

B-1 PRINCIPAL

B-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.

B-2 PROCEDURE

B-2.1 Conversion of N-Methylol Resin into Its Methyl Ether

B-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.

B-2.2 Preparation of TLC Plates

B-2.2.1 Coat the thoroughly cleaned and dried glass plates of uniform thickness measuring 200 mm x 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.

B-2.3 Preparation of Chromatographs

B-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 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.

B-2.3.2 Expose the developed chromatographs to iodine vapours in a separate tank for detecting the spots.
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Amendments Issued Since Publication

<table>
<thead>
<tr>
<th>Amend No.</th>
<th>Date of Issue</th>
<th>Text Affected</th>
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