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# उत्पाद मैन्युअल

## Chlorinated Polyvinyl Chloride (CPVC) Resin— Specification

## IS 17988: 2022 के अनुसार

## PRODUCT MANUAL

## FOR Chlorinated Polyvinyl Chloride (CPVC) Resin— Specification

## ACCORDING TO IS 17988: 2022

**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.**

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| 1. | मानक संख्या<br>**IS No.** | : | IS 17988: 2022 |
| | शीर्षक<br>**Title** | : | Chlorinated Polyvinyl Chloride (CPVC) Resin— Specification |
| | संशोधनों की संख्या<br>**No. of amendments** | : | 0 |
| 2. | नमूना दिशानिर्देश<br>**Sampling Guidelines** | | |
| a) | कच्चामाल<br>**Raw material** | : | The material shall be conforming to clause 5.1 of IS 17988: 2022.<br>Conformity of 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):<br>Supplier test certificate/test report from BIS recognized lab/empanelled lab or any other lab having accreditation as per IS/ISO/IEC 17025 or in-house testing.<br><br>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<br>**Grouping Guidelines** | : | Each Grade to be tested. |

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| c) | **नमूनेका परिमाण**<br>**Sample Quantity** | : | *3 Kg*<br><br>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) |
| 3. | **परीक्षण उपकरणों की सूची**<br>**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**<br>**Possible tests in a day** | | |
| | All tests are possible in a day.<br><br>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:** | | |
| | "Licence is granted to use Standard Mark as per IS 17988: 2022 with the following scope: | | |
| | **Name of the product**<br>**उत्पाद का नाम** | | Chlorinated Polyvinyl Chloride (CPVC) Resin— Specification |
| | **Grades** | | Grade 1/Grade 2/Grade 3 |
| | **Additional Requirements/Properties** | | Suitable/Not suitable for products used in contact with foodstuffs, pharmaceuticals and drinking water |

## ANNEX–A

## LIST OF TEST EQUIPMENTS

***(INDICATIVE LIST, FOR GUIDANCE ONLY)***

| Sl. No. | Tests Used In With Clause Reference | Test Equipment/Chemical |
|---|---|---|
| **1** | K Value for PVC resin | i. Viscometer<br>ii. Graduated flask<br>iii. Filter funnel, with fritted-glass filter disc of medium porosity (pore size 40 µm to 50 µm), or glass funnel with paper filter.<br>iv. Mechanical agitator<br>v. Analytical balance (accurate to 0.1 mg)<br>vi. Temperature-regulated bath (capable of being set at 25.0 °C ± 0.5 °C in steps of 0.1 °C and maintaining a stability of ± 0.05 °C around the set temperature)<br>vii. Thermometer (with a sensitivity of 0.05 °C)<br>viii. Time-measuring device (with a sensitivity of 0.1 s)<br>ix. Cyclohexanone<br>x. sulphuric acid<br>xi. potassium dichromate |
| **2** | Inherent Viscosity | i. Viscometer<br>ii. Graduated flask<br>iii. Filter funnel, with fritted-glass filter disc of medium porosity (pore size 40 µm to 50 µm), or glass funnel with paper filter.<br>iv. Mechanical agitator<br>v. Analytical balance (accurate to 0.1 mg)<br>vi. Temperature-regulated bath (capable of being set at 25.0 °C ± 0.5 °C in steps of 0.1 °C and maintaining a stability of ± 0.05 °C around the set temperature)<br>vii. Thermometer (with a sensitivity of 0.05 °C)<br>viii. Time-measuring device (with a sensitivity of 0.1 s)<br>ix. Cyclohexanone<br>x. sulphuric acid<br>xi. potassium dichromate |
| **3** | Sieve Analysis, material retained on 250- micron sieve | ***As per IS 4669: 2002:***<br><br>*i. Sieves (250 micron)*<br>*ii. Vibrating device*<br>*iii. Carbon Black*<br><br>***As per* ISO 4610:2001(E)**<br><br>i. Sieves<br>ii. Air-jet sieve apparatus in accordance with ISO 4610:2001(E)<br>iii. Timer (e.g. stopwatch)<br>iv. Balance, capable of being read to 0.01g |

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| | Average Particle Size | ***As per IS 4669: 2002:***<br>*i.*<br>*ii. Sieves (250 micron)*<br>*iii. Vibrating device*<br>*iv. Carbon Black*<br><br>***As per* ISO 4610:2001**<br><br>i. Sieves<br>ii. Air-jet sieve apparatus as per ISO 4610:2001(E)<br>iii. Timer (e.g. stopwatch)<br>iv. Balance, capable of being read to 0.01g |
| | Apparent density | i. Measuring Cylinder (capacity of 100 ± 0.5 ml and an internal diameter of 45 ± 5 mm)<br>ii. Funnel(with a cover for the lower orifice (for example: metal plate) in accordance with IS 4669/IS 13360 (Part 3/Sec 2)/ISO 60<br>iii. Balance (accurate to 0.1 g) |
| | Dry Flow of 140 g | i. Funnel in accordance with ISO 6186:1998<br>ii. Funnel support<br>iii. Stopwatch (accurate to 0.1 s)<br>iv. Balance (accurate to 0.1 g) |
| | Volatile Matter, percent | i. Weighing bottle of 50 ml capacity<br>ii. Weighing balance<br>iii. Air circulating oven capable of maintaining 105 ± 2°C |
| | Chlorine Content, percent | i. Silver nitrate, standard volumetric solution, *c*(AgNO3) = 0.1 mol/l or 0.05 mol/l.<br>ii. Nitric acid solution, *c*(HNO3) = 2 mol/l.<br>iii. Drying oven, capable of being maintained at 50 °C ± 2 °C or 75 °C ± 2 °C.<br>iv. Balance, to weigh to an accuracy of 0.01 g (method B).<br>v. Equipment for Volhard titration or for potentiometric titration<br><br>**Method A:**<br><br>i. Nitric acid, concentrated.<br>ii. Sodium peroxide, granulated.<br>iii. Starch, sucrose or ethylene glycol, as combustion aids.<br>iv. Balance, to weigh to an accuracy of 0.1 mg<br>v. Combustion bomb<br>vi. Nickel crucible with lid<br>vii. Safety oven<br>viii. beaker(600ml capacity)<br><br>**Method B:**<br>i. Oxygen, gaseous.<br>ii. Sodium nitrate.<br>iii. Potassium hydroxide solution, 100 g/l.<br>iv. Hydrogen peroxide solution, 300 g/l.<br>v. Round- or flat-bottomed flask, capacity 500 ml to 1 000 ml, with head designed for oxygen combustion<br>vi. A platinum wire 1.0 mm in diameter and 120 |

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| | | mm long in the shape of a tapered spiral in accordance with ISO 1158.<br>vii. Filter paper (about 3 cm x 3.5 cm, free from halogens and ash)<br>viii. Beaker(250ml capacity) |
| | RVCM Content, ppm | i. Vinyl Chloride (VC)<br>ii. N, N-dimethylacetamide (DMA)<br>iii. Diethyl Ether or cis-2-butene, in DMA<br>iv. Gas Chromatograph<br>v. Flame Ionization Detector or Other Detectors, namely, the micro electrolytic conductivity detector<br>vi. Gas Chromatographic Column<br>vii. Sample Phials or Flasks Fitted with Silicon or Butyl Rubber Septa<br>viii. Micro-syringes<br>ix. Gas-Tight Syringes for Manual Headspace<br>x. Sampling<br>xi. Analytical Balance |
| | Foreign Matter | i. Glass plate, 340 mm x 340 mm x 4.5 mm, colorless<br>ii. Rigid plate, 450 mm × 450 mm, covered with a sheet of glazed white paper<br>iii. Stop watch |

## ANNEX B

## SCHEME OF INSPECTION AND TESTING

### 1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan 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 defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 **RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT**:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: the material manufactured under similar conditions of production and with same raw material in a day.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

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. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

**2. ENSURING COMPLIANCE THROUGH TESTING-** It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.1 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as “R” or other tests which can be subcontracted as “S”. Subcontracting is permitted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

**2.2 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as “R” in Column 2 of Table 1) is also optional.**

2.2.1 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.3 **Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as "R" in Column 2 of Table 1)**, where different tests given in the specification shall be carried out in accordance with the method given in the specification**.** They shall also implement a calibration plan for the in-house test equipment.

2.3.1 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.4 **TEST RECORDS**- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

**3. PACKING AND MARKING** - The Standard Mark as given in the Schedule of the licence shall be incorporated legibly and indelibly on each bag provided always that the material so marked conforms to each requirement of the specification.

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

3.2 **Additional Marking requirements**: The material shall also be marked with the following additional requirement on each bag:

*a)* "For BIS certification details please visit www.bis.gov.in"

**4. HYGIENIC CONDITIONS** – Product suitable for use in contact with foodstuffs, pharmaceuticals and drinking water shall meet the requirements specified in IS 10151.

**5. REJECTION -** All 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**
***(ONLY FOR GUIDANCE PURPOSE)***

| (1) | | | | (2) | (3) | | |
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| **Test Details** | | | | **Test equipment requirement R: required (or) S:Sub -contracting permitted** | **Levels of Control** | | |
| Cl. | Requirement | Test Methods Clause Reference | | | No. of Sample | Frequency | Remarks |
| 5.1 | PVC Resin | -- | IS 17658 | S | Each consignment | | Conformity of 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): Supplier test certificate/test report from BIS recognized lab/empanelled lab or any other lab having accreditation as per IS/ISO/IEC 17025 or in-house testing. |
| 5.2 | K Value for PVC resin | -- | IS 4669/ISO 1628: PART 2 | R | One | Each Control Unit | |
| 5.2 | Inherent Viscosity | -- | ISO 1628: PART 2 | R | One | Each Control Unit | |
| 5.2 | Sieve Analysis, material retained on 250- micron sieve | -- | IS 4669/ISO 4610 | R | One | Each Control Unit | |
| 5.2 | Average Particle Size | -- | IS 4669/ISO 4610 | R | One | Each Control Unit | |
| 5.2 | Apparent density | -- | IS 4669/IS 13360 (PART 3/Sec 2)/ISO 60 | R | One | Each Control Unit | |
| 5.2 | Dry Flow of 140 g | -- | Method A of ISO 6186 | R | One | Each Control Unit | |
| 5.2 | Volatile Matter, percent | -- | IS 4669/ISO 1269 | R | One | Each Control Unit | |

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| 5.2 | Chlorine Content, percent | -- | IS 15778/ISO 1158 | R | One | Each Control Unit | |
| 5.2 | RVCM Content, ppm | -- | Annex A of IS 10151/ ISO 24538 | S | One | Once in a month | Conformity of 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): Supplier test certificate/test report from BIS recognized lab/empanelled lab or any other lab having accreditation as per IS/ISO/IEC 17025 or in-house testing. |
| 5.2 | Foreign Matter | -- | ISO 1265 | R | One | Each Control Unit | |
| 6 | Special Requirements Of Polymer Used For Moulding Or Extrusion Articles In Contact With Food Stuff | -- | IS 10151 | S | One | Once in a month | Conformity of 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): Supplier test certificate/test report from BIS recognized lab/empanelled lab or any other lab having accreditation as per IS/ISO/IEC 17025 or in-house testing. |