



उत्पाद मनअल
एक्रिलोनिट्राइल-विनिर्देश
IS 12540: 2023 के अनुसार

PRODUCT MANUAL FOR
ACRYLONITRILE-SPECIFICATION
ACCORDING TO IS 12540: 2023

भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम 2018 की स्कीम-I के तहत यह उत्पाद मैनुअल प्रमाणीकरण की संचालन रीति में सुसंगतता और पारदर्शिता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेन्स धारियों द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस लाइसेन्स/प्रमाण पत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज़ का उपयोग किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence 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 licence/certificate

1.	उत्पाद Product	:	IS 12540: 2023
	शीर्षक Title	:	Specification for Acrylonitrile
	संशोधन संख्या No. of Amendments	:	Nil
2.	नमूनाकरण दिशानिर्देश Sampling Guidelines:		
a)	कच्चा माल Raw material	:	No specific requirement
b)	समूहिकरण दिशानिर्देश Grouping guidelines	:	NA
c)	नमूने का परिमाण	:	2 litres

	Sample Size		
d)	Any other information	:	Undertaking to be submitted by firm regarding application of Acrylonitrile i.e. Food contact and/or other applications
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	कृपया Annex-A देखें Please see Annex – A
4.	निरीक्षण व परीक्षण स्कीम Scheme of Inspection and Testing	:	कृपया Annex-B देखें Please see Annex – B
5.	एक दिन में संभावित परीक्षण Possible tests in a day :		
	All tests are possible in a day except Soluble iron content and Heavy metals as Cu.		
6.	लाइसेन्स का कार्यक्षेत्र / Scope of the Licence:		
	Licence is granted to use Standard Mark as per 12540: 2023 with the following scope:		
	Name of the product	Acrylonitrile	
	Application	Food Contact and/or Other applications	

BUREAU OF INDIAN STANDARDS
ManakBhawan, 9, Bahadur Shah ZafarMarg,
New Delhi – 110002

ANNEX – A**LIST OF TEST EQUIPMENTS****Major test equipment required to test as per the Indian Standard**

Sr. No.	Tests used in with Clause Reference	Test equipment
1.	Distillation range, Table 1, Sl. No i	Distillation Apparatus Distillation Flask Temperature Measuring Device Distillation Receiver Condenser Draught Screen Asbestos Board Source of Heat Measuring Cylinder Barometer General Glassware
2.	Specific Gravity, Table 1, Sl. no ii	Pyknometer or Specific Gravity bottle - 25 ml capacity, Water bath (27 ± 0.2 °C) Thermometer Weighing balance Or Digital Density Meter
3.	Colour, Pt-Co scale, Table 1, Sl. No. iii	Colour measuring instrument as per IS 1448 (Part 178) Absorption cells (50mm light path length) Glass tubes (11mm path length)

4.	Refractive Index, Table 1, Sl. No iv	Acetone or aliphatic hydrocarbon solvents Refractometer as per IS 1448 (Part 158) Glass certified reference material White light source Sodium arc lamp Thermostatted bath and circulating pump
5.	Water content, Table 1, Sl. no. v	As per Annex-C of IS 12540 Conical Flasks as given in figure 1 Pipette - with a mark at 1.1 to 1.5 ml Weighing Balance Karl Fischer Titrator Micro burette Methanol 2-Methoxyethanol (Ethylene Glycol Monomethyl Ether) Iodine Pyridine Sulphur Dioxide Karl Fischer Reagent Sodium Tartrate, Crystalline Water-Methanol Standard Solution - 10 mg/ml Water-Methanol Solution – approximately 2 g/l Aluminium Sodium Silicate/Activated Silica Gel Silicone Base Grease As per IS 1448 (Part 175) or IS 1448 (Part 182) Molecular sieve pellets, Type 4A Xylene, Reagent grade Karl Fischer reagent Sodium dioctylsulphosuccinate Water conforming to Grade 3 of ISO 3696 Methanol N-ethyl piperidine Titration solvent Karl Fischer titrator Non-aerating mixture Glass syringes Balance (LC-0.1mg) Volumetric flask Sealable bottles or Desiccators Ovens Cooling bath Thermometer (LC-1°C)

6.	Assay, Table 1, Sl. No. vi	As per Annex-D of IS 12540 Conical Flasks as given in figure 1 Pipette - with a mark at 1.1 to 1.5 ml Weighing Balance Water Bath (27 ± 0.2 °C) Sodium Sulphite Anhydrous Solution Standard Sulphuric Acid Solution Thymolphthalein Alcoholic Solution Weighing balance As per Annex-E of IS 12540 Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Stock Acrylonitrile
7.	Acetone, Table 1, Sl. No. vii	Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Acetone (Known purity)
8.	Acetonitrile, Table 1, Sl. No. viii	Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Acetonitrile (Known purity)
9.	Benzene, Table 1, Sl. No. ix	Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Benzene (Known purity)
10.	Crotononitrile, Table 1, Sl. No. x	Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Crotononitrile (Known purity)

11.	Methylacrylonitrile, Table 1, Sl. No. xi	Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Methylacrylonitrile (Known purity)
12.	Propionitrile, Table 1, Sl. No. xii	Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Propionitrile (Known purity)
13.	Acrolein, Table 1, Sl. No. xiii	Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Acrolein (Known purity)
14.	Hydrocyanic acid content, Table 1, Sl. no xiv	Method – A of Annex-F of IS 12540 Spectrophotometer or Photoelectric Colorimeter - equipped with cells of 5 cm light-path Copper Sulphate Solution Potassium Cyanide Potassium Hydroxide Solution Rectified Spirit Buffer Solution Acrylonitrile - free from hydrocyanic acid Freshly prepared Phenolphthalein Solution Method – B of Annex-F of IS 12540 Separatory funnel Burette, Microburette Erlenmeyer flask Graduated cylinder Volumetric flask Plastic bottle Analytical Balance Silver nitrate Potassium Iodide Sodium hydroxide Ammonium hydroxide Caustic Iodide solution

15.	Methyl vinyl ketone, Table 1, Sl. No. xv	As per Annex-G of IS 12540 Infrared spectrophotometer with sodium chloride cell of 0.5 mm path Acrylonitrile - Free from methyl vinyl ketone Methyl Vinyl Ketone (Known purity) As per Annex-E of IS 12540 Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Methyl vinyl ketone (Known purity)
16.	Acetaldehyde content, Table 1, Sl. No. xvi	Method A of Annex-H UV Spectrophotometer Schiff's Reagents Acrylonitrile - Free from acetaldehyde Cooling bath Method B of Annex-H UV Spectrophotometer Pyrex cells Syringes Balance (LC-0.1mg) Volumetric flasks Pipettes 3-methyl-2-benzothiazolinone Hydrozone hydrochloride color reagent Ferric chloride hexahydrate Sulfamic acid Acetaldehyde 4-Methoxyphenol-CP grade Acrylonitrile-inhibitor free Method as per Annex-E Gas Chromatograph as per E-1.1 Analytical balance (L.C.-0.1mg) Serum bottle Syringe Isobutanol Acetaldehyde (Known purity)

17.	Monomethyl ether of hydroquinone (MEHQ), Table 1, Sl. No. xvii	Method A of Annex-J UV Spectrophotometer Measuring Flasks Pipette Glacial Acetic Acid Saturated Sodium Nitrite Solution Distilled water Method B of Annex-J UV Spectrophotometer Volumetric flasks Burette Absorption cell Analytical balance (LC-0.1mg) Separatory funnel Monomethyl ether hydroquinone (MEHQ) Sodium hydroxide Inhibitor free Acrylonitrile
18.	Peroxide content, Table 1, Sl. No. xviii	Erlenmeyer Flask, Glass Stoppered Pipette Spectrophotometer – visible range with 10 mm path cells Potassium Iodide - reagent grade Acetic Anhydride Hydrogen Peroxide IRA-410 Ion-Exchange Resin
19.	Soluble Iron content, Table 1, Sl. No. xix	As per Annex-L of IS 12540 Spectrophotometer Burette Measuring Flasks Glass funnel with No. 3 porous plate Quartz dish Steam bath Muffle furnace Watch Glass Distilled water Congo red indicator paper Hydrochloric Acid Solution Hydroxylamine Hydrochloride Solution Orthophenanthroline Solution Standard Iron Solution Aqueous Ammonia As per IS 1448 (Part 172) Ultrapure water Hydrochloric acid Conc. Nitric acid

		Dil. Nitric acid Oil soluble Cadmium, Cobalt or Yttrium Multi element/Organometallic standards Dilution solvent like mixed xylenes, Kerosene, Oxylene, ultrapure water Tartaric acid Toluene Porpan-2-ol High purity Argon gas High purity Nitrogen gas High purity air Analytical Balance (LC-0.1mg) Inductively Coupled Plasma Atomic Emission Spectrometer Nebulizer Peristaltic pump Platinum or Silica crucible/dish Hot plate Electric Muffle furnace
20.	Heavy metals (as Cu), Table 1, Sl. No. xx	As per Annex-M of IS 12540 Spectrophotometer - 10 mm path cells. pH Meter Perchloric Acid - Reagent grade Ammonium Citrate solution Sodium Diethyldithiocarbamate Copper Stock Solution Acid mixture Beakers Water bath Hot plate Distilled water Pipette As per IS 1448 (Part 172) Ultrapure water Hydrochloric acid Conc. Nitric acid Dil. Nitric acid Oil soluble Cadmium, Cobalt or Yttrium Multi element/Organometallic standards Dilution solvent like mixed xylenes, Kerosene, Oxylene, ultrapure water Tartaric acid Toluene Porpan-2-ol

		High purity Argon gas High purity Nitrogen gas High purity air Analytical Balance (LC-0.1mg) Inductively Coupled Plasma Atomic Emission Spectrometer Nebulizer Peristaltic pump Platinum or Silica crucible/dish Hot plate Electric Muffle furnace
21.	pH (5 percent aqueous solution), Table 1, Sl. No. xxi	pH Meter Magnetic Stirrer with Glass Stirring Bars Beaker Pipette Reference Buffer Solutions (Standards pH 4 and 7) Distilled water
22.	Non-volatile matter, Table 1, Sl. No. xxii	Evaporating Dish Warming plate Constant Temperature Oven Desiccator Weighing balance Pair of Tongs Graduated Cylinder Desiccant - indicating type

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

ANNEX B
SCHEME OF INSPECTION AND TESTING

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare and implement a calibration plan for the test equipments.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. PACKING AND MARKING –The Standard Mark as given in the Schedule of the license shall be marked on each container, provided that the material in each container to which this mark is thus applied conforms to every requirement of the specification. Packing and Marking shall be done as per Cl. 5 of the Indian Standard IS 12540:2023.

3.2 If material is supplied in bulk packaging like in tank cars, tank trucks, container ships etc. the Standard Mark as given in Schedule of the licence and Licence Number (i.e. CM/L) shall be incorporated on a test certificate to be provided along with each tank car/tank truck/container ship as per the format at Annexure-1 enclosed, provided always that the product thus marked conforms to all the requirement of the specification. Packing shall be done as per provisions of Indian Standard and the marking details as per Cl 5.2 of IS 12540 : 2023 shall also be indicated on the test certificate.

3.3 The containers shall be suitably marked with letter ‘**TOXIC**’ and with symbol as given in Fig. 5 of IS 1260 (Part 1). The label shall also bear the following clear and legible instruction:

**‘HARMFUL VAPOUR, DO NOT INHALE;
FLAMMABLE KEEP IN COOL PLACE’**

3.4 In addition, the following shall be incorporated on each container and/or on the Test Certificate:

i. BIS Licence No. (CM/L)

ii. BIS website details i.e.–“For details of BIS certification please visit www.bis.gov.in

4. CONTROL UNIT –For the purpose of this scheme, Acrylonitrile produced in a day shall constitute a control unit.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

6. REJECTIONS – 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 (Levels of Control)
(Para 5 of Scheme of Inspection and Testing)

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Method			No. of Sample	Frequency	Remarks
		Clause	Reference				
3.1	Description	3.1	IS 12540	R	Firm to have adequate in-process controls to ensure compliance to this parameter of the Indian Standard and appropriate records shall be maintained for evidence of conformity		
3.2, Table 1							
Sl. No. i	Distillation range at 760 mm Hg		IS 5298	R	One	Each control unit	
Sl. No. ii	Specific gravity	Annex-B	IS 12540	R	One	Each control unit	
Sl. No. iii	Colour, Pt-Co scale		IS 1448 (Part 178)	R	One	Each control unit	
Sl. No. iv	Refractive index at 25°C		IS 1448 (Part 158)	R	One	Each control unit	Optional test
Sl. No. v	Water content	Annex-C	Annex-C of IS 12540 or IS 1448 (Part 175) or IS 1448 (Part 182)	R	One	Each control unit	
Sl. No. vi	Assay	Annex-D/ E	IS 12540	R	One	Each control unit	
Sl. No. vii	Acetone	Annex-E	IS 12540	S	One	Once in a month	
Sl. No. viii	Acetonitrile	Annex-E	IS 12540	S	One	Once in a month	Not applicable if acrylonitrile obtained from hydrocyanic acid and

							acetylene
Sl. No. ix	Benzene	Annex-E	IS 12540	S	One	Once in a month	
Sl. No. x	Crotononitrile	Annex-E	IS 12540	S	One	Once in a month	Optional test
Sl. No. xi	Methylacrylonitrile	Annex-E	IS 12540	S	One	Once in a month	
Sl. No. xii	Propionitrile	Annex-E	IS 12540	S	One	Once in a month	
Sl. No. xiii	Acrolein	Annex-E	IS 12540	S	One	Once in a month	
Sl. No. xiv	Hydrocyanic acid content	Annex-F	IS 12540	S	One	Once in a month	
Sl. No. xv	Methyl Vinyl Ketone	Annex-G/E	IS 12540	S	One	Once in a month	
Sl. No. xvi	Acetaldehyde content	Annex-H/E	IS 12540	S	One	Once in a month	
Sl. No. xvii	Monomethyl ether of hydroquinone (MEHQ)	Annex-J	IS 12540	S	One	Once in a month	
Sl. No. xviii	Peroxide content	Annex-K	IS 12540	S	One	Once in a month	
Sl. No. xix	Soluble iron content	Annex-L	Annex-L of IS 12540 or IS 1448 (Part 172)	S	One	Once in a month	
Sl. No. xx	Heavy metals (as Cu)	Annex-M	Annex-M of IS 12540 or IS 1448 (Part 172)	S	One	Once in a month	
Sl. No. xxi	pH (5 percent aqueous solution)	Annex-N	IS 12540	R	One	Each control unit	
Sl. No. xxii	Non-volatile matter	Annex-P	IS 12540	R	One	Each control unit	

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval to BO head.

Annexure-1

TEST CERTIFICATE

XYZ COMPANY (REGISTERED OFFICE ADDRESS AND WORKS ADDRESS)

TEST CERTIFICATE FOR ACRYLONITRILE

TEST CERTIFICATE NO. _____ DATED _____

SUPPLIED TO M/s _____ (Name and Address of Consignee)

It is certified that the material described below fully conforms to IS 12540:2023.

The properties of the product, as tested in accordance with the Scheme of Inspection and Testing contained in the BIS Certification Marks Licence No. CM/L___ are as indicated below against each order no. etc.

(PLEASE REFER TO IS 12540:2023 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Control Unit No.	Month & Year of Packaging	Quantity	Requirements																							
				Description	Distillation range at 760mm Hg	Specific gravity	Colour	Refractive index	Water content	Assay	Acetone	Acetonitrile	Benzene	Crotonitrile	Methylacrylonitrile	Propionitrile	pH	Acrolein	Non-volatile matter	Hydrocyanic acid content	Methyl Vinyl Ketone	Acetaldehyde content	Monomethyl ether of Hydroquinone	Peroxide content	Soluble iron content	Heavy metals (as Cu)	Remarks

The material supplied conforms to specified requirements of IS 12540:2023.

REMARKS:

Tank Car / Tank Truck / Container ship no.

MATERIAL SUPPLIED BY

Name and Address of manufacturer:

Recognized Trade Mark if any:

Symbol given in Fig. 5 of IS 1260 (Part 5) and the words "HARMFUL VAPOUR, DO NOT INHALE, FLAMMABLE, KEEP IN COOL PLACE".

(Signature)
For XYZ Company**"For details of BIS certification please visit www.bis.gov.in"**

