



उत्पाद मैनुअल
इथाइलीन ग्लाइकॉल – विशिष्टि
IS 5295: 2023 के अनुसार

**PRODUCT MANUAL FOR
ETHYLENE GLYCOL - SPECIFICATION
ACCORDING to IS 5295: 2023**

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 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.	मानक संख्या IS No.	:	IS 5295: 2023
	शीर्षक Title	:	इथाइलीन ग्लाइकॉल - विशिष्टि ETHYLENE GLYCOL- SPECIFICATION
	संशोधनों की संख्या No. of Amendments	:	01
2.	नमूना दिशानिर्देश Sampling Guidelines:		
a)	कच्चा माल Raw material	:	No specific requirement.
b)	समूहीकरण दिशानिर्देश Grouping guidelines	:	कृपया Annex-A देखें Please see Annex – A
c)	नमूने का परिमाण Sample Size	:	500 ml
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request		Name of the product: 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	:	कृ पया Annex-B देखें Please see Annex – B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	कृ पया Annex-C देखें Please see Annex – C
5.	एक दिन में संभावित परीक्षण Possible tests in a day :		
	All tests are possible in a day		
6.	लाइसेन्स का कार्यक्षेत्र /Scope of the Licence:		
	IS 5295: 2023 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 5295: 2023 with the following scope:		
	उत्पाद का नाम Name of the product	इथाइलीन ग्लाइकोल ETHYLENE GLYCOL	
	ग्रेड Grade	i) General Grade - 99 % purity; and/or ii) Fibre Grade - 99.7 % purity	

BUREAU OF INDIAN STANDARDS
MANAK BHAWAN,
9, BAHADUR SHAH ZAFAR
MARG, NEW DELHI – 110002

ANNEX A
TO THE PRODUCT MANUAL FOR
ETHYLENE GLYCOL -SPECIFICATION
AS PER IS 5295: 2023

GROUPING GUIDELINES

1. Ethylene Glycol has been classified into following 2 Grades (clause 3):

(i)	General Grade - 99 % purity
(ii)	Fibre Grade - 99.7 % purity

2. The manufacturer shall declare the Grade of the product they intend to cover in the scope of licence.
3. The sample of each grade of Ethylene Glycol to be drawn and shall be subjected to testing, for considering grant of licence/inclusion of that type.
4. It shall be ensured that the firm is having all the necessary manufacturing and testing facilities for the manufacture and testing of the grades to be included in the licence.
5. During the operation of licence, BO shall ensure that all the types of Ethylene Glycol, covered in the license are drawn for independent testing on rotation over a period of time.

ANNEX B
LIST OF TEST EQUIPMENT
(INDICATIVE LIST, FOR GUIDANCE ONLY)

Sr. No.	Tests used in with Clause Reference	Test equipment
1.	Color, Hazen units, Cl.4.2, Table 1	<u>Method A of Annex-B-1 of IS 5295</u> <u>Apparatus</u> Spectrophotometer, volumetric flask, volumetric pipettes (1, 2 and 10 ml), Erlenmeyer flask (1000 ml, glass stopper), cuvette (50 mm) <u>Reagents</u> Cobalt Chloride, Potassium chloroplatinate, Hydrochloric acid (concentrated, specific gravity – 1.19), Platinum-Cobalt reference standards, Platinum-Cobalt stock solution OR <u>Method B of Annex-B-1 of IS 5295</u> <u>Apparatus</u> Nessler cylinder (two, 100 ml capacity), One-mark volumetric flask (250 ml and 500 ml) <u>Reagents</u> Cobaltous Chloride Hexahydrate solid, Hydrochloric acid, Chloroplatinic acid
2.	Relative density at 20 °C, Cl.4.2, Table 1	<u>As per B-2</u> <u>Apparatus</u> Relative density bottle, 25 ml capacity, Water bath, Thermometer, Weighing balance. OR Digital density meter OR <u>As per 1448 (Part 167)</u> <u>Apparatus</u> Density meter, circulating constant-temperature bath, temperature sensor, Homogenizer <u>Reagents</u> Flushing Solvent, ammonium peroxydisulfate, calibration fluid, Water (conforming to ISO 3696 grade 2 or better)..
3.	Distillation Range, Cl.4.2, Table 1	Distillation flask of 200 ml capacity, Thermometer, Electric Heater/ Gas Burner/ Other Flame Type Heater, Rectangular Draught Screen, Liebig Condenser, Receiver Barometer

4.	Moisture Content, Cl.4.2, Table 1	<u>Method as per Annex B-3 of IS 5295 (cross-referred to IS 2362)</u> <u>Apparatus</u> Karl Fischer Titrator, Weighing balance, Micro burette, Pipette, Titration Vessel <u>Reagents</u> Methanol, 2-Methoxyethanol (Ethylene Glycol Monomethyl Ether), Iodine, Pyridine, Sulphur Dioxide, Karl Fischer Reagent, Sodium Tartarate (crystalline), Water-Methanol Standard Solution - 10 mg/ml, Water-Methanol Solution – approximately 2 g/l, Aluminium Sodium Silicate/Activated Silica Gel, Silicone Base Grease OR <u>Method as per IS 1448 (Part 175):2020/ISO 6296: 2000</u> <u>Apparatus</u> Karl Fischer titrator using potentiometric end-point., Non-aerating mixer, Syringes (of glass, with needles of suitable length such that the tip can reach under the surface of the anolyte when inserted through the inlet-port septum), Balance capable of weighing to ± 0.1 mg, Volumetric flask, Sealable bottles or desiccators, Ovens, Cooling bath, Thermometer <u>Reagents and materials</u> Molecular sieve pellets (type 4A), Xylene, Karl Fischer reagents (Pyridine-containing Karl Fischer reagent, Pyridine-free Karl Fischer reagent, Karl Fischer reagent specially formulated for ketones), Sodium dioctylsulfosuccinate, Methanol, N-ethyl piperidine, Titration solvent for pyridine-containing Karl Fischer reagent, Titration solvent for pyridine-free Karl Fischer reagent, Titration solvent for Karl Fischer reagent specially formulated for ketones OR <u>Method as per IS 1448 (Part 182):2020/ISO 12937: 2000</u> <u>Apparatus</u> Automatic coulometric Karl Fischer titrator, Non-aerating mixer, Syringes (of glass, with needles of suitable length such that the tip can reach under the surface of the anolyte when inserted through the inlet-port septum) Balance capable of weighing to ± 0.1 mg, Volumetric flask, Sealable bottles or desiccators, Ovens, Cooling bath, Thermometer <u>Reagents and materials</u> Molecular sieve pellets (type 4A), Xylene, Karl Fischer reagents, Anode electrolyte solution (anolyte), Cathode electrolyte solution (catholyte), Single Karl Fischer solution, Sodium dioctylsulfosuccinate,
----	-----------------------------------	--

5.	Acidity, Cl.4.2 Table 1	<u>Method as per Annex B-4 of IS 5295</u> <u>Apparatus</u> 500 ml conical flask, 25 ml capacity graduated burette and Weighing balance <u>Reagents</u> Standard Sodium Hydroxide solution (0.01 N), Phenolphthalein indicator
6.	UV Transmittance, Cl.4.2, Table 1	<u>Method as per Annex B-5 of IS 5295</u> <u>Apparatus</u> UV spectrophotometer, Ultra-violet Light Source, Silica Cells (1 cm) <u>Reagents</u> Ethylene glycol and distilled water.
7.	Freezing point, Cl.4.2 Table 1	<u>Method as per Annex B-6 of IS 5295 (cross-referred to Method B of IS 1448 (Part 11))</u> <u>Apparatus</u> Jacketed Sample tube, Collar (Collar type A, Collar type B) Stirrer, Vacuum flask, Thermometer. <u>Reagents</u> Coolant {Propan-2-ol or Methanol or Acetone or Ethanol, Carbon dioxide(solid) / dry ice or Nitrogen (liquid)}, Nitrogen gas or dry air, Fibre glass (commercial grade, for use in moisture-proof collar B), Dehydrating agent {(Calcium sulfate or Silica gel (1.7mm))}
8.	Iron Content, Cl.4.2 Table 1	<u>Method as per Annex B-7 of IS 5295</u> <u>Method A Determination of iron content by using thioglycolic acid</u> <u>Apparatus</u> Nessler cylinders 100 ml capacity <u>Reagents</u> Thioglycolic acid, Concentrated Ammonia (relative density 0.90), Ferrous ammonium sulphate, Standard iron solution, Distilled Water OR <u>Method B Determination of iron content by using 1, 10-phenonthroline</u> <u>Apparatus</u> UV-Vis spectrophotometer, Cuvette (10 mm or 50 mm) <u>Reagents</u> Hydrochloric acid, Hydroxylamine hydrochloride (10 percent), Ammonium acetate – acetic acid solution, 1,10-Phenonthroline solution (0.3 percent), Iron standard solution (1 000 mg/kg)

9.	Chlorides Content, Cl.4.2 Table 1	<u>Method as per Annex-B-8 of IS 5295</u> <u>Method A(Determination of chloride by turbidity method)</u> <u>Apparatus</u> Turbidity meter, Turbidity cell, Nessler tube (capacity 100 ml), Volumetric flask, <u>Reagents</u> Nitric acid, Silver nitrate, Sodium chloride, Chloride free water, ultra-pure water or triple distilled water, Chloride standard solution (1 ml = 5.58 µg chloride ion) OR <u>Method B (Determination of chloride by microprocessor-based potentiometric auto titrator)</u> <u>Apparatus</u> Potentiometric autotitrator, Magnetic stirrer with PTFE coated stirring bar, Analytical balance 0.1 mg readability, Oven with accuracy ± 5 °C temperature, Glasswares (volumetric flasks, measuring cylinders, pipettes) <u>Reagents</u> Nitric acid, Silver nitrate, Sodium chloride, Hydrochloric acid, Isopropyl alcohol, Acetone, Glacial acetic acid, Standard Silver Nitrate Solution OR <u>Method C (Determination of chloride by ion-chromatography)</u> <u>Apparatus</u> Ion chromatograph as per Cl B-8.4.2.1, Analytical balance (capable of weighing 220 g to the nearest 0.000 1 g), Pipettes (capable of measuring from 100 µl to 10 ml), Filter (0.2 µm), Plastic syringes (5 ml and 10 ml), Volumetric flasks (100 ml), Plastic cups. <u>Reagents</u> Sodium carbonate, Sodium bicarbonate, Sodium chloride, Sodium Hydroxide
10.	Diethylene Glycol, Cl.4.2 Table 1(See Note 1)	<u>Apparatus</u> Gas chromatograph (Any gas chromatograph equipped with flame ionization detector (FID), a split/split less injector and a suitable electronic integrator/software), GC column, Analytical Balance, minimum capacity 220 g capable of weighing to the nearest 0.1 mg, Syringe <u>Reagents</u> Monoethylene Glycol, 99 percent purity, minimum and Diethylene Glycol, 99 percent purity, minimum
11.	Purity, Cl.4.2 Table1	<u>Apparatus</u> Gas chromatograph (any gas chromatograph equipped with flame ionization detector (FID), a split/splitless injector and a suitable electronic integrator/software), GC column, Analytical Balance (minimum capacity 220 g capable of weighing to the nearest 0.1 mg), Syringe. <u>Reagents</u> Monoethylene Glycol (99 percent purity, minimum) and Diethylene Glycol (99 percent purity, minimum)

12.	Aldehyde as HCHO	<u>Apparatus</u> UV-VIS Spectrophotometer, Analytical Balance capable of weighing 200 g to the nearest 0.000 1 g, Stopwatch, Volumetric Flask (50 ml and 100 ml), Pipettes (1 ml, 2 ml, 5 ml, 10 ml and 20 ml), Cuvette (10 mm), <u>Reagents</u> 3-Methyl-2-benzothiazone Hydrazone Hydrochloride (MBTH), Ferric Chloride, Methanol or Acetone, Formaldehyde, Hydrochloric Acid
-----	------------------	---

ANNEX-C
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 entire quantity of the material of the same grade produced in a continuous run in one day, 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**.

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/empaneled 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 container and on the label applied to the container. 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 <insert the place where marking can be done>:

- a) "For BIS certification details please visit www.bis.gov.in"
- b) *Any other requirement not specified in the Indian Standard*

4. 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)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
4.1	Colour, Freedom for suspended matter and miscibility with water at 20°C	4.1	IS 5295	R	1	Each Control unit	
4.2 and Table 1	Color, Pt-Co	B-1	IS 5295	R	1	Each Control unit	
4.2 and Table 1	Relative density at 20°C /20 °C	----	IS 1448 (Part 167)	S	1	Once a Month	
4.2 and Table 1	Distillation Range at 760 mm Hg	----	IS 5298	S	1	Once a Month	
4.2 and Table 1	Moisture Content	B-3 of IS 5295:2023	IS 5295 (IS 2362) or IS 1448 (Part-175) or IS 1448 (Part-182)	R	1	Each Control unit	
4.2 and Table 1	Acidity (As Acetic Acid)	B-4	IS 5295	R	1	Each Control unit	
4.2 and Table 1	Ultra-Violet Transmittance in 1 cm cell	B-5	IS 5295	R	1	Each Control unit	Applicable only for Fibre Grade

4.2 and Table 1	Freezing point of equal volumes of material and water	B-6	IS 5295	S	1	Once a Month	Applicable only for General Grade
4.2 and Table 1	Iron Content	B-7	IS 5295	R	1	Each Control unit	Applicable only for Fibre Grade
4.2 and Table 1	Chlorides Content	B-8	IS 5295	R	1	Each Control unit	Applicable only for Fibre Grade
4.2 and Table 1	Purity	B-9	IS 5295	R	1	Each Control unit	
4.2 and Table 1	Diethylene Glycol content	B-9	IS 5295	R	1	Each Control unit	Applicable only for Fibre Grade
4.2 and Table 1	Aldehyde as HCHO	B-10	IS 5295	R	1	Each Control unit	Applicable only for Fibre Grade

Appendix-1

TEST CERTIFICATE

XYZ COMPANY (REGISTERED OFFICE ADDRESS AND WORKS ADDRESS)

TEST CERTIFICATE FOR ETHYLENE GLYCOL

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 5295: 2023.

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

(PLEASE REFER TO IS 5295: 2023 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order no and date	Name of the material	Test	Requirement	Observed value	Control Unit/ Batch Number	Month and Year of manufacture	Quantity	Remarks
		Colour, Freedom for suspended matter and miscibility with water at 20°C						
		Color, Hazen units/Pt-Co						
		Relative density at 20/20 °C						
		Distillation Range at 760 mm Hg						
		Moisture Content						
		Acidity (As Acetic Acid)						
		Freezing point of equal volumes of material and water						
		UV Transmittance in 1 cm cell						
		Iron Content						
		Chlorides Content						
		Diethylene Glycol content						
		Purity						
		Aldehyde as HCHO						

The material supplied conforms to specified requirements of IS 5295: 2023.

REMARKS:

Tank Car / Tank Truck / Container ship no.

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