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उत्पाद मैनुअल

पालीएल्युमीनियम क्लोराइड
IS 15573: 2018 के अनुसार

**PRODUCT MANUAL
FOR POLYALUMINIUM CHLORIDE
ACCORDING TO IS 15573: 2018**

नियम 2018 की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरणके प्रचलन में रीति और पारदर्शिता के सुसंगत 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.	मानक संख्या IS No.	: IS 15573 : 2018
	शीर्षक Title	: Polyaluminium Chloride
	संशोधनों की संख्या No. of amendments	: 03
2.	नमूना दिशानिर्देश Sampling Guidelines	
a)	कच्चा माल Raw material	When medium, and high basicity Polyaluminium chloride (PAC) is manufactured by a process using PAC concentrate having high alumina content for example, PAC-18; then PAC-18 must be produced in-house using virgin materials and stored properly away from direct sunlight and heat to avoid its degradation and contamination. Undertaking/Declaration in this regard shall be submitted by manufacturer. 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 Grouping Guidelines	: Sample of PAC in each form (liquid/powder) and each grade (medium/high basicity) shall be tested for covering the respective form and grade in scope of licence.
c)	नमूने का परिमाण Sample Quantity	: For Powder: 750 grams For Liquid: 750 ml 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)
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	1. Form 2. Grade/Type 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	: Please refer-ANNEX-A
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	: Please refer-ANNEX-B
5.	एक दिन में संभावित परीक्षण Possible tests in aday	
	a) Specific gravity b) Bulk density c) pH of 5percent solution d) Relative basicity e) Insoluble matter f) Determination of Aluminium Oxide g) Chloride h) Viscosity(dynamic)	
6.	लाइसेंस का दायरा /Scope of the Licence:	
	“Licence is granted to use Standard Mark as per IS 15573:2018 with the followingscope:	
	Name of the product	Polyaluminium chloride
	Form	Liquid/Powder
	Grade/Type	Medium/High basicity (to be mentioned for each form)

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN,9, BAHADUR SHAH ZAFAR MARG,
NEW DELHI-110002

ANNEX – A**LIST OF TEST EQUIPMENTS*****(INDICATIVE LIST, FOR GUIDANCE ONLY)***

Sl. No.	Tests Used In With Clause Reference	Test Equipment
1.	DETERMINATION OF ALUMINIUM OXIDE, Cl. 5.1 & Annex A	Weighing Balance, LC-1mg Measuring jar Distilled water Volumetric flask Conical flask Weighing bottle Bunsen burner/hot plate Watch glass pHmeter/pHpaper Burette Stand Glass rod Pipette -20ml Beaker -250ml Nitric acid (1:12) EDTA(M/20) Ethylene diamine tetra acetic acid disodium salt dihydrate Sodium acetate buffer solution- Sodium acetate trihydrate Glacial acetic acid Xylenol orange indicator a)0.1% Solution Xylenol orange (w/v) b) Powder Xylenol orange mixture Mortar Xylenol orange Potassium nitrate Hydrochloric acid AR grade Zinc solution(M/50) Zinc metal pellets (AR grade) Hydrochloric acid Water bath Sodium hydroxide solution Heater
2.	DETERMINATION RELATIVE BASICITY , Cl. 5.1 & Annex-B	Weighing balance, LC1mg Measuring jar Pipette ,25ml Burette Watch glass Stand Volumetric flask, 1000ml, 500ml Funnel PE/PP Bottle flask

		Filter paper Glass dropper Glass rod Hot air oven Water bath Crucible Desiccator Bunsen burner/hot plate Weighing bottle Conical flask, 250ml Stopper Distilled water Potassium fluoride solution (50%) Anhydrous potassium fluoride Non-Carbonic water Redistilled water Ethyl alcohol solution of Methyl red- Bromocresol green Methyl red Bromocresol green Ethyl alcohol (95% (w/v)) Ethyl alcohol solution of phenolphthalein (0.5% w/v) Ethyl alcohol Phenolphthalein Sodium hydroxide (N/50) Anhydrous sodium carbonate AR Grade-99.9% purity Sodium hydroxide-AR grade Hydrochloric acid solution (N/2) Conc. Hydrochloric acid AR grade
3.	DETERMINATION OF CHLORIDE CONTENT, Cl. 5.1 & Annex-C	Weighing balance, LC1mg Measuring jar Distilled water Glass dropper Volumetric flask-100ml 500ml Erlenmeyer flask-300ml Beaker-100ml Burette Pipette -25ml Stand Hot air oven Desiccator Crucible Brown bottle Conical flask Conc. Nitric acid (Sp.gr 1.42) Dil. Nitric acid Mixed indicator solution Crystalline diphenyl carbazone Bromophenol blue powder Methyl alcohol (95%) Standard sodium chloride solution (0.1N) Sodium chloride (AR/GR) Mercuric nitrate solution (0.1N) Mercuric Nitrate monohydrate Acidified water (5:1)

4.	DETERMINATION OF SULPHATE, Cl. 5.1 & Annex D	Weighing balance, LC 1mg Measuring jar Distilled water Hydrochloric acid solution 4N approx.. Barium chloride solution-10%(w/v) Silver nitrate solution Beaker-250ml pHpaper/pHmeter Hot plate/Bunsen burner Glass dropper Crucible Filter paper Thermometer Hot air oven
5.	DETERMINATION OF SPECIFIC GRAVITY, Cl. 5.1 & Annex E	Specific gravity hydrometer, scalerange:1.1 -1.3 Glass cylinder having no distortion Weighing balance Glass mercurial thermometer, LC0.5°C Range :-10 to 110°C Agitating rod
6.	DETERMINATION OF BULK DENSITY, Cl. 5.1 & Annex F	Rubber base pad Glass funnel with 12.5mm dia Weighing balance Stoppered measuring glass cylinder, LC 1ml 100ml Narrow head spatula
7.	DETERMINATION OF MERCURY, Cl. 5.1 & Annex G	<u>Mercury analyser method:</u> Weighing balance Distilled water Measuring jar Mercury analyser (Cold vapor atomic absorption spectrophotometry) Nitric acid-10%,5%,2%(v/v) Conc. Hydrochloric acid Stannous chloride solution-20%(w/v) in10% HCl Stannous chloride Hydrochloric acid Tin metal pellet Hot plate/Bunsen burner Potassium permanganate solution-4%(w/v) Conc. Sulphuric acid Potassium permanganate Volumetric flask Hydroxylamine hydrochloride-10%(w/v) Mercuric chloride AR grade Potassium dichromate-1% Glass dropper <u>Alternate Method:</u> As per G-2 of IS 15573:2018 by Atomic Absorption spectrophotometer with suitable metal hydride system

8.	DETERMINATION OF ARSENIC, Cl. 5.1 & Annex H	Distilled water Weighing balance Measuring jar Hot air oven Desiccators Nitric acid(1.40g/ml) Dihydrogen dioxide 30% Sulphuric acid Hydrochloric acid(0.2mol/l) Ammonium sulphate Arsenic stock solution Arsenic reference solution Inductively coupled plasma atomic emission spectrometer. 308,215nm Sample bottles-250ml,500ml Beaker Volumetric flask-1000ml Filter funnel Pipette Acid dispenser Membrane filtration equipment & filter Alternate Method-ICP-AES as prescribed in IS 3025 (Part 2) Referee Method- As per H-2 of IS 15573:2018 by Atomic Absorption spectrophotometer as per method given in IS 3025(Part 37)
9.	DETERMINATION OF CADMIUM, Cl. 5.1 & Annex J	Distilled water Weighing balance Measuring jar Hot air oven Desiccators Nitric acid Dihydrogen dioxide 30% Sulphuric acid Hydrochloric acid(0.2mol/l) Ammonium sulphate Cadmium stock solution Cadmium reference solution Inductively coupled plasma atomic emission spectrometer, 226,502nm Sample bottles-250ml,500ml Beaker Volumetric flask-1000ml Filter funnel Pipette Acid dispenser Membrane filtration equipment & filter Pore size-0.45µm Alternate Method- As per J-2 of IS 15573:2018 by ICP-AES as prescribed in IS 3025(Part 2)
10.	DETERMINATION OF LEAD, Cl. 5.1 & Annex K	Measuring Jar Weighing balance Distilled water Nessler cylinder-100ml Volumetric flask-1000ml

		Standard lead solution Lead nitrate Acetic acid -1N Hydrogen sulphide gas Referee Method- As per K-2 of IS 15573:2018 by Atomic Absorption spectrophotometer as per method given in IS 3025(Part 47) Alternate Method- As per K-3 of IS 15573:2018 by ICP-AES as prescribed in IS 3025(Part 2)
11.	DETERMINATION OF IRON, Cl. 5.1 & Annex L	Weighing balance Measuring jar Distilled water Conc. Hydrochloric acid AR grade(35-37%) Potassium permanganate solution Potassium permanganate Volumetric flask-1000ml,100ml Ammonium thiocyanate solution Ammonium thiocyanate-10g Dil. Sulphuric Acid(1:5) Standard Iron solution Ferrous Ammonium sulphate hexahydrate AR Dil. Sulphuric acid Glass rod Nessler cylinder-100ml Micropipette Alternate Method- As per L-3 of IS 15573:2018 by ICP-AES as prescribed in IS 3025(Part 2) Referee Method- As per L-2 of IS 15573:2018 by Atomic Absorption spectrophotometer as per method given in IS 3025(Part 53)
12.	DETERMINATION OF MANGANESE, Cl. 5.1 & Annex M	Measuring jar Weighing balance Distilled water Nessler cylinder Volumetric flask Beaker-100ml Dil. Nitric acid (1:1) Dil. Phosphoric acid (1:1) Potassium periodate powder AR grade Conc. Sulphuric acid AR grade Standard Manganese Solution Manganese sulphate monohydrate Sulphuric acid-1ml Hot plate/Bunsen burner Distilled water Weighing balance Membrane filtration equipment & filter Pore size-0.45µm Referee Method:- As per M-2 of IS 15573:2018 by Atomic Absorption Spectrophotometer, as per IS 3025

		(Part 59) Alternate Method- As per M-3 of IS 15573:2018 by ICP-AES as prescribed in IS 3025(Part 2)
13.	DETERMINATION OF CHROMIUM, Cl. 5.1 & Annex N	Weighing Balance, LC1mg Measuring jar Distilled water Sulphuric acid(1:1,1:9) Phosphoric acid(1:5) Diphenyl carbazide reagent Diphenyl carbazides Phthalic anhydride Ethanol Bromine water potassium iodide solution Sodium hydroxide solution-30% Neutral sodium sulphite solution Potassium dichromate(AR grade) Conc. Hydrochloric acid (AR grade) Aluminium solution Aluminium metal HCl Hot air oven Hot plate/Bunsen burner Beaker -250ml,100ml Volumetric flask Pipette Glass dropper pHpapper/meter Sintered glass crucible Filter paper Glass rod Spectrophotometer at 540nm Referee Method- As per N-2 of IS 15573:2018 by Atomic Absorption spectrophotometer as per method given in IS 3025(Part 53) Alternate Method- As per N-3 of IS 15573:2018 by ICP-AES as prescribed in IS 3025(Part 2)
14.	DETERMINATION OF SELENIUM, Cl. 5.1 & Annex P	Distilled water Weighing balance LC 1mg Measuring jar Hot air oven Desiccators Nitric acid Dihydrogen dioxide 30% Sulphuric acid Hydrochloric acid(0.2mol/l) Ammonium sulphate Selenium stock solution Seleniumreference solution Inductively coupled plasma atomic emission spectrometer Sample bottles Beaker Volumetric flask-1000ml

		Filter funnel Pipette Acid dispenser Membrane filtration equipment & filter, Pore size-0.45µm Alternate Method- As per P-1 of IS15573 by ICP-AES IS 3025(Part 2)
15.	DETERMINATION OF TOTAL ORGANIC CONTENT, Cl. 5.1 & Annex Q	Total organic carbon analyser Potassium hydrogen phthalate(AR) Weighing balance LC 1mg Measuring jar Distilled water Sodium hydroxide(AR) Sodium carbonate(AR) Sodium hydrogen carbonate Sodium persulphate-30% Hydrochloric acid/ortho phosphoric acid Volumetric flask Beaker -500ml pH meter Crucible Desiccator TOC free water Furnace
16.	DETERMINATION OF INSOLUBLE MATTER, Cl. 5.1 & Annex R	Weighing balance LC 1mg Measuring jar Distilled water Beaker 400ml Oven Filter paper Gooch/sintered glass crucible Hot air oven
17.	DETERMINATION OF PH, Cl. 5.1 & Annex S	Weighing Balance LC 1mg Measuring Jar pH meter Glass electrodes Distilled water
18.	DETERMINATION OF VISCOSITY, IS 6213 (4)	a) Cupraammonium Method Distilled Water Measuring Jar Weighing Balance Constant temperature bath with temperature range-20±0.2°C Alkali resistant viscosity tube 10mm dia I-270 mm Copper sulphate-500g Volumetric flask Magnetic hot plat with stirrer Liquor ammonia Stock bottle Conical flask-250ml Nitric acid(1:1) Bromine water Barium Chloride solution Ammonium hydroxide solution Glacial acetic acid Potassium iodide 30%

		Sodium thiosulphate solution Pipette Burette Stand Starch indicator Hydrochloric acid 0.5N Methyl Red Solution Stainless Steel Tube Rammer Cork b) Cupriethylenediamine Method Cylinder of nitrogen ga-0.14 to 0.21kgf/cm³ Constant temperature bath –suited for holding fensike pipettes Viscosity pipette Dissolving tube Stirrer, stainless steel rod-3mm dia Sodium hydroxide Ethylenediamine ,technical grade Copper sulphate Ammonium hydroxide Litmus paper Refrigerator Sodium hydroxide Phenolphthalein Barium chloride Rotary shaker Volumetric Flask-250ml Sulphuric acid Burette Stand Sodium thiosulphate solution Starch indicator Ammonium Cyanide Methyl orange indicator Viscometer motor (Spindles are attached to shaft) IS 9316 (2) Beaker -85mm internal dia, 600ml capacity Water bath Glass rod
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Annex B

SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that during operation of BIS licence, manufacturers will implement a Quality Assurance Plan (QAP) 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 (QAP) defining the control unit (i.e. lot/batch etc.), the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and declare the arrangement for testing i.e. whether in-house or subcontracting/sharing for each applicable test and submit the same to BIS Branch Office for information. The manufacturer shall comply with the QAP and maintain test records in accordance with para 2.1.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: entire quantity of Polyaluminium Chloride of the same form and grade manufactured from the same consignment of raw materials in a reaction vessel at a time.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**. Manufacturer has the discretion of declaring their own levels of control or accept the levels of control given in this document.

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.

2. ENSURING COMPLIANCE THROUGH TESTING- manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard for which they may have in-house test facilities. However, there is no obligation to maintain in-house laboratory. Licensee may use alternative arrangements for tests of the production as per the declared QAP. Various alternatives are available for operation of BIS certification as given below and the relevant guidelines for availing such relaxations by the manufacturers, as amended from time to time, are to be referred:

- i) Shared testing resources like common facility,
- ii) Cluster based testing facility,
- iii) Sub-contracting to outside laboratories which may either be:
 - a) BIS recognised/empanelled laboratories, or
 - b) Any accredited laboratory as per ISO/IEC 17025

2.1 TEST RECORDS- The manufacturers shall maintain test records for the tests carried out (either in-house or at a sub-contracted or at shared test facility) to establish conformity of the product to the Standard for operation of licence. For the tests being subcontracted or conducted at a shared test facility, test results issued by the laboratories or test facilities, shall be made 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 of Polyaluminium chloride provided always that

the material in each container to which this mark is thus applied conforms to every requirement of the specification.

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

3.2 **Additional Marking requirements:** The container of the material shall also be marked with the following additional requirement.

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

4. REJECTION - 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
(Recommended Levels of Control By BIS- For Guidance Only)

(1)				(2)		
Test Details				Levels of Control		
Clause	Requirements	Test Method		No. of Samples	Frequency	Remarks
		Clause	Reference			
5.1, 5.1.1, & 5.1.2	Description	5.1	IS 5573:2018	One	Firm to have adequate in-process controls to check compliance of this parameter. However, appropriate records shall be maintained by the manufacturer for evidence of conformity	
5.2 & Table 1	Aluminium as Al ₂ O ₃	Annex A	-do-	-do-	Each control unit	
	Relative Basicity	Annex B	-do-	-do-	-do-	
	Chloride as Cl	Annex C	-do-	-do-	-do-	
	Sulphate as SO ₄	Annex D	-do-	-do-	-do-	
	Specific Gravity at 25 ⁰ C	Annex E	-do-	-do-	-do-	
	Viscosity (Dynamic) at 20°C	--	IS 9316 (Pt2) IS 6213 (Pt4)	-do-	-do-	
	Bulk Density	Annex F	IS 15573:2018	-do-	-do-	
	Mercury (as Hg)	Annex G	- do-	-do-	-do-	
	Arsenic (as As)	Annex H	- do-	-do-	Once in a month	
	Cadmium (as Cd)	Annex J	- do-	-do-	-do-	

	Lead (as Pb)	Annex K	- do-	-do-	Each control unit	
	Iron (as Fe)	Annex L	- do-	-do-	Once in a month	
	Manganese (as Mn)	AnnexM	- do-	-do-	-do-	
	Chromium as (Cr)	Annex N	- do-	-do-	-do-	
	Selenium (as Se)	Annex P	- do-	-do-	-do-	
	Total organic carbon (TOC)	Annex Q	- do-	-do-	-do-	
	Insolubles, percent by mass	Annex R	- do-	-do-	Each control unit	
	pH of 5% solution	Annex S	- do-	-do-	-do-	

Appendix-1**TEST CERTIFICATE**

XYZ COMPANY (REGISTERED OFFICE ADDRESS AND WORKS ADDRESS)
TEST CERTIFICATE FOR POLYALUMINIUM CHLORIDE

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 15573:2018 .

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 15573:2018 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
		Aluminium as Al ₂ O ₃						
		Relative Basicity						
		Chloride as Cl						
		Sulphate as SO ₄						
		Specific Gravity						
		Viscosity (Dynamic) at 200C						
		Bulk Density						
		Mercury (as Hg)						
		Arsenic (as As)						
		Cadmium (as Cd)						
		Lead (as Pb)						
		Iron (as Fe)						
		Manganese (as Mn)						
		Chromium as (Cr)						
		Selenium (as Se)						
		Total organic carbon (TOC)						
		Insolubles, percent by mass						
		pH of 5% solution						

The material supplied conforms to specified requirements of IS 15573:2018 .

REMARKS:

Tank Car / Tank Truck / Container ship no.

(Signature)
 For XYZ Company

MATERIAL SUPPLIED BY

Name and Address of manufacturer:

Recognized Trade Mark if any:

“Corrosive liquid, irritating to eyes; in case of contact, rinse immediately with plenty of water and seek medical advice. On contact with skin, wash immediately with plenty of water, immediately take off all the contaminated clothing. Wear suitable gloves and eyes and face protection devices, while handling the material.”

“For details of BIS certification please visit www.bis.gov.in”