PRODUCT MANUAL FOR SULPHURIC ACID ACCORDING TO IS 266:1993

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.	**Product**		**SULPHURIC ACID**
	Title		**IS 266:1993**
	No. of Amendments		2
2	**Sampling Guidelines**		
	a	**Raw Material**	**NA**
	b	**Grouping Guidelines**	Sample Shall be tested for each Type to cover respective type
	c	**Sample Size**	**2×500ml**
3	**List of Test Equipments**		Please refer-ANNEX-A
4	**Scheme of Inspection and Testing**		Please refer-ANNEX-B
5	**Possible Test in a Day**		a) Total acidity b) Residue on ignition c) Oxidizable impurities d) Organic matter e) Nitrates f) Chlorides g) Manganese h) Ammonia
6	**Scope of the Licence**		License is granted to use standard mark on **SULPHURIC ACID** as per **IS 266:1993 with the following scope**
	Name of the product		**Sulphuric Acid**
	Grades		**a) Technical** **b) Battery(Concentrated and Dilute)** **c) Chemically Pure** **d) Analytical reagent**

ANNEX A

LIST OF TEST EQUIPMENTS

SL.NO	TEST DETAILS	CL.NO	NAME OF EQUIPMENTS,CHEMICALS & GLASSWARES
1	TOTAL ACIDITY	4.2& A-2	Lung-Rey Pipette
			Burette
			Stand
			Volumetric flask
			Sodium Hydroxide
			Methyl red indicator
			Distilled water
			Ethanol
			Weighing balance
			Conical flask-500ml
			Sulphuric acid
2	RESIDUE ON IGNITION	4.2& A-3	Sulphuric acid
			Weighing balance
			Platinum/Silica dish of 10ml
			Sand bath
			Desiccator
			Electric furnace
			Temperature
			Stopwatch
3	IRON	4.2& A-4	
		A-4.1	**METHOD 1(Bipyridyl method)**
			Photometer / Photoelectric Colorimeter
			Dil.Hydrochloric acid
			Sand bath
			Distilled water
			2'2'-Bipyridyl solution
			Beaker -100ml
			2'2'-bipyridyl
			Standard Iron Solution A
			Ferrous Ammonium Sulphate
			Conc.Sulphuric acid
			Volumetric Flask-1000ml
			Standard Iron solution B
			Ammonium Acetate
			Hydroxyl Ammonium Chloride
			Volumetric Flask-100ml
		A-4.2	**METHOD 2(Thiocyanate Method)**
			Hydrochloric acid
			Potassium Permanganate
			Ammonium Thiocyanate
			Mixture of Amyl Alcohol&Acetate(1:1)v/v

			Standard Iron Solution B
			Standard Fe Solution A-100ml
			Volumetric Flask-1000ml
		For Battery and Chemically Pure Grade	
			Nessler cylinder
			Potassium permanganate
			Ammonium thiocyanate
			Amyl alcohol and acetate mixture
			Measuring jar
			Distilled water
		For Technical Grade	
			Standard Fe Solution B
			Measuring jar
			Weighing balance
			Nessler cylinder
			Potassium permanganate
			Ammonium thiocyanate
			Mixture of Amyl alcohol l& Acetate
			Distilled water
		For Analytical Reagent Grade	
			Platinum dish/silica dish-100ml
			Weighing balance
			Sand bath
			Hydrochloric acid
			Distilled water
			Potassium permanganate
			Ammonium thiocyanate
			Mixture of Amyl alcohol & Acetate
4	CHLORIDE	4.2& A-5	Dil.Nitic acid
			Silver Nitrate
			Std.Chloride Solution
			Sodium Chloride
			Distilled water
			Oven
			Volumetric Flask-1000ml
			Weighing balance
			Nessler Cylinder
			Measuring jar
5	LEAD	4.2& A-6	**METHOD1(colorimetric determination) IS 7017:1973**
			Distilled water
			Nessler cylinder-50ml (as per IS 4161:1967)
			Standard Lead solution
			Lead nitrate
			Nitric acid
			Volumetric flask-1000ml

			Dil .Ammonium hydroxide
			Triammonium citrate/citric acid
			Dithizone
			Chloroform
			Hydroxylamine Hydrochloride
			Carbon tetrachloride
			pHpaper
			Filter paper
			Volumetric flask -100ml
			Weighing balance
			Measuring jar
			Thymol blue indicator
			Rectified spirit
			Separating funnel
			Beaker-250ml
			Method B (A-6.1)
			Petridish
			Dil .Hydrochloric acid
			Distilled water
			Dil.Ammonia solution
			Hydrogen sulphide gas
			Standard lead solution
			Dil.Acetic acid
			Volumetric flak-100ml
			Measuring jar
			Weighing balance
6	ARSENIC	4.2& A-7	
			Distilled water
			Conical flask-100ml
			Conc. Hydrochloric acid
			Potassium iodide solution
			Stannous chloride solution
			Zn granules(0.5 to 1.0mm)
			Standard Arsenic Stock Solution(Arsenic trioxide,NaOH solution ,Beaker, Volumetric flask-1000ml)
			Silver diethyldithiocarbamate Solution(Silver diethyl dithiocarbamate,water white pyridine, pyridine ,beaker,Stoppered glass bottles)
			Impregnated absorbent cotton wool
			Connecting tube
			Spectrophotometer/Photometric absorbptiometer
			Absorption tube
7	OXIDIZABLE IMPURITIES	4.2& A-8	Potassium permanganate
			Measuring jar
			Conical flask-250ml
			Distilled water

			Burette
			Pipette
			Stand
			Ice
8	ORGANIC MATTER	4.2& A-9	Beaker
			Sulphuric acid
			Bunsen flame
9	NITRATES	4.2& A-10	Conc.Hydrochloric acid(as per IS 265:1993)
			Distilled water
			Measuring jar
			Diphenylamine solution(diphenylamine & nitrogen free sulphuric acid,water)
			Beaker
			Heater
10	AMMONIA	4.2& A-11	Sodium hydroxide Solution
			Nessler Solution
			Potassium iodide
			Distilled water
			Glass rod
			Measuring jar
			Mercuric chloride
			Potassium hydroxide
			Bottle
			Well-fitting rubber stopper
			Weighing balance
			Ammonium chloride
			Volumetric flask-1000ml
			Ice
11	SELENIUM	4.2& A-12	Conc. Hydrochloric acid
			Sodium sulphite
			Standard Selenium solution
			Conc. Nitric acid
			Volumetric flask-1000ml
			Petri dish
			Distilled water
			Dil.Selenium free Sulphuric acid
		For Battery Grade Concentrated Acid	
			Test tube
			Con .Hydrochloric acid
			Ice
			Sodium sulphite
			Weighing balance
			Measuring jar
		For Battery Grade Dilute Acid	
			Test tube

			Con.Hydrochloric acid
			Weighing balance
			Measuring jar
			Standard Selenium Solution
12	MANGANESE	4.2& A-13	Conc.Nitric acid(as per IS 264:1976)
			Potassium periodate
			Potassium permanganate
		For Battery Grade Conc. Acid	
			Conc.Nitric acid
			Weighing balance
			Measuring jar
			Potassium periodate
			beaker
		For Battery Grade Dil.Acid	
			Weighing balance
			Measuring jar
			Potassium permanganate
			Conc.Nitric acid
13	COPPER	4.2& A-14	Platinum/silica dish
			Temperature
			Desiccators
			Weighing balance
			Sand bath
			Electric furnace
			Nessler cylinder-50ml
			Conc.Hydrochloric acid(as per IS 265:1993)
			Ammonium hydroxide (density 0.90)
			Cupric sulphate
			Distilled water
			Volumetric flask -1000ml
			Steam bath
			Filter paper
			Funnel
14	ZINC	4.2& A-15	Nessler cylinder-100ml
			Sulphuric acid
			Hydrogen sulphide gas
			Ammonium hydroxide(density 0.90)
			Citric acid solution
			Ammonium thiocyanate
			Hydrochloric acid(density 1.20)
			Potassium Ferrocyanide
			Standard Zinc Solution
			Volumetric flask-1000ml
			Weighing balance
			Pure Zinc
			Calcium Carbonate

			Silica dish
			Filter paper
			Funnel
15	NITRATES,NITRITES & AMMONIA	4.2& A-16	Nessler cylinder-50ml
			Citric acid
			Filtration assemblies
			Sodium hydroxide
			Devada's alloy(45 parts Al,50 parts Cu,5parts Zn)
			Hessian crucible
			Copper
			Electric furnace
			Iron rod
			Lid to cover crucible
			Dil.Hydrochloric acid
			Nessler solution(Potassium iodide ,Mercuric chloride, distilled water,)
			Standard Ammonium Chloride Solution
			Weighing balance
			Volumetric flask-1000ml
			Distilled water
			Conical flask-500ml
			Distillation head & condenser(distillation set up)
16	ANTIMONY	4.2& A-17	Hydrogen Sulphide
			Mercuric Chloride Test Paper
			Dil. Ammonium Hydroxide
			Con. Sulphuric Acid
			Standard Antimony solution
			Antimony potassium tartarate
			Weighing balance
			Volumetric flask-1000ml
			Distilled water
			Sodium sulphite
			Conc.Hydrochloric acid(as per IS 265:1993)
		For Battery Grade Conc. Acid	
			Measuring jar
			Filter paper-9cm(quantative filter paper)
			Funnel
			Daylight/artificial light
			Temperature 60°C
			Mercuric Chloride Test paper strip
			Standard Antimony Solution
			Ammonium Hydroxide
			Hydrogen Sulphide Gas
			Conc.Sulphuric acid
			Beaker -250ml
			Distilled water
			Sodium Sulphite

			Hydrochloric acid
			Boiling tubes
			Volumetric flask-50ml
			Aliquot
		For Battery Grade Dilute Acid	
			Measuring jar
			Distilled water
			Weighing balance
			Filter paper -9cm(quantative filter paper)
			Hydrogen Sulphide
			Day light/artificial light
			Standard Antimony Solution
			Temperature 60°C
			Mercuric Chloride test paper strip
			Conc. Sulphuric acid
			Dil .Ammonium hydroxide
17	PLATINUM	4.2& A-18	Aqua Regia(Conc.HCl acid &Con. Nitric acid)
		For Battery Grade Conc. Acid	
			Measuring jar
			Weighing balance
			Porcelain evaporating dish
			Sand bath
			Aqua regia
			Watch glass
			Steam bath
			Thin Asbestos paper
			Crucible tongs
			Bunsen flame
		For Battery grade Dil.acid	
			Measuring jar
			Weighing balance
			Porcelain evaporating dish
			Sand bath
			Aqua regia
			Steam bath
			Watch glass
			Thin Asbestos paper
			Crucible tongs
			Bunsen flame

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

ANNEX-B

SCHEME OF INSPECTION AND TESTING

FOR CERTIFICATION OF SULPHURIC ACID

(ACCORDING TO IS 266:1993)

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

1.1 The Manufacturer shall prepare a calibration plan for test equipment

2. TEST RECORDS- All records of analysis and tests shall be kept in suitable forms approved by the Bureau of Indian Standards. Copies of any records that may be required by BIS shall be made available at any time on request.

3. LABELLING AND MARKING – As per requirement of IS 266:1993.

4. CONTROL UNIT -For the purpose of this scheme, the total quantity of the acid of one grade produced during the day and thoroughly homogenized shall be considered as 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.

6. HYGIENIC CONDITIONS –Wherever applicable**,** hygienic conditions shall be complied in day to day production and quality control activities. Schedule for each activity for this purpose shall be displayed prominently in the factory premises and records of compliance shall be maintained.

7. REJECTION –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.

SULPHURIC ACID

TABLE -1

(Para 6 of Scheme of Inspection And Testing)

1				2	3		
TEST DETAILS				TEST EQUIPMENT REQUIREMENT	LEVELS OF CONTROL		
CLAUSE	REQUIREMENTS	TEST METHOD					
		CLAUSE	IS REFERENCE		NO.OF SAMPLES	FREQUENCY	REMARKS
4.1	Description		266:1993	R	One	One Control Unit	Sample shall be drawn from storage container after homogenizing the contents. A day's production of acid shall constitute a control unit
4.2	Total Acidity	A-2	-do-	R	One	One Control Unit	
-do-	Residue on ignition	A-3	-do-	R	-do-	-do-	
-do-	Iron(Fe)	A-4	-do-	R	-do-	-do-	
-do-	Chlorides(Cl)	A-5	-do-	R	-do-	-do-	
-do-	Lead(Pb)	A-6	-do-	R	-do-	-do-	
-do-	Arsenic(As)	A-7	-do-	R	-do-	-do-	
-do-	Oxidizable impurities(SO_2)	A-8	-do-	R	-do-	-do-	
-do-	Organic matter	A-9	-do-	R	-do-	-do-	
-do-	Nitrate(NO_3)	A-10	-do-	R	-do-	-do-	
-do-	Ammonia(NH_3)	A-11	-do-	R	-do-	-do-	
-do-	Selenium(Se)	A-12	-do-	R	-do-	-do-	
-do-	Manganese(Mn)	A-13	-do-	R	-do-	-do-	
-do-	Copper(Cu)	A-14	-do-	R	-do-	-do-	
-do-	Zinc(Zn)	A-15	-do-	R	-do-	-do-	
-do-	Nitrate, Nitrite and Ammonia as Nitrogen(N)	A-16	-do-	R	-do-	-do-	
-do-	Antimony	A-17	-do-	R	-do-	-do-	
-do-	Platinum	A-18	-do-	R	-do-	-do-	

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: The control unit and levels of control as decided by the Bureau are obligatory, to which the licensee shall comply with.