PRODUCT MANUAL
FOR ZINC SULPHATE HEPTAHYDRATE, AGRICULTURAL GRADE
ACCORDING TO IS 8249 : 2019

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**	:	**IS 8249 : 2019**
	Title	:	**Zinc Sulphate Heptahydrate, Agricultural Grade**
	No. of Amendments	:	Nil
2.	**Sampling Guidelines:**		
a)	**Raw material**	:	Please see clause 6 of SIT
b)	**Grouping guidelines**	:	NA (No varieties for the product mentioned in IS)
c)	**Sample Size**	:	500 gm
3.	**List of Test Equipment**	:	Please refer ANNEX – A
4.	**Scheme of Inspection and Testing**	:	Please refer ANNEX – B
5.	**Possible tests in a day :**		
	i. Zinc (as Zn), percent by mass ii. pH of 5% solution iii. Matter insoluble in water, percent by mass		
6.	**Scope of the Licence :**		
	“Licence is granted to use Standard Mark as per IS 8249 : 2019 with the following scope:		
	Name of the product	**:**	Zinc Sulphate Heptahydrate, Agricultural Grade

BUREAU OF INDIAN STANDARDS
Manak Bhawan, 9, Bahadur Shah Zafar Marg,
New Delhi – 110002

ANNEX – A

TO PRODUCT MANUAL FOR ZINC SULPHATE HEPTAHYDRATE, AGRICULTURAL GRADE ACCORDING TO IS 8249 : 2019

List of Test Equipments required to test as per the requirement of Indian Standard

Sr. No.	Test Equipment and chemicals	Test used in with clause reference
1.	Dilute Sulphuric acid-10 %, Water bath for boiling, Gooch crucible/sintered glass crucible (G No. 4), Analytical balance (0-200 g, LC- 0.01 mg), Oven (capable of operating at 110 $\pm$ 5^{0}C), Standard Glassware.	Matter insoluble in water Cl 3.2, Table 1 (Annex F of IS 8249)
2.	**Method I (Ethylene Diamine Tetra acetate Method):** Dilute Sulphuric acid – 1:100), Ammonium sulphate – AR grade, Hydrochloric acid (1:1), Sodium Hydroxide Solution – 1N, Methyl Orange indicator – 0.05 %, Methyl red indicator, Ethanol, Hydrogen Sulphide generator, ,EDTA solution – 0.01 M, Zinc Ion Solution -0.1M, Buffer Solution – pH 10, Erichrome Black T indicator, Analytical Balance (0-200 g, LC-0.01 mg) , Whatman No. 42 filter paper, Water bath, Standard Glassware. **Method II (Modified EDTA Method):** Disodium Ethylene Diamine Tetraacetate (EDTA), Standard Zinc Solution, Ammonium Hydroxide — 20 percent (m/m), Ammonium Chloride — AR grade, Sodium Cyanide — AR grade, Sodium Chloride — AR grade, Eriochrome Black T Indicator Mixture, Formaldehyde-Acetic Acid Solution (4 Percent), Hydroxyiamine Hydrochloride — AR grade, Analytical Balance (0-200 g, LC-0.01 mg), Standard Glass ware. **Method III (Absorption Spectrophotometric Method) :** Standard Zinc Solution, Analytical Balance (0-200 g, LC-0.01 mg), Watch glass, Whatman No. 42 filter paper, atomic absorption Spectrophotometer, Standard glass ware.	Zinc (as Zn) Cl 3.2 & Table 1 (Annex A of IS 8249)
3.	Standard Lead Solution, One Percent Nitric Acid Solution, Twenty Percent Zinc Sulphate Solution,	Lead (as Pb) Cl 3.2, Table 1

	atomic absorption spectrophotometer, Analytical Balance (0-200 g, LC-0.01 mg), Standard Glassware.	(Annex D of IS 8249)
4.	**Atomic Absorption Spectrophotometric Method**: Standard Copper Solution, Analytical Balance (0-200 g, LC-0.01 mg), atomic absorption spectrophotometer Standard Glassware.	Copper (as Cu) Cl 3.2, Table 1 (Annex C of IS 8249)
5.	**Atomic Absorption Spectroscopic Method:** Strontium Chloride, Standard Magnesium Solution, Analytical Balance (0-200 g, LC-0.01 mg), atomic absorption spectrophotometer Standard Glassware.	Magnesium (as Mg) Cl 3.2 & Table 1 (Annex B of IS 8249)
6.	pH meter, Analytical balance ((0-200 g, LC-0.01 mg), Arrangement for boiling water,	pH of 5% solution Cl 3.2, Table 1 (Annex E of IS 8249)
7.	Analytical balance (0-200 g, LC-0.01 mg), carbon disulphide, soxhlet apparatus, Oven capable of operating at 60 to 70 ^{0}C, Carbon tetra chloride, Nitric acid, Hot plate, Concentrated Hydrochloric acid, Bromophenol blue, Ammonium hydroxide, Barium Chloride, Steam bath, Asbestos on Gooch crucible previously ignited at 8'10°C or Whatman No. 42 paper, Muffle furnace (capable of operating at 800^{0}C).	Sulphur (as S) Cl 3.2, Table 1 {Cl 5.3 of IS 6092 (Part 5)}
8.	Beaker, 250 ml capacity, Volumetric Flask, 100 ml and 1 000 ml capacity, pH Meter, Atomic Absorption Spectrophotometer, Standard Cadmium Solution, Analytical balance ((0-200 g, LC-0.01 mg), Glass Distilled Water of pH 2.5 ± 0.5	Cadmium (as Cd) Cl 3.2, Table 1 (Annex G of IS 8249)
9.	**Silver diethyldithiocarbamate method:** Evolution and absorption apparatus , Spectrophotometer - with 10 mm cells, Lead acetate solution, Dry lead acetate paper, Absorbent cotton wool saturated with lead acetate, Mercuric bromide solution, Sensitized mercuric bromide paper strips, Dilute sulphuric acid - approximately 5 N, Concentrated hydrochloric acid, Potassium iodide solution - 15 percent, Stannous chloride solution, Zinc, Sodium hydroxide solution - approximately 20 percent, Standard arsenic trioxide solution, Silver diethyldithiocarbamate solution.	Arsenic (as As) Cl 3.2, Table 1 {cl 5.3 of IS 6092 (Part 6)}

List above is indicative only and may not be taken as exhaustive.

ANNEX - B

SCHEME OF INSPECTION AND TESTING FOR ZINC SULPHATE HEPTAHYDRATE, AGRICULTURAL GRADE ACCORDING TO IS 8249 : 2019

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 a calibration plan for the test equipments.

2. TEST RECORD - 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 licence, shall be stenciled/printed on each container of Zinc Sulphate Heptahydrate or printed on the label applied to it, as the case may be, provided always that the material in each container to which this mark is thus applied, conform to every requirement of the specification.

3.1 Packing and Marking – The material shall be packed and marked as per clause 4.1 and 4.2 of the Indian Standard. In addition, the following details shall be mentioned on each container legibly and indelibly:

a) BIS Licence No. CM/L_____.
b) BIS website details i.e – "For details of BIS certification please visit www.bis.gov.in".

3.2 Handling and Storage - The handling and storage of the material shall be in accordance with IS 5985, 'Code of Practice for Handling and Storage of Bagged Fertilizers'.

4. Control Unit – For the purpose of this Scheme, the entire quantity of the material produced in a day shall constitute a control unit.

4.1 In case the material produced is not to be sold directly and is to be stored for sale during season, the following constitute a control unit:

4.1.1 At the time of repacking, the material from the various batches to be mixed together, pulverized/sieved and repacked in new bags as per clause 4.1 of IS 8249. Ten tones of such material/ one day mixing whichever is less shall constitute the new control unit.

5. **Levels of Control** - The tests as indicated in column 2 of Table 1 and the levels of control in column 6 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.

5.2 In case the sample fails in any of the requirements as specified in IS 8249, the entire material in the control unit shall be suitably reprocessed so as to rectify the defects. Such reprocessed material when tested shall satisfy all the requirements of the specification. In case any sample fails, the control unit shall be rejected. Thereafter two samples from each control unit for all requirements except Zinc for which four samples from each control unit shall be tested and the original frequency shall be restored after three consecutive control units show conformity to the requirements of the specification.

6. RAW MATERIAL – Each consignment of raw zinc ash as received shall be tested and analyzed for requirements of zinc, magnesium, copper and lead. In case consignment fails to meet the limits of magnesium, copper and lead as specified in Table 1 of IS 8249, the consignment shall be deemed to be unfit for the manufacture of zinc Sulphate and shall be rejected. The records of such rejection shall be maintained.

7. 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

(1)				(2)	(3)		
Test Details				**Test equipment requirement R: required (or) S: Sub-contracting permitted**	**Levels of Control**		
Cl.	**Requirement**	**Test Method Cl. Ref.**	**Test Method IS**		**No. of Sample**	**Frequency**	**Remarks**
3.1	Description	3.1	IS 8249	R	One	Each Control unit	See clause 5.2 of SIT
3.2 and Table 1							
(i)	Matter insoluble in water	Annex F	-do-	R	One	-do-	
(ii)	Zinc (as Zn)	Annex A	-do-	R	Two *	-do-	See note 3 & clause 5.2 of SIT
(iii)	Lead (as Pb)	Annex D	-do-	R	One	Every seventh control unit	See clause 5.2 of SIT
(iv)	Copper (as Cu)	Annex C	-do-	R	-do-	-do-	
(v)	Magnesium (as Mg)	Annex B	-do-	R	-do-	-do-	
(vi)	pH (5 percent solution)	Annex E	-do-	R	-do-	Each control unit	
(vii)	Sulphur (as S)	5.3	IS 6092 (Part 5)	R	-do-	-do-	
(viii)	Cadmium (as Cd)	Annex G	IS 8249	S	-do-	Every seventh control unit	
(ix)	Arsenic (as As)	5.3	IS 6092 (Part 6)	S	-do-	-do-	

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. Subcontracting 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 by BO Head.

Note-3: The representative samples shall be prepared by drawing the material from five different places in the batch. (*) The value of zinc obtained in both the samples shall not be less than the minimum specified value of the standard.