



**PRODUCT MANUAL FOR
ARTIFICIAL LIGHTWEIGHT AGGREGATE FOR CONCRETE –
SINTERED FLY ASH COARSE AGGREGATE
ACCORDING TO IS 9142 (PART 2) : 2018**

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 9142 (Part 2) : 2018
	Title	: Artificial lightweight aggregate for concrete – Sintered fly ash coarse aggregate
	No. of Amendments	: NIL
2	Sampling Guidelines:	
a)	Raw Material	: Fly ash – Clause 6 of IS 9142 (Part 2) : 2018
b)	Grouping guidelines	: Please refer Annex A
c)	Sample Size	: (a) Sintered Fly Ash Coarse Aggregate – 60 kg (b) Fly ash – 5 kg [For testing as per clause 6 of IS 9142 (Part 2) : 2018]
3	List of Test Equipment	: Please refer Annex B
4	Scheme of Inspection and Testing	: Please refer Annex C
5	Possible tests in a day	: Please refer Annex D
6	Scope of the Licence:	
	Licence is granted to use Standard mark on Artificial Lightweight Aggregate for Concrete — Sintered Fly Ash Coarse Aggregate as per IS 9142 (Part 2) : 2018 with the following scope	
	Type	Single sized - 10 mm/ 12.5 mm/ 16 mm/ 20 mm
		Graded - 12.5 mm/ 16 mm/ 20 mm

ANNEX A

Grouping Guidelines

1. Artificial lightweight aggregate for concrete – Sintered fly ash coarse aggregate covered under IS 9142 (Part 2) : 2018 are classified as given below based on grading:
 - a) Single sized - 10 mm/ 12.5 mm/ 16 mm/ 20 mm
 - b) Graded - 12.5 mm/ 16 mm/ 20 mm
2. Following grouping guideline has been developed for GoL/CSoL:
 - a) Sample of any size of coarse aggregate from any type (Single size/Graded) shall be tested for all requirements to cover all sizes of Single size and Graded coarse aggregate.
3. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
4. During the operation of the Licence, BO shall ensure that all the varieties covered in the Licence are tested in rotation, to the extent possible.

ANNEX B**List of Test Equipment***Major test equipment required to test as per the Indian Standard*

S. No.	Tests used in with Clause Reference	Test Equipment
1	Grading (Clause 4)	- IS sieves - 2.36 mm , 4.75 mm , 10 mm, 12.5 mm, 16 mm, 20 mm and 40 mm
		- Weighing balance
		- Sieve shaker with pans
2	Bulk density (Clause 5)	- Cylindrical Metal Measures of 3 ltr, 15 ltr & 30 ltr capacity
		- Weighing balance
		- Tamping Rod of minimum 16 mm in diameter and 60 mm long.
3	Organic impurities (Clause 6.3)	- Graduated clear glass medicine bottle of capacity 350 ml
		- Sodium Hydroxide
		- Tannic Acid
		- Alcohol
4	Clay lumps (Clause 6.4)	- Weighing balance.
		- Suitable Containers
		- IS Sieve 2.36 mm, 4.75 mm , 10 mm, 20 mm and 40 mm
		- Oven
5	Loss on ignition (Clause 6.5)	- Muffle Furnace with thermostatic control
		- Oven
		- Physical balance
		- Crucible – Platinum or Silica
		- IS Sieve 150 micron
		- Tongs
6	Water absorption (Clause 7.1)	- Oven
		- Metal Tray
		- Soft absorbent cloth
		- Weighing balance
		- Water container
		- Wire Basket / Perforated container

7	Sulphate Content (Clause 7.2)	- IS Sieve 50 micron
		- Muffle Furnace
		- Oven
		- Glassware: Volumetric Flask, Beaker, Measuring Cylinder, Burette, Conical Flasks, Pipette
		- Hydrochloric acid
		- Glass rod
		- Barium chloride
		- Physical balance
		- Washing bottle
		- Whatman filter Paper No. 42
		- Hot plate
		- Desiccators with covers & Desiccant
		- Steam Bath
		- Crucible of Platinum or Porcelain
8	Crushing value (Clause 7.3.1)	- Compression Testing Machine
		- Weighing balance
		- Steel Cylinder with Plunger and Base plate
		- IS sieve 12.5 mm, 10 mm & 2.36 mm
		- Tamping Rod 16 mm diameter and 45 to 60 cm long
		- Drying Oven with thermostatic control
		- Cylindrical Metal Measures diameter 11.5 cm, Height 18.0 cm
9	Impact value (Clause 7.3.2)	- Aggregate Impact Tester [Clause 4.2, Fig 2- IS 2386(Part 4) : 1963]
		- Weighing balance
		- IS sieve 12.5 mm, 10 mm & 2.36 mm
		- Tamping Rod 10 mm of 230 mm long
		- Oven
		- Cylindrical Metal Measures diameter 75 mm & depth 50 mm
10	Soundness (Clause 7.4)	- Container with arrangement to regulate temperature of sample during the test
		- IS sieve 16 mm, 12.5 mm, 10 mm, 4.75 mm & 2.36 mm
		- Weighing balance
		- Oven
		- Reagents: Sodium Sulphate and Magnesium Sulphate

11	For Sampling	- Mixing Trays- Adequate size
		- Scoops
12	Abrasion Value Clause 7.3.3	- Los Angeles abrasion testing machine
		- 1.70 mm sieve
		- Abrasive charge
13	Drying Shrinkage 7.5	- Fine aggregates zone II of IS 383
		- Steel prism bar moulds 75 × 75 × 300 mm
		- Curing arrangement i.e. Temperature controlled water bath or humidity & temperature controlled cabinet
		- Slum cone test apparatus with tamping rod etc
		- Weighing balance
		- Measuring cylinder

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

ANNEX C

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 a calibration plan for the test equipment.

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

3.0 LABELLING AND MARKING – As per the requirements of IS 9142 (Part 2) : 2018.

4. CONTROL UNIT – Sintered fly ash aggregate manufactured under similar condition of manufacturing in one day from fly ash received from same source 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 Standard 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

(1)				(2)	(3)		
TEST DETAILS				Test equipment requirement R: required (or) S: Sub Contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			Number of sample	Frequency	Remarks
		Clause	Reference				
4	Grading	4, 8.2, Table 1	IS 9142 (Part 2) IS 2386 (Part 1)	R	One	Each control unit	-
5.1	Bulk density	5.1, 8.3	IS 9142 (Part 2) IS 2386 (Part 3)	R	One	Each control unit	-
5.2	Uniformity of mass	5.2	IS 9142 (Part 2)	R	One	Each control unit	-
6	Deleterious Substances						
6.1	Fly ash	6.1 Table 1	IS 9142 (Part 2) IS 3812 (Part 1)	S	One	Once in a month from each source of supply	No testing is required if received with manufacturers test certificate or ISI marked.
6.3	Organic Impurities	6.3, 8.4	IS 9142 (Part 2) IS 2386 (Part 2)	R	One	Once in a month	Additional sample shall be tested whenever there is change in source of supply of fly ash or manufacturing process
6.4	Clay Lumps	6.4, 8.5	IS 9142 (Part 2) IS 2386 (Part 2)	R	One	Once in a month	
6.5	Loss on Ignition	6.5, 8.6 4.2	IS 9142 (Part 2) IS 4032	R	One	Each control unit	-

7	Concrete Making Properties						
7.1	Water Absorption	7.1	IS 9142 (Part 2)	R	One	Each control unit	-
7.2	Sulphate Content	7.2, 8.8, 4.9	IS 9142 (Part 2) IS 4032	R	One	Once in a week	-
7.3	Mechanical Properties						
7.3.1	Crushing Value	7.3.1	IS 9142 (Part 2) IS 2386 (Part 4)	R	One	Each Control Unit	-
7.3.2	Impact Value	7.3.2	IS 9142 (Part 2) IS 2386 (Part 4)	R	One	Each Control Unit	-
7.3.3	Abrasion Value	7.3.3	IS 9142 (Part 2) IS 2386 (Part 4)	R	One	Each Control Unit	-
7.4	Soundness	7.4	IS 9142 (Part 2) IS 2386 (Part 5)	R	One	Once in a month	Additional sample shall be tested whenever there is change in source of supply of fly ash or manufacturing process
7.5	Drying Shrinkage	7.5, 8.7	IS 9142 (Part 2)	S	One	Once in three months	

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

ANNEX D

Possible tests in a day :

- (i) Crushing value (Clause 7.3.1)
- (ii) Impact value (Clause 7.3.2)
- (iii) Abrasion Value (Clause 7.3.3)
- (iv) Grading (Clause 8.2)
- (v) Bulk density (Clause 8.3)
- (vi) Loss on ignition (Clause 8.6)