



**PRODUCT MANUAL FOR
REQUIREMENTS FOR FILTRATION EQUIPMENT- FILTRATION
MEDIA - SAND AND GRAVEL
ACCORDING TO IS 8419 (Part 1):1977**

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 8419 (Part I):1977
	Title	:	REQUIREMENTS FOR FILTRATION EQUIPMENT - FILTRATION MEDIA - SAND AND GRAVEL
	No. of Amendments	:	Nil
2.	Sampling Guidelines:		
a)	Raw material	:	--
b)	Grouping guidelines	:	Please refer ANNEX- A
c)	Sample Size	:	Filtration Sand- 2 kg, Filtration Gravel – 5 kg
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	:	(i) Impurities (%) (Cl 3.1.2) (ii) Loss on Ignition (Cl 3.1.4) (iii) Thin, Flat & Elongated Gravels (% by mass) (Cl 4.1.2)
6.	Scope of Licence	:	Please refer ANNEX – D

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ANNEX A

Grouping Guidelines

1. The guidelines given below shall be followed for GoL/ CSoL of Filtration Media (Sand and Gravel) as per IS 8419 (Part 1): 1977:
 - **Filtration Sand:**
 - (a) Sample of any variety (i.e. Effective Size & Uniformity Coefficient) shall be tested for all requirements to cover filtration sand of all varieties.
 - **Filtration Gravel:**
 - (a) Filtration Gravel is classified into the following groups based on sizes:
 - i) Group 1: Gravel sizes \geq 10mm
 - ii) Group 2: Gravel sizes $<$ 10mm
 - (b) Sample of any gravel size from each group shall be tested for all the requirements to cover all gravel sizes in that group.
2. The Firm shall declare the varieties of Filtration Media (Sand and Gravel) they intend to cover in the Licence. The Scope of Licence may be restricted based on the manufacturing and testing capabilities of the manufacturer
3. During the operation of the Licence, BO shall ensure that all the types and sizes 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*

Sl.no	Test used in with clause reference	Test equipment
1.	Grain Size determination of Filter Gravel (Cl 3.1 of IS 2720 (Pt 4): 1985)	<ul style="list-style-type: none"> - Weighing balance - IS Sieves – 100mm, 80mm, 75mm, 63mm, 37.5mm, 20mm, 19mm, 13.2mm, 9.5mm, 6.7mm, 4.75mm, 2mm, 425 μ) [other sieve sizes may be introduced between the sieves depending upon desired additional information from the analysis] - Rubber Pestle & Mortar - Wooden mallet - Sampler (riffle sampler or sample splitter) - Trays or Buckets, Brushes - Drying Oven - water - Sodium Hexametaphosphate
2.	Grain Size determination of Filter Sand (Cl 4.1 of IS 2720 (Pt 4): 1985)	<ul style="list-style-type: none"> - Weighing balance - IS Sieves- 2mm, 425 μ, 75 μ - Drying Oven - Trays or Buckets, Brushes - Mortar with a rubber covered pestle - Mechanical Sieve Shaker (optional) - Riffler - Sodium Hexametaphosphate or mixture of Sodium Hydroxide and Sodium Carbonate or any other suitable dispersing agent (for wet sieving only) - Water (for wet sieving only) - Pan and lid
3.	Grain Size determination of Filter Sand (Cl 5.1 of IS 2720 (Pt 4): 1985) [Pipette Method (standard method)]	<ul style="list-style-type: none"> - IS Sieves-4.75mm, 2mm, 425 μ, 75 μ & receiver - Sampling Pipette [fig 1 of IS 2720 (Pt 4): 1985] - Glass Sedimentation Tubes - Weighing Bottles - Glass Sedimentation Tubes - Weighing Bottles - Constant Temperature bath

		<ul style="list-style-type: none"> - Stirring Apparatus - Weighing Balance - Oven - Stop watch - Desiccator with Silica Gel - Evaporating dish - Glasswares- Conical Beaker, Funnel, Filter Flask, Measuring Cylinder, Pipette, Buchner Funnel Wash Bottle, Filter papers, Blue Litmus paper, Glass Rod - Thermometer, Distill Water - Reagents – Hydrogen Peroxide, HCl, Sodium Hexametaphosphate, Sodium Carbonate - Rubber Covered Pestle - Arrangement for Lowering the Sampling Pipette (fig 4 of IS 2720 (Pt 4))
<p>4.</p>	<p>Grain Size determination of Filter Sand (Cl 5.2 of IS 2720 (Pt 4): 1985) [Hydrometer Method (Subsidiary Method)]</p>	<ul style="list-style-type: none"> - Hydrometer - Glass Measuring Cylinder with Ground Glass or Rubber Stopper - Thermometer - Water Bath or Constant Temperature Room - Stirring Apparatus - IS Sieves-4.75mm, 2mm, 425 μ, 75 μ & receiver - Weighing balance - Oven - Stopwatch - Glass Desiccator with Silica Gel - Centimeter Scale - Porcelain Evaporating Dishes - Wide Mouth Conical Flask or Conical Beaker - Buchner or Hirsch Funnel - Filter Flask - Measuring Cylinder - Wash Bottles - Filter Papers - Blue Litmus Paper - Glass Rod - Reagents – Hydrogen Peroxide, HCl, Sodium Hexametaphosphate, Sodium Carbonate - Rubber Covered Pestle - Distilled Water

	Grain Size Analysis by Plummet Balance Method (Alternative Method) Cl 5.3 of IS 2720 (Pt 4): 1985)	<ul style="list-style-type: none"> - Plummet Balance - Glass Measuring Cylinder with Ground Glass or Rubber Stopper - Thermometer
5.	Determination of Silica (Cl 3.1.1 of IS 8419 (Pt 1)) & IS 2000 (Pt-2):1985	<ul style="list-style-type: none"> - Weighing Balance - Whatman Filter Paper No.40 - Reagents : <ul style="list-style-type: none"> a) Concentrated Sulphuric Acid b) Concentrated Nitric Acid c) Hydrochloric Acid d) Sodium Carbonate e) Hydrofluoric Acid - Pyrex Beaker - Conical Beaker - Platinum Crucible with lid - Glass Rod - Hot Plate - Filtering Flask - Glass Desiccator with Silica Gel - Stopwatch - Muffle Furnace
6.	Specific Gravity (Cl 3.1.1 & 4.1.1)	<ul style="list-style-type: none"> - Pycnometer with Brass Cone - Stout Airtight Container - Dry Soft Absorbent Cloth - Distilled Water - Shallow Tray - Weighing Balance - Wire Basket - Arrangement to maintain water temperature at 22 -32°C - Glass Vessel or Jar - IS Sieve-10mm - Means of Supplying Warm Air (e.g. Hair Dryer) - Hydrometer - Filter paper & Funnel - Water bath <p>Hot Air Oven</p>
7.	Determination of Impurities (such as Clay, Loam & Silt.) (Cl 3.1.2 - Appendix A)	<ul style="list-style-type: none"> - Measuring Cylinder 1000ml(Calibrated) - Distilled Water
8.	Acid Solubility Test (Cl 3.1.3 & 4.1.3- Appendix B)	<ul style="list-style-type: none"> - Distilled Water - Hot Air Oven - Hydrochloric Acid - Weighing Balance

9.	Loss on Ignition (Cl 3.1.4)	<ul style="list-style-type: none"> - Distilled Water - Hot Air Oven - Muffle Furnace - Weighing balance
10.	Percentage of Thin, Flat or Elongated Gravels (Cl 4.1.2)	<ul style="list-style-type: none"> - Weighing Balance - Caliper
11.	Grain Shape and shape variation - a) Effective Size: (Cl 2.1& 3.2.2) b) Uniformity Coefficient: (Cl 2.2& 3.2.2)	<ul style="list-style-type: none"> - Weighing balance - Mechanical Sieve Shaker - Nylon Sieve Brush - Lab Tray, Bowls& Buckets - Oven - Sieve Set (Brass Frame): 4mm,2 mm,1.4 mm,1.18 mm,1 mm, 850 μ,710 μ,600 μ,500 μ,425 μ,355 μ,300 μ,250 μ,212 μ,180 μ,160 μ,150 μ,125 μ,106 μ,75 μ,63 μ,53 μ (other sizes as required may be added) - Pan and lid (cover)

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 equipments.

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

3. LABELLING AND MARKING – As per the requirement of IS 8419 (Part 1):1977.

4. CONTROL UNIT –

(a) **Filter Sand** – Filter Sand of the same effective size and uniformity coefficient manufactured from a single consignment of raw material from same source, under similar conditions of manufacturing shall constitute a control unit.

(b) **Filter Gravel** – Filter Gravel of the same size manufactured from a single consignment of raw material from same source, under similar conditions of manufacturing 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 Standards 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. No	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Cl No	Requirement				
FILTER SAND							
3.1	Quality Requirements	3.1.1	IS 8419 (Pt 1)	R	One	Once in Month or whenever there is a change of source, whichever is earlier	
		3.1.2, 3.1.4	IS 8419 (Pt 1)	R	One	Each Control Unit	
		3.1.3	IS 8419 (Pt 1)	R		Every alternate Control Unit	
3.2	Grain Shape and Shape variation	3.2.1, 3.2.2	IS 8419 (Pt 1)	R	One	Once in a week or whenever there is a change of source, whichever is earlier	
FILTER GRAVEL							
4.1	Quality Requirements	4.1.1	IS 8419 (Pt 1)	R	One	Once in Month or whenever there is a change of source, whichever is earlier	
		4.1.2	IS 8419 (Pt 1)	R	One	Each Control Unit	
		4.1.3	IS 8419 (Pt 1)	R		Every alternate Control Unit	

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

SCOPE OF LICENCE

Licence is granted to use Standard Mark as per IS 8419 (Part 1):1977 with the following scope	
Name of the product	(a) Filtration Media - Sand (b) Filtration Media - Gravel
Effective Size (mm) & Uniformity Coefficient	(for Filter Sand)
Size (mm)	(for Filter Gravel)