Technical Specification Of

Bio sand Filter (BSF)

Dipak Suppliers

Urlabari - 07 , Morang Nepal

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उर्लावारी-७, आश्रम टोल, मोरङ
मो.नं.: ९८४०२८८६८३
९८०४०९४५३५

प.सं.:
च.नं.: मिति:.....

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BIOSAND FILTER (BSF)

FIGURE 1 : BIO SAND FILTER

Technical Specification

1. Introduction

The **Biosand Filter (BSF)** is an adaptation of the traditional **slow sand filter**, a technology used for community water treatment for nearly **200 years**. The biosand filter is designed for **household-level water treatment** and operates intermittently.

The filter consists of a **container filled with layers of specially prepared sand and gravel** that remove pathogens, suspended solids, and contaminants from water through **biological, physical, and chemical processes**.

The BSF is suitable for **households, rural communities, schools, and emergency water supply systems**.

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2. Filtration and Pathogen Removal Mechanisms

The biosand filter consists of **five functional zones**:

2.1 Inlet Reservoir Zone

2.2 Standing Water Zone

2.3 Biological Zone

2.4 Non-Biological Zone

2.5 Gravel Zone

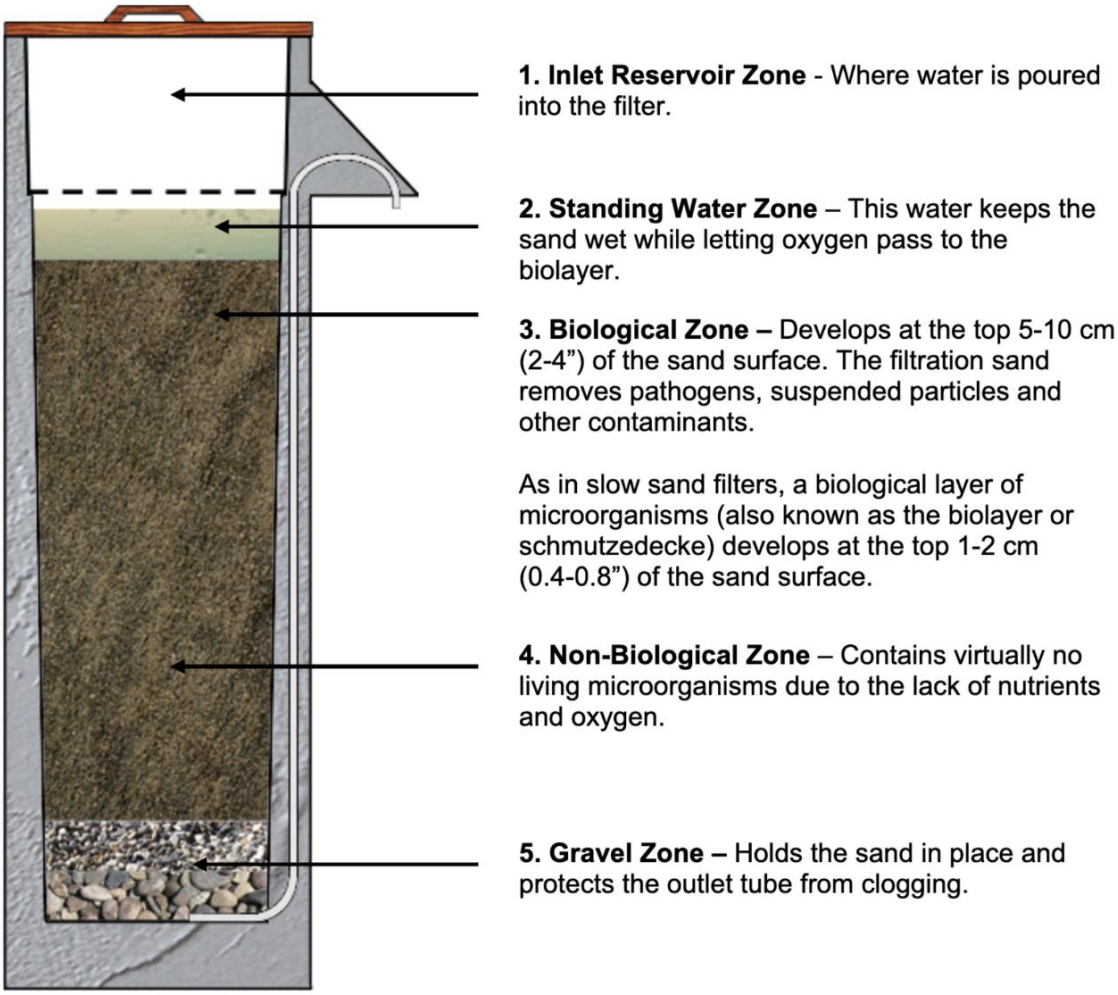

FIGURE 2 : FILTER OPERATING ZONES

Pathogen Removal Process

The biosand filter removes pathogens and suspended solids through **biological and physical processes** occurring in the **biolayer and sand layer**.

- **Mechanical Trapping:** Dirt and microorganisms are trapped between sand particles as water flows through the filter.
- **Predation:** Beneficial microorganisms in the biolayer consume harmful pathogens.
- **Adsorption:** Pathogens stick to sand grains and other particles in the filter.
- **Natural Die-off:** Some pathogens die naturally due to lack of food and oxygen.

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3. Design Specifications

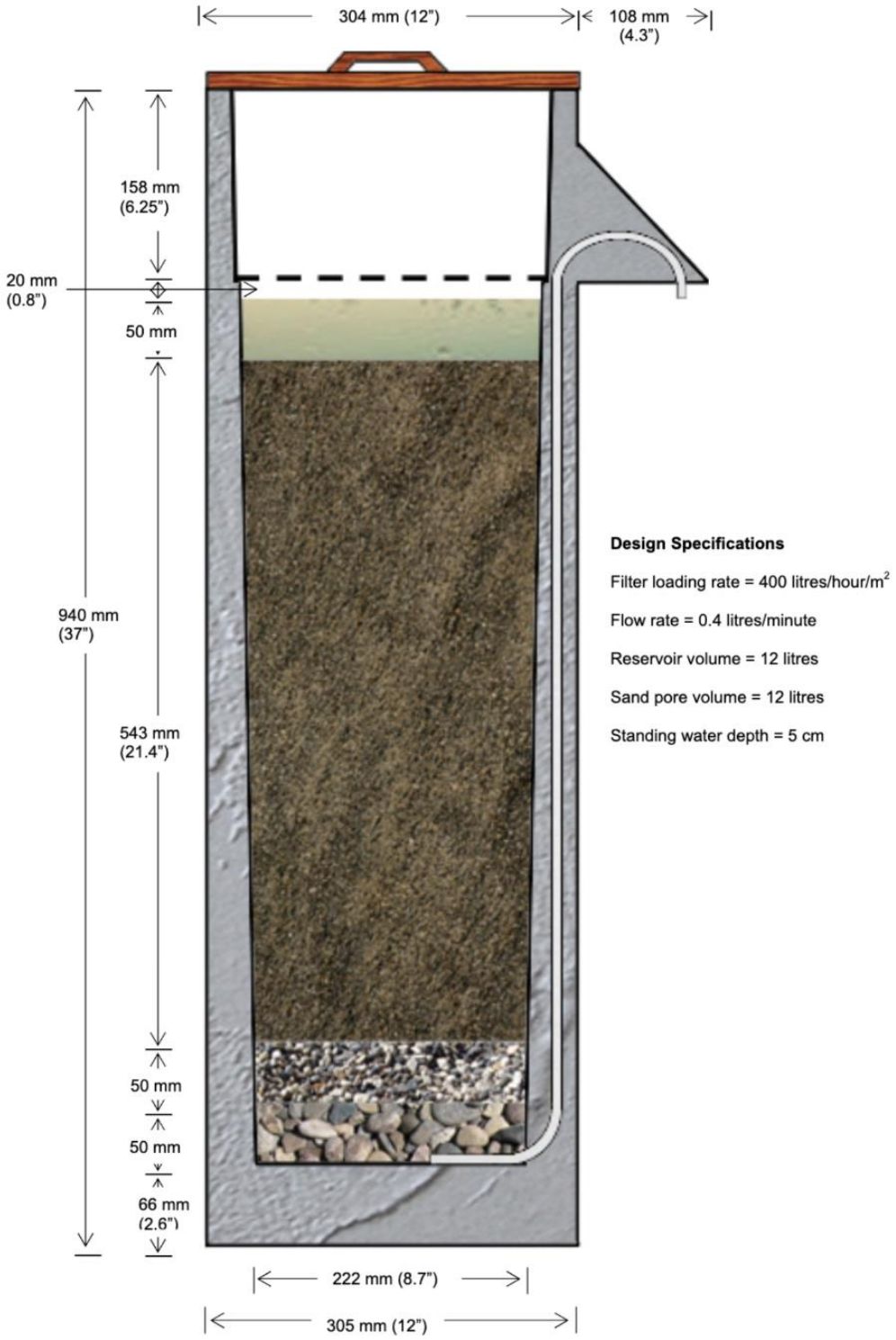

FIGURE 3 : VERSION 10.0 CONCRETE BIOSAND FILTER

Performance Specifications

Parameter	Value
Filter Loading Rate	400 L/hour/m²
Flow Rate	0.4 L/min
Reservoir Volume	12 L
Sand Pore Volume	12 L
Standing Water Depth	5 cm

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4. Filter Media Specifications

Proper grading of sand and gravel is essential for effective filtration.

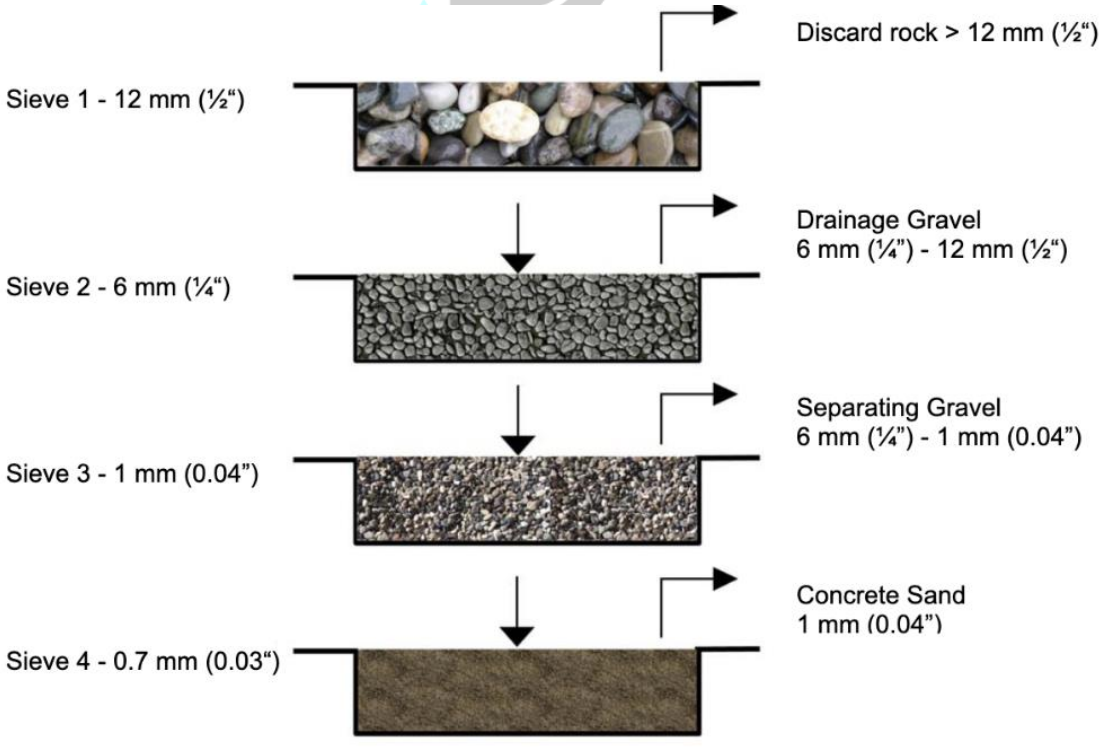

FIGURE 4 :FILTER MEDIA SPECIFICATIONS

5. Maintenance

Maintenance requirements are minimal.

Cleaning Method (Swirl and Dump)

1. Remove diffuser.
2. Stir top sand layer gently.
3. Scoop out dirty water.
4. Replace diffuser.

No removal or replacement of sand is normally required.

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6. Expected Performance

The biosand filter typically removes:

Contaminant	Removal Efficiency
Bacteria	90–98%
Protozoa	99%
Turbidity	80–95%
Helminths	Nearly 100%

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7. Applications

Biosand filters are commonly used in:

- Rural households
- Disaster relief
- Community water systems
- Schools
- Low-income areas

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