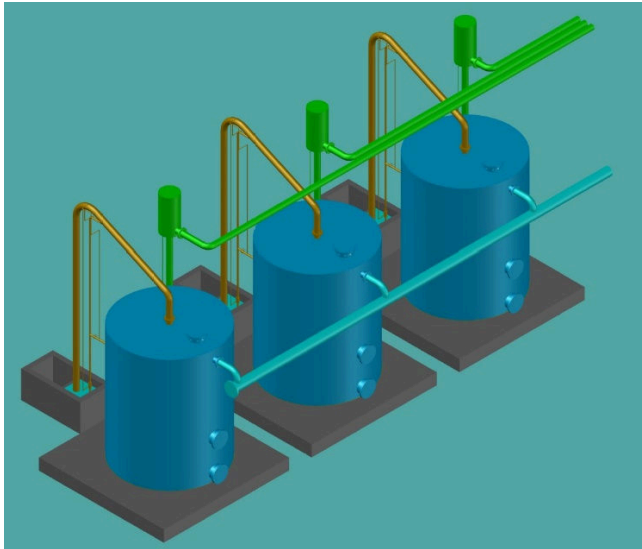


ENGRASAND[®] AUTOMATIC GRAVITY SAND FILTER

**EXCELLENT OPERATION PERFORMANCE
ZERO ENERGY, NO VALVE AND NO STAFF**



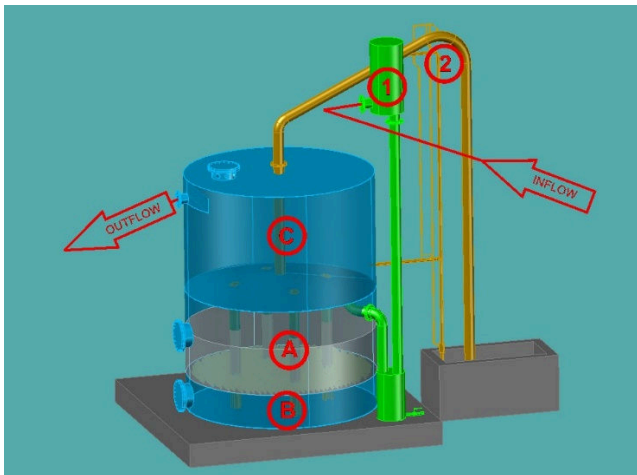
TECHNICAL SPECIFICATIONS



ENGRASAND® automatic gravity sand filter

Endemic automatic gravity sand filter “**ENGRASAND® FILTER**” is an excellent sand filter designed for the purification of water with different characteristics. It requires no energy or personnel, does not use valves, performs self-cleaning operations automatically, and operates fully automatically.

Engrasand® Filter is used for filtration in areas such as cooling towers and tertiary filtration sections of wastewater treatment plants at low loads, such as when the suspended solids concentration is less than 60 mg/L.



Its most important feature is that it operates with zero energy, without valves and without personnel demand.

It can be fed through free flow or with a low-pressure pump.

Engrasand® Filter performs all operational processes fully automatically, without requiring any operational valves.

The **Engrasand® Filter** consists of three hydraulically connected sections:

1. **Filtration Section** – This is where the actual filtration occurs.
2. **Filtered Water Section** – This section collects the filtered water.
3. **Clean Water and Backwash Storage Tank** – Located above the filtration bed, this section holds the clean water and the backwash stock.



ISO 9001:2015



ISO 14001:2015

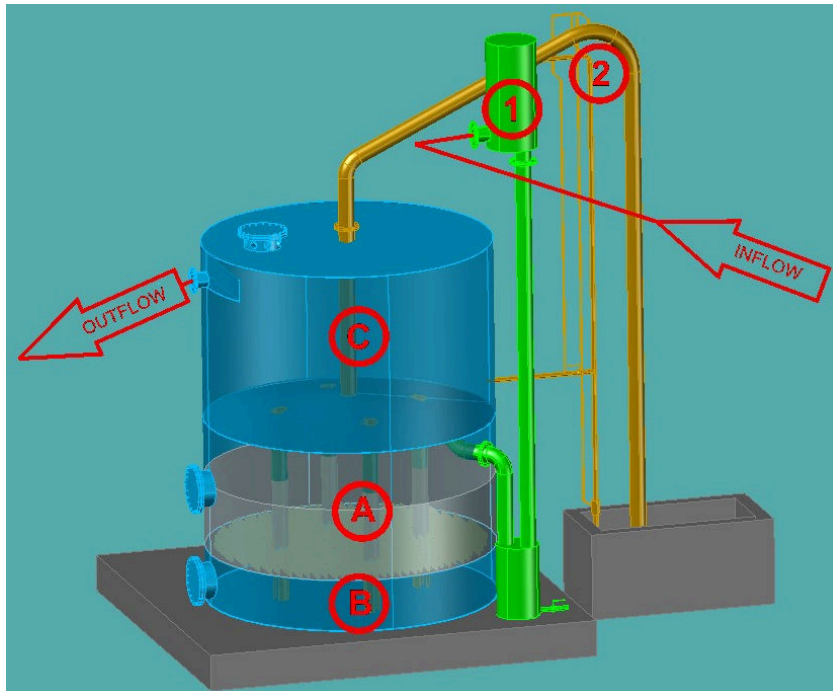


ISO 45001:2018



Endemic holds ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, ISO 10002:2018 and CE certifications as one of its additional steps in providing its customers with the best customer support and a high-quality product. ENGRASAND® is delivered in accordance with the EC Machinery Directive and welded according to European standards.

HOW IT WORKS?



- A) Filtration Bed Compartment
- B) Filtered Water Compartment
- C) Clean Water & Backwash Compartment
- 1) Inlet System
- 2) Venturi & Siphon System

Engrasand® Filter consists of three separate sections that are hydraulically connected to each other. Section 1 is the filtration, section 2 is the filtered water underneath and section 3 is the backwash stock chamber.

Dirty water, arriving through free flow or a low-pressure inlet pump, is processed by the **filtration system (1)**. The backwash process is perfectly automated by the **Venturi-siphon system (2)**.

The filtration process is carried out using downflow filtration principles. Raw water flows into compartment 1 **(A)** and passes through the quartz sand bed to gravity-feed into the filtered water tank **(B)** in compartment 2. From compartment 2, clean water rises through transition pipes to the backwash stock tank **(C)** in section 3. Clean water is discharged from the **Engrasand® Filter** through the weir and outlet pipe located in compartment 3.

During the filtration operation, the filter sand bed becomes contaminated and develops counter pressure. When a certain level of counter pressure is reached, the filter must switch to the backwash operation.

The backwash process is carried out with a simple solution using the rationally designed **Venturi-siphon backwash system (2)**, without the need for washing pumps, airlifts, valve arrangements, or complex automation processes, and without requiring operational personnel.

A backwash siphon is placed on compartment **(A)**. When the Venturi-Siphon system activates the backwash line, a low pressure is created in compartment **(A)**. As a result, the water flow occurs from the bottom to the top over the filter bed.

Particles on the filter bed are rapidly discharged through the backwash line. For this, clean water from compartment **(C)** is used, causing the water level in this tank to drop quickly. The Venturi-siphon backwash line then fills with air again, completing the backwash process.

The rinsing process occurs automatically at the end of the backwash cycle. The filter bed returns to its initial position, and the filtration process resumes.

STRUCTURE MODELS

With the steel structure style, it is produced with CS-epoxy protection and materials AISI304 and AISI 316L, up to a diameter of 8.0 meters.

If requested, the outer shell can be designed and constructed using reinforced concrete, while the internal components will still be manufactured using the steel structure style. In the reinforced concrete structure style, it can also be planned in a prismatic shape. For all flow rates, it can be planned using a prismatic compact structure style.

Engrasand® Filter dimensions are calculated and optimized based on the requested flow rate (m³/h) and suspended solids concentration (mg/L) parameters.

TYPICAL APPLICATIONS

- Cooling Tower Circulation Units
- Urban drinking water treatment plants,
- Urban advanced wastewater treatment plants,
- Process water treatment and recycling plants,
- Surface and groundwater treatment plants,
- Paper and cardboard industry,
- Iron & steel industry,
- Food industry,
- Chemical industry,
- Pharmaceutical industry,
- Mining and mineral industry,
- Energy and thermal power plants,
- Textile industry,
- and other specialized applications.

INLET AND OUTLET PARAMETERS IN DIFFERENT APPLICATIONS

Application area	Inlet Parameters	Outlet Parameters
Wastewater Treatment Plant - Sedimentation Tank Outlet	SS : 35-60 mg/L	SS < 5 mg/L
Drinking Water Treatment Plant - Rinse Tank Outlet	Turbidity : 1-32 NTU	Turbidity < 0,5 NTU
Process Water Plants	SS : 35-60 mg/L	SS < 5 mg/L
Paper Mill Wastewater Treatment Plant	SS : 7- 60 mg/L	SS < 1-5 mg/L
Phosphorus Removal Process	P : 2-6 mg/IL	P < 0,5 mg/L
Resistance to Maximum Sudden Loads	SSmax : 85 mg/L	

BASIC FEATURES OF ENGRASAND® AUTOMATIC GRAVITY SAND FILTER

- It is a free-flow filtration system with superior operational features compared to traditional sand filtration systems,
- No valves are required,
- It has zero energy demand,
- It does not require operational personnel,
- It performs fully automatic filtration operations on its own,
- It does not use backwash and rinsing pumps or blowers,
- It can be fed by gravitational flow, and the hydraulic head loss is fixed and limited,
- It is a suitable and safe choice for biological, physicochemical, and biochemical treatment facilities,
- With proper planning, there is no need for backup filters,
- In drinking water plants, wastewater flow can be recovered through lamella separation,
- There are no complex automation instruments, valves, automatic valves, or penstock mechanisms,
- There are no moving parts in the system,
- The operational reliability is very high, and there is no need for spare parts,
- It operates simply, easily, and with ZERO energy,
- It can be designed for very high capacities with a compact structure style,
- It is manufactured using either steel or reinforced concrete structure styles.
- It can be designed in a compact and modular form for any capacity.