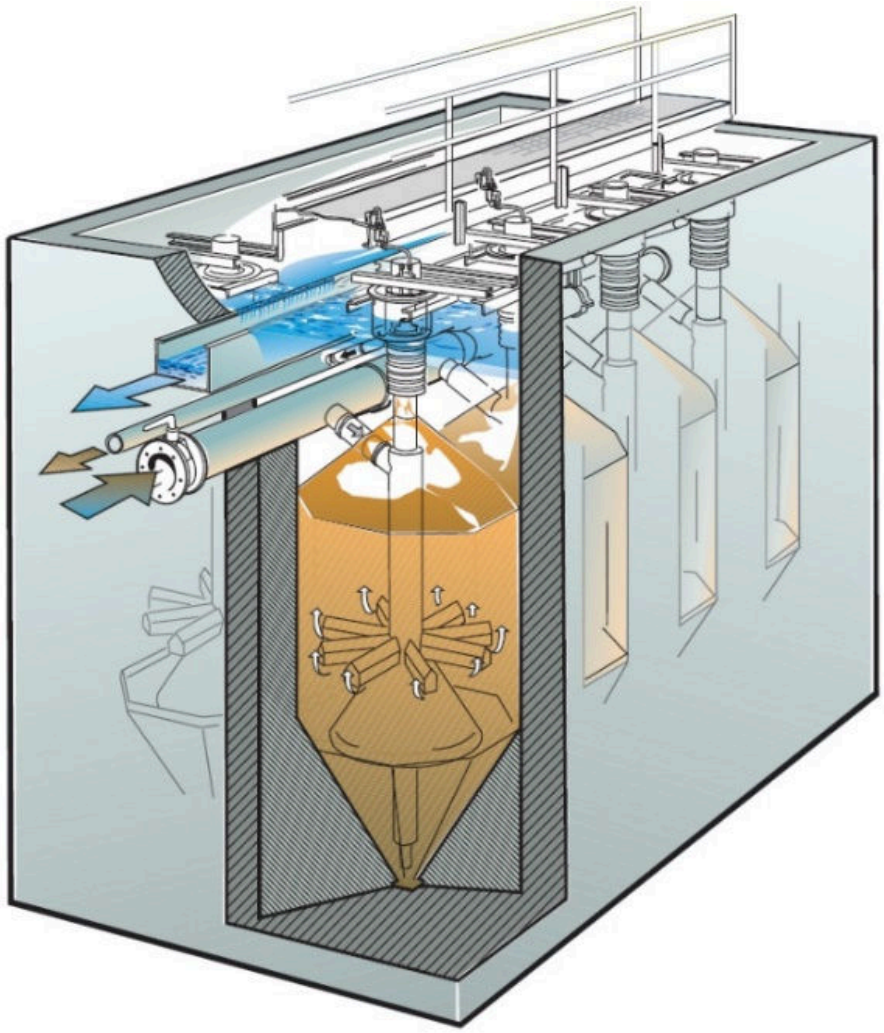
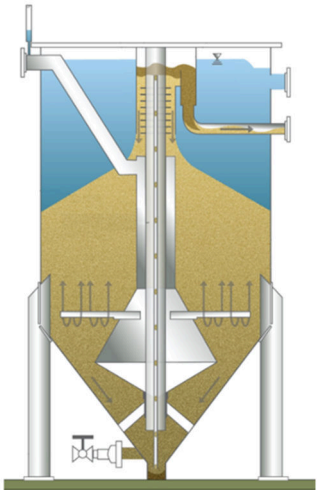
ENDEMIC
— process engineering —



ENCOSAND® CONTINUOUS SAND FILTER

HIGHEST SAND FILTRATION PERFORMANCE

TECHNICIAL SPECIFICATIONS



ENCOSAND® CONTINUOUS SAND FILTER

The Endemic Continuous Sand Filter **"ENCOSAND® FILTER"** is a newly designed and improved continuous sand filter specifically developed for the treatment of waters with different characteristics. It operates based on the counter current principle.

Encosand® Filter operates continuously during the filtration process, as the sand is cleaned simultaneously. There is no need to stop **Encosand® Filter** for backwashing operations or for the cleaning of the sand. It performs both the filtration and sand cleaning processes simultaneously, earning it the designation of a continuous sand filtration system. **Encosand® Filter** system does not require a spare filter.

One of its most crucial features is its superior performance against high and sudden loads, ensuring a consistent output water quality.

Encosand® Filter is a compact system with a modular design, allowing it to be sized from the smallest filtration capacity to very large capacities. It can be operated safely with minimal personnel.

One of its most important features is the absence of any moving parts. Since there is no need to shut down for backwashing, storage tanks, backflow pumps, and automatic control valves are not required. It is easy to use and operates under simple and reliable operating conditions.

It has low energy consumption; the energy demand can be adjusted with compressor frequency control according to the input and output parameter requirements, thus adapting to the variable conditions of the operation in the most suitable and economical way.

It can be used for contact filtration, oxidation, and (de)nitrification purposes for waters/wastewaters that require different operating conditions.

In various sizes and operating conditions, wastewater (reject water) is separated from the sludge using the **"ENCOSEP® Lamella Separator"** and this water is recovered.

It consists of the following basic materials and elements;

1) Inlet water distribution line,
2) Air-lift system,
3) Sand cleaning chamber,
4) Clean water outlet weir,
5) Wastewater outlet line,
6) Air-lift compressor,
7) Control Panel,
8) Filter sand,
9) Steel or reinforced concrete body with SS or CS-epoxy protection.

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. ENOCSAND® is delivered in accordance with the EC Machinery Directive and welded according to European standards.

ISO 9001:2015 ISO 14001:2015

ISO 45001:2018

HOW IT WORKS?

Raw Water Movement: The raw water feed pipe is designed along the axis of the Encosand® Filter's inlet pipe and is transferred to the distribution system, distributing it homogeneously to the filter base. As water travels upward through the filter sand, it is cleaned, and the clean water is discharged from the weirs.

Filter Sand Movement: As water moves upward, the homogeneous fine sand bed moves downward. The dirty sand is suctioned from the bottom through an air-lift and sent to the equipped sand washer through the central air-lift line.

Sand Washer Principle: The dirty sand, moved to the sand washer through the air-lift pump line, undergoes a hydraulic forced separation of sand, water, and particulate matter as it passes through the hydraulic-forced sand, water, and particle separator throat. Contaminants such as impurities on the heavy sand particles, like SS, are separated from the sand with the help of a level difference (DeltaH) between the filtrate water and dirty water, as well as the air released upward into the atmosphere. The separated contaminants are sent out of the filter as reject water. The sand, washed with a small amount of clean water, moves downward by gravity and is returned to the cleaned sand bed. DeltaH can be easily adjusted, and the amount of dirty water can be controlled.

Supply of Compressed Air: Compressed air for the air-lift pump is obtained from a compressor. Depending on the operational performance conditions and requirements, the air flow of this compressor is controlled manually or automatically by a speed control device. The circulation of sand can be adjusted based on the flow rates of the air-lift pump, providing energy efficiency in accordance with the operational conditions and demands of the system.

STEEL and REINFORCED CONCRETE STRUCTURE MODELS

MODEL*	ENCO-1	ENCO-2	ENCO-3	ENCO-4	ENCO-5	ENCO-6	ENCO-7	ENCO-8
Flow (m3/h)**	4-12	6-17	9-28	19-57	23-72	31-92	38-109	45-142
Wastewater, (m3/h)	% 2-7	% 2-7	% 2-7	% 2-7	% 2-7	% 2-7	% 2-7	% 2-7
Surface Load (m/h)	5-25	5-25	5-25	5-25	5-25	5-25	5-25	5-25
Diameter (mm)	950	1250	1570	2200	2520	2800	3150	3500
Height (mm)***	3260	3700	3900	4900	5300	6800	6900	7200
Sand (ton)***	1,8	4,1	4,7	9,2	11,5	18,7	32,0	41,0

* ENCO-1,2,3,4 structures are fabricated in a steel construction style, while ENCO-5,6,7,8 are made in a reinforced concrete construction style. ENCOSAND FILTER facilities are designed modularly for all capacities requested in either steel or reinforced concrete construction styles.

** Capacities are selected based on application processes and raw water / clean water parameters.

*** Heights may vary according to the specific requirements of application areas, with bed depths of 100, 150, 200, and 250 cm. Heights and sand quantities are for a net bed depth of 100 cm.

TYPICAL APPLICATIONS

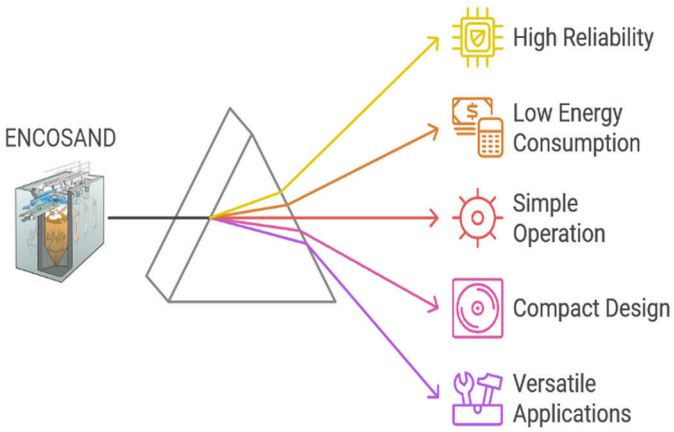
- Urban drinking water treatment plants,
- Urban advanced wastewater treatment plants,
- Process water treatment and recycling plants,
- Surface and groundwater treatment plants,
- Paper and cardboard industry,
- Iron & steel industry,
- Food industry,
- Chemical industry,
- Pharmaceutical industry,
- Mining and mineral industry,
- Energy and thermal power plants,
- Metal processing 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 : 35-85 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 : 40-200 mg/L	SS < 5 mg/L
Paper Mill Wastewater Treatment Plant	SS : 7- 70 mg/L	SS < 1-5 mg/L
Phosphorus Removal Process	P : 2-6 mg/lL	P < 0,5 mg/L
Resistance to Maximum Sudden Loads	SSmax : 400 mg/L	

BASIC FEATURES OF ENCOSAND® FILTER

- It has more efficient filtration compared to traditional fixed bed filtration due to its counter-current feature,
- It is resistant to shock and high suspended solid (SS) loads,
- With its continuous operation, there are no operating interruptions and it provides continuous and constant permeate water,
- Variable feed flow changes do not affect filtration capacity and quality,
- Continuous sand wash flow is independent of the suspended solid load and flow rate,
- It can be fed with gravity flow, and hydraulic head loss is constant and limited,
- It is a suitable and secure choice for biological, physico-chemical, and bio-chemical treatment plants,
- No need for spare filters,



- No need for a backwash pump/blower or a backwash holding tank,
- Dirty water flow can be reclaimed using lamella separation,
- There are no complex automation instruments, automatic valves, or cover arrangements,
- The system has low energy consumption,
- It can be manually or fully automatically controlled,
- The compressor can go into sleep mode based on the raw water pollution condition,
- There are no moving parts in the system,
- High operational reliability with very few spare part requirements,
- Minimal need for operating personnel,
- It has a simple, easy, and economical operating technique,
- It can be designed for very high capacities with a compact structure,
- It is manufactured with either a steel or civil construction style,
- It can also be used for oxidation and denitrification with ENCOSAND-O or ENCOSAND-N types.