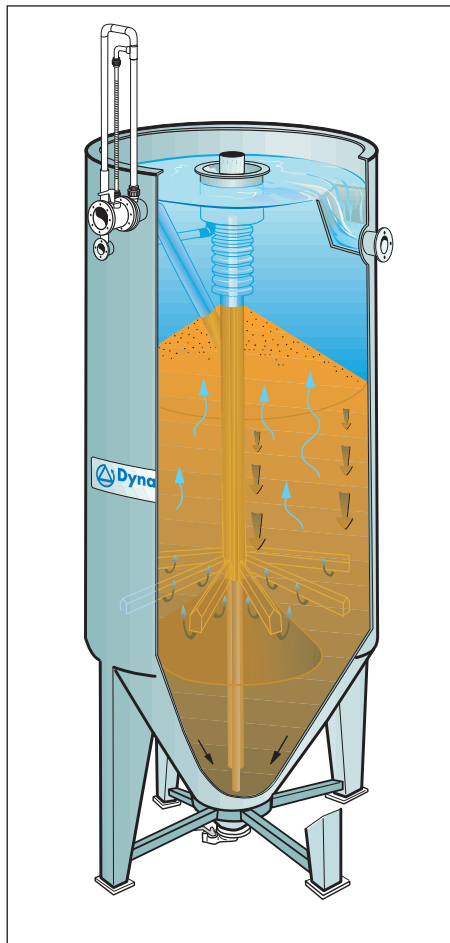


# CLEAN WATER



*with DynaSand®*

# The DynaSand® filter – an intelligent tool

*It is the uninterrupted mode of operation that makes the difference.*

Filtration through a bed of sand is a cost effective way of removing suspended solids and other impurities in water treatment and wastewater purification. Nature itself employs the process and water engineers adopted it for practical use already in ancient times.

Our mission is pure water. With DynaSand we made water filtration a continuous process and offered the water industry a new, unique tool. When introduced in 1980, DynaSand quickly gained approval. The uninterrupted mode of operation offers the user a number of advantages compared to conventional backwash filters. Today, more than 15 000 DynaSand units are in operation throughout the world. Supported by continuous application and product development, the number is steadily growing. DynaSand is market leader and represents state of the art in continuous water filtration.

The DynaSand unit is a continuously operating sand filter. Availability is maximized by eliminating the need to take the unit out of service for backwashing. The sand is cleaned at all times by means of an internal washing system. Operation is straightforward and reliable.



DynaSand improves the process:

- No first filtrate. Always clean effluent.
- No shockloads on the wash water treatment system.
- Handles high suspended solids without need for pretreatment.
- Low head loss.
- Low energy consumption.
- Low supervision and maintenance costs.

DynaSand simplifies the system:

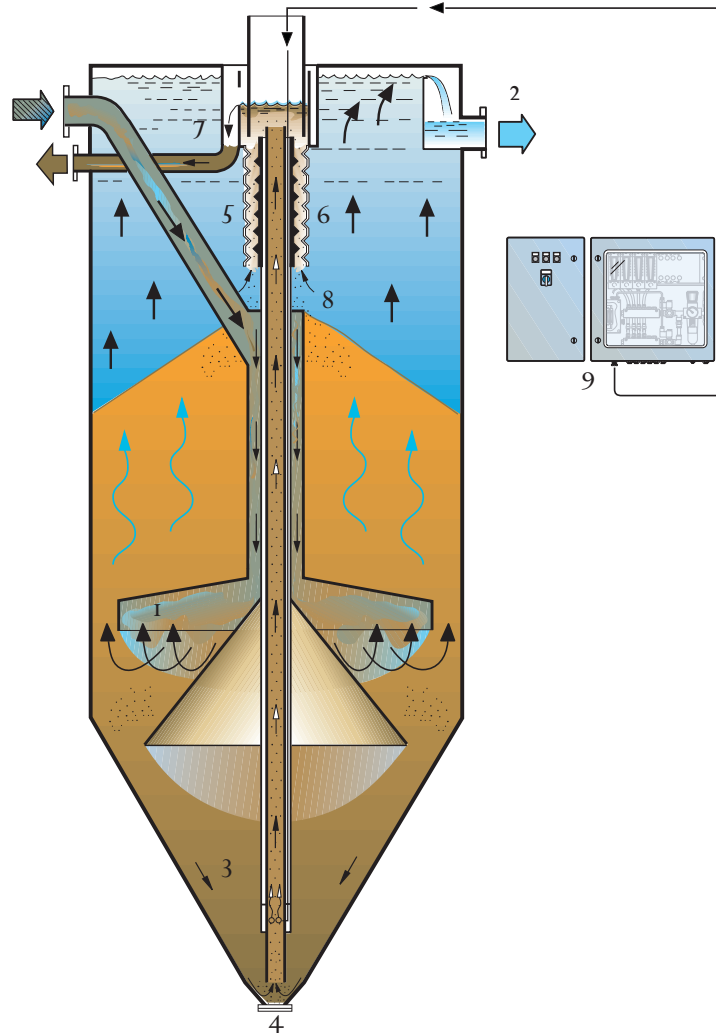
- No need for backwash pumps.
- No wash water storage tanks.
- No wash water collecting tanks.
- No automatic valves.
- No air scour blower.
- No clogging filter bottom nozzles.
- Single media filter bed.

# DynaSand<sup>®</sup> filter

## – operation

The DynaSand filter is based on the counterflow principle. The water to be treated is admitted through the inlet distributor (1) in the lower section of the unit and is cleaned as it flows upwards through the sand bed, prior to discharge through the filtrate outlet (2) at the top. The sand containing the entrapped solids is conveyed from the tapered bottom section of the unit (3), by means of an airlift pump (4), to the sand washer (5) at the top. Cleaning of the sand commences in the pump itself, in which impurities are separated from the sand grains by the turbulent mixing action. The contaminated sand spills from the pump outlet into the washer labyrinth (6), in which it is washed by a small countercurrent flow of clean water. The separated solids are discharged through the wash water outlet (7), while the grains of clean sand (which are heavier) are returned to the sand bed (8). As a result, the bed is in slow, constant downward motion through the unit. Compressed air for the sand pump is provided via the control panel (9).

Thus, water purification and sand washing both take place continuously, enabling the filter to remain in service without interruption.



*DynaSand operates continuously and requires a minimum of attention.*

# DynaSand<sup>®</sup> filter

The DynaSand filter is available as freestanding filter units and as filter modules for installation in concrete basin.

The freestanding filter consists of filter tank and filter internals. Internals comprise feed pipe, feed distributor, air lift pump and sand washer. The tank has flanged connections for feed, filtrate and wash water. Stainless steel or GRP are standard materials of construction. Other options are available for special applications.

A filter plant may consist of a single filter or a number of filters working in parallel to make up for the required filtration area.

Large capacity DynaSand plants are often built up by filter modules housed in concrete basins. The filter module consists of a bottom cone of steel or GRP and filter internals. The point at which concrete becomes a more economical alternative than freestanding units has to be determined from case to case by considering actual, specific conditions.

In an installation of this type, the filter cell (each consisting of several filter modules) shares a common sand bed. A plant can be designed for a virtually unlimited filter area, enabling DynaSand to be applied to large water and effluent treatment plants with capacities equivalent to populations of 100 000 or more.

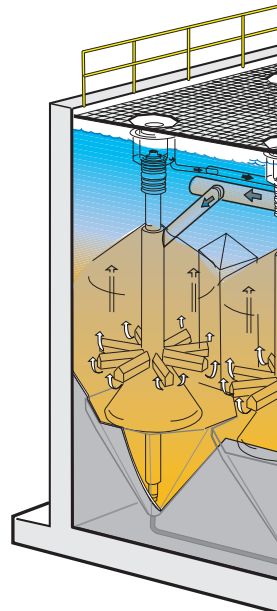
*DynaSand is manufactured in several models, sizes and materials.*



FILTER BASIN.

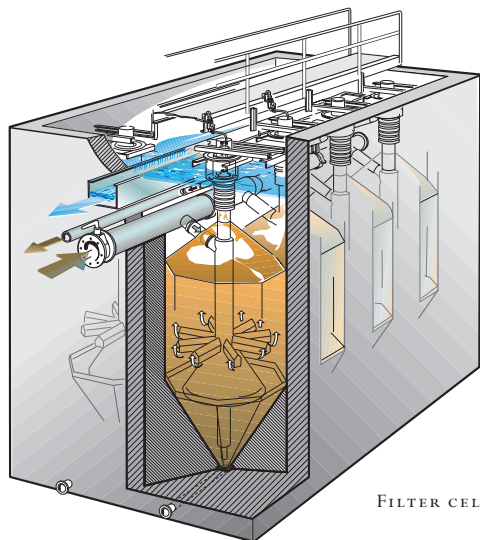


AIR SUPPLY CONTROL PANELS.



EXAMPLE OF FILTER PLANT WITH MODULES  
INSTALLED IN CONCRETE BASINS.

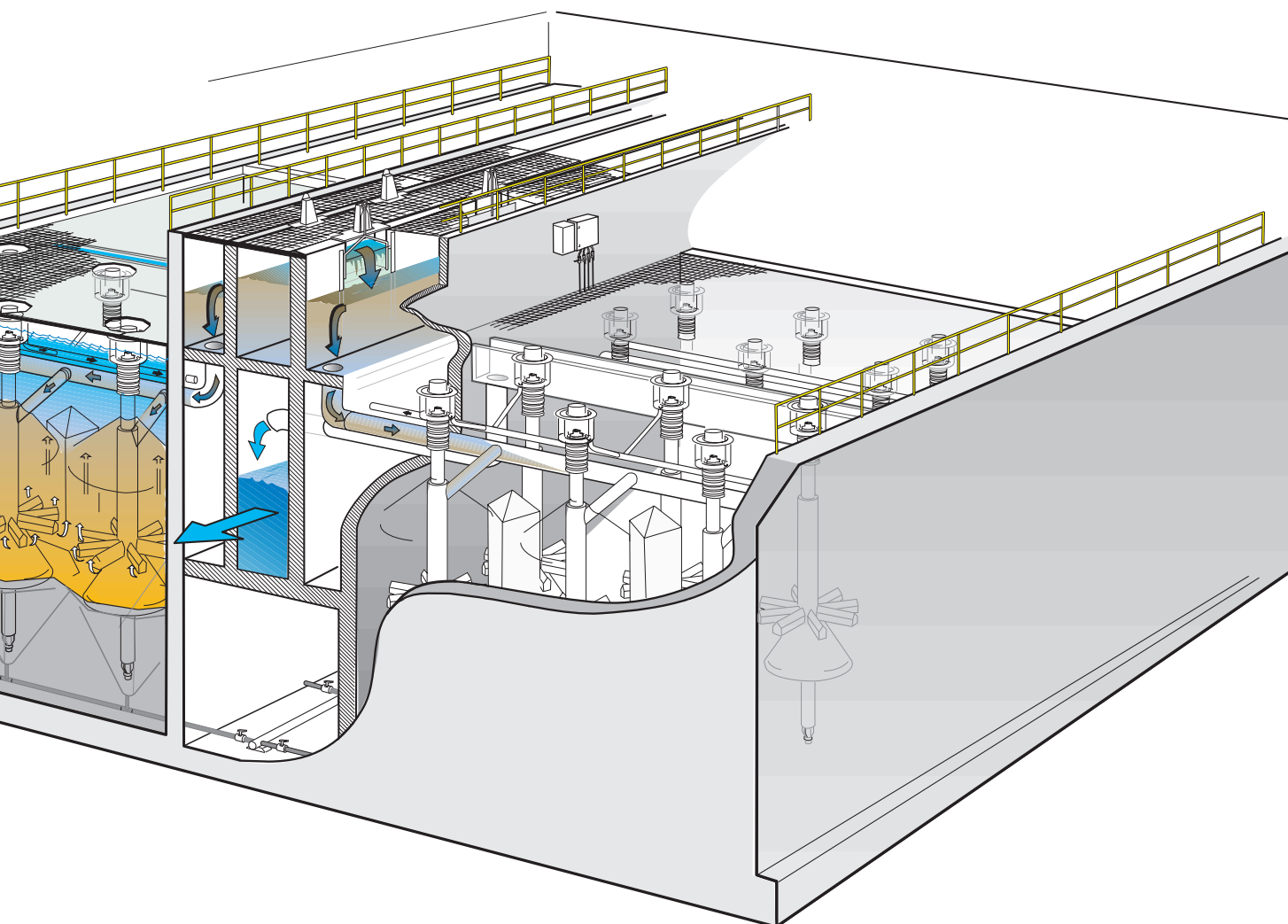
# – models and materials



FILTER CELL WITH EIGHT MODULES.



PLANT WITH FREESTANDING  
FILTER UNITS OF STAINLESS STEEL.



# DynaSand<sup>®</sup> filter

## – process design and applications

DynaSand is used to solve purification problems in drinking water treatment, industrial water supply, recovery and reuse of water and treatment of wastewater before discharge. Customers are public utilities, pulp and paper industry, iron and steel industry, chemical process industry, pharmaceutical industry, mining and mineral industry, food industry, power plants, incineration plants, metal finishing and electroplating industry and others who use and process water.

**CONTINUOUS CONTACT FILTRATION** is used to produce process water and drinking water from river or lake water and for certain wastewater applications. The flocculation chemicals are mixed into the feed stream of the DynaSand filter(s). The first part of the filter bed provides excellent conditions for fast floc formation and serves as

flocculation reactor. No flocculation tanks are required. Presettling can be eliminated because of DynaSand's ability to handle high concentration of suspended solids.

**PROCESS WATER RECYCLING** reduces water consumption and permits full control of the water quality. After screening or primary settling, spent process water is pumped to the DynaSand filters. The filtered water is recycled. Wash water is flocculated and thickened. The overflow from the thickener goes back to the filters.

**TERTIARY FILTRATION** is used for final treatment of wastewater before discharge. Contact filtration with aluminium or iron salts as flocculation agents may be employed, as required, to precipitate phosphorous and enhance suspended solids removal. The end product meets the highest environmental standards

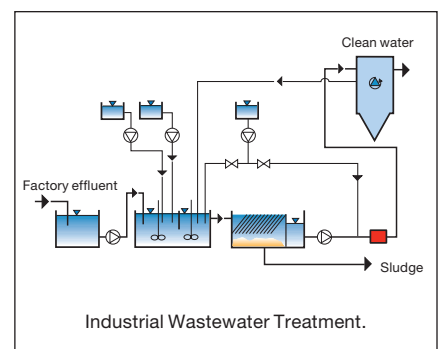
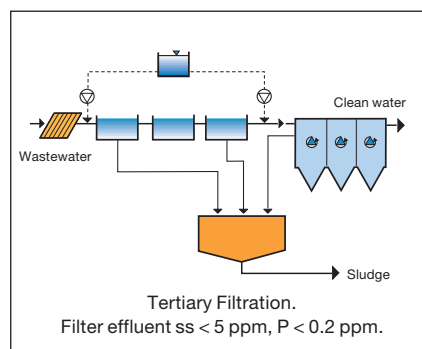
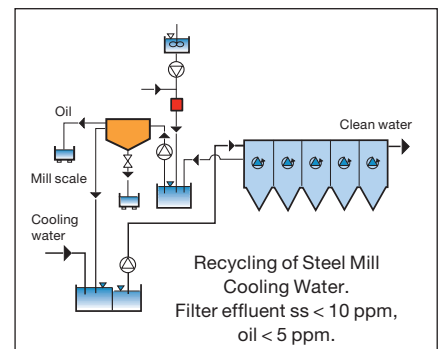
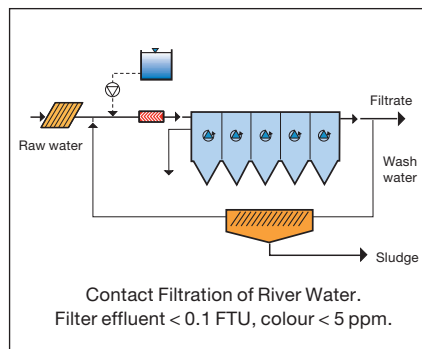
applicable to municipal wastewaters and industrial effluents.

The final filtration process can be combined with biological **DENITRIFICATION**. Nitrates are converted to nitrogen gas by a thin film of active bacteria on the filter granules.

**TREATMENT OF METAL-BEARING INDUSTRIAL EFFLUENTS** includes precipitation of the metallic ions, followed by flocculation, sedimentation, and final filtration in a DynaSand filter. The process produces low residual metal contents and meets strict environmental standards.

**FILTER MEDIA** is in most applications natural, graded quartz sand. Particular material is used in bioactivated filters. DynaCarbon is a special version with activated carbon as media.

*DynaSand is flexible and can be adapted to different requirements.*



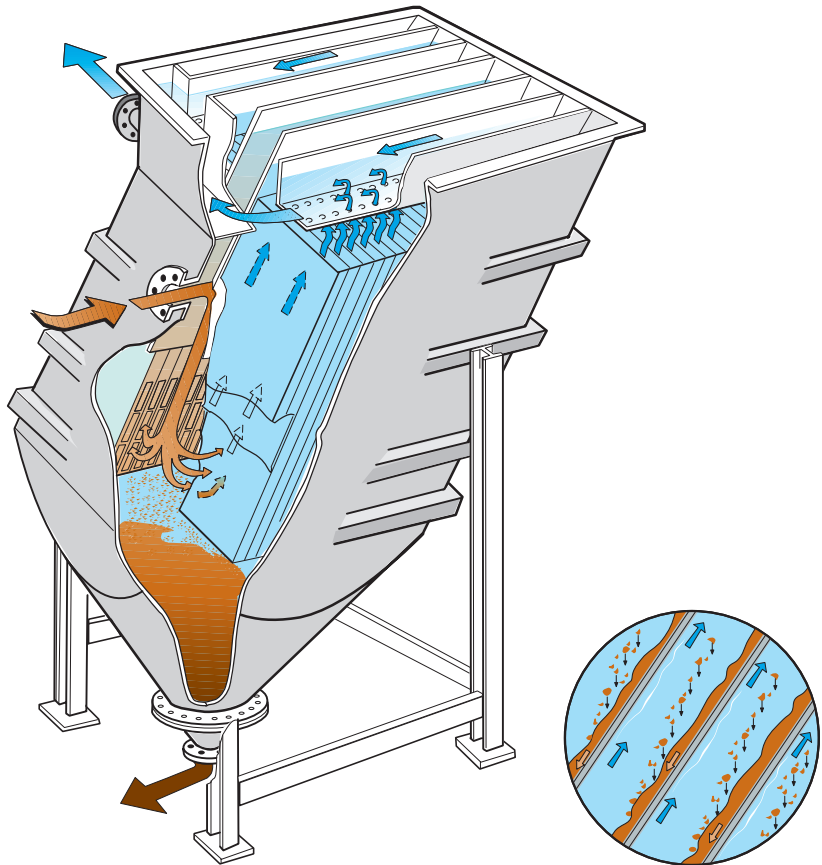
# The Johnson Lamella<sup>®</sup> separator takes care of the wash water

The DynaSand<sup>®</sup> filter can be combined with a Johnson Lamella separator to create an integrated water treatment system. In this case, the separator is used to clean the filter wash water, the separated sludge being thickened and the clean water being returned to the filter.

The settling surface in the lamella separator unit is provided by a number of inclined, parallel plates. The saving of floor area compared with a conventional settling tank is about 90 %.

The water to be treated is admitted through the inlet chamber in the mid-section, flows upwards through the plate assembly and is discharged to the runoff launders ensuring that flow is distributed uniformly between the plates. After settling on the plates, the solids slide downwards to collect in the sludge hopper in the base of the unit.

The Johnson Lamella separator is designed to minimize the overall cost of the plant. The separator is supplied as a complete unit to reduce the cost of installation, while the maintenance costs are minimized by the almost negligible degree of wear and by the absence of moving parts.



# Over 15 000 DynaSand® filters installed

Nordic Water provides equipment and systems for the water industry.

Nordic Water Nynäshamn specialises in equipment based on filtration and gravity settling. MEVA and ZICKERT with offices in Göteborg provide fine screens, sludge scrapers

and associated equipment.

We offer cost-effective solutions founded on intelligent, unique products, to solids-liquid separation requirements in water and wastewater treatment.



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