150 YEARS 1872-2022

HUBER TECHNOLOGY
WASTE WATER Solutions

HUBER Dissolved Air Flotation Plants HDF & HDF S

- Effective and efficient wastewater purification and treatment for municipal and industrial applications

More information, downloads and current news

www.huber.de

General information

Process water is needed in many production processes as a solvent, for production of material, or for cleaning purposes. Water is recirculated and reused for economical and environmental reasons. Grease, oil, fat, floating and suspended solids, settling material, and dissolved components need to be separated to provide good and uniform water quality. Recovery of valuable product from the water may be another additional objective.

Where used process water is discharged as wastewater, extensive pre-treatment is reasonable and necessary for both economic and legal reasons. Proper pre-treatment ensures that the applicable discharge standards for problematic substances (e.g. heavy metals, HC, AOX, etc.) are met and that the effluent discharge fee is minimized.

Conventional gravity clarifier sare often incapable to achieve sufficient pre-treatment for the reliable compliance with effluent standards or for extensive reduction of the contaminant load upstream of subsequent treatment stages.

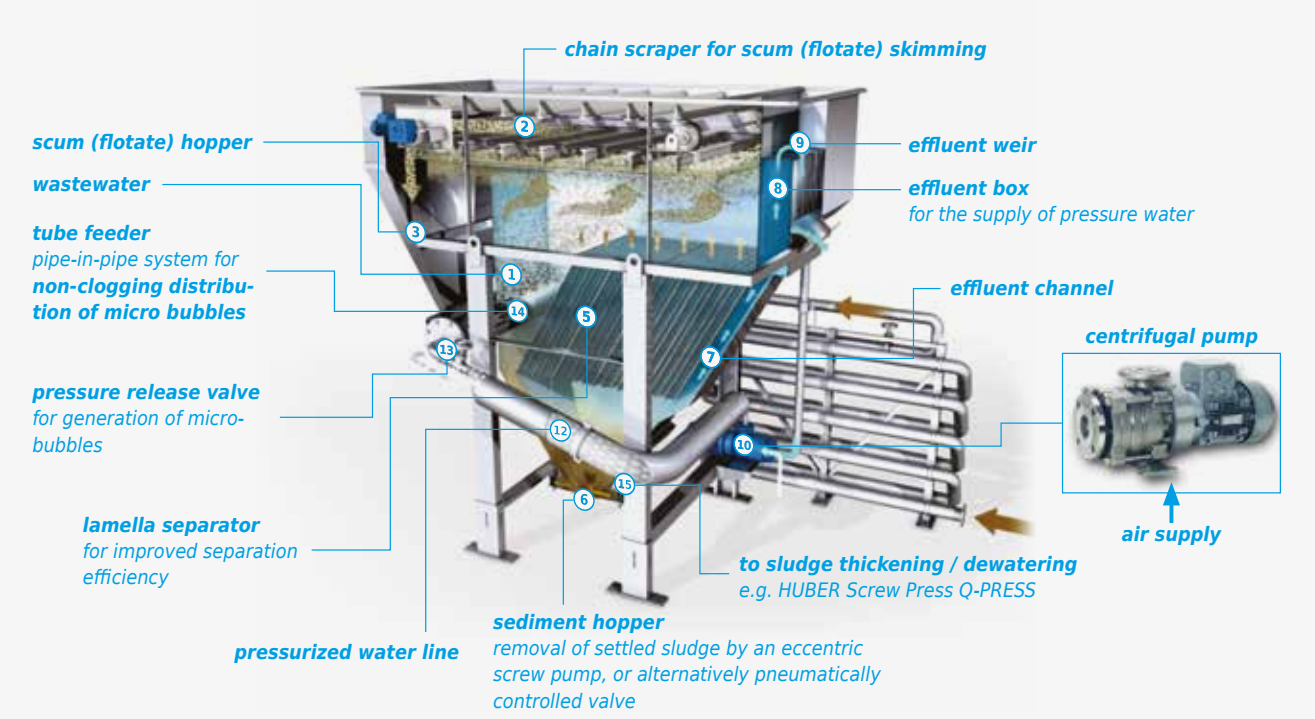
Various types of flotation processes have been developed for such separation requirements, whereof dissolved air flotation with pressure water recirculation has proven most effective.

The use of a multistage rotary pump for recycle water saturation with air eliminates the need for costly pressure tanks with high maintenance requirements.

HUBER Dissolved Air Flotation Plant HDF units are used for a wide variety of industrial and municipal applications, such as:

- Slaughter houses
- Meat processing and packing
- Fish processing
- Dairies
- Convenience food production
- Gastronomy
- Disposal companies
- Soap works
- Land remediation
- Chemical industry
- Petro chemical industry
- Iron and steel industry
- Leather & textile industry
- Cosmetics industry
- Galvanizing, electroplating
- Municipal wastewater treatment
- Activated sludge separation
- Phosphate after treatment plants
- Rendering plants

HUBER Dissolved Air Flotation Plant HDF for advanced (waste)water treatment



Functional description of the HUBER Dissolved Air Flotation Plant HDF

The (waste) water to be treated enters the flotation plant via the tube feeder (1) and is directly mixed with the released pressure water (white water). The micro bubbles (20 – 80 µm dia.) generated when the pressure is suddenly released are brought into close contact with the suspended material in a tube feeder (special pipe-in-pipe system) (14).

The gas bubbles attach to the surface of solids. Due to their increased buoyancy, the light aggregates of solids and air bubbles float to the water surface. The blended influent flows upward into the tank of the dissolved air flotation unit where it is evenly distributed over the total tank width. The laminar flow conditions ensure optimum phase separation.

The solids/gas flocs rise to the water surface where they form a scum (or flotate) layer that is skimmed off into the flotate hopper (3) by a scraper (2). The scraper joists with their special design dewater the flotate additionally. The flotate is either collected in a container or by an eccentric screw pump delivered to further treatment stages (e.g. sludge dewatering with HUBER Screw Press Q-PRESS) (15).

The non-clogging lamella separator (5) increases the effective clarifier area, for maximum hydraulic loads on a small footprint. While the water flows down through the gaps between the inclined lamella plates, buoying flocs rise a short distance and attach at the lower surface of the upper lamella and dense particles sink a short distance to the upper surface of the lower lamella.

The lamellae retain thin layers until they are grown into thick and compact layers that finally detach from the surface and slide quickly up or down along the lamella surface. Detached light aggregates slide up and rise to the water surface where they form a floating scum layer. Heavy sludge aggregates slide and sink down to the bottom of the tank into the sediment hopper (6) from where they are either removed by an eccentric screw pump or gravity discharged by means of a pneumatically controlled valve.

The clarified waterwater flows behind the baffle plate (7) to an effluent box (8) from where the water falls over a height-adjustable weir into the clarified water outlet (9).

Up to 30 % of the effluent is recirculated for the generation of pressure water. A multi-stage centrifugal pump (10) generates a pressure of about 6 bar. In this process, air is introduced into the pump impeller housing and intensively mixed with the water. This pressurized water flows through the pressurized water line (12) to the pressure relief valve of the tank.

There, the micro bubbles with a diameter of 20 to 80 microns are generated through pressure relief (13) to ambient pressure. In the tube feeder (14), the micro bubbles thoroughly blend with the influent to be treated so that all solids get in close contact with a sufficient number of micro bubbles.

HUBER Dissolved Air Flotation Plant HDF S for the treatment of heavily polluted wastewater

In addition to the compact HUBER Dissolved Air Flotation Plant HDF with a separation zone of more than one metre, there is a flat flotation system with a reduced separation zone but larger water surface, the HUBER Dissolved Air Flotation Plant HDF S. The letter 'S' stands for sludge, as the plant is able to separate very voluminous and highly contaminated wastewater and sludge in a defined way. Maximum performance is ensured by a very large water surface for reliable flotation and a flow-optimised design of the tank. The contact zone between wastewater and saturated water is followed by a defined flow over the entire width of the tank. The sludge particles can thus rise to the water surface as required. There, they are additionally thickened with special scraper joists and then removed with a chain scraper in the direction opposite to the direction of the flow. Remaining sediment and heavy materials are automatically discharged via several funnelshaped sediment outlets. The efficiency of the saturation system is greatly increased in these plants in order to meet the requirements caused by higher wastewater loads.

The main field of application of the HUBER Dissolved Air Flotation Plant HDF S is heavily polluted industrial wastewater and the separation of activated sludge as relief or alternatively as replacement for a secondary clarifier.

HUBER Dissolved Air Flotation Plant HDF S installed for activated sludge separation.

Installation of the flotation system in container as a quick and locally flexible solution from 50 to 2000 m³/d

Site expansion or changes in production often result in increased wastewater volumes for industrial companies. Rapid solutions without the need for major construction work are required here. For this reason, pre-treatment of wastewater in pre-assembled containers is a good option. These plants are completely assembled in the factory, includingpipelineconstructionandcabling.Theyarethen delivered and commissioned as turnkey systems. The interfaces are thus reduced to a minimum and the plant technology can start operation directly.

The user's benefits:

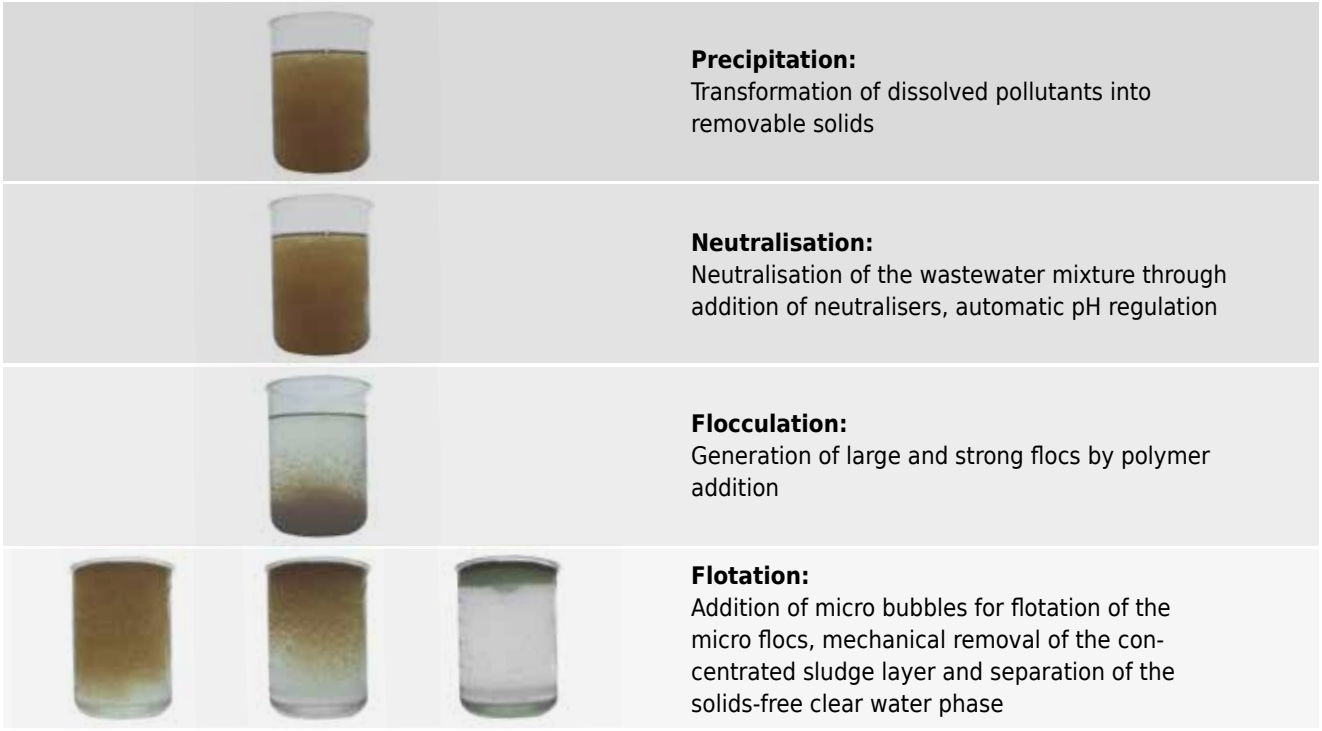
- Possibility of relocation due to operational changes
- Reduced planning costs due to fixed container dimensions
- Quick execution due to a high degree of prefabrication of the plant

Installation in container construction up to 80 m³/h as a fast and mobile solution.

Increased separation efficiency through chemical treatment stage

- Individual project-specific tube flocculator for optimal chemicals dosing
- Ideal admixture of chemicals due to a flow-optimised design
- Compact unit directly beside the HUBER Dissolved Air Flotation Plant HDF
- Accommodating individual preferences for sampling / dosing points / measurement instrumentation

Increased separation efficiency through chemical pre-treatment



Precipitation:
Transformation of dissolved pollutants into removable solids

Neutralisation:
Neutralisation of the wastewater mixture through addition of neutralisers, automatic pH regulation

Flocculation:
Generation of large and strong flocs by polymer addition

Flotation:
Addition of micro bubbles for flotation of the micro flocs, mechanical removal of the concentrated sludge layer and separation of the solids-free clear water phase

HUBER Chemicals Dosing DIGIT-DOSE

Chemicals dosing is optimal if the flotation system constantly achieves the required performance without overdosing of chemicals and unnecessarily increasing operating costs.

In practice, it proves to be difficult to adjust the chemicals dose due to varying volumes and freights.

Large-dimensioned mixing and balancing tanks are beneficial but can frequently not be installed due to lack of space. Besides, the investments costs are high for the tanks and the accessory equipment required, such as circulation pumps and aeration systems for homogenisation.

The innovative HUBER Chemicals Dosing DIGIT-DOSE allows optimal dosing of the chemicals even with small mixing and balancing tanks. The specially developed system uses a combination of several measuring principles and constantly determines the optimal chemicals dose in real time.

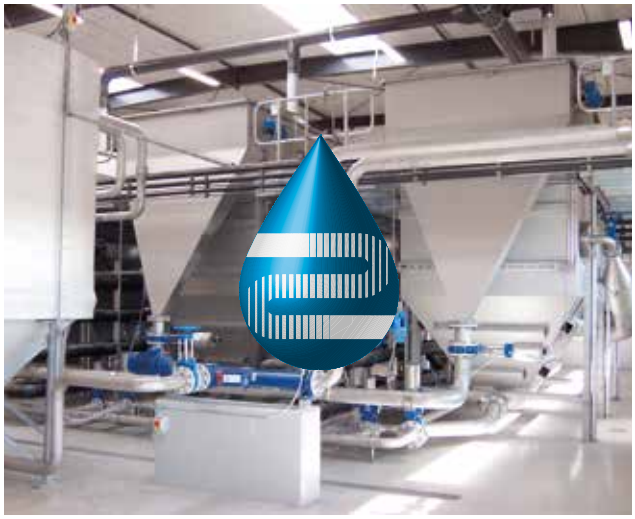
Chemicals consumption, and therefore also operating costs, are reduced to a minimum. Additional positive effects can be seen in the volume of flotate sludge generated.

The production of hydroxide sludge resulting from overdosing of precipitants is effectively avoided. The further utilisation and disposal of the flotate sludge generated is a main cost factor of flotation plants.

Furthermore, DIGIT-DOSE makes life easier for the operating staff as the system adjusts automatically to varying wastewater parameters without the need for any manual intervention.

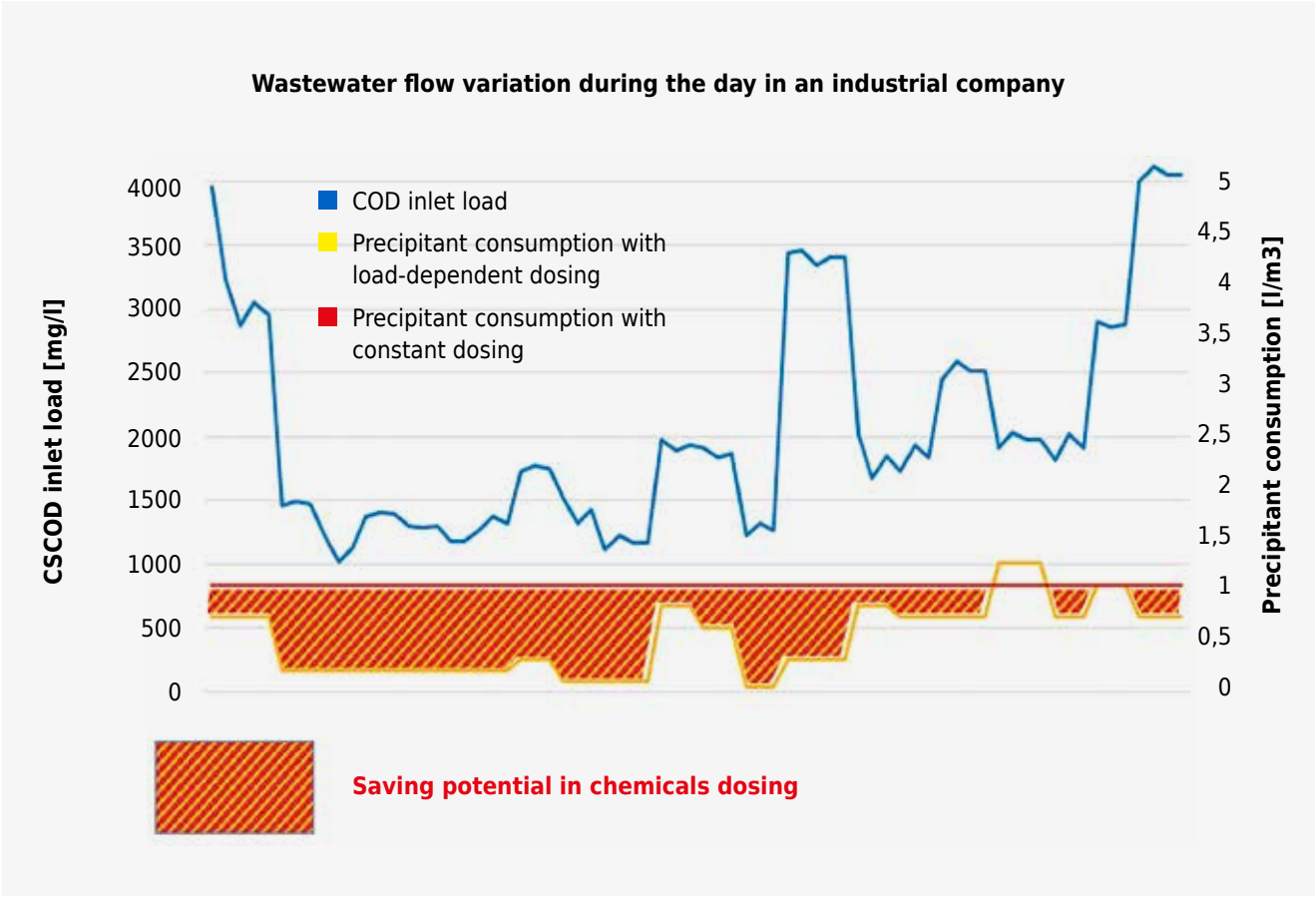
DIGIT-DOSE applications

- Slaughterhouses and meat processing industry
- Dairies and cheese dairies
- Food companies
- Tanneries
- Animal rendering plants
- Pre-treatment by flotation in general
- Suitable also for retrofitting existing HUBER HDF installations!



DIGIT-DOSE system benefits

- Up to 30% reduction in chemicals consumption
- Support and relief for operating staff
- Up to 20% reduced flotate sludge volumes
- Integrated automatic cleaning of the measuring equipment used
- Low investments costs and space requirements for mixing and balancing tanks
- Return on investment within few months



System approach

We provide complete systems for mechanical-physical water treatment by combining the HUBER Dissolved Air Flotation Plant HDF with other HUBER components.

- Chemical pre-treatment by precipitation, neutralization and flocculation in a tube reactor to improve separation efficiencies, and even remove some dissolved pollutants
- Mechanical pre-treatment with HUBER Micro Strainer ROTAMAT® Ro 9, HUBER Rotary Drum Fine Screen ROTAMAT® Ro 2, or HUBER Complete Plant ROTAMAT® Ro 5
- Treatment of the removed scum and sediment with: HUBER Disc Thickener S-DISC, HUBER Screw Press S-PRESS or Q-PRESS®
- Complete wastewater treatment: additional downstream anaerobic and/or aerobic biological stage to achieve the required limit values for indirect or direct discharge

Process safety through pilot testing in the laboratory and large-scale tests

For a realistic feasibility assessment, wastewater samples can be analysed in advance in HUBER's own laboratory to obtain first reference data to estimate consumption values. It is also possible to organise pilot tests on the customer's site with a tank-mounted HUBER Dissolved Air Flotation Plant HDF 0.5 including the required peripheral equipment. Do not hesitate to contact us.

Laboratory test.

Mobile pilot unit of a HUBER Dissolved Air Flotation Plant HDF.

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