

[Home](#) ■ [HUBER Report](#) ■ [Screens](#) ■ [RakeMax® - Bar screen for headworks](#)

RakeMax® - Bar screen for headworks



These RakeMax® screens at the WWTP Zwickau are exemplary for their combination of sturdiness and performance

Removal of solids in pump stations and at the headworks of wastewater treatment plants is essential for the protection of downstream processes and equipment. Pump and pipe clogging, for example, can be prevented by good screening.

Our multi-rake bar screen RakeMax® is especially suitable for difficult applications in deep pump stations and headworks. It serves as “the first line of defence” against arriving debris and other solids; it can be hit by large and heavy objects and thus needs to be sturdy, robust and dependable. This screen is able to handle wide flow variations between dry weather low flow and wet weather peak flow. It can handle heavy peak loads of solids that are remobilized in sewers by flow surges. It is able to remove heavy solids loads quickly, thus preventing screenings from blocking the open area during peak flow. It has a low head loss even during peak flow and is not affected by rising upstream water levels. RakeMax® screens are usually installed in deep channels; they lift the screenings high up, from the depth of the channel bottom to well above the ground floor. Requirements on bar screen performance have become far stricter over the years: 6 mm, or even less, is nowadays a commonly specified bar spacing. Our RakeMax® has the sturdiness of a bar screen, but is often a fine screen all the same.

Traditional bar screens with a long rake arm do not comply with all the mentioned requirements: the main problems are that a single rake is too slow to raise high solids loads over great heights; that a long rake arm is shaky and cannot reliably insert tines into small spaces between bars; and that long rake arms require high headspace in buildings.

An important functional element of our RakeMax® is its bar rack. For small bar spacing below 12 mm we use a special tear drop bar profile. One important advantage of the tear-drop shape, in comparison with rectangular or trapezoidal shapes, is substantially lower flow resistance and head loss. The peak flow through the bar rack is thus increased. Another advantage is that rake tines are well guided even into small gaps between the bars. The tines penetrate to the point where the gaps are smallest. Blockage of the gaps is thus prevented.

During low flow solids can be allowed to form a screenings carpet on the bar rack, thus permitting removal of solids smaller than the bar spacing. When the flow suddenly surges, the water level in front of the screen suddenly rises. Now it is important to quickly remove the

screenings carpet and the arriving peak solids load. The RakeMax® is provided with a number of rakes, mounted at selectable distances on a pair of chains. When the chains are moved, the multiple rakes travel in short intervals up the bar rack – a high raking velocity is not even needed. By selecting the distance between subsequent rakes, the solids removal capacity of our RakeMax® can be adjusted to match even the heaviest peak solids load. In contrast to conventional single-rake bar screens, the solids removal capacity of the RakeMax® is independent of its length, which is a great advantage where the channel is deep.

In case that some object should become firmly stuck in between two bars, thus obstructing rake movement, an overload switch instantly stops the chain drive to prevent damage of rake tines. When the chain drive exceeds a certain torque, a rocker arm moves a small distance against a spring and pushes an overload switch triggering an alarm.

Our RakeMax® screens are well adaptable to given structural requirements and constraints, and to widely varying peak flows and solids loads. Particularly where conditions are difficult, the RakeMax® proves its value. No channel is too deep, no headspace in buildings too low, no solids load too high. The RakeMax® is typically installed at an angle of 75° and needs only a short channel length. We want to mention only a few of over a hundred RakeMax® installations at wastewater treatment plants:

- WWTP Augsburg, 3 units, each 2.200 mm wide, 8 mm spacing
- WWTP Zwickau, 3 units, each 1.400 mm wide, 5 mm spacing

Both treatment plants suffer under sometimes extreme sand and grit loads and thus need heavy duty screens.

Another example for a RakeMax® application is the city of Hamburg's water supply system. The water works Curslack takes in surface water from the small river Bille and feeds it through a channel system to places where it is used for irrigation and ground infiltration. We installed our RakeMax® upstream of the pumps in a deep channel within an existing intake structure. Installation was extremely difficult: we had to supply the RakeMax® in three pieces and to reassemble it on site, within the building's confined space. The multiple rakes reliably remove sometimes large quantities of debris, twigs and leaves. A blade wipes these screenings from the rakes. The removed screenings are then washed and compacted in a WAP wash-press.

These examples illustrate that our RakeMax® is applied as solution for various challenges and that there is a wide range of applications for this excellent screen.

Related Products:

- [HUBER Multi-Rake Bar Screen RakeMax®](#)

Related Solutions:

- [HUBER Solutions for Centralized Wastewater Treatment](#)

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