

Reliable Separation of Solids at Small Hydropower Plants with the **HOBAS®** Sand Trap

In order to design and build a small hydropower plant as efficient and sustainable as possible, it is important to keep an eye on the solids in the river water: Turbines are sensitive to abrasive wear, and the built-up of sediments in hydropower pipelines affects the plant's functionality. Sand traps that remove solids from the water are therefore essential elements in hydroelectric power systems. HOBAS has developed a particularly effective sand trap made of glass fiber reinforced pipes that separates solids reliably and is custom-tailored to ensure an optimal performance.

Sand traps are key components in small hydropower systems, especially in systems with medium or high pressure. After large stones and woody debris are held back by a screen at the weir, the sand trap separates smaller solids such as gravel and sand from the river water. It thereby prevents sedimentary deposits in the penstock. This, in turn, extends the hydropower plant's operating time and maintenance intervals, protects the turbine from excessive wear and abrasion, and increases the facility's efficiency and service life.

The construction of a sand trap often involves great efforts and expenses. For very small plants, these efforts are often disproportionately high. HOBAS has decided to tackle this issue and developed a solution in cooperation with the Czech ČVUT (Czech Technical University in Prague) and the Austrian BOKU (University of Natural Resources and Life Sciences in Vienna): A particularly effective, prefabricated sand trap which is built out of glass fiber reinforced pipes. Thanks to the precast units, the construction works on site are reduced to a minimum. The low weight of the HOBAS Sand Trap enables it to be transported to the installation site and integrated into the power plant system very easily. A flushing unit, which can be fully automated on request, reliably cleans the sand trap from separated solids.



How the HOBAS Sand Trap works

After the river water has passed the screen and is thereby cleaned of large solids, it enters the sand trap through an **inlet pipe (1)**. The **stilling chamber (2)**, a cross-sectional enlargement in the first part of the sand trap, continuously reduces the flow velocity. The slowdown process is supported by factory-mounted, vertical **stilling slats (3)**. They calm turbulence in the flow, especially that perpendicular to the direction of flow.

As an effect of the water's reduced flow velocity and turbulence, the solids sink down to the bottom of the **settling chamber (4)**, right into the integrated **sedimentation system (5)**. The HOBAS Sand Trap is designed in a way to prevent the settled solids from being stirred up and resuspended very effectively.

The solids are then rinsed out of the sand trap through a **flushing pipe (6)** that can be opened for this purpose. On request, special sensors are integrated to control the flushing automatically. During the flushing process, the turbine continues to operate unhindered, ensuring continuous power generation and maximum plant exploitation.

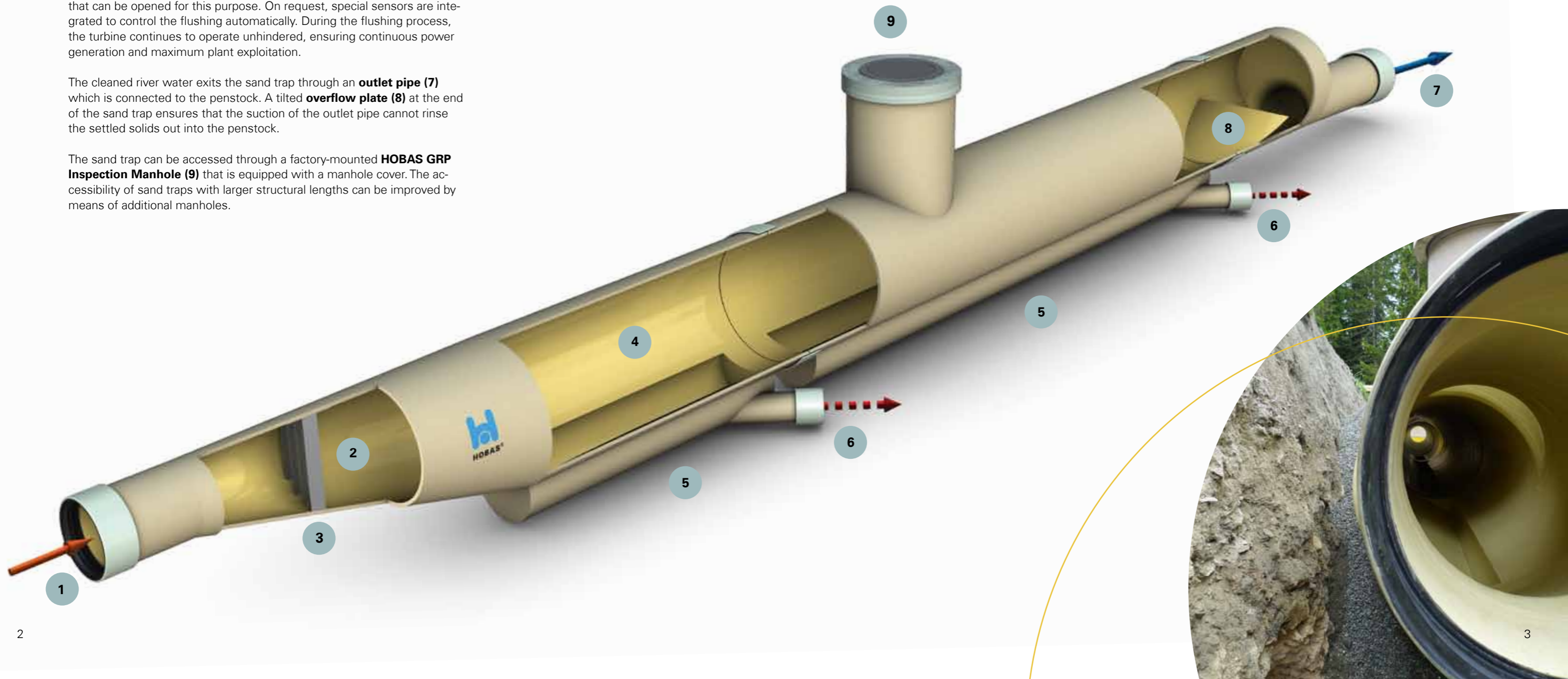
The cleaned river water exits the sand trap through an **outlet pipe (7)** which is connected to the penstock. A tilted **overflow plate (8)** at the end of the sand trap ensures that the suction of the outlet pipe cannot rinse the settled solids out into the penstock.

The sand trap can be accessed through a factory-mounted **HOBAS GRP Inspection Manhole (9)** that is equipped with a manhole cover. The accessibility of sand traps with larger structural lengths can be improved by means of additional manholes.

Optimum Performance and Efficiency

The sophisticated settling system and the efficient flushing function of the HOBAS Sand Trap have been proven and verified by a numerical simulation model at the ČVUT Prague and a hydraulic model at the BOKU Vienna. Each HOBAS Sand Trap is custom-tailored to the given requirements such as the solids size and the inlet flow. This guarantees the best possible settling and flushing performance of the sand trap and an optimal long-term performance of the hydropower plant.

The HOBAS Sand Trap has already been successfully installed in various projects in Austria and Italy. A recent one has been put into operation in Austria in summer 2014. For the small hydropower plant "Haringbach," which is located in the vicinity of the well-known lake "Grüner See" in the Austrian state Styria, HOBAS also supplied a GRP pressure line DN 300, PN 6 and 10 for conveying the water to the power house. The hydropower plant features a flow rate of 71 l/sec and a head of 73 m. A two-jet Pelton turbine with a performance of 38 kW covers the entire energy requirements of the nearby restaurant, the remaining energy is fed into the regional energy grid.



The HOBAS Sand Trap Benefits at a Glance

- Reliable separation of solids
- Effective flushing system for the safe removal of sediments from the sand trap
- Unproblematic operation of the turbine during the flushing process
- Easy mounting thanks to prefabricated units
- Little space and excavation required during installation
- Individual design for optimal performance
- Easy handling thanks to low weight
- Installation in remote areas possible



Would you like to learn more about the **HOBAS®** Sand Trap?
Send us an email at info@hobas.com or click [HERE](#) to find your local sales representative.

We are looking forward to your thoughts and questions!

