



**Passavant
Geiger**

We Build Responsibility

Adaptive Inlet System for Secondary Clarifiers

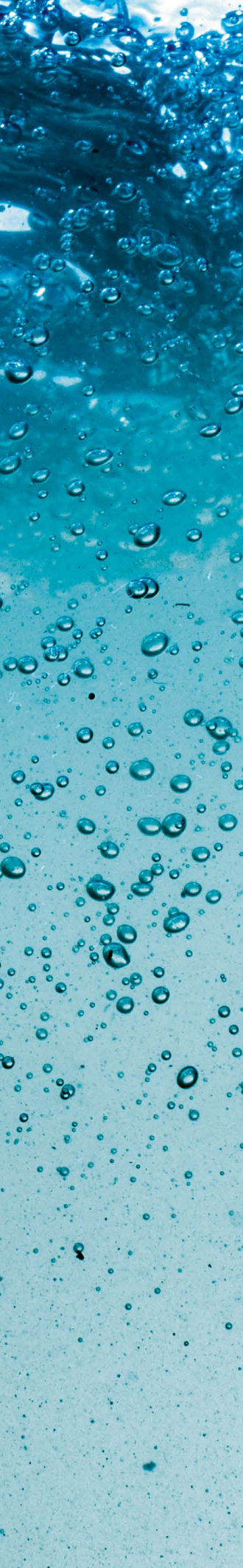
Passavant® hydrograv® adapt System

**Better
than
Filtration**
patented

A brand of
Aqseptence Group



**Passavant[®]
hydrograv[®]
adapt System**



Revolutionizing Secondary Sedimentation

The cities and metropolises of our world are constantly growing. As a result, the demands on water treatment are changing as well: the amount of wastewater and therefore the purification processes need to become more efficient.

A simple idea with an astonishing effect

Especially in densely populated areas, the operators of water treatment plants face special challenges: Increasing throughput volumes require solutions with high capacities.

However, the expansion of a plant is very expensive, requires a lot of space and is often made more difficult by environmental regulations. Therefore, it is a good idea not having to expand a wastewater treatment plant, but simply to be able to optimize it.

With the **Passavant® Adaptive Inlet System hydrograv® adapt**, **Passavant-Geiger** offers an innovative but state-of-the-art

concept that makes water clarification more efficient. The patented system ensures that the water flows in as calmly and deeply as possible. That means that sludge overflow and flock discharge through secondary clarifiers can be consistently avoided – leading to a notable increase in the capacity of the system.

This improves the flow rate significantly and makes the cleaning process more efficient – without adding extra tanks to the existing plant.

Set up for the future – with the Passavant® hydrograv® adapt System.

Functional principle



Higher capacity

and better than Filtration

The way the intelligent **Passavant® hydrograv® adapt System** works is simple but ingenious.

Our engineers quickly realized that as soon as the inlet system continuously adapts to the current load and sludge level, the flock filter can work without swirling the sludge.

This is why an intelligent digital control system continuously adjusts the system to the external conditions and the water flow rate and ensures that the water enters with optimal speed at the correct depth. Turbulence is thus minimized, the water stays clearer and the internal loading by entrainment is

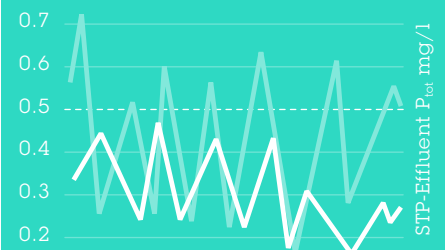
significantly reduced. As a result, significantly more water can flow through the system and the secondary clarifier becomes more efficient.

A further advantage: the flock discharge is significantly reduced, so that the phosphorus concentration of the suspended particles falls below a value of 0.3 mg/l average and frequently the effluent water even reaches reuse quality.

An additional filtration is therefore often no longer necessary, which saves further investments as well as high efforts in maintenance. The adapt System is in fact virtually maintenance free.

CONCENTRATION OF TOTAL PHOSPHORUS:

∅ < 0.3 mg/l



Passavant® hydrograv® adapt System
Conventional inlet

Duration: 4 Month

Elimination of secondary clarifiers bottlenecks

To this day, continuous flock discharge at average loading as well as massive spill-out of sludge at higher loading are fundamental problems for many wastewater treatment plants – regardless of their technological progress. As a result, the environment is unnecessarily polluted, the discharge limits are repeatedly exceeded and an additional sand filtration is necessary.

In addition to the elevation of the inlet opening, the height of the inlet slot is also individually controlled by narrowing and widening as determined by the current load.

The advantages are obvious:

- ✓ **less turbulence**
- ✓ **no additional filtration necessary**
- ✓ **higher loading capacity**
- ✓ **increasing efficiency at decreasing costs**
- ✓ **tailor-made solutions for the hydraulic design and control systems through hundreds of individual CFD simulations**

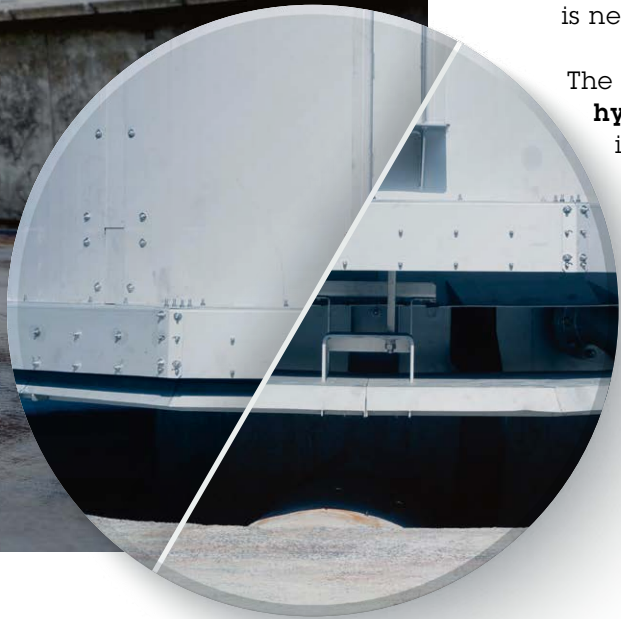
The innovative **Passavant® hydrograv® adapt System** is the solution, because a movable inlet opening and variable outlet slots adapt the flock filter to the current conditions:



At a low sludge blanket level the inlet shifts itself to a low position.



At a high sludge blanket level the inlet shifts itself just to a high position.



Dry weather, night time:

The inflow of wastewater is low, as is the sludge blanket level. The movable inlet lies deep and the opening is small.



Dry weather, day time:

The inflow of wastewater is normal, as is the sludge blanket level. The inlet is slightly higher and the inlet slots are wider.



Wet weather:

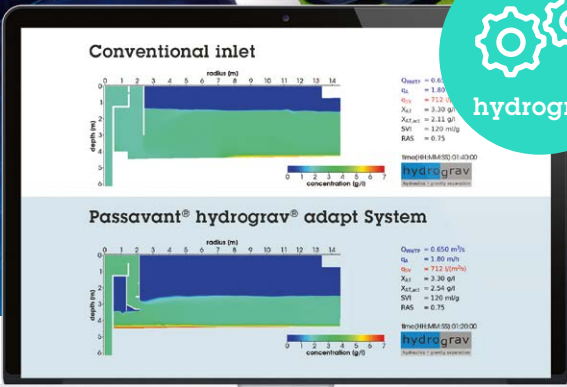
The inflow of wastewater and additional rainwater is high, as is the sludge blanket level. The inlet is raised high and the outlet slots are fully open.



Heavy storm weather:

The inflow of wastewater and rainwater is very high, as is the sludge blanket level. The inlet is completely raised and the outlet slots are fully open.

Benefits



Virtual Capacity Simulation STP



Customer

System on monitor

Our process expertise is your advantage

We as developers of the **Passavant® hydrograv® adapt System**, we at Passavant-Geiger and hydrograv GmbH are not only leading experts in our fields. We also know how to optimize our technology individually to achieve the best results.

This is why we analyze your wastewater treatment plant before installation and run a virtual test based on acquired data, which realistically forecasts all possible results. The number and size of the secondary clarifiers are just as

important as the type of aeration tanks, the geographical location and its climatic conditions, the current load and, of course, the scope you want to achieve.

After all factors have been evaluated and the results meet your requirements, we start with the installation of the **Passavant® hydrograv® adapt System** in your wastewater treatment plant. Of course our system is available in two different versions – for circular and suction scraper. Certainly,

the **Passavant® hydrograv® adapt System** also includes the corresponding software and measuring technology – smart and reliable:

- A process measuring and control technology, customized and optimally controllable
- Several monitoring, security and warning tools
- Several hundreds of individual optimization CFD simulations prior to each installation

Case Studies



Saudi Arabia

This wastewater treatment plant in Saudi Arabia had to be expanded due to a 50% higher loading in 2015. With a total of 8 secondary clarifiers and a diameter of about 55 m (180 feet) the capacity was no longer sufficient.

Instead of constructing four additional clarifiers, the 8 existing clarifiers were equipped with **Passavant® hydrograv® adapt System**. The result: the capacity has been increased by almost 50%. As a side effect the suspended solids at the effluent dropped down to zero and major costs were saved.

Delivery Year	2016
Plant Type	STP with 8 clarifiers
Clarifier dimensions	approx 55 m (180 ft)
Condition	critically loaded
Scope	Increase of hydraulic STP loading by 50%
First Planning	4 additional clarifiers
Delivery	8 Passavant® hydrograv® adapt Systems
Benefit	clear effluent and water
Extra Effect	Major civil costs savings

Germany

The resources of a treatment plant in Germany were no longer able to absorb the volume of wastewater from a growing city. Instead of constructing two new secondary clarifiers, the planners now rely on the **Passavant® hydrograv® adapt System**. With success: the capacity of the plant was sufficiently increased without the need for costly new constructions. Positive side effect: the particulate phosphorus in the effluent of the clarifiers dropped to almost zero and the average turbidity was brought to a value of around 2 FNU.

Delivery Year	2015 – 2016
Plant type	STP with 6 secondary clarifiers
Clarifier dimensions	approx 50 m (164 ft)
Condition	critically loaded
Scope	Increase of hydraulic STP loading
First Planning	2 additional clarifiers
Delivery	6 Passavant® hydrograv® adapt Systems
Extra Effect	Reduction of suspended solids in the effluent



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