

## THE BETTER SOLUTION WITH ACAT

### Polymer Preparation Systems in the Focus of the Optimisation of Operating Materials



**Increasing sewage sludge disposal costs causing wastewater treatment plant operators to focus on the optimisation of their existing sludge dewatering systems.**

In the past, the main focus was on optimising the use of liquid flocculants based on dispersions or emulsions. Currently, the use of powdered flocculants is in the foreground.

As a reliable partner in the optimisation of operating equipment on the various sludge dewatering aggregates, ACAT was significantly involved in the development and the application of new powder polymers. Intensive laboratory tests and subsequently supervised machine tests on the most diverse sludge de-

watering aggregates with the most diverse sludge types and their compositions have led to the fact that the sewage treatment plant operators could be convinced to use increasingly powder polymers.

Furthermore, the development of dissolving and dosing technology made a substantial contribution to making the use of powder polymers easy to “handle” for the operator. In the past, the use of 25 kg bags was common, but currently 750 kg Big Bags are used as

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standard and, at the customer's request, also 1000 kg Big Bags. The Big Bags only require a certain amount of "attention" when changing them, but subsequently the operator no longer comes into contact with the "dusty and slippery" material.

Due to the positive feedback of the plant operators and the constant efforts of the ACAT Company to stand out from the competition in accordance with the company's motto "Technical Service is our Success", the entire team of the Technique Centre Scheibbs developed polymer preparation plants for the operation with solid and liquid polymer.

### The units from the PPU series allow the following modes of operation:

- 100 % solid polymer or
- 100 % liquid polymer or
- Mixtures of solid and liquid polymer in any mixing ratio

All the above-mentioned operating modes can be run both with and without the addition of a defoamer. This additionally increases the flexibility of the plant operator, if the filtrate/centrate tends to foam - which is particularly the case with high-performance centrifuges.

The **advantage** of the solid and liquid polymer mode of operation is obvious:

- The shear stability of a linear powder polymer can be increased by combining it with a cross-linked liquid polymer.

- The white oil and the emulsifiers of the liquid polymers have a defoaming effect.
- Optimisation of the entire sludge dewatering in the case of fluctuating sludge compositions

In the summer months, the sludge dewatering system can be operated with 100 % solid polymer; in the off-season or winter season, the optimum ratio is a mixed operation of 50 % liquid and 50 % solid polymer. The operating modes are very flexible and can be continuously adapted by the operator in terms of technical and economic aspects.

Due to the close cooperation of ACAT with the plant operators and their operating staff, the needs and procedural requirements as well as the wishes of the customer can be taken into account and individually implemented. These advantages and the flexibility of ACAT's project design have already convinced a number of wastewater associations.

### Project ARA Region Dornbirn-Schwarzach GmbH

#### Polymer dissolving station PPU 3 for sludge dewatering with 3 belt presses

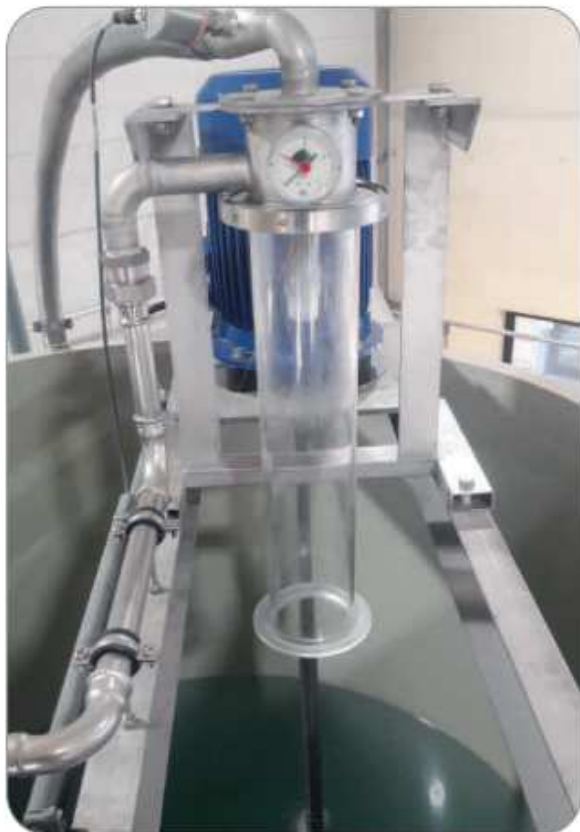
Since the 1980s, the ARA Region Dornbirn-Schwarzach GmbH has been operating its digested sludge dewatering with three belt filter presses with downstream fluidised bed drying.

Constantly increasing energy costs and polymer prices and the fact that the aging plant

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Detail of the polymer solution station

did not have any measurement technology for balancing, prompted the management, represented by Mr. qualified industrial engineer MAS Alexander Zerlauth, to take a closer look at the conversion of the sludge dewatering system. For this purpose, a market survey was commissioned of the various suppliers of dissolving and dosing control systems. The overall technical concept of a polymer processing station including dosing control and the use of synergies between the “old

sludge dewatering system” and the “new system components” were the decisive reasons why ACAT was able to stand out from the competition.

After clarifying the technical details, the concept was also convincing from the commercial point of view. Thus, ARA Dornbirn-Schwarzach GmbH awarded ACAT the contract for the conversion of the sludge dewatering system.

#### Old Stock

- SERVO controlled sludge feed pumps without IFM(inductive flow meter)
- Piston diaphragm pumps for polymer dosing without IDM
- post-dilution of the polymer ready-to-use solution necessary
- Polymer dissolving station 3 chamber continuous flow system insufficient maturing time for the powder polymer
- Irregular preparation concentration of the polymer stock solution due to pressure fluctuations in the preparation water

#### Special features of the new plant

- The polymer plant is supplied with 750 kg Big Bags or IBC containers.
- The desired preparation concentration in x % active polymer is preselected in the PLC by the operator. Current operation with 100 % solid polymer.
- The calibration of the polymer concentrate pump or of the dosing screw of the solid polymer is carried out via the PLC by an operator.
- The water supply of the polymer dissolving station is controlled via an IDM.

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Project ARA Region Dornbirn-Schwarzach GmbH

- Batch-wise preparation according to the preselected batch-volume. Pressure fluctuations in the network have no influence on the preparation concentration.
- Separate preparation and storage tank
- Due to the total tank volume of approx. 6,000 l, sufficient maturing time for the polymer solution is guaranteed. 3 belt presses can be operated in parallel.
- No post- dilution of the polymer solution is necessary
- The prepared FHM can be emptied down to the minimum level of the preparation tank using the function “Empty”. No new preparation is started. When starting the units in the

morning, a fresh polymer solution is always prepared automatically first.

- Stainless steel control cabinet for dosing control and “communication” with the “old stock”.
- Sludge charging with eccentric screws Pumps of the latest generation incl. IFM (inductive flow meter)
- Polymer charging with eccentric screws Pumps of the latest generation incl. IFM (inductive flow meter)
- Online solids measurement type Solitax High Line
- The IDM “Sludge” records the volume of the digested sludge in m<sup>3</sup>/h, the online density

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measurement registers the current dry substance content/h.

- The polymer dosage is proportional to the volume and mass of the digested sludge in kg/t dry substance.
- The entire assembly, electrical installation, programming of the dosing control and the integration into the existing control system were carried out by Technique Centre Scheibbs.

We would like to thank the management, Mr. qualified industrial engineer MAS Alexander Zerlauth and his team for the trust they have placed in us and for the quick and uncomplicated implementation of this very extensive project.

An “almost” trouble-free installation and commissioning would not have been possible in such a short time without the support of the entire team! Many thanks also for the hospitality during the “lock-down”.

### Project Stadtwerke Schwaz – Department Waste Water

#### Polymer dissolving station PPU 3 for sludge dewatering with a high-performance decanter

The existing sludge dewatering system with a centrifuge was upgraded to the latest generation of high-performance decanters. The primary focus of the plant operator was on increasing the dry substance content of the discharge and on the high level of operational safety of the new plant components.

In a second optimisation step, the use of operating resources was examined more closely. The existing polymer dissolving station could only process liquid flocculants. In the course of the ongoing optimisation of the sludge dewatering, our sales representative Roland Auer installed a mobile FHM station for powder admixture, which was tested over several months. Different mixing ratios of solid and liquid polymer were tested and evaluated from a technical and economic point of view. The dry substance content of the sludge cake remained unchanged, but the centrate was more stable with this mixture than in the conventional liquid operation.

Due to the good results, a new plant was planned and an overall concept was worked out. At the customer’s request, the preparation and storage tanks were integrated into a former storage room. The control system of the new polymer dissolving station was integrated into the existing sludge dewatering control system, which further increases the operator’s flexibility. Furthermore, ACAT installed two new polymer dosing pumps on a stainless steel frame and integrated them into the existing control system.

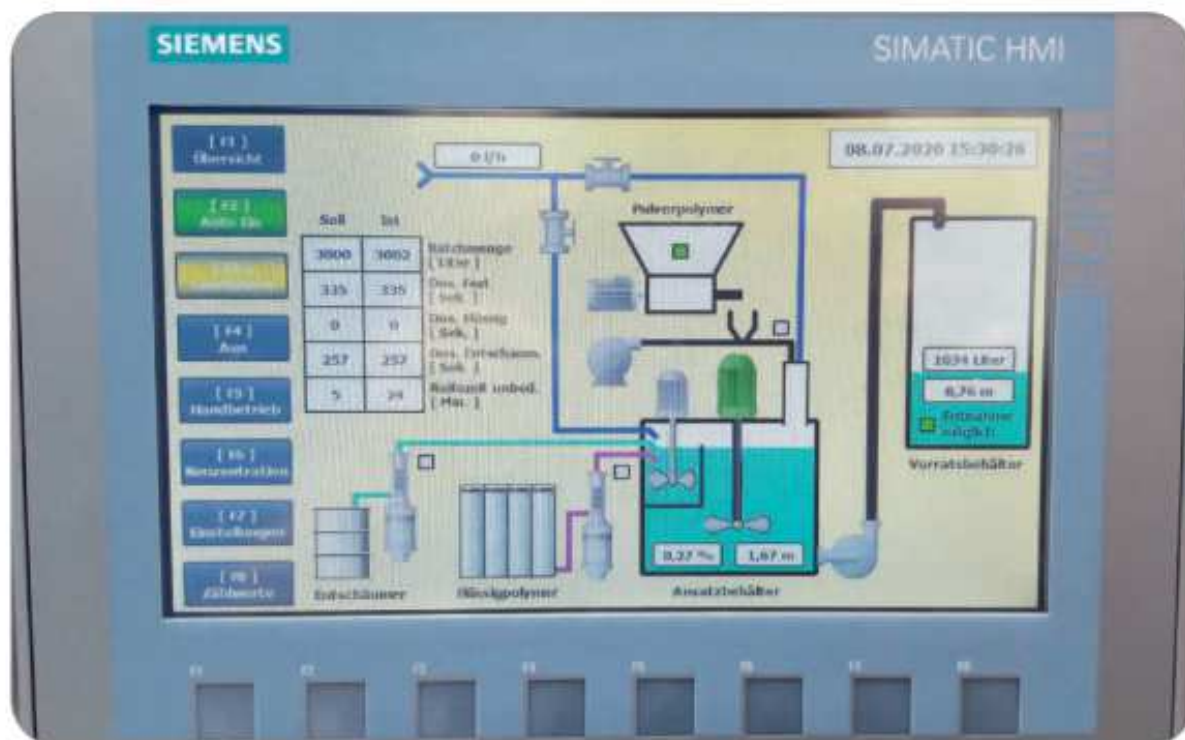
#### Special features of the system

- The preparation and maturing tanks are located separately. The tanks are located on different floors.
- Due to the large tank volume of approx. 6,000 l, sufficient maturing time for the polymer solution is guaranteed.

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Project Stadtwerke Schwaz - Waste water department



- The prepared FHM can be emptied down to the minimum level of the storage tank with the function “Empty”. No new preparation is started. The preparation and the storage tank are at the minimum level until the polymer preparation system is restarted. If the decanter is started in the morning, a fresh polymer solution is always prepared automatically first.
- If necessary, a defoamer can be added to the preparation.
- The polymer plant is supplied with 750 kg Big Bag or IBC containers.

- The batch volume is monitored at the water inlet with an IFM (inductive flow meter) made by E&H.
- The ratio of liquid to powder polymer can be adjusted to any mixing ratio.

We would like to thank the Stadtwerke Schwaz for the trust they have placed in us. Special thanks to Mr. Armin Schrottenbaum and Mr. Stefan Patka for their personal commitment and for co-ordinating the individual interfaces.

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Project AWV (Waste Water Association) Grazerfeld

**Polymer dissolving station PPU 3 for sludge dewatering with two high-performance decanters**

The existing digested sludge dewatering with centrifuges was upgraded to the latest generation of high-performance decanters and the polymer processing station in the sludge line was redesigned. Years of co-operation and the AWV's confidence in ACAT's competence were decisive that the Managing Director Michael Lechner and the Managing Director Deputy DI Andreas Philadelphy accepted the application of a system change of the already tendered polymer processing station. Therefore, the contractor of the complete sludge dewatering system took over the components for the polymer dissolving station type PPU 3 according to the specifications of ACAT.

### Special features of the system

- The polymer plant is supplied with 750 kg Big Bag or IBC containers.
- The dosing of the liquid polymer is carried out via an EMF (electromagnetic inductive flowmeter) from E&H
- The batch volume is monitored at the water inlet with an IFM (inductive flow meter) made by E&H.
- If necessary, a defoamer can be added to the preparation



Detail of the polymer solution station  
AWV Grazerfeld

- Due to the total tank volume of approx. 4,000 l, sufficient maturing time for the polymer solution is guaranteed.
- The prepared FHM can be emptied down to the minimum level of the storage tank with the function "Empty". No new preparation is started. The preparation and the storage tank are at the minimum level until the polymer preparation system is restarted. If the decanter is started in the morning, a fresh polymer

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solution is always prepared automatically first.

- The ratio of liquid to powder polymer can be adjusted to any mixing ratio.

We would like to thank the AWV GrazerFeld Managing Director Mr. Michael Lechner, and Managing Director Deputy DI Andreas Philadelphia for the trust they have placed in us. Our special thanks go to Mr. Wolfgang Mayer for his personal commitment and the coordination of the installation companies.

### Project AWV (Waste Water Association) Hohe Tauern Süd

#### **Polymer dissolving station FPU for sludge thickening with disc thickener; Polymer dissolving station FPU for sludge dewatering with screw press**

The AWV Hohe Tauern Süd operates a mechanical excess sludge thickening system with a belt thickener. A liquid polymer is used for sludge conditioning. The aging "old plant" was prone to failures and met no longer the necessary technical requirements of the AWV Hohe Tauern Süd.

As a reliable supplier of sludge dewatering systems for many years ACAT was invited to a technical discussion and to submit an offer. Roland Auer, our long-standing sales representative with an extensive experience in the field of sludge dewatering, the ACAT Technique Centre Team Scheibbs and the waste water association worked out a customised offer together. It convinced the plant man-

agement and subsequently also the board of directors from both a technical and a business management point of view!

In December 2020, the new polymer dissolving station for the excess sludge thickening with a disk thickener was put into operation. Since then, the system has been running trouble-free.

Almost exactly one year later, in December 2021, the order for a second polymer dissolving station for a sludge dewatering system with a screw press was awarded to ACAT. We will exhibit this reference system at the IFAT 2022 in Munich.



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### Special features of the system

- The required preparation concentration in x % active polymer is preselected in the PLC by the operator.
- The operator calibrates the polymer concentrate pump via the PLC.
- The water supply is monitored via an IFM (inductive flow meter).
- The polymer concentrate pump is controlled via a frequency converter and regulates itself according to the water supply and the preselected preparation concentration, so that a constant preparation concentration is guaranteed.
- The prepared FHM can be emptied down to the minimum level of the storage tank with the function “Empty”. No new preparation is started. The preparation and the storage tank are at the minimum level until the polymer preparation system is restarted. If the decanter is started in the morning, a fresh polymer solution is always prepared automatically first.

The entire installation, the mechanical piping and the integration into the existing control system was carried out as an in-house service.

We would like to thank the AWW Hohe Tauern Süd for the trust they have placed in us and to Deputy Operations Manager Gernot Ortner and his team!