Clean wastewater – with ProMinent

Efficient wastewater treatment in the industrial and municipal sectors

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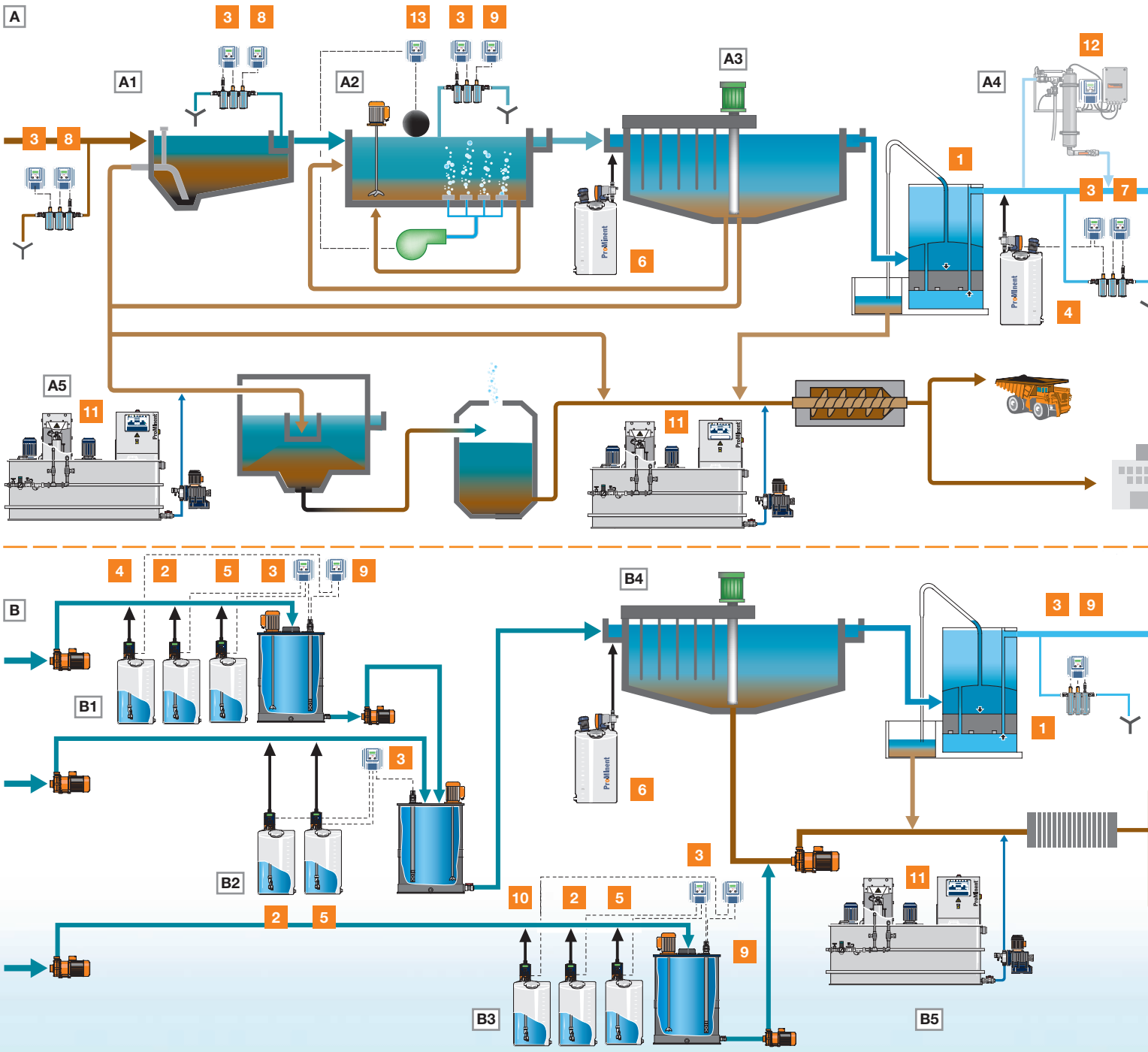
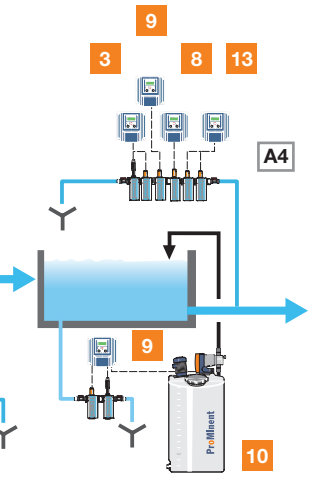
A	Municipal sewage plant	A3	Post-clarification	B	Industrial wastewater treatment	B3	Chromate decontamination
A1	Pre-clarification	A4	Disinfection/decontamination	B1	Cyanide decontamination	B4	Precipitation/sedimentation
A2	Biological stage	A5	Sludge treatment	B2	pH neutralisation	B5	Sludge treatment

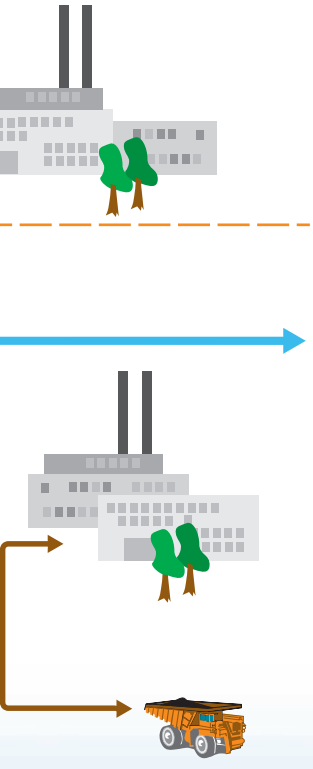


1	Gravity filter INTERFILT® SK	2	ProMinent® dosing station for sulphuric acid	3	pH measuring station DULCOMETER®/ DULCOTEST®	4	ProMinent® dosing station for free chlorine	5	ProMinent® dosing station for caustic soda
7	Measuring/control station for total chlorine DULCOMETER®/ DULCOTEST®	8	Measuring station for electrolytic conductivity DULCOMETER®/ DULCOTEST®	9	Redox measuring station DULCOMETER®/ DULCOTEST®	10	ProMinent® dosing station for sodium sulphite	11	Polyelectrolyte batching and dosing system Ultromat®

Complete solutions for complex wastewater



The treatment of wastewater is a complex process of caring for the valuable resource of water and prevention of environmental damage. Optimally designed processes ensure efficient cleaning of the wastewater and save money. Many processes are based on dosing of chemicals – often controlled and automated. ProMinent not only has years of experience in water treatment but can also offer a comprehensive and flexible range of Chemical Fluid Handling equipment.



Depending on the nature of the wastewater and use in municipal water treatment or in industry, physical, chemical or biological methods are employed. ProMinent ensures optimal design of the entire process for compliance with all statutory regulations – worldwide.

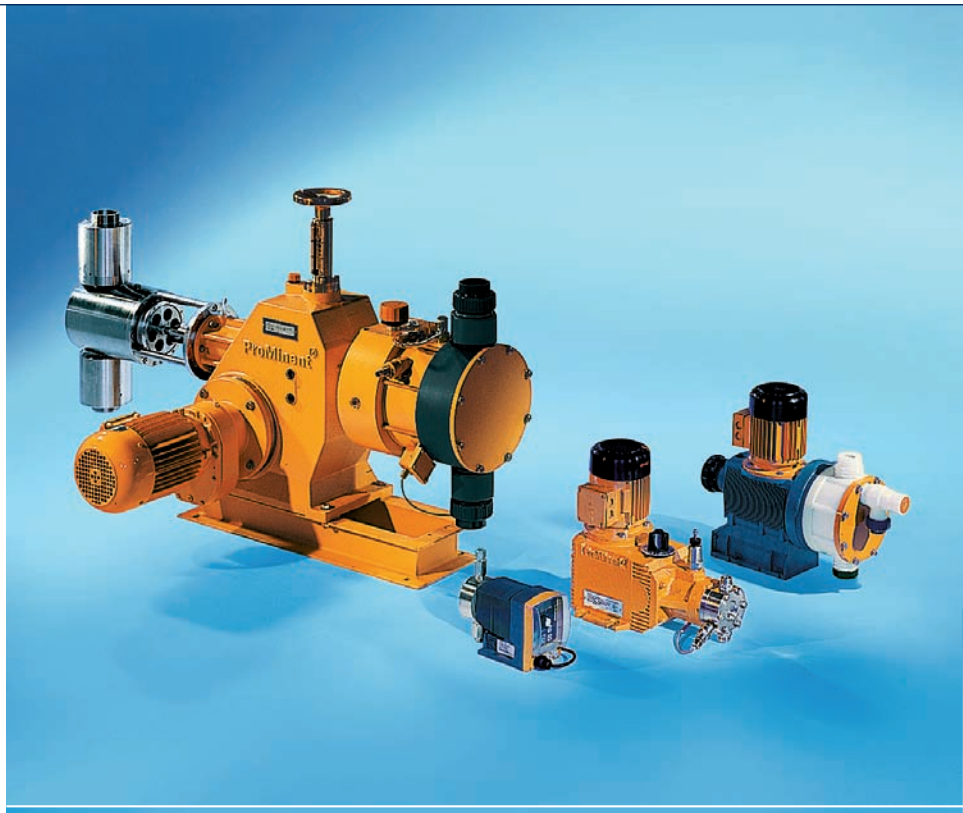
- Controlled dosing of acids/alkalis for pH neutralisation
- Control of the oxygen content in the aeration basins of municipal sewage plants
- Controlled dosing of reducing/oxidising agents for decontamination of process water containing chromate or cyanide, for example
- Dosing of iron(III) chloride for phosphate precipitation
- Dosing of polyelectrolyte solution for optimal flocculation of precipitable pollutants
- Removal of precipitable pollutants in the gravity filter
- Sludge dewatering by polyelectrolyte dosing
- Desalination of process waters by reverse osmosis
- In some countries: controlled dosing of disinfectants in the post-clarification basin and measured value-dependent destruction of excess disinfectant before the wastewater is discharged back to nature

6 **ProMinent® dosing station for iron(III) chloride**

12 **UV disinfection system Dulcodes, alternative to chemical disinfection**

13 **Measuring/control station for dissolved oxygen DULCOMETER®/ DULCOTEST®**

Further information:
www.prominent.com/wastewater



Metering pumps

Metering chemicals – the core task of a metering pump. And ProMinent offers metering pumps in every performance class and profile. The world market leader in solenoid-driven diaphragm metering pumps is equally convincing when it comes to medium- and high-pressure pumps.

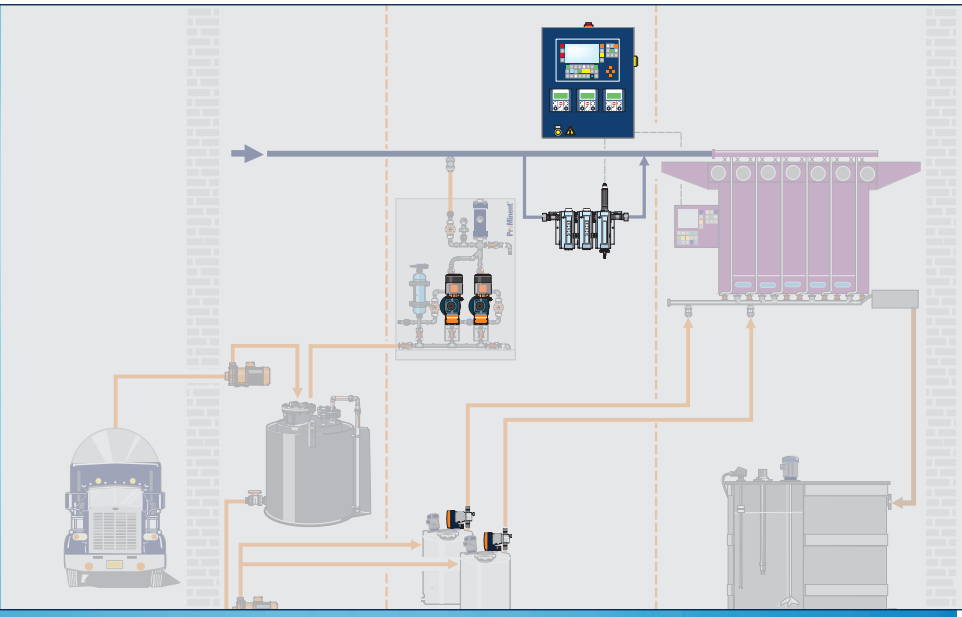
- Solenoid-driven diaphragm pumps: up to 30 l/h
- Motor-driven diaphragm pumps: up to 4,000 l/h
- Hydraulically actuated diaphragm pumps: up to 40,000 l/h
- Plunger pumps: up to 40,000 l/h
- Custom metering pumps

Sensors

The DULCOTEST® sensors deliver exact, reliable and application-adjusted measured values in real time – for the monitoring or control of processes. The sensors can be optimally integrated into the ProMinent control loop together with controllers and metering pumps. Numerous probe housings are available for individual integration into the process.

- pH
- Redox/ORP
- Conductivity
- Chlorine
- Chlorine dioxide
- Chlorite
- Bromine
- Ozone
- Dissolved oxygen
- Hydrogen peroxide
- Peracetic acid
- Fluoride
- Temperature

The heart of an optimum solution



The precise interplay of metering pump, controller and sensor is a guarantee of optimum metering. Components from ProMinent are perfectly interacting and together they form a perfect control loop.

Measurement and control systems
Our measurement and control instrumentation is adjusted to each specific application: Finely graduated performance classes offer the right technology for every metering task. ProMinent offers full product lines from the simple transformation of measured signals for transmission to a central control unit via user-calibrated instruments with measured variable display, to controllers for complex control tasks. We offer PROFIBUS® DP and CANopen-BUS components to enable integration of the control loop into a bus system.

- 1-channel controller D1C
- 2-channel controller D2C
- Multi-channel controller DULCOMARIN® II
- Various measurement transducers/transmitters
- Handheld measurement units

Further information:
www.prominent.com/metering_pumps
www.prominent.com/mcs

Measuring station for dissolved oxygen

Efficient controlling and monitoring of oxygen

An amperometric sensor measures the dissolved oxygen, controls pumps for feeding atmospheric oxygen into the biological treatment stage and monitors the oxygen concentration at the sewage plant outfall.

- Unique float accommodates changing water levels
- Self-cleaning through Venturi grooves
- Dirt-resistant sensor membrane
- Particularly simple sensor maintenance and calibration
- Simple installation and 2-wire connection up to 1,000 m length

	DO 1-mA-20 ppm	DO 2-mA-10 ppm
Measured value	**Dissolved oxygen as concentration [mg/l]**	**Dissolved oxygen as concentration [mg/l]**
Measuring range	0 - 20 [mg/l]	0 - 10 [mg/l]
Mounting	as float	in the immersion tube
Operating temperature	0 - 50 °C	0 - 50 °C
Max. pressure	1 bar	1 bar
Min. incident flow velocity	0.05 m/s	0.05 m/s
Output signal	4 - 20 mA calibrated	4 - 20 mA calibrated
Controller connection	D1CAXX	D1CAXX

Further information:
www.prominent.com/mcs

Controllers DULCOMETER® D1C/D2C

The brain of the control loop

The DULCOMETER® D1C/D2C controllers make up the core of the extensive range of controllers and transmitters available from ProMinent. They are reliable, universally usable and can control a wide range of parameters.

DULCOMETER® D1C

- Universally usable for 14 different measured variables
- Optimised process sequences through special functions such as disturbance signal activation, pH compensation for chlorine, base load dosing and numerous limit value functions
- Special “Cool control” version, tailored to the special requirements of cooling tower conditioning

DULCOMETER® D2C

- The efficient solution for simultaneous control/measurement of: pH/redox, pH/chlorine, pH/pH, chlorine/chlorine and pH/chlorine dioxide
- Optimised process sequences through special functions such as base load dosing and numerous limit value functions

DULCOMETER® D1C

Measured Variable	Measurement and control range
pH	0 - 14
Redox/ORP	-1,000 mV ... 1,000 mV
Chlorine	in 7 graduated measuring ranges between 0.00 and 100.0 ppm
Bromine	in 2 graduated ranges between 0.02 and 10.0 ppm
Conductive conductivity	in 4 graduated ranges between 0 µS/cm and 200 mS/cm
Inductive conductivity	in 4 graduated ranges between 0 µS/cm and 2,000 mS/cm
Chlorine dioxide	in 4 graduated ranges between 0.00 and 20.0 ppm
Chlorite	in 2 graduated ranges between 0.02 and 2.00 ppm
Ozone	0.00 - 2.00 ppm
Fluoride	0.05 - 10 mg/l
Hydrogen peroxide	in 4 graduated ranges between 1 - 20,000 ppm
Peracetic acid	in 3 graduated ranges between 1 and 2,000 ppm
Dissolved oxygen	in 2 graduated ranges between 0.1 and 20 ppm
Temperature	0 - 100 °C
Analogue signal	0/4 ... 20 mA

DULCOMETER® D2C

Measured Variable	Measurement and control range
pH (Measured variable 1,2)	0 - 14
Redox/ORP (Measured variable 2)	0 - 1,000 mV
Chlorine (Measured variable 1,2)	in 7 graduated ranges between 0.00 and 100.0 ppm
Chlorine dioxide (Measured variable 2)	in 4 graduated ranges between 0.00 and 20.0 ppm

Further information:
www.prominent.com/mcs

Polymer mixing and dosing stations Ultromat®

Continuous Flow Systems Ultromat® AT/AF/ATF

In Continuous Flow Systems, the reservoir is separated into three chambers. This largely prevents recently mixed polymer entering the suction area of the metering pump (product entrainment). This helps to ensure that the efficiency of the subsequent drainage plant is conserved in its entirety.

- Low product entrainment
- Ease of operation
- Easy commissioning
- Low space requirements
- Control with integrated operating panel and display
- Accurate solution concentration through proportional control

Two-chamber batch systems Ultromat® ATP/AFP/ATFP

The two-chamber batch systems are separated into two chambers. While one chamber is filled, matured polymer solution can be withdrawn from the other. The freshly mixed polymer and the matured polymer cannot mix (no product entrainment).

- No product entrainment
- Ease of operation
- Easy commissioning
- Low space requirements
- Control with integrated operating panel and display
- Accurate solution concentration through proportional control

Reliable dosing of flocculation agent

Polymer	Continuous flow system	Dual chamber batch system	Manual mixing station
Powder	AT	ATP	MT
Liquid	AF	AFP	MT
Powder and liquid	ATF	ATFP	MT

Technical data	Continuous flow system	Dual chamber batch system	Manual mixing station
Container Capacity	400 - 8,000 l	2 x 400 - 2 x 4,000 l	120 - 4,800 l
Ouput capacity	400 - 8,000 l/h	400 - 4,000 l/h	120 - 4,800 l
Maturing time at max output capacity	60 min	60 min	60 min
Concentration	0.05 - 0.5 %	0.05 - 0.5 %	0.05 - 0.5 %

Ultromat® systems have been specially developed for mixing liquid and/or powder polymers. Their design is based on many years of experience in waste water treatment. Hundreds of applications world wide impressively demonstrate ProMinent's specialised expertise in this field.

- Reliable, matured technology
- Simple mounting
- Operational input reduced to a minimum

Mixing station Ultromat® MT
A simple, rugged and cost effective option. The Ultromat® MT consists of a single-chamber container. The liquid or powder flocculant is added manually; mixing is carried out be the agitator.

Options and accessories for Ultromat®
Options:

- Agitator in reservoir
- Overfill safe guard
- Flow monitor for liquid concentrate pump
- Compacter for powder dosing unit
- Pause feature and operating indication

Accessories:

- Supply funnel for powder dosing unit
- Small conveying unit
- Powder reservoir

Further information:
www.prominent.com/mixing_stations

Polymer preparation and dosing systems

Effective polymer dosing

Polymer preparation and dosing systems
for the preparation of stock solutions or working solutions of synthetic flocculants (polyelectrolytes)

Areas of application

- Waste water and sludge treatment
- Paper production
- Drinking water and industrial water treatment
- Treatment of sand and gravel
- Brine treatment
- Ore enrichment

Customer benefit

- Reliable compliance with all statutory requirements
- Fully-automatic operation with a minimum of staff and maintenance
- Flexible process design thanks to adaptation to various concentration demands
- High process safety of water treatment

Type	Principle	Particularity	Application	Polymers F = liquid T = powder TF = liquid + powderr	Capacity range (discharge volume)
Ultromat® AF/AT/ATF	Continuous flow system	Optimum price/performance ratio ProMinent® controls	Waste water	F/T/TF	400 – 8,000 l/h
Ultromat® AFP/ATP/ATFP	2-chamber batch system	No carryover of unmatured polymer ProMinent® controls	Waste water/Papier	F/T/TF	400 – 4,000 l/h
Ultromat® AFD/ATD/ATFD	Double-deck system	Low space requirement S7 control	Waste water/paper	F/T/TF	400 – 2,000 l/h
Ultromat® ATR	Continuous flow system	Round tank made of PP; simple relay control	Waste water	T	400 – 2,000 l/h
Ultromat® AFK	Continuous flow system	Integrated concentrate tank ProMinent® controls	Waste water	F	260 – 2,600 l/h
Ultromat® MT	Manual mixing station	1-chamber tank	Waste water	TF	140 – 5,000 l/h
POLYMORE	In-line mixing	Only for liquid polymers; with peristaltic pump	Waste water	F	120 – 18,000 l/h
PolyRex	Double-deck system	Low space requirement; tank made of stainless steel	Waste water/paper	TF	240 – 3,820 l/h

Further information:
www.prominent.com/mixing_stations

Dosing systems POLYMORE and PolyRex

Homogeneous polymer solutions

In-line preparation station POLYMORE

In the in-line preparation station, the liquid polymer is added to the diluent water in the multi-zone mixing unit through a peristaltic pump and processed into a homogeneous polymer solution.

- Discharge volume 120 – 18,000 l/h
- Low maintenance thanks to peristaltic pump
- No calibration required
- Large, opaque mixing chamber
- Easily accessible metering valve
- Direct remote control via 4…20mA signal
- No additional metering pump required

PolyRex double-deck preparation station

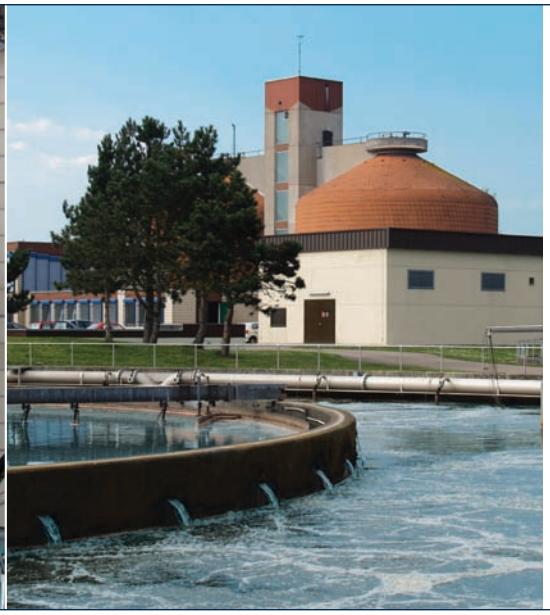
The double-deck preparation station is divided into two tanks. The upper tank is the preparation/maturing tank, the bottom tank is the storage tank for the prepared polymer solution.

- Discharge volume 240 – 3,820 l/h
- For powdery and liquid polyelectrolytes
- Double-deck tank made of stainless steel
- Optimal use of polymer through batch system
- High metering accuracy
- Highly reproducible batch composition
- Optimal re-dilution through static mixer

Further information:
www.prominent.com/mixing_stations

Practical example: Sewage works Landau (Germany)

Cost reduction in digested sludge dewatering



"Thanks to the effective and reliable generation and addition of flocculants with the polyelectrolyte preparation and dosing system Ultromat®, we are obtaining a very high dewatering ratio in the generated digestive sludge. This means that we obtain a relatively dry residual sludge with a very high dry matter contents. We are thus saving considerably with regard to the disposal of residual sludge"
Dieter Hochdörffer, waste water manager and plant manager of the Landau sewage works

As partner of KHD Humbold Wedag GmbH, Cologne, ProMinent supplies the polymer preparation station for powdery and liquid polymer for the production of stock solutions or working solutions of synthetic flocculants. The components optimally matched among each other and to the process guarantee an extremely economic overall solution.

Challenge

Process-technical optimisation of the sludge dewatering by an effective and reliable metering of synthetic flocculants (polyelectrolyte)

Solution

- Ultromat® ATFP 2500 2-chamber batch system for the preparation of liquid and solid flocculants to prepare a 0.05 - 0.5 % polymer solution
- Precise addition of the liquid flocculant by using metering pumps

Customer benefits

- Fully-automatic operation with a minimum of staff and maintenance
- Optimisation of the sludge dewatering through high dewatering ratio
- Reduction of the sludge disposal costs by obtaining higher dewatering ratios (high dry matter contents of 30 %).

Further information:
www.prominent.com/references

Practical example: Rhein Papier GmbH (Germany)

Cost reduction in the retention at the paper machine

„A clean complete solution“
Guide H. Clemens, technology manager of the paper mill Rhein Papier GmbH in Hürth

Retention agents facilitate an economic paper production. At the Rhein Papier in Hürth, an extremely high retention of fines can be achieved using components optimally matched to the process. As partner of Herkules in Düsseldorf, ProMinent supplied the preparation station for powdery retention agents for this application.

Challenge

- Effective and reliable preparation of retention agent solutions to optimise the dewatering of the fibre suspension

Solution

- Ultromat® continuous flow system for the preparation of retention agents to prepare a 0.05 - 0.5 % solution
- Control of the system with superordinated host computer

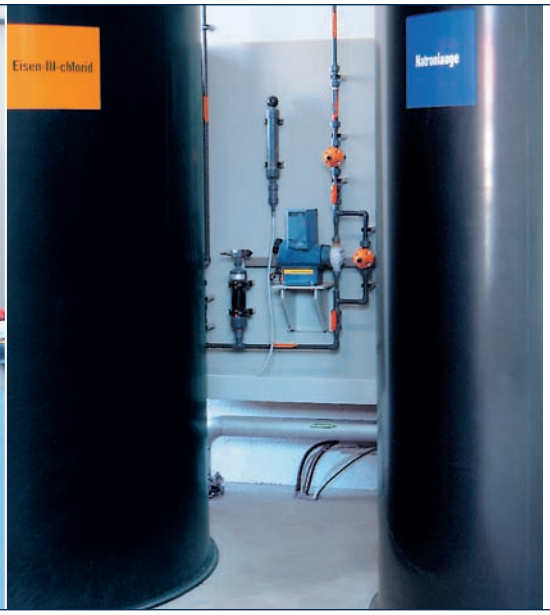
Customer benefits

- High level of retention and lower consumption of retention agents thanks to optimally prepared polymer solutions
- Fully-automatic operation with a minimum of staff and maintenance
- Flexible process design thanks to adaptation of the preparation station to various concentration demands
- The preparation station Ultromat® for metering solutions with solid retention agent can also be used for liquid retention agents.

Further information:
www.prominent.com/references

Reference: Lutz Fleischwaren (Lutz Meat Products) (Germany)

Cost-cutting in production wastewater



"The high efficiency of the ProMinent plant ensures that we reduce the typically high COD and fat content of our production wastewater to below the statutory limits and so make clear savings on wastewater fees."
Uwe Martin, Factory Manager, Lutz Fleischwaren AG, Hammelburg, Germany

As a partner of HUBER AG, ProMinent supplied components for pH value adjustment, flocculation, precipitation and flotation. The components – optimally matched to one another and to the process – offer an extremely economical total solution for the meat processing industry.

Challenge

- Precise flow-proportional dosing of iron(III) chloride for precipitation
- Accurate pH value-dependent control of the caustic soda dosing
- Effective and reliable dosing of flocculant
- Safe storage of chemicals in high-level tanks in accordance with the guidelines of the Water Resources Act

Solution

- Use of dosing pumps, hydraulic accessories, measurement and control equipment
- Use of dosing and storage tanks
- Batching station for polyelectrolyte dosing solution with liquid or solid flocculant

Customer benefits

- Reliable compliance with all statutory conditions by the food producer
- High process safety in the water treatment
- Savings on wastewater fees and heavy polluter surcharges

Further information:
www.prominent.com/references

Global service locally

We already offer our service to you even if you are not yet our customer. Our pre-sales services ensure that you get the optimum solution for your individual needs:

- **Advice in choosing the products**
- **Application and process optimisation**
- **Project planning**

However, our commitment does not end with delivery. We offer you a comprehensive after-sales service, which lasts for the entire service life of your equipment.
That maximises your productivity and minimises your operating costs:

- **Assembly/installation**
- **Commissioning**
- **Maintenance**
- **Spare parts service**
- **Repair**
- **Troubleshooting**

Thanks to our worldwide presence in over 100 countries, our service is available wherever you need it.

Further information:
www.prominent.com/service

World-wide contact

ProMinent is at home in more than 100 countries of the world. This guarantees world-wide availability of the products and short distances to the customer. We offer you the same high quality standard in products and services worldwide. For you at your location: experience and know-how in water treatment and chemical fluid handling are available world-wide.

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5-11
69123 Heidelberg
Germany
Phone: +49 6221 842-0
Fax: +49 6221 842-419
info@prominent.com
www.prominent.com

Experts in Chem-Feed and Water Treatment