



# Wastewater

SWISS ENGINEERED PUMPS SINCE 1947



# From wastewater to sludge treatment

Egger is present in many areas of wastewater treatment from pumping raw sewage, sand and water mixtures, primary sludge, recirculation, recycled and digested sludge to other secondary sludge such as lime water and activated carbon suspensions. The liquids involved in these processes may be strongly abrasive or corrosive, or they may be multi-phase mixtures with a high gas content. As a specialist in pumping fluids containing solid matter and gas, we accept any challenge. Our Iris® diaphragm control valves also offer the perfect solution for precise control of liquids and gases.

## Raw sewage

Over recent years, the composition of wastewater has changed dramatically, and pumping raw sewage has become increasingly challenging. Clogging problems and related pump stoppages have steadily increased. The causes of this are a decline in drinking water consumption through more prudent use of water resources, accompanied by an increase in suspended solids through increased concentration of the pollution load in wastewater.

### The problem is set to increase further

Due to decreasing wastewater volumes, many pump stations increasingly operate at partial load. The decrease in flow velocity in the collector, piping and pumps and, in particular, the resulting flow pattern also increase susceptibility to faults. A further problem is caused

by changes in the disposal and consumer habits of private households. In particular, the increased use of hygiene articles and their disposal in toilets cause pump station operators many problems.

### Special impeller tackles the clogging problem

For decades, Egger Turo® vortex pumps have proven successful in pumping wastewater. Changes to the composition of raw sewage presents a particular challenge in itself. During extensive research and field trials, Egger developed an impeller which is specially designed to tackle clogging problems and thus added a new TA wastewater impeller to the tried and trusted range of Turo® pumps.

In the process, particular emphasis was placed on integrating the impeller into



the modular system of our Turo® vortex pump. All types of design (submerged, dry mounted with vertical and horizontal configuration, close-coupled or bearing frame pumps, shaft or cantilever) are available.







## High discharge heads

Closures of smaller wastewater plants mean that transition pump plants have to cover long distances and overcome large differences in height. In the case of raw sewage, with individually operating Egger Turo® vortex pumps, discharge heads of up to 90 m are possible. When these pumps are operated in series, discharge heads of up to 150 m can be achieved. Not all centrifugal pumps can achieve such discharge heads at speeds of 1,450–1,750 1/min. This technology combines characteristics such as reliable pumping of raw sewage with low wear and tear at lower speeds. In pre-treatment plants such as screening plants, Egger's EOS series pumps can also be employed as open impellers offering even greater energy efficiency.



## Sand and water mixtures

When pumping sand and water mixtures, high durability is of utmost importance. Resistance to abrasion can be influenced by the pump's design itself and also by the choice of pump materials used. The TV version of the Turo® vortex pump (casing and impeller in high-chrome chill casting) perfectly combines both of these characteristics. The impeller, which is recessed in the casing, and the specially designed wafer-type casing, produces an optimum flow formation with significantly lower solid matter retention times compared to conventional vortex pumps. The high-chrome chill casting is three times tougher than the usual grey cast iron.



## Recirculation

Circulating flows such as the recirculation of activated sludge during the biological purification stage are characterised by large volume flows and low discharge heads. At the same time, the activated sludge must be protected as carefully as possible during transport to preserve its characteristics. Egger's elbow propeller pump features a four-bladed propeller with an overlapping and fibre-repellent propeller profile. This prevents back flow into the pump and achieves smooth conveyance of the fluid. Adding precipitating agents increases the corrosiveness of the activated sludge. For this, designs made of resistant stainless steel materials are available.



## Recycled sludge

Sedimented activated sludge must be continuously pumped back from the secondary sedimentation tanks to the activated sludge tanks. Recycled sludge pumps are operated non-stop and must be available 24/7. Egger's process pumps with EOS hydraulics offer the ideal solution. An optimum level of efficiency can be achieved for this application using the mixed-flow impeller. In addition to traditional dry assembly, Egger offers a completely seal-less pump, with cantilever design, which allows unlimited dry running and low maintenance. The hydraulics are completely submerged and the drive assembly is dry mounted above the shaft cover – the perfect combination of dry and wet mounting.



## Flow control of process air/sludge



In wastewater treatment plants after the activated sludge process, approx. 60% of the total energy requirement is needed to transfer atmospheric oxygen into the biological process. There is considerable potential here for many plants to save energy.

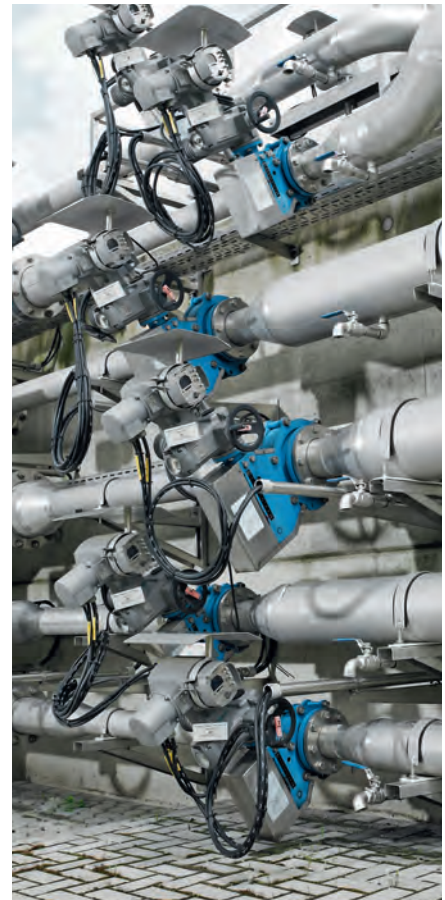
### Efficient control of air volumes

Over recent years, the Iris® diaphragm control valve has been tried and tested in hundreds of wastewater treatment plants where it is primarily used to efficiently control air volumes in activated sludge tanks. Through its unique design with a continuously variable cross section (similar to a camera aperture) and its central axis of flow, air volumes can be precisely controlled in a reproducible way. The virtually linear control characteristics across the valve's complete controlling range, together with minimum pressure loss, make the Iris® diaphragm control valve a benchmark in the wastewater sector. Biological processes can be operated in a stable manner and input target values can be

set at an extremely low level. This makes energy efficiency possible from several points of view. With its robust construction and self-cleaning design, the valve is also a reliable control device for fluids containing solids, such as raw sewage or slurry. Thus, Iris® diaphragm control valves can be used to control raw sewage, wastewater, and primary and activated sludge and also for coating centrifuges with digested sludge. Corresponding hard-wearing material combinations are available for abrasive fluids.

### We support you with our experience

We would be delighted to show you how you too can save energy with our Iris® diaphragm control valves. Using our own i-valve calculation program, we would be happy to create system-dependent control characteristics for your application.





## Sludge treatment

Sludge handling plays a central role in wastewater treatment and also poses particular challenges regarding technology and energy consumption. Egger possesses many years of experience in this stage of treatment, for example in the following areas:

- drawing off primary sludge during the primary treatment process
- conveying sludge across long distances
- sludge circulation in digestion towers
- coating digestion towers.

### Trouble free operation thanks to the right hydraulics

The well-proven Turo® vortex pump is used for small to average-sized volumes whereas EOS series pumps are used for larger volumes. Highly wear-resistant cast materials can also be used if the nature of the fluid (high mineral content) requires it. As well as pumping solid matter, a specific characteristic of the EOS series pumps lies in their ability to pump gas contents of up to 15 % without performance curve correction, and gas contents of up to 25 % with performance curve correction. This characteristic of multi-phase pumping is particularly sought after for sludge circulation processes in digestion towers. Depending on the activity in the digestion tower, a higher portion of sludge gas is found in the fluid alongside the solid matter. With standard hydraulics, this leads to gas accumulation in the pump, which is associated with having to dismantle the conveying system. We can help prevent this type of fault from interrupting operation. If, for example, you need to transport fluids containing long fibres, we would recommend our fibre-repellent impeller. Whether you need to pump raw sewage, digested sludge or any other type of fluid, just ask Egger!



Swiss Engineered Pumps  
since 1947

# Our products, our expertise

Each Egger pump is unique, custom-tailored and assembled on a modular basis or even designed individually and in our many years of practice, we have gained extensive experience with the most varied media. Our pump experts will be pleased to advise you on cost-effective solutions for your applications.

## Turo® vortex pumps T

This range offers a completely open spherical channel as a result of the recessed impeller, with only 15% of the pumped medium coming into contact with the impeller. Turo® pumps are therefore used, vice-versa, for gentle pumping of sludge of all kinds, municipal and industrial waste water, high concentrations of fibrous suspensions, chemical and crystalline suspensions or viscous materials.

## Turo® TA impeller

Special impeller for pumping raw sewage in municipalities with high levels of textiles that tend to wrap around the blades. Fully integrated into our Turo® vortex pump's modular system, the impeller is hydraulically optimised for this requirement.

## Process pumps EO/EOS

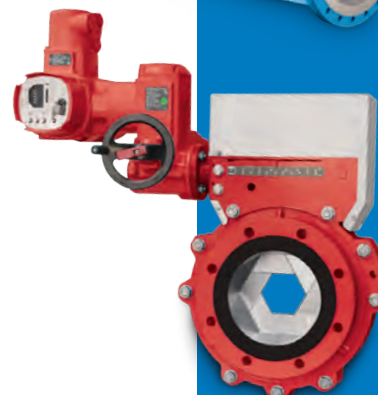
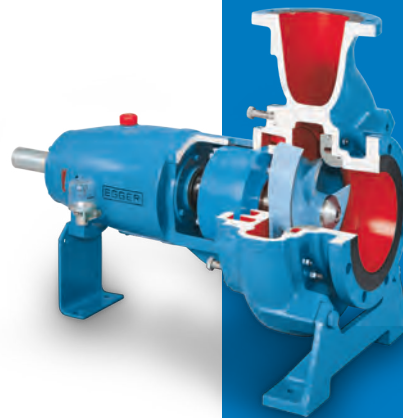
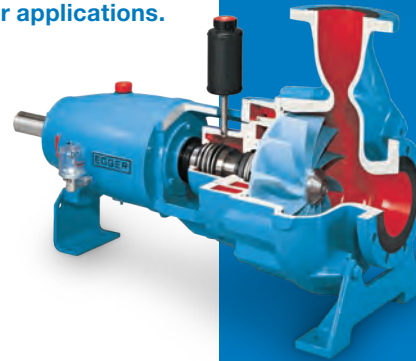
The high-performance pump for homogeneous liquids containing high concentrations of solids and high gas content. Different impellers for large and small particle sizes mean that this pump is also suitable for the conveying of demanding media in the chemical and petrochemical industries, from multiphase mixtures for reactor loops or aerated fibrous suspensions in the paper and pulp industry. Process pumps are frequently used in waste water technology and with numerous abrasive and viscous media.

## Elbow propeller pumps RPP/RPG

The ideal pump with excellent suction performance for large flow rates (up to 7,000 l/s) with low discharge heads available with a welded or cast design depending on requirements. The design eliminates seals or deposits in the medium. Egger has considerable experience in vaporisation plants, reactor loops, crystallisation plants, pumping stations and sludge recirculation.

## Iris® diaphragm control valve BS

Patented control valve for the precise and cost-effective control of solids-laden or pure liquids and gases at low pressure drop. High-precision, energy-saving control of the flow through concentric Iris® diaphragms and a flow-optimised design. Iris® diaphragm control valves are suitable, vice-versa, for the control of air for aeration, gases in the chemical industry and in other industries and slurries and viscous materials, paper pulp and fibrous suspensions, bulk materials and drinking water.



**There is an individual Egger solution for each medium, set of challenging operating conditions and critical environments. Tell us your specifications.**



# Emile Egger & Cie SA

Egger is a medium-sized independent Swiss company with offices in many countries. A key quality feature is that the whole production process – from development through to functional testing – is carried out in-house under controlled conditions. 350 skilled employees represent the professional expertise of Emile Egger & Cie SA.



## Gradual development and internationalisation

Over the past 65 years, the company has developed from small beginnings to become a major manufacturer in the Swiss machine industry. As a result of careful expansion, the company has been able to preserve its independence and to this day remains a family business. We strive to stay close to our customers and, over the years, we have established subsidiaries in ten European countries, in Asia and in North America. A network of trading partners complements our presence.



## A corporate culture of ethical and social responsibility

Profit maximisation has never been central to the company's considerations and the attitude of the family owner is to a much greater extent characterised by a sense of responsibility as one of the largest employers and training operations in the Canton of Neuchâtel, Switzerland.

## Focus on challenging media

A key focus of the company's operations to date has been to be at the forefront of the development and production of vortex pumps and process pumps for gas and solids-laden media. Other hydraulic solutions have also been produced for decades, including propeller pumps and special pumps for use in demanding environments as well as diaphragm control valves.

## Quality pumps last longest!

Parts and components undergo strict controls in the manufacturing process and the fully assembled pumps are also subjected to real operating conditions in our test area. The pumps have to show that they can operate with various technical parameters using water as the test medium. Egger tests its

pumps in accordance with tolerances and procedures specified in internationally recognised standards and industry standards.



## The environment is our priority

The production of Egger pumps takes place in pristine surroundings on Lake Neuchâtel. Contributing to the preservation of this remaining natural habitat is an important concern of the company.

## From design to commissioning

Emile Egger & Cie SA was established in 1947 and, to date, it has remained a privately owned and independent company. Swiss quality thinking shapes our work.

### Engineering and design

Each pump is unique and is manufactured to customer specifications. We use computational tools and validated flow simulation programmes for the design of your pump. What is more, the casting mould is manufactured in our workshops by our own highly specialised professionals!

### One-stop shop

The whole chain of production is handled by some 220 specialists in our own planning and production workshops. This workflow ensures a high production rate and quality that meets international standards.

### Service

On request, we can carry out installation and commissioning throughout the world. With our after sales service, we are always there for you during the warranty and beyond. Egger has always invested in the longevity of its products. With a well-stocked spare parts store, we are at your disposal anywhere in the world to take care of your pump problems.



### Headquarters

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