



LINAK[®] Actuators Wastewater treatment

Contents

Introduction	3
Valve automation solution	4
System overview.....	6
LINAK® actuators in wastewater treatment applications	8
Treatment phases.....	8
Preliminary treatment.....	8
Primary treatment	10
Secondary treatment.....	10
Tertiary treatment	10
Sludge treatment and biogas utilisation.....	12
The importance of automation	17



Introduction

This catalogue is designed for wastewater professionals to give inspiration to and guidance on how LINAK® electric actuators can help automate various valve solutions in wastewater treatment.

For LINAK it is very important to talk to wastewater treatment professionals about how their daily work could be improved through automation.

The knowledge shared in this catalogue is accumulated from projects and cooperation that LINAK has had with local wastewater treatment plants, valve manufacturers and consulting engineers.

Today energy positive wastewater treatment is possible. With innovative technology "waste" can be transformed into a valuable green resource in the form of power, heating, and fertiliser. Automation plays a vital role in efficient wastewater management, and LINAK solutions support these processes.

Contact us

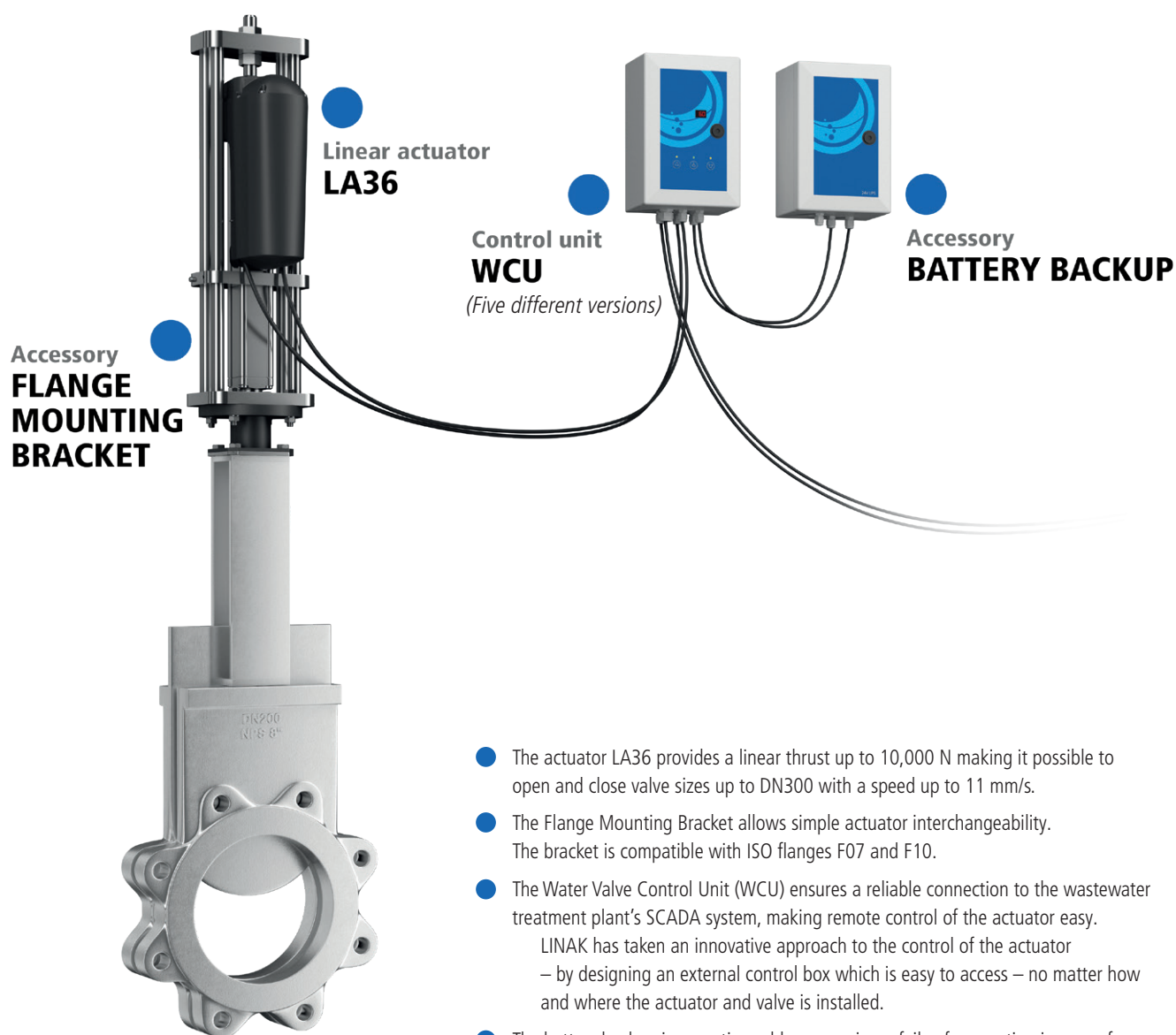
Your local LINAK contact is ready to help.
Feel free to contact us.



Valve automation solution

LINAK® offers a complete electric actuator solution for valve automation. In wastewater treatment plants, uptime means everything, and reliable automation of valves means more stable processes and less maintenance.

The actuator system offers simple installation with few components and an easy all-in-one package solution.



- The actuator LA36 provides a linear thrust up to 10,000 N making it possible to open and close valve sizes up to DN300 with a speed up to 11 mm/s.
- The Flange Mounting Bracket allows simple actuator interchangeability. The bracket is compatible with ISO flanges F07 and F10.
- The Water Valve Control Unit (WCU) ensures a reliable connection to the wastewater treatment plant's SCADA system, making remote control of the actuator easy.
LINAK has taken an innovative approach to the control of the actuator – by designing an external control box which is easy to access – no matter how and where the actuator and valve is installed.
- The battery backup is an option add-on ensuring a fail-safe operation in case of power cut-offs

Manual hand crank

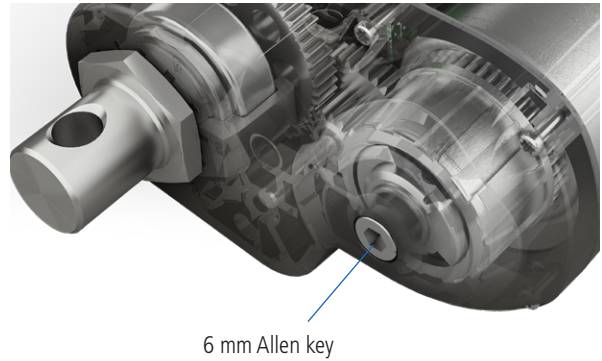
Manual drive for emergency operation is possible with a manual hand crank on the actuator, for example in case of power cut-offs.

The cover over the Allen Key socket must be unscrewed before the Allen Key can be inserted and the hand crank operated.

Hand crank Torque: 6-8 Nm

Hand crank rpm: Max 65

Piston Rod movement per turn 3 mm



- The power supply has to be disconnected during manual hand crank operation.
- If the actuator is operated as a hand crank, it must only be operated by hand, otherwise there is a potential risk of overloading and thereby damaging the actuator.

System overview

1. Choose the actuator according to valve size (DN)

DN 50-200	Actuator LA36, stroke 240	
DN 200-300	Actuator LA36, stroke 340	

2. Flange mounting bracket for mounting the actuator on ISO Flanges F07 and F10 of valve

DN 50-200	Length: 482 mm	FMB without middle plate.		
		FMB with middle plate		
DN 200-300	Length: 632 mm	FMB without middle plate.		
		FMB with middle plate		

3. Choose the WCU (Water Valve Control Unit) according to your needs

WCU Versions (five different versions)	WCU Bus	WCU Basic	WCU Light	WCU Light (WHO, without housing)	WCU Light (R, rail mounting)
Comparison	 Control unit in high-quality box. PROFIBUS compatible	 Control unit in high-quality box. Not fieldbus compatible	 A compact version of the WCU Basic in a small box, without control panel	 Like the WCU Light - excluding the compact box	 WCU for direct mounting on DIN-Rail. Excluding box and transformer
Control unit for actuators LA36 and LA37	✓	✓	✓	✓	✓
SCADA Ready	✓	✓	✓	✓	✓
Digital display (0-100%)	✓	✓	✓	✓	✓
Transformer	✓	✓	✓	✓	
High-quality box with control panel for easy and fast manual valve operation	✓	✓			
PROFIBUS compatible	✓				
Compact poly carbonate box with transparent lid (no control panel)			✓		
DIN-Rail compatible					✓

Coupling adapter between actuator and valve

Valve-specific accessories such as rod clevis are not included in the solution.

Accessories

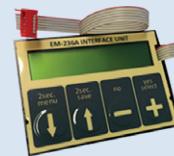
Fail-safe Battery Backup

WCU-UPS designed to supply the WCU with voltage in case of power cut-offs. The actuator can run the valve to a pre-programmed position.



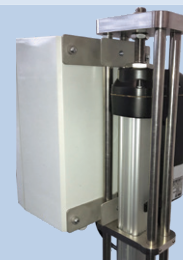
Programming unit for the WCU

For easy parameter setting of the WCU. The unit has 26 parameters e.g. change between running valve ON/OFF (open/closed) or 0-100% (regulation).



Mounting bracket for WCU and Battery Backup

For mounting of WCU Basic, WCU Bus or Battery Backup directly on the Flange Mounting bracket. As an alternative to external mounting.



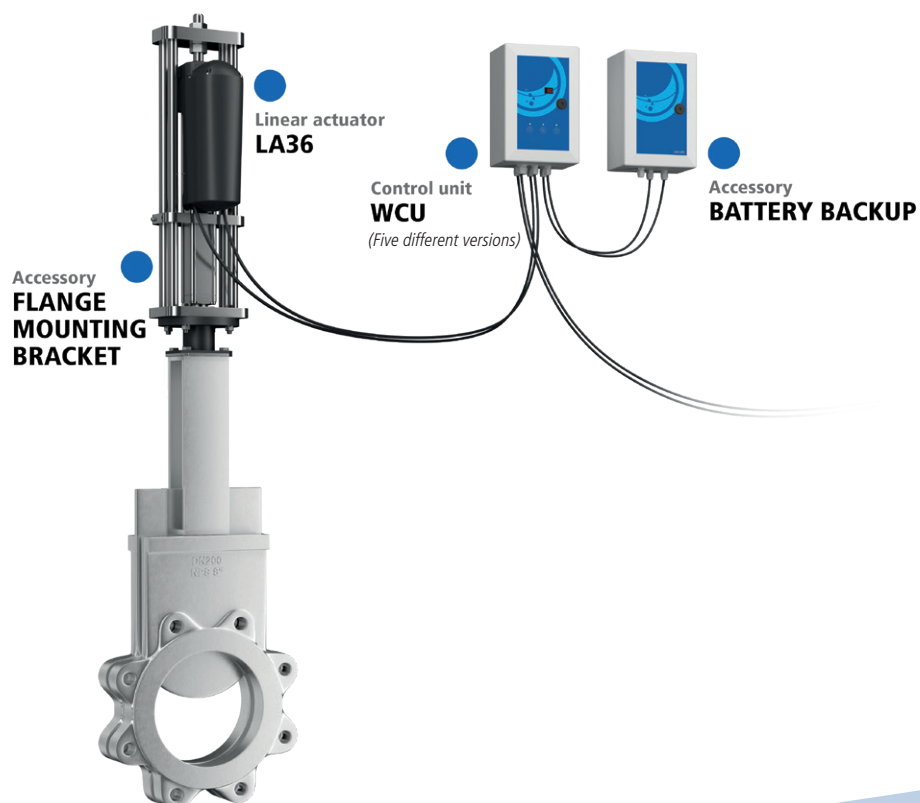
Extra long power and signal cables.

Note: Cables of 1.5 metres are included in the purchase of an actuator

Power and signal cable 5 m

Power and signal cable 10 m

Harsh environment protection of actuator housing



LINAK actuators in wastewater treatment applications

Treatment phases

LINAK® actuators are vital parts in all phases of wastewater treatment. The following pages give an insight into wastewater treatment applications where LINAK actuators serve an important purpose.

Preliminary treatment

Grit Chambers

In rectangular grit chambers air is blown into the basin, causing sand to sink and collect on the bottom. The oil and the fat are deposited on the surface. A LINAK actuator lowers the **surface scraper** that removes the oil and fat.

The fat must be removed prior to the biological process. Later the fat is treated in the digester.



Biofos, Copenhagen, Grit Chambers – Oil and grease scrapers automated by LINAK actuator LA36.

Grit/sand washer

The sand from the grit chamber can be washed and drained by a sand washer. The sand can either be sold or reused. LINAK actuators automatically open and close valves on several flows:

- Sand & sludge inlet
- Sludge outlet
- (Back) Flushing inlet

Kasper K. Frederiksen, Operations Manager at the Danish wastewater treatment facility Fredericia Spildevand og Energi A/S, says about this solution: "It has definitely been advantageous to have a solution that requires minimal maintenance. Moreover, we can easily handle it ourselves".

Kasper also says: "Other gears can only be adjusted four times every hour and that is not enough. Of course, we can buy control gears that can run multiple times, but they are very expensive. With LINAK, we get a cheaper alternative with a greater adjustment flexibility".

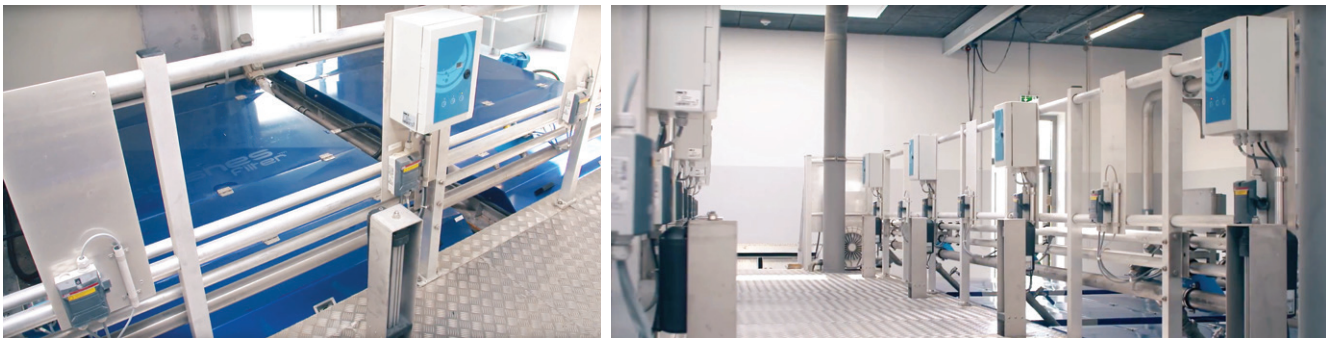


Stjernholm sand washer application. The control unit is mounted externally which makes it easy for the operator to access.

Primary treatment

Primary treatment of wastewater removes material that will either float or settle out by gravity.

Linear electric actuators from LINAK® automatically open and close inlet valves to the solids separation filters from Salsnes™. The primary sludge that exits the filters has such a high solids concentration that pre-dewatering can be avoided. LINAK offers a compact and space saving solution – just like Salsnes. The primary and the biological sludge from the filters are both pumped to the anaerobic digester tank, where the biogas is generated.



Eight LINAK actuators on Salsnes Filters for solids separations at Egaa Wastewater treatment plant. Salsnes filters can completely replace conventional primary treatment such as sedimentation tanks or clarifiers.

Secondary treatment

Secondary treatment uses biological processes to remove any material remaining after primary treatment. LINAK actuators are used with the activated sludge process.

LINAK actuators regulate the inlet of air to the aeration tanks to control the biological process – which leads to cost reduction.



Aeration tanks at DIN Forsyning, Esbjerg.

Tertiary treatment

In the tertiary treatment stage, the water is purified by various chemical means before its final release into the sea. LINAK actuators are installed on weirs at the final outlet. The battery backup from LINAK ensures reliable operation in case of power cut-offs.



Dennis Pedersen, former Operations Manager at Faaborg wastewater treatment plant.



Weirs at Faaborg.

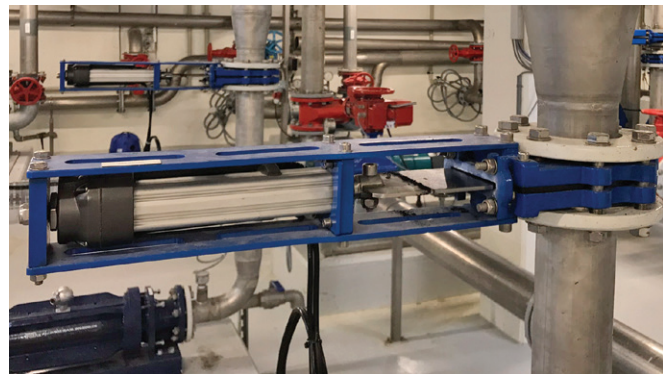
Sludge treatment and biogas utilisation

Dewatering

From the secondary treatment process excess sludge is being removed. Later the dewatered sludge is digested and biogas is hereby produced.



Decanter Centrifuge with LINAK actuators at Egaa wastewater treatment plant.



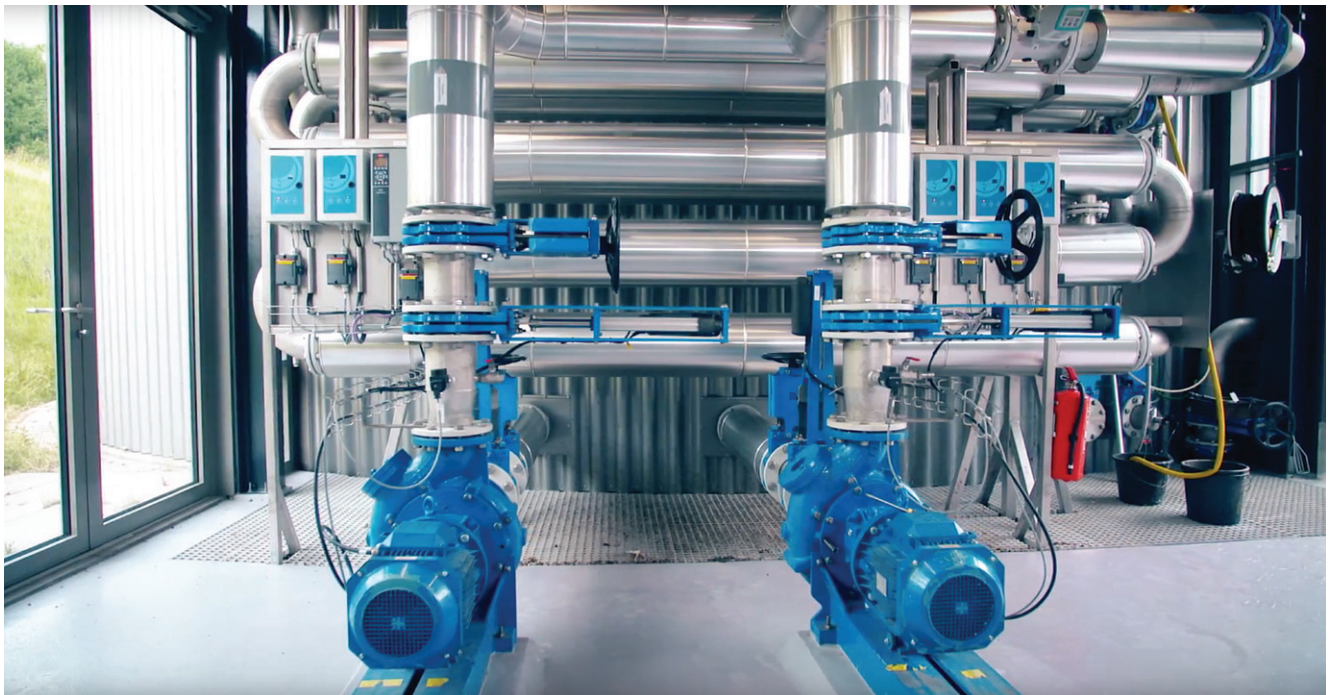
Pipeline with LINAK actuators. Dewatered sludge to anaerobic digester tank.



Sludge heat exchanger on anaerobic digester tank

The anaerobic digester creates biogas. The biogas is used to generate heat and electricity, making the plant in Aarhus 150% self-sufficient and providing district heating and electricity to local communities. A number of LINAK® electric actuators are installed to automate the valves that control the flow of sludge in an energy-efficient heat exchanger and into the plant's anaerobic digester.

Both primary sludge and secondary sludge are codigested in the digester. The heat exchanger ensures a constant temperature in the digestion tank and has a high efficiency.



Picture from the 150 % self sufficient wastewater treatment plant in Egaa, Aarhus. LINAK actuators LA36 on sludge heat exchanger on anaerobic digester.



*The transportation of fermented sludge to a buffer tank.
Two WCUs are mounted on the wall where they are easy to access for the wastewater operator.*

Sludge buffer tank

After the digestion the sludge is transported to a sludge buffer storage before final dewatering.



LINAK® actuators controlling the flow to the sludge buffer tank.



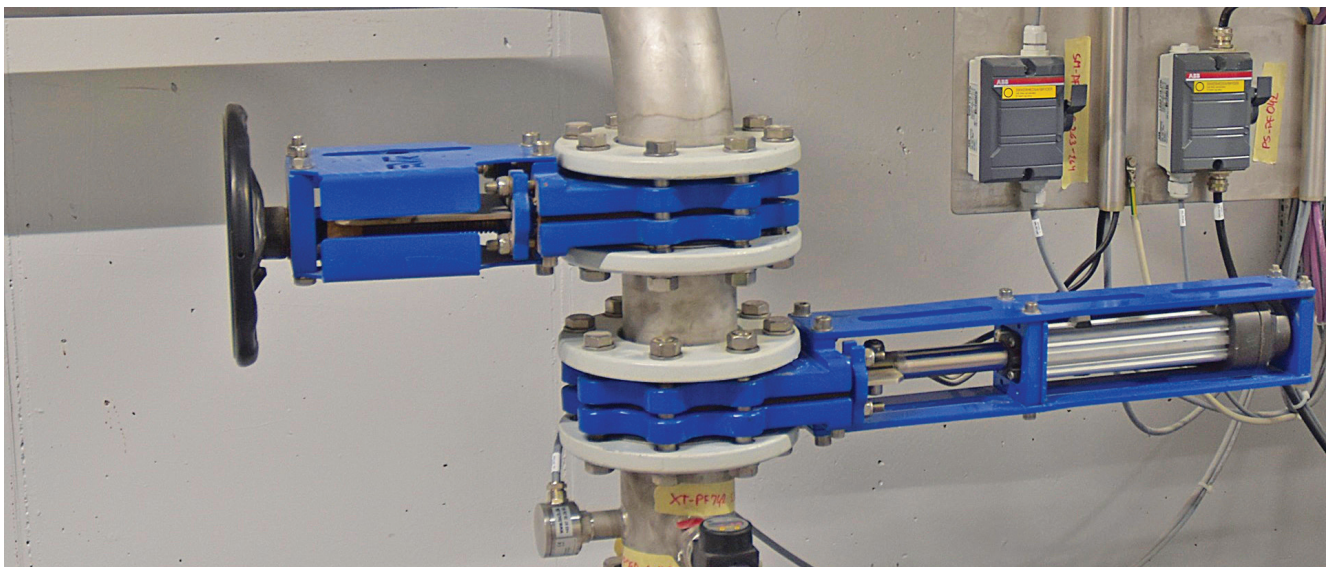
LINAK actuator on Vogelsang sludge grinder

Sludge grinders

Sludge grinders remove and grind objects that can damage both pumps and dewatering equipment. LINAK actuators are used to control the flow of sludge from the grinder.

Centrate

Centrate, the liquid removed from the thickened sludge contains large amounts of nutrients and often has high temperatures. The centrate is often recycled into the main flow - but further treatment of the centrate has shown an increased capacity in wastewater treatment plants.



LINAK actuator on the centrate pipeline.

Phosphorus recovery

Extracting phosphorus from wastewater helps save energy and prevents build-up of struvite inside the pipes. LINAK® actuator solutions help optimise the process of extracting the phosphorus by reliably controlling the valves involved.



Three reactors with LINAK actuators at Marselisborg Wastewater Treatment plant.

At Marselisborg wastewater treatment plant near Aarhus, Denmark, a full-scale phosphorus recovery plant has been installed. The plant produces struvite under controlled conditions. A perfect combination of phosphorus, ammonia and magnesium produces premium fertiliser, which is a valuable product for gardeners and greenkeepers. In addition, the process reduces the struvite from building up inside the pipes in the rest of the wastewater treatment plant, which leads to lower maintenance costs. Furthermore the energy and chemical use is decreased.

The importance of automation

Changes in the global climate cause more extreme weather, such as heavy rainfalls, in many parts of the world. This will be a serious challenge to sewage systems in the affected areas, why control of valves and water streams is absolutely vital. Automation begins with actuators. Actuators from LINAK are vital parts of automated control of valves. LINAK offers an innovative, intelligent solution for automation of valves compared to old gears.



"We must be able to control valves and waterflow in today's world. We have some sewage systems that are challenged by massive downpours and other rainfall events and people become very dissatisfied if they get water in their basements – even though it is a 100 or 50 years' event - so we have to be able to control these things – and that's why we have to have actuators. All the old gears that are mounted on the valves were designed over 100 years ago and have the complexity of 100 year old technology. So it's innovating when LINAK comes up with an ingenious technical design and a lot of solutions around intelligence and semi intelligence which we've never had in this part of the industry before. LINAK has been an amazing player in all of this because they've really gotten Involved and they've been fast and innovative. "

Product Manager Bo Bartelt, Krüger A/S (Veolia)



Resting on the pillars of the LINAK values

LINAK® is decades of experience, a broad product portfolio, and a consistent high quality due to modern production automation and a thorough testing programme. Combined with our global presence and our comprehensive local market insights, these assets form your short-cut to full compliance in your market.

We have a well-developed sales and service setup covering Europe, the Americas, Asia and Australia. This enables us to assist you locally, following our sales concept: Be global, act local!



Built on state-of-the-art technologies and refined processes by competent people, you can expect the same quality worldwide.



Innovation is in our core. We have the curiosity to think innovatively and the power to make it real on all levels.



We are responsible in what we do – towards customers, employees and environment. Creating trust and taking care is in our DNA.



From global presence to local understanding. We believe in world-wide support and being close to our customers.



For further information, please visit our website:
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