WASTEWATER TREATMENT

Passion and expertise build the world’s leading wastewater treatment plants
When there’s passion every step of the way

What is it that makes us walk that extra mile to understand what is needed to achieve operational excellence at each individual treatment plant? We believe it’s passion.

Our passion drives us to analyze both real and possible challenges in order to best overcome them. We have been setting the benchmark for innovation, performance and reliability within aeration, mixing, pumping, disinfection, oxidation, clarification and filtration. And we deliver substantial energy savings, reduced ownership costs, reliable operations and minimum maintenance. It’s no wonder we are behind the world’s leading wastewater plants.

The expertise to think how you work

A function, to us, is a specific, vital task that a particular product needs to perform at each particular stage of the treatment process. We consider a treatment plant to be the sum total of a number of inter-relating functions.

Our expertise enables us to set functions together in the most effective way possible to maximize the operating efficiency of your treatment plant. This sets us apart from the rest and ensures you are achieving optimum performance with the lowest possible lifecycle costs. Working closely with our customers, we learn their work processes and the issues that drive their business.

This is how we ensure smooth, cost-effective operations, energy savings and trouble-free maintenance in a treatment plant. And peace of mind for you.

LEADING THE WAY WITH PASSION AND EXPERTISE

• Over 100 years of hands-on experience.
• Powerful R&D.
• Highly advanced laboratories.
• Cutting edge systems engineering.
• Systems simulation utilizing computational fluid dynamics (CFD).
• Model testing and on-site pilot testing capabilities.
• Professional guidance for achieving the lowest possible installation, operation and service costs.
• Innovative, reliable global service network.

Visit www.treatment.xyleminc.com for more information.
Functions that set the standard in wastewater treatment

Work with us and you will understand the difference that is a result of deep-rooted passion and expertise. It is this expertise that allows us to set the right functions together in for example an oxidation ditch or Sequencing Batch Reactor, so they work perfectly to deliver results that enables our customers to set standards in the business they compete in.

PUMPING
This involves the handling of every type of wastewater and sludge. It also deals with various capacities and solids contents and combinations of these, as well as the balancing of robust performance with energy efficiency.

MIXING
The mixer configuration is actually more critical than the product itself. Expertise in the positioning and fluid dynamics of the mixer is the defining factor in maximizing efficiency.

AERATION
Aeration systems constitute more than half of the energy costs at a typical treatment plant. We understand the sheer complexity of balancing the right amount of oxygen needed in the process, as well as the interaction between mixing and aeration in oxidation ditches.

CLARIFICATION
An efficient clarification function increases the efficiency of solids removal to allow downstream wastewater treatment equipment to operate more efficiently due to lower loading, as well as increasing the efficiency of sludge handling equipment and reducing the cost of sludge processing.

FILTRATION
A complete operating filter system regulated to achieve maximum filtration efficiency at the longest possible filtration cycles is essential to removing suspended solids and nutrients such as nitrate and/or phosphorus and organic compounds.

DISINFECTION
UV light presents the most cost effective disinfection of wastewater. The UV light is generated using special lamps at a certain wavelength and when in direct contact with the contaminated wastewater, safely inactivates microorganisms without producing any byproducts.

OXIDATION
Ozone gas is used to degrade and remove harmful micropollutants as well as odor from wastewater. The entire process is efficient, eco-friendly and safe. The treated water can be either reused or discharged.

More information about our offerings is available on the following pages:
1. Primary and preliminary wastewater treatment ... page 4-5
2. Secondary and tertiary wastewater treatment ... page 6-7
3. Sludge wastewater treatment.............. page 8-9
Primary and preliminary wastewater treatment
1. Feeding and control of incoming wastewater
2. Prevention of sedimentation in pump station
3. Mixing in grit chamber to maintain suspension and grit separation
4. Withdrawal of grit from grit chamber
5. Aerated flotation in the grit chamber to remove fats, oils and solids
6. Primary sludge withdrawal from primary sedimentation
7. Retention basin mixing of resuspend solids
8. Aeration to reduce odor in retention basin
9. Retention basin pumping
10. Monitoring and control systems for efficient treatment plant operation
Secondary and tertiary wastewater treatment
1. Mixing in secondary treatment. Homogenization in anoxic and anaerobic stages of the process.
2. Aeration inoxic stage of the process for BOD-removal and nitrification.
3. Aeration using blowers.
4. Complete standardized ozone system for odor removal or sludge disintegration.
5. Recirculation of mixed liquor from oxic zone to anoxic zone for denitrification.
6. Biological treatment (SBR), complete biological system with all treatment steps within a single tank.
7. Return activated sludge pumping.
12. Inactivation of harmful microorganisms by UV disinfection.
13. The treated wastewater is discharged to the recipient.
15. Combined in oxidation ditches.
Sludge wastewater treatment
1. Monitoring and control systems for efficient treatment plant operation
2. Aeration of sludge for odor control and homogenization
3. Thickened sludge pumping from gravity thickening
4. Thickened sludge pumping from mechanical thickener
5. Homogenization and blending of incoming raw (undigested) sludge in digester
6. Feeding and control of raw sludge from digester
7. Feeding and control of sludge to dewatering unit
8. Pumping of dewatered sludge to sludge disposal
9. Sludge storage mixing
10. Feeding and control of sludge to dewatering unit
FLYGT N 3000

TYPE OF HYDRAULIC: centrifugal radial flow  
TYPE OF IMPELLER: N self cleaning  
SIZE OF OUTLET FLANGE: DN80 - DN400  
MAX. FLOW: 4,000 m³/h  
MAX. HEAD: 120 m  
MOTOR PROTECTION: IP 68, 3 thermal switches + leakage sensor FLS  
MAX. LIQUID TEMPERATURE: 70°C  
MOTOR SEALING: 2 mechanical seals with Spin out™  
Pump also available in Atex EEx d IIB  

MATERIALS:  
CASING: GG25, G-X260Cr27 (HCR 60)  
OUTER SEAL: WCCr/WCCr, RSIC / RSIC  
COOLING JACKET: Steel painted, AISI 316

FLYGT F 3000, CHOPPER

TYPE OF HYDRAULIC: centrifugal radial flow  
TYPE OF IMPELLER: N impeller with chopper insert ring  
SIZE OF OUTLET FLANGE: DN50 - DN150  
MAX. FLOW: 500 m³/h  
MAX. HEAD: 70 m  
MOTOR PROTECTION: IP 68, 3 thermal switches + leakage sensor FLS  
MAX. LIQUID TEMPERATURE: 70°C  
MOTOR SEALING: 2 mechanical seals with Spin out™  
Pump also available in Atex EEx d IIB

MATERIALS:  
CASING: GG25  
IMPELLER: G-X260Cr27 (HCR 60)  
OUTER SEAL: WCCr/WCCr  
COOLING JACKET: Steel painted, AISI 316

FLYGT D 3000

TYPE OF HYDRAULIC: centrifugal radial flow  
TYPE OF IMPELLER: Vortex  
SIZE OF OUTLET FLANGE: DN50 - DN100  
MAX. FLOW: 240 m³/h  
MAX. HEAD: 105 m  
MOTOR PROTECTION: IP 68, thermostats included in all pumps, leakage sensors as option  
MAX. LIQUID TEMPERATURE: 40°C, higher on request  
MOTOR SEALING: 2 mechanical seals  
Pump also available in Atex EEx d II B (3080 in d I)

MATERIALS:  
CASING: GG25, AISI 316  
IMPELLER: GG25, AISI 316  
OUTER SEAL: RSIC/RSIC

FLYGT DY 8000

TYPE OF HYDRAULIC: centrifugal radial flow  
TYPE OF IMPELLER: Vortex  
SIZE OF OUTLET FLANGE: DN80 - DN200  
OPEN THROUGHLET: 65 - 150 mm  
MAX. FLOW: 468 m³/h  
MAX. HEAD: 78 m  
MOTOR PROTECTION: More than IP55, thermostats or PTC thermistors  
MAX. LIQUID TEMPERATURE: 70°C  
MOTOR SEALING: 2 mechanical seals

MATERIALS:  
CASING: GG25, AISI 316  
IMPELLER: GG25, AISI 316  
OUTER SEAL: RSIC/RSIC

FLYGT PL/N 7000

TYPE OF HYDRAULIC: Propeller (vertical)  
TYPE OF PROPELLER: PL/N: self cleaning N-hydraulic  
DISCHARGE PIPE DIAMETER: 800 - 1,400 mm  
MAX. FLOW: 22,000 m³/h  
MAX. HEAD: 12 m  
MOTOR PROTECTION: IP 68, 3 thermal switches + leakage sensor FLS  
MAX. LIQUID TEMPERATURE: 70°C  
MOTOR SEALING: 2 mechanical seals  
Pump also available in Atex EEx d IIB

MATERIALS:  
CASING: GG25  
PROPELLER: AlBr, AISI 316  
OUTER SEAL: WCCr/WCCr, RSIC / RSIC  
COOLING JACKET: Steel painted, AISI 316
## PUMPING cont.

### FLYGT PP 4600
- **Type of Hydraulic:** Propeller (vertical)
- **Type of Propeller:** 2 or 3 blade clog free design
- **Discharge:** DN400 - DN800
- **Max. Flow:** 7,000 m³/h
- **Max. Head:** 2 m
- **Pump Speed (50Hz):** 365–1350 rpm
- **Power:** 1.5–30.0 kW
- **Motor:** Insulated acc. class H
- **Motor Protection:** IP 68, 3 thermal switches, leakage sensor optional
- **Max. Liquid Temperature:** 90°C
- **Motor Sealing:** 2 mechanical seals
- **Materials:**
  - Motor Cover: AISI, 304, AISI316
  - Propeller: AISI316, G-X260Cr27, Duplex
  - Outer Seal: WCCr/WCCr, RSIC / RSIC

### FLYGT COMPACT
- **Progressive Cavity Pump**
  - **Capacity:** up to 225 m³/h
  - **Pressure:** up to 24 bar
  - **Temperature:** up to 100°C
  - **Viscosity:** 300,000 mPas
  - **DS:** 12% and up to 15% with a special square inlet
  - **Design:** block construction alternatively with bearing house
  - **Sealing:** mechanical or gland packing

### FLYGT WIDETHROAT PUMP
- **Progressive Cavity Pump**
  - **Capacity:** 215 m³/h
  - **Pressure:** 48 bar
  - **Temperature:** up to 100°C
  - **Viscosity:** up to 1,000,000 cP
  - **DS:** more than 40% can be handled when fitted either with the integral bridge breakers or large augers
  - **Design:** block construction alternatively with bearing house
  - **Sealing:** mechanical or gland packing

### MIXING

### FLYGT SR 4600
- **Type of Mixer:** Submersible
- **Type of Propeller:** 2 or 3 blade clog free design
- **Diameter of Propeller:** 210–766 mm
- **Propeller Speed (50Hz):** 365–1350 rpm
- **Rated Thrust:** from 100 to 6,400 N
- **Rated Power at 50 Hz:** 0.75 to 25 kW
- **Motor Protection:** IP 68, 3 thermal switches, leakage sensor optional
- **Max. Liquid Temperature:** 90°C
- **Motor Sealing:** 2 mechanical seals
- **Materials:**
  - Motor Cover: AISI304, AISI316
  - Propeller: AISI316, G-X260Cr27, Duplex
  - Outer Seal: WCCr/WCCr, RSIC / RSIC

### FLYGT SR 4400
- **Type of Mixer:** Submersible
- **Type of Propeller:** 2 blade clog free design
- **Diameter of Propeller:** 14–2.5 m
- **Transmission:** Gear box
- **Propeller Speed (50Hz):** 17–54 rpm
- **Rated Thrust:** from 450 to 4,700 N
- **Rated Power at 50 Hz:** 0.9 to 5.7 kW
- **Motor Protection:** IP 68, 3 thermal switches, leakage sensor optional
- **Max. Liquid Temperature:** 40°C (60°C)
- **Motor Sealing:** 2 mechanical seals
- **Materials:**
  - Motor Cover: GG25
  - Propeller: PU/Fiber glass
  - Outer Seal: WCCr/WCCr

### FLYGT JET MIXER
The Flygt jet mixer is designed to create a strong bulk flow. The mixer's significant components are the nozzle, the ejector pipe, and the pump. The pump generates a primary flow that is delivered to the tank via the nozzle. As this flow enters the ejector pipe, a secondary flow is induced from the surrounding liquid. This results in a mixing effect near the nozzle. Furthermore, the induced flow adds to the primary flow and creates the thrust being imparted to the tank. This thrust creates the bulk flow velocity within the tank.
### Sanitaire Fine Bubble Diffuser

**Type:** 7” or 9” high efficiency

**Silver Series II membrane**

**Diffuser Air Capacity:** 0.85 to 6.5 Nm³/h

**Design:** Optimised slit pattern for best oxygen transfer capacity. Integrated O-ring and effective centre check valve

**Materials:**

- **Silver Series II membrane:** High-quality EPDM for reduced head loss and increased oxygen transfer
- **Holder:** PVC or PP
- **Pipes:** UPVC or CPVC with 2% TiO₂ for UV resistance

**Other Versions:**

- Ceramic membrane discs
- Low pressure silver series II membranes

**Power Efficiency:**

2.5 – 6 kg O₂/kWh

### Sanitaire Coarse Bubble Diffuser

Sanitaire stainless steel wide band coarse bubble diffusers are mainly used for aeration in sludge-related processes, including aerobic sludge digestion, sludge holding, flow equalization and channel aeration.

The units are available in alternative lengths, 12” and 24”.

The system is manufactured in corrosion-resistant stainless steel (AISI304L or 316L) for structural strength and long life.

**Power Efficiency:**

0.7 – 2 kg O₂/kWh

### ZS+ Positive Displacement Blower

The ZS+ series is a direct-driven high-efficiency, low noise, low pulsation, positive displacement blower. The blower is delivered with integrated VSD (Variable Speed Drive).

The ZS+ series blowers are built as complete units, and include an intelligent control unit that is ready to plug and play. This provides extremely reliable 100% oil-free air.

**Capacity:**

200 – 4,600 m³/h

### ZB Variable High Speed Turbo Blower

The ZB VSD (Variable Speed Drive) is a turbo blower. Through the integration of revolutionary technologies, the ZB VSD offers unparalleled savings in life cycle costs thanks to its very high efficiency and very low maintenance costs. In addition, it has a small footprint and extremely low noise levels.

The machines are delivered with the following, as standard:

- Magnetic bearings
- Air inlet system including filter
- Controller and electrical installation
- Acoustic enclosure and silencers
- Check valve
- Blow-off valve
- Variable speed drive system

**Capacity:**

2,500 – 6,000 m³/h

The HA series single-stage air compressor can handle flows from 8,200 to 85,000 m³/hr (4,800 to 50,000 cfm) at discharge pressures up to 2 bar.

### ZL Tri Lobe Blower

The ZL series is a standard roots type, lobe blower featuring relatively low noise, low vibration, low pulsation, delivery in a complete, ready-to-run package.

The ZL comes in a range of 20 sizes for intake volumes of 25 to 10,000 m³/hr at over pressures of up to 1,000 mbar, depending on the blower size.
A concrete tank system that is built on-site. The concrete tank will be poured for the rapid mix, flocculators, dispersion and reaction zones, sludge collection channel, and clarified water channel. Xylem would provide engineering design, the rapid mixer, flocculators with VFDs, effluent laterals, mechanical sludge removal, and complete recycle system with pumps, valves, air compressor, saturator tank and dispersion header, as well as instruments and controls. Can be engineered to specific design requirements for mixing time, loading rate, or recycle rate.

INTERMITTENT CYCLE EXTENDED AERATION (ICEAS)

The ICEAS process is a complete treatment system providing cost effective treatment solution for the most demanding effluent qualities. A flexible, simple and energy efficient process that includes fine bubble diffusers, blowers, decanters, controls, pumps, mixers and complete customized process design. Flows range from 25,000 GPD (1.2 l/s) to over 150 MGD (6,600 l/s).

A steel tank system to be installed on a concrete pad with the recycle system shipped separately and connected on site. The total system is comprised of a compartmented tank, rapid mix, flocculators, dispersion and reaction zones, effluent laterals, mechanical sludge removal, and complete recycle system with pumps, valves, air compressor, saturator tank and dispersion header, as well as instruments and controls. Can be engineered to specific design requirements for mixing time, loading, or recycle rate. Available in standardized design and flow capacity below 2 MGD (300 m³/hr).

A floating sludge collector installed in rectangular wastewater secondary clarifiers. It operates on the principle of siphon where the collection header vacuums the solids that have been naturally settled on the tank floor. The sludge is siphoned into a separate trough where it is pumped to waste or returned to the activated sludge biological process. There are no moving parts under water. All parts except the drive are nonferrous metals to minimize corrosion potential.

FLYGT JET AERATOR

DESIGN: submersible self aspirating jet aerator
TYPE: JA112, JA117, JA217 and JA317
CAPACITY: 60 kg O₂/h at 7.5 meter water depth
NUMBER OF EJECTORS: 1, 2 or 3
EJECTOR TYPES:
4B12 (55 mm nozzle)
4B17 (95 mm nozzle)
N PUMPS: 3085, 3102, 3127, 3153, 3171 and 3202

MATERIALS:
PUMPS: see N-pump product data
EJECTOR HOUSING: cast iron or stainless steel
OUTLET PIPES: stainless steel
SUCTION AND CONNECTION PIPES: stainless steel or galvanized steel
POWER EFFICIENCY: 0.5-1.2 kg O₂/kWh
The Leopold elmi-NITE™ denitrification system harnesses the advantages of deep bed, mono-media filters to effectively and efficiently remove nitrogen in wastewater effluent. In addition to nitrogen the elmi-NITE™ denitrification system can remove suspended solids.

Methanol, or another carbon source, is added to the filter influent to provide an organic substrate for the denitrifying microbiological culture in the filter media. The culture metabolizes the nitrate, changing it to nitrogen gas that becomes embedded in the filter bed as bubbles which are then released into the atmosphere. A complete backwash cycle cleans the media, removing influent suspended solids trapped during the normal filter cycle and some of the microbiology.

The easily-installed UV TAK system ensures safe and chemical-free operations with excellent disinfection results. Installed in the final effluent open channels, the modular design of the TAK allows for practically unlimited flow capacities. It makes wastewater reusable for agricultural purposes or for discharge into the environment. With the UV comes a control system that makes sure the UV dose is constant irrespective of changes in water quality or flow. The system is equipped with a fully automatic wiping system for cleaning of the lamps.

The lamps are of low pressure high intensity design. The sealed and ready calibrated UV sensor is automatically cleaned to make sure the dose is always correct.

The Leopold elmi-NITE™ gravity filtration system

The Leopold elmi-NITE™ denitrification system harnesses the advantages of deep bed, mono-media filters to effectively and efficiently remove nitrogen in wastewater effluent. In addition to nitrogen the elmi-NITE™ denitrification system can remove suspended solids.

Methanol, or another carbon source, is added to the filter influent to provide an organic substrate for the denitrifying microbiological culture in the filter media. The culture metabolizes the nitrate, changing it to nitrogen gas that becomes embedded in the filter bed as bubbles which are then released into the atmosphere. A complete backwash cycle cleans the media, removing influent suspended solids trapped during the normal filter cycle and some of the microbiology.

The Leopold LBX device has a fully automatic wiping system for cleaning of the lamps.

With the UV device comes a control system that makes sure the UV dose is constant irrespective of changes in water quality or flow.

The lamps are of low pressure high intensity design. The sealed and ready calibrated UV sensor is automatically cleaned to make sure the dose is always correct.

The UV light is generated by efficient WEDECO Spektrotherm low pressure high intensity lamps. Calibrated UV sensors acc. to DVGW / ÖNORM monitor the UV intensity to ensure optimized life time of the lamps. The system is delivered with sampling valves at both inlet and outlet flanges.
### OXIDATION

**WEDECO SMO/SMA**

Wedeco SMO/SMA is a compact, fully assembled ozone system in the production range of 200–20,000 g O3/h for efficient and reliable ozone generation. All ozone generators are fitted with patented EFFIZON® HP electrodes providing efficient and reliable generation of high concentration ozone from oxygen or dry air feed gas. Typical production turndown is from 1% to 100%. Reduced energy costs and less maintenance in connection with extremely high plant availability are some of the considerable benefits for operators of WEDECO SMO/SMA ozone systems.

**WEDECO PDA/PDO**

The customized Wedeco PDA/PDO ozone system delivers reliable and efficient production of large quantities of ozone from 15.3 kg O3/h to more than 250 kg O3/h. Two key features separate WEDECO ozone generators from the others: The exclusive use of EFFIZON® HP electrode/dielectric technology and the variable frequency technology. These features combined are the basis for an ozone generator with unmatched flexibility and low specific power consumptions. All in a compact package that minimizes space requirements and associated facility construction costs.

### MONITORING AND CONTROL

**FLYGT AquaView SCADA SYSTEM**

Flygt AquaView SCADA (Supervisory Control And Data Acquisition) system enables remote control of connected stations or plants within a network providing a complete overview of the operational status.

All data automatically present the information as trends, graphs and reports. It provides extensive alarm functionality so that, should a problem occur, all necessary information will be available in precise detail and on time.

Flygt AquaView provides cost-effective, efficient, convenient and practical plant operations.

**FLYGT APX 761 CONTROLLER**

The advanced Flygt APX 761 controller is exclusively designed for fluid handling. The modular design and platform let your plant expand free from care. Built-in functions such as flow measurement, capacity- and energy calculation can be uniquely programmed. Advanced alarm handling provides immediate attention and time-stamped data.

**FLYGT PumpSmart® VARIABLE PUMP DRIVES**

The algorithm within PumpSmart® is designed with mind on the pump hydraulic, protect the pump, optimize the performance, reduce pump ware, increase lifetime, reduce downtime, cut energy costs, reduce clogging and installation costs. It can operate two variables at the same time, which is excellent in treatment applications.

PumpSmart® patented internal SmartFlow PID control reduces the need of external flow meter. PumpSmart® communicates with most SCADA or DCS systems.

### AFTER SALES SERVICES

Service is a life-long commitment that goes hand in hand with quality products. It means more than only installing your equipment correctly from the start. It also involves supplying spare parts quickly and efficiently, and providing dependable maintenance. It also means doing everything necessary to ensure the efficient operation of your installation or plant. Not just avoiding breakdowns, but ensuring continuous, trouble-free operation. Our service professionals are always close at hand, no matter where you are in the world. They have unique training and know-how about our products and applications. And they are backed by our R&D teams, production resources and supply chain.

Visit www.treatment.xyleminc.com for more information.
Xylem ['zɪləm]

1) The tissue in plants that brings water upward from the roots
2) A leading global water technology company

We’re 12,000 people unified in a common purpose: creating innovative solutions to meet our world’s water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

For more information on how Xylem can help you, go to xyleminc.com