Level and pressure instrumentation for wastewater treatment
Instrumentation for wastewater treatment

This brochure presents examples of applied level and pressure measurement technology. Here, you’ll learn which sensors fit which measuring tasks.

1 Sewer network
   - Level measurement
   - Gauge measurement

2 Combined sewer overflow
   - Level measurement

3 Stormwater retention basin
   - Level measurement

4 Vacuum sewerage system
   - Level measurement

5 Pumping station
   - Level measurement

6 Sewage screw lifting station
   - Level measurement

7 Inlet channel
   - Flow rate measurement

8 Sludge receiving station
   - Level measurement

9 Coarse and fine screens
   - Gauge measurement

10 Grit trap
    - Point level detection

11 Grit washer
12 Mixing and equalization ponds
13 Precipitant and chemicals station
   - Level measurement and point level detection

14 Lime silo
15 Conditioning
16 Sludge thickener tank
   - Level measurement

17 Digester
   - Level measurement and point level detection

18 Gas pipeline
   - Quantity measurement

19 Biogas storage facility
   - Volume and pressure monitoring

20 Sludge storage tank
  - Level measurement

21 Sludge dewatering
22 Sludge drying
23 Sludge granulate silo
   - Level measurement

24 Process water tank
25 Pump room
   - Pressure measurement and point level detection

26 Sludge receiving station
   - Level measurement

27 Container
28 Fuel tank
29 Receiving water
30 Container

More applications can be found at

www.vega.com/wastewater
## Continuous level measurement

<table>
<thead>
<tr>
<th>Instrument type</th>
<th>Measuring range</th>
<th>Process fitting</th>
<th>Process temperature</th>
<th>Process pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEGAPULS C 11</td>
<td>up to 8 m</td>
<td>Thread G1½, ½ NPT</td>
<td>-40 ... +60 °C</td>
<td>-1 ... +3 bar (-100 ... +300 kPa)</td>
</tr>
<tr>
<td>VEGAPULS C 21/22</td>
<td>up to 15 m</td>
<td>Thread G1½, ½ NPT</td>
<td>-40 ... +80 °C</td>
<td>-1 ... +3 bar (-100 ... +300 kPa)</td>
</tr>
<tr>
<td>VEGAPULS C 23</td>
<td>up to 30 m</td>
<td>–</td>
<td>-40 ... +80 °C</td>
<td>-1 ... +3 bar (-100 ... +300 kPa)</td>
</tr>
<tr>
<td>VEGAPULS 21</td>
<td>up to 15 m</td>
<td>Thread G1½, ½ NPT</td>
<td>-40 ... +80 °C</td>
<td>-1 ... +3 bar (-100 ... +300 kPa)</td>
</tr>
<tr>
<td>VEGAPULS 64</td>
<td>up to 30 m</td>
<td>Mounting strap, thread from G¾, ¾ NPT, flanges from DN 50, 2”, compression flanges from DN 80, 3”</td>
<td>-196 ... +200 °C</td>
<td>-1 ... +25 bar (-100 ... +2500 kPa)</td>
</tr>
</tbody>
</table>

## Point level detection

<table>
<thead>
<tr>
<th>Instrument type</th>
<th>Measuring range</th>
<th>Process fitting</th>
<th>Process temperature</th>
<th>Process pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEGACAP 64</td>
<td>Fully insulated rod up to 6 m</td>
<td>Thread G¾, ¾ NPT, flanges from DN 25, 1”</td>
<td>-50 ... +200 °C</td>
<td>-1 ... +64 bar (-100 ... +6400 kPa)</td>
</tr>
<tr>
<td>VEGASWING 63</td>
<td>up to 6 m</td>
<td>Thread from G¾, ¾ NPT, flanges from DN 25, 1”</td>
<td>-50 ... +250 °C</td>
<td>-1 ... +64 bar (-100 ... +6400 kPa)</td>
</tr>
<tr>
<td>VEGAVIB 62</td>
<td>Bulk solids from 20 g/l</td>
<td>Thread from G1, 1 NPT, flanges from DN 32, 1½”</td>
<td>-10 ... +150 °C</td>
<td>-1 ... +6 bar (-100 ... +600 kPa)</td>
</tr>
</tbody>
</table>

## Pressure measurement

<table>
<thead>
<tr>
<th>Instrument type</th>
<th>Measuring range</th>
<th>Process fitting</th>
<th>Process temperature</th>
<th>Process pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEGABAR 82</td>
<td>0.2 %</td>
<td>Thread G½, ½ NPT</td>
<td>-40 ... +150 °C</td>
<td>-1 ... +100 bar (-100 ... +1000 kPa)</td>
</tr>
<tr>
<td></td>
<td>0.1 %</td>
<td>Flanges from DN 15, ½”</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.05 %</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Signal processing

<table>
<thead>
<tr>
<th>Instrument type</th>
<th>Hysteresis</th>
<th>Input</th>
<th>Output</th>
<th>Operating voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEGAMET 841/842</td>
<td>adjustable</td>
<td>VEGAMET 841: 1x 4 ... 20 mA sensor input</td>
<td>1/2x 0/4 ... 20 mA current output</td>
<td>24 ... 65 V DC 100 ... 230 V AC, 50/60Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VEGAMET 842: 2x 4 ... 20 mA sensor input</td>
<td>3x operating relay 1x fail safe relay (instead of an operating relay)</td>
<td></td>
</tr>
<tr>
<td>VEGAMET 861</td>
<td>adjustable</td>
<td>1x 4 ... 20 mA/HART sensor input 2x digital input</td>
<td>1/3x 0/4 ... 20 mA current output 4/6x operating relay 1x fail safe relay (instead of an operating relay)</td>
<td>24 ... 65 V DC 100 ... 230 V AC, 50/60Hz</td>
</tr>
</tbody>
</table>

All sensors at a glance
Accurate, service-proven instrumentation
VEGA is an experienced supplier of instrumentation for sewage treatment plants. The company has been delivering level and pressure sensors to wastewater plants around the world for decades.

VEGA instrumentation provides accurate measurement data as a basis for automatic control of the various process steps. All sensors use state-of-the-art technology and are optimised and certified for deployment in wastewater treatment facilities.

Reasonable price
Quality pays off: these durable sensors reduce maintenance and operating costs.

Fast delivery
Whether initial delivery or repair: VEGA instruments arrive at your facility within a few days. This considerably reduces stocking costs.

Simple integration
VEGA sensors can be easily integrated into existing systems. Fast mounting and setup make installation easy.
Level measurement in the stormwater overflow chamber

Large Combined Sewer Overflows (CSOs) protect the wastewater treatment plant from a capacity overload during heavy rain. The precipitation is temporarily stored and then delivered to the treatment plant at a reduced rate. If the stormwater basin cannot hold the accumulating quantities of water, part of it is discharged. Due to legal requirements, such operational events and discharged water quantities must be measured and documented. A level sensor provides the required measurement data.

**VEGAPULS C 22**

Event duration and stormwater retention monitoring using radar level sensor

- Reliable overfill detection without requiring a fouling-prone submergence shield
- Radar based sensor enables accurate monitoring of level and discharge quantity
- Reliable overfill detection without additional, contamination-causing brackets
- Secure, user-friendly wireless operation via Bluetooth with smartphone, tablet or PC

**VEGAMET 861**

Controller and display instrument for level and flow volume computation

- Clearly arranged display for indication of retained and discharged quantities
- Highly accurate calculation of the discharge volume
- Large measurement data memory with micro SD card
Level measurement in a sewer network

Wastewater from households and industrial operations is carried through a sewerage system to the clarification plant. In large sewer systems, the water levels are monitored at key points in the network. Level measurement in the sewer allows an accurate assessment of the degree of utilization of the conduit system.

**VEGAPULS C 21**

Non-contact radar level measurement in the sewage inlet channel

- Reliable overfill detection without requiring a fouling-prone submergence shield
- Highly resistant materials ensure a long service life and maintenance-free operation
- Secure, user-friendly wireless operation via Bluetooth with smartphone, tablet or PC

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Reliable
Reliable function even when subjected to flooding

Cost effective
Maintenance-free operation

User friendly
Simple installation and setup
Level control in a pumping station

Wastewater from households and businesses, together with surface water, is carried to the wastewater treatment plant via an extensive sewer network. If the natural gradient is not steep enough, numerous pumping stations are required to create a sufficient height difference. The level measurement in the inlet shaft is used for cost-effective control of the pumps.

VEGAPULS C 11
Non-contact level measurement with radar in the inlet shaft

- Exact measuring results unaffected by internal fixtures and foaming
- High plant availability thanks to wear and maintenance free measurement
- Highly corrosion resistant materials ensure a long service life
- Secure, user-friendly wireless operation via Bluetooth with smartphone, tablet or PC

VEGAMET 841
Controller and display instrument for pump control

- Universal controller for simple pump control
- Fast setup and commissioning thanks to simple menu navigation and application wizards
Flow-rate measurement in open channels

Sewage and rainwater are often transported to the treatment plant in open collection channels or flumes. The flow rate is measured at various points in these channels. Measurement of the water flow at the inlet and outlet of the treatment plant is the basis for the calculation of tariffs and operating costs.

VEGAPULS C 21
Flow measurement of the wastewater inlet with radar in an open channel

- High plant availability thanks to wear and maintenance free measurement
- Exact measuring results unaffected by ambient conditions
- Sensor-integrated flow characteristic curves make it also possible to have a direct flow-proportional output signal
- Secure wireless operation through Bluetooth with smartphone, tablet or PC

VEGAMET 861
Flow computation, control and display for open channel flow measurement structures

- Highly accurate calculation of the flow rate
- Clear, simple display of flow rate and total flow volume
- Fast setup and commissioning thanks to simple menu navigation and application wizards
Differential water level measurement for control of screen raking

Mechanical cleaning removes entrained floating matter with screens or sieves. This protects the downstream process stages from buildup, clogging and abrasion. Solids with diameters greater than 25 mm are trapped in the coarse screens, compressed in a press and then disposed of. Finer secondary screens remove smaller residual materials. Measurement of the difference in water level between the front and the back of the screen determines the degree of contamination and initiates the cleaning of the screen when necessary.

VEGAPULS C 21
The radar sensors measure the water level difference between the front and back of the rake screen

- Exact measuring results unaffected by ambient conditions
- High plant availability thanks to wear and maintenance free measurement
- Secure wireless operation via Bluetooth with smartphone, tablet or PC

VEGAMET 842
Controller for measured value processing and display

- Universal controller for two analogue sensors for differential measurement
- Analogue outputs for connection to process control systems
- Fast setup via simple menu navigation and application wizards
Point level detection in a grit trap

Through circulation and aeration of the wastewater, mineral substances such as grit and sand settle to the bottom of the settling basin. Point level detection of settled sand under water prevents equipment malfunction and damage and controls the cleaning cycle in the grit trap.

VEGA VIB 62

Level detection of settled grit under water

- Reliable function through product-independent switching point
- Wear and maintenance free operation
- Freely moving sensor element and highly durable suspension cable

VEGA TATOR 121

Single channel controller for level detection

- Comprehensive monitoring detects short-circuit and line break of the measuring cable and interferences in the sensor
- Simple and comfortable SIL and WHG function test by means of test key
- Simple installation through carrier rail mounting as well as detachable, coded terminals

Grit trap

Reliable

Reliable control of the cleaning cycle in sand traps

Cost effective

Targeted cleaning depending on the amount of sand deposits

User friendly

Simple installation and maintenance-free operation
Level measurement and point level detection in the chemical tank

Through the addition of chemicals, phosphates in the wastewater are precipitated out, for example in primary sedimentation, in aeration systems or in special precipitation and secondary clarifiers. Precipitants like ferric chloride bind the phosphate chemically and deposit it in the sludge. In the storage tanks for these chemicals, a level measurement and point level detection system is deployed for continuous inventory control and optimal dosage.

VEGAPULS 21

Continuous level measurement with radar for inventory monitoring of treatment chemicals

- Maintenance-free operation through non-contact 80 GHz radar technology
- Exact measuring results independent of product, process and ambient conditions
- Highly corrosion resistant materials ensure a long service life
- On plastic containers, measurement from the outside is possible, through the vessel top

VEGASWING 63

Backup point level detection system to avoid overfilling the tank with media hazardous to water

- A choice of highly chemically resistant materials and coatings
- Universally applicable
- Adjustment and maintenance free operation
Level measurement and point level detection of foam in the digester

The organic components of sewage sludge are decomposed under anaerobic conditions in heated, closed digestion tanks. In the process, combustible gases such as methane are released from the sludge. These are collected in a biogas tank and then converted into electricity and heat in cogeneration (CHP) plants. A level sensor controls the filling of the digester. To ensure that no foam gets into the gas system along with the collected gas, a point level sensor is used for monitoring.

**VEGAPULS 64**
Level measurement with radar for control of the filling process

- Maintenance-free operation through non-contact measurement
- Accurate and reproducible measurement data, independent of gas concentration and pressure fluctuations
- Reliable measurement, even with foam and density changes
- Wireless operation via Bluetooth with smartphone, tablet or PC

**VEGACAP 64**
Detection of the conductive foam prevents it from entering the gas facility

- Reliable foam detection, even with different foam consistencies
- Unaffected by contamination and buildup
- Simple mounting and setup

**Reliable**
Reliable level measurement and protection against foam overfill

**Cost effective**
Continuous, maintenance-free operation of the digester

**User friendly**
Low maintenance costs and reliable gas production
Volume and pressure monitoring in the biogas storage facility

The methane gas extracted from the digestion tank is temporarily stored in a gas reservoir. Depending on the design of the gas storage facility, either a flexible diaphragm of plastic or a floating roof is used for volume equalization. The gas volume and gas pressure are measured continuously to ensure reliable and safe operation.

**VEGAPULS 64**
Continuous level measurement with radar for permanent gas volume measurement

- Reliable, maintenance-free measurement
- Independent of environmental influences
- Easy integration into existing gas storage facilities
- Wireless operation via Bluetooth with smartphone, tablet or PC

**VEGABAR 82**
Monitoring of the gas pressure in the gas reservoir

- High measuring accuracy through use of finely graduated measuring cells
- Robust sensor construction for high availability
- Long-term stability of the ceramic measuring cell ensures maintenance-free operation

**VEGADIS 82**
External measured value display in field housing

- Easy-to-read display with plain text and graphics
- Robust housing designed for the harsh conditions in the field
Level measurement and point level detection in the sludge granulate silo

After thermal drying, the sludge is stored in silos for further use. The granulated product is deposed of in landfills, used in agriculture or burned for energy generation. The level measurement and point level detection ensure that the container volume is optimally utilized.

**VEGAPULS C 23**
Continuous radar level measurement of the sludge granulate silo
- Simple mounting and setup
- Unaffected by dust generation
- Maintenance free thanks to contactless measurement
- Wireless operation via Bluetooth with smartphone, tablet or PC

**VEGACAP 65**
Capacitive point level detection for full alarm during filling
- Dependable full alarm during filling
- Robust mechanical design of sensor ensures a long service life
- Cable can be shortened for easy adaptation to local conditions
Level measurement in a container

After coarse/fine screening, sorted solids such as waste, plastics, sand and sludge are transported to special containers via conveyor belt. Reliable level measurement enables automatic notification to change over these containers.

**VEGAPULS C 11**

Continuous level measurement with radar in a container

- Maintenance-free operation through non-contact 80 GHz radar technology
- Precise measuring results independent of buildup and condensate
- Highly resistant materials ensure a long service life
- Secure wireless operation via Bluetooth with smartphone, tablet or PC
Pressure monitoring and flood protection in the pump room

To protect the process pumps, any leakage water, for example, arising from a faulty pump seal, is detected and an alarm triggered. The pressure in the pipe is measured directly at the pump and displayed in the control system of the plant. Any malfunctions can be quickly detected and dealt with.

**VEGASWING 61**
- Point level detection signals an alarm in case of flooding
- Reliable detection even of small amounts of water
- Adjustment-free and easy to install
- Maintenance-free operation, fail safe design

**VEGABAR 82**
- Process pressure transmitter for monitoring the pump pressure
- High overload resistance, withstands water hammer
- Ceramic measuring cell ensures high long-term stability
- Measurement display directly on the sensor or on the external housing
- Wireless operation via Bluetooth with smartphone, tablet or PC

**VEGATOR 121**
- Single channel controller for level detection
- Comprehensive monitoring detects short-circuit and line break of the measuring cable and interferences in the sensor
- Simple and comfortable SIL and WHG function test by means of test key
- Simple installation through carrier rail mounting as well as detachable, coded terminals
Wireless operation

With Bluetooth, VEGA is looking far into the future. But even today, radio technology is already making processes more and more flexible. Wireless communication provides better accessibility: In clean rooms, in harsh industrial environments and in hazardous areas. It allows setup, display and diagnostics from a distance of up to 25 metres, thus saving time and avoiding hazardous situations. Simply via VEGA Tools app – on any available smartphone or tablet.

myVEGA

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- 2D/3D drawings of configured instruments
- Access to product data, operating instructions, certificates and software
- Manage offers and order data, and also track shipments
- Save, manage and synchronize access codes for VEGA sensors

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