

Pressure
Temperature
Level
Flow
Calibration

Wastewater Instruments & Technology



 Part of your business

About us



**Alexander Wiegand,
Chairman and CEO, WIKA**

As a family-run business founded in 1946, with over 10,000 employees around the world today, the WIKA group of companies is a global leader in measurement and monitoring technologies. We have built a reputation for high-quality products, setting the standard in the measurement of pressure, temperature, level, flow, and force. With our extensive knowledge base in these areas, we are innovators in wastewater treatment.

WIKA is a trusted partner for all your industrial measurement needs, thanks to our broad portfolio of high-precision instruments and comprehensive services. Our network of wholly owned subsidiaries and partners allows us to support our customers with fast turnaround times, no matter where they are in the world. In the United States, we are headquartered in suburban Atlanta with divisions in four states.

Our experts have a deep understanding of not only measuring instruments, but also the water/wastewater industry. We have helped build some of the world's largest municipal plants in recent years, and the experience our team has gained during supplying and commissioning enables us to offer trusted advisory and outstanding service and maintenance for facilities of any size.

Customers return time and time again to WIKA for our best-in-class instrumentation, in-depth industrial knowledge, and exceptional support. We have become part of their business. In this brochure, we invite you to discover our range of instruments for wastewater treatment plants – all in one place and without having to research suppliers or the specifications for a particular application. Let WIKA USA become part of your business.



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Our Watery World



Water is essential for life. It is so vital that one of the two criteria for a potentially habitable exoplanet is its ability to maintain water in a liquid state. (The other criterion is a rocky surface.) Earth has a seemingly endless supply of H₂O, yet only a very small percentage is both drinkable and accessible.

We live in a watery world: Oceans, rivers, and lakes cover more than 70% of Earth's surface. But of all that water, only 3% is not salty. What's more, about three-quarters of that fresh water is bound up as glacial ice.

While these percentages have remained unchanged throughout most of our planet's history, the human population has not. It took 200,000-plus years to reach the 1 billion mark, which occurred in 1804, but only 200 more years to hit 2 billion. With an exponential population growth comes a greater demand for fresh water – not only for drinking, cooking, and bathing, but also for growing enough crops and raising enough livestock to feed everyone. The current reality is dwindling groundwater levels and rivers with less flow.

Thirsty for Fresh water

As the demand for fresh water increases, the best solution lies in efficient, cost-effective wastewater treatment.

The more we can filter, sterilize, and reclaim the water we use, the more we meet one of our world's greatest challenges.

A second option is to remove the salt from seawater. With limited, unreliable sources of fresh water, Middle Eastern countries rely on massive desalination plants to supply enough water for human consumption and agriculture. Saudi Arabia, the UAE, and Israel are currently the leaders in this field, but other regions, including arid U.S. states, are building similar plants as well. The desalination process is energy-intensive and expensive, yet the cost is expected to go down as technology improves.



Cleaning the Water Supply

Wastewater collection and treatment began with the Romans. Although rural areas rely on wells and cooperatives, most municipalities around the world today enjoy the convenience and peace of mind that comes from having a robust system of public water and sewer utilities. The United States alone has 16,000-plus waste treatment plants and processes 32 billion gallons of wastewater per day⁽¹⁾. And this is a growing industry. The annual revenue from wastewater treatment in the U.S. has risen from \$28.7 billion in 2000 to \$63.1 billion in 2018⁽²⁾. Globally, North America makes up the largest market for industrial wastewater treatment, projected to be 67% more than Asia Pacific or Europe by 2024⁽³⁾.

To recapture as much fresh water as possible while keeping utility prices low, treatment plants need the safest, most reliable, and most cost-effective technologies for measuring and monitoring pressure, temperature, flow, and liquid level.

(1) National Water Reuse Action Plan, EPA, September 2019

(2) Statista.com/statistics/192838/revenue-from-us-wastewater-treatment-since-2000/

(3) Statista.com/statistics/1099424/market-size-industrial-wastewater-treatment-global-by-region/

Wastewater Treatment Plant

Modern treatment plants use a sophisticated system of pumping and booster stations, filters, storage tanks, digestion towers, and more to clean wastewater, and then either return it to the municipal supply or discharge the sanitized effluent into the environment. The specific processes vary from plant to plant, but it all begins when the influent is pumped into the wastewater treatment facility.

The preliminary treatment or pretreatment stage removes large debris such as branches, leaves, garbage, and “flushable” wipes. Holding basins allow grit and other heavy particles to gradually settle to the bottom, while grease and fats rise to the top.

The primary treatment stage further separates and removes debris using mostly mechanical means. Large scrapers move heavy solids into a sludge hopper, while skimmers and blowers remove floatables: grease, fats, plastics, etc. The remaining dirty liquid is pumped to basins in the next stage.

The secondary treatment stage degrades biological solids. Aeration and mixing infuse wastewater with oxygen to encourage aerobic digestion. Enormous digesters promote anaerobic decomposition, a process that creates methane, a highly explosive biogas.

In the tertiary treatment stage, facilities use chemicals, reverse osmosis filtration, and/or biological agents to remove nutrients from the clarified wastewater and to kill pathogens. Some plants have a quaternary treatment stage to purify the water even further, such as removing extremely low levels of pharmaceuticals, hormones, and pesticides.

In all these stages, continuous monitoring makes sure the equipment and processes are running safely and efficiently.

- **Pressure** at the pump suction head, of blowers and injection systems, in valves and hydraulic systems, and inside digesters
- **Temperature** of lubrication oil systems, activated sludge, and machine bearings
- **Level** in holding basins and digesters
- **Flow** rates during wastewater transfer

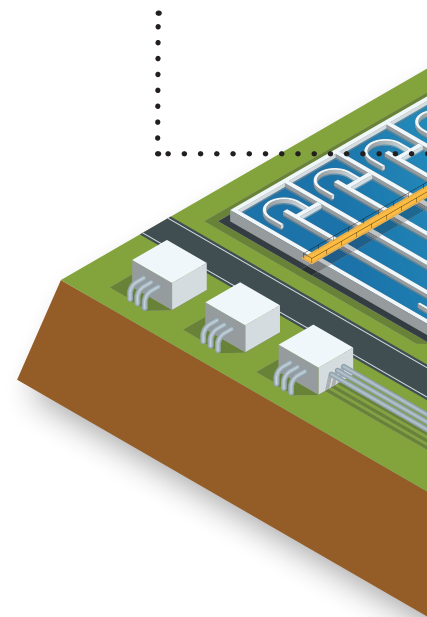
Reliable and robust measuring instruments detect small problems before they become bigger, more dangerous, and more expensive – making them a worthwhile investment for any wastewater treatment plant.

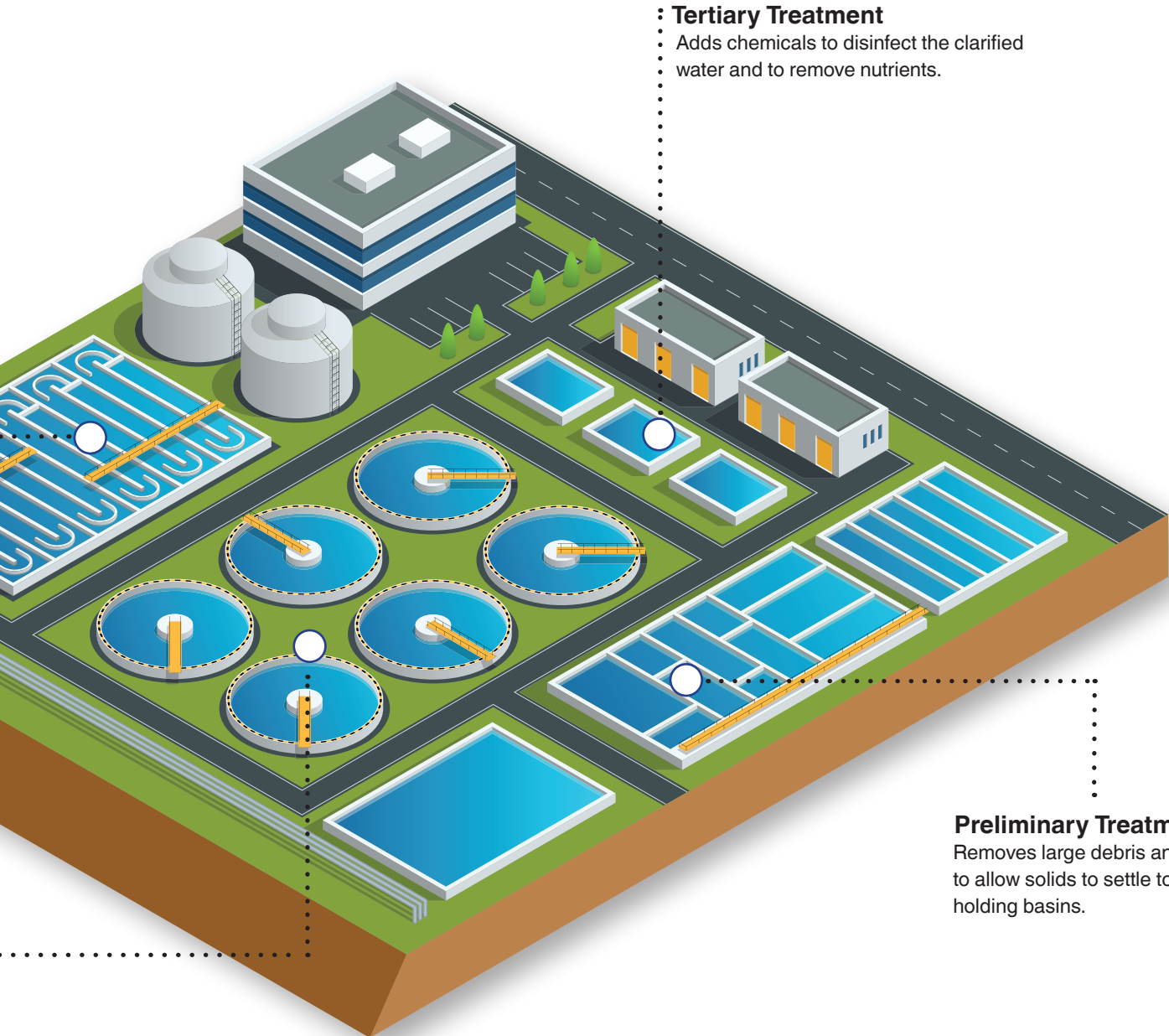
Secondary Treatment

Breaks down biomass using aerators, digesters, filtration, and other means.

Primary Treatment

Uses scrapers to remove settled debris, while skimmers and/or chemicals get rid of floating debris.





Tertiary Treatment

Adds chemicals to disinfect the clarified water and to remove nutrients.

Preliminary Treatment

Removes large debris and uses gravity to allow solids to settle to the bottom of holding basins.

Preliminary Treatment

When the influent first reaches a treatment facility, the first step is to remove the “easy pickings”: branches, wipes, cans, and bottles. The wastewater is then pumped into settling basins to allow gravity to pull large solids to the bottom.

For safety and efficiency, the instruments found in pumping stations must be able to withstand working conditions with:

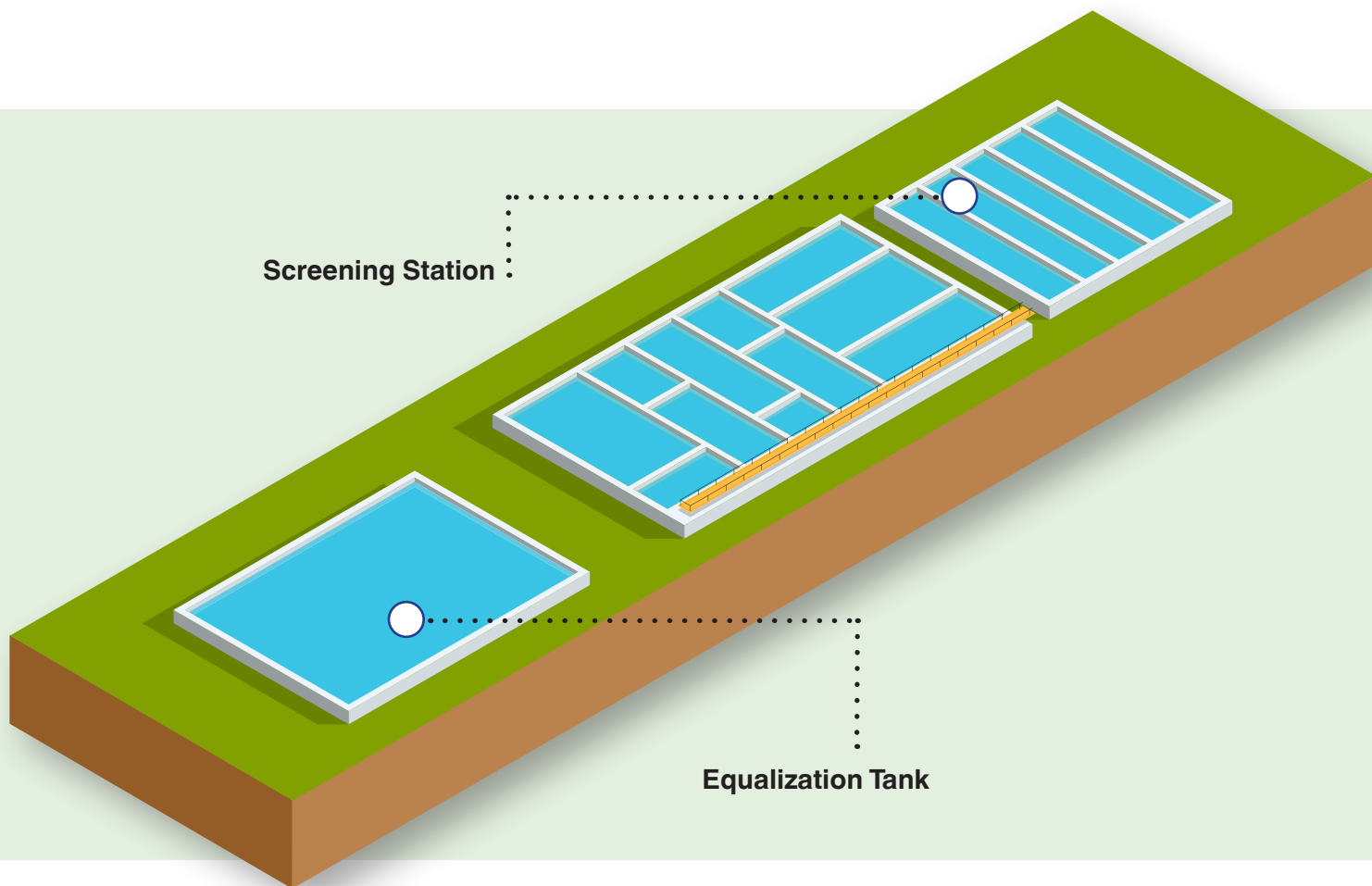
- High humidity
- Varying pressures
- Wide temperature variations
- Strong vibrations and shocks
- Corrosive media

WIKA has a comprehensive portfolio of **pressure gauges** and **pressure transmitters** designed to monitor pressure

in demanding conditions. For sewage or slurry lines, where instruments ports can get plugged, a good solution is to use a specialized **diaphragm seal** with these pressure instruments (see next page).

Pumps and motors in a water treatment plant work non-stop. To monitor their performance, **resistance thermometers** (RTDs) detect changes in temperature that can indicate a change in loading or a potential failure, while **temperature transmitters** send that information to plant operators.

WIKA also makes **Venturi tubes** that, when combined with differential pressure transmitters, continuously monitor the rates of flow to detect small issues, such as low pressure drops, before they become major problems.



Pressure Gauges



232.34,
233.34 XSEL®
Process



233.54
Stainless Steel

Diaphragm Seals



981.31
Inline™ Seal



700.05
Differential
Pressure



632.51
Capsule

Temperature Transmitters



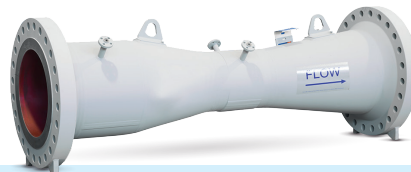
T32
HART®
Transmitter

Pressure Transmitters



A-10
For Common
Demands

Venturi Tubes



FLC-VT
From Bar Stock
or Welded Sheets

Resistance Thermometers



TR58
Bearing RTD Sensor

INLINE™ Diaphragm Seal

A common issue when monitoring pressure in sewage and slurry lines is plugged ports. WIKA's solution to this problem is our INLINE™ diaphragm seal (DS) Model 981.31. Designed to fit between two pipe flanges, this cylindrical DS has a polyurethane liner and no cavities, which prevent viscous materials from clogging instruments. In addition, it has enough volume to allow users to connect multiple pressure instruments – gauge, transmitter, and

even switch – with one device and minimal thread connections.

This isolation ring's innovative modular design is what sets the INLINE™ apart from our competitors. To replace a gauge or transmitter, simply remove one instrument and mount another. There's no longer the need to disassemble the entire assembly – saving wastewater plants significant time and money on parts and maintenance.

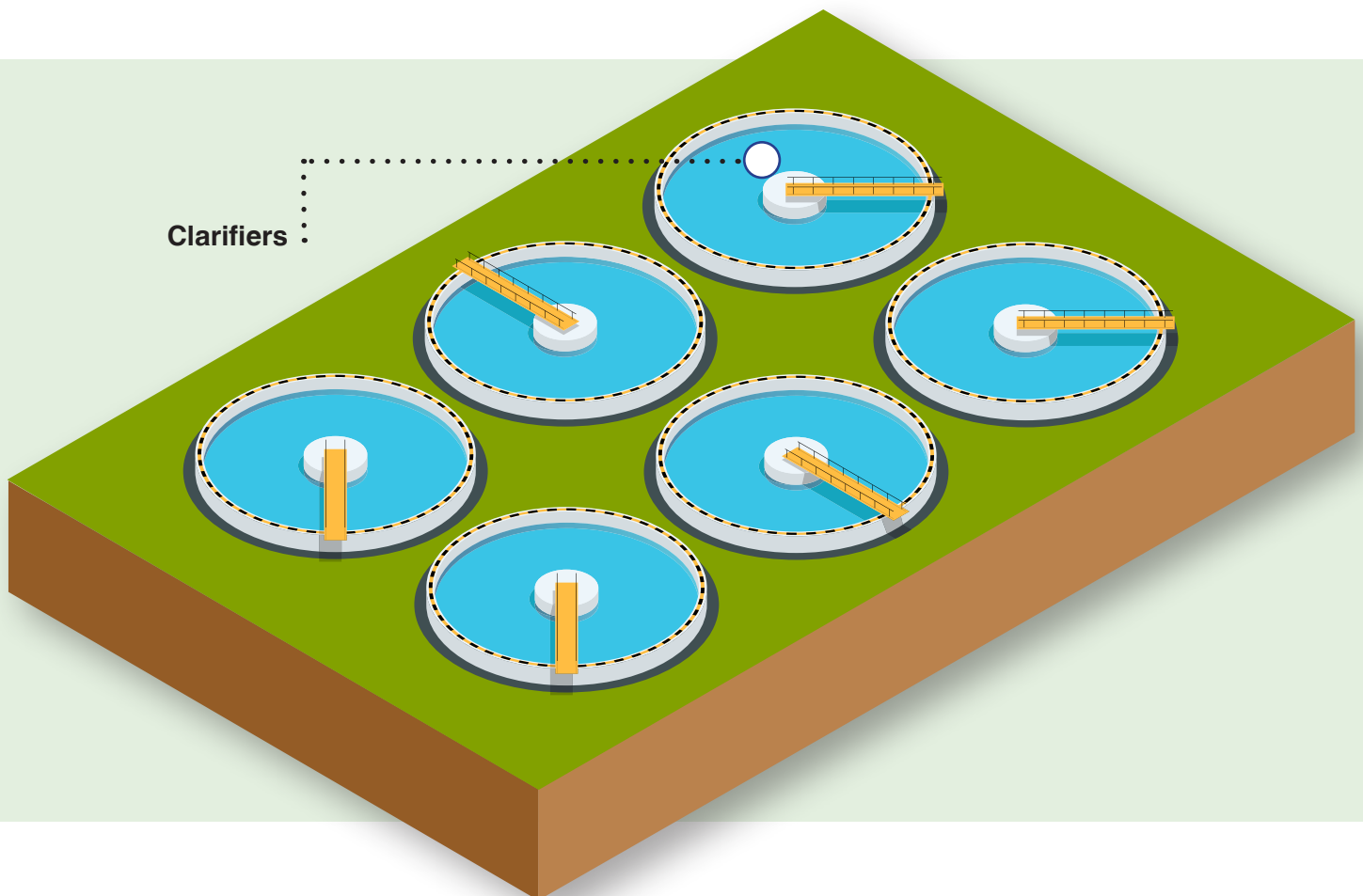


Primary Treatment

After the large solids have settled, a series of pumps move the resulting sewage from those basins to the next stage of wastewater treatment: clarifying. The main goal here is to remove the floatables – plastics, fats, grease – using mechanical skimmers and/or chemicals treatments like sodium hypochlorite, ferrous sulfate, and magnesium hydroxide.

A skid-mounted unit is practical for the chemical injection systems that aid in coagulation (solidifying), flocculation (clumping), sludge conditioning, and so on. Skids are also used for lube oil systems. The **pressure transmitters** and **pressure switches** on these modular units should be compact, lightweight, and easy to configure.

Liquid level monitoring is vital in both the preliminary and primary stages, as overflow creates logistical issues and safety hazards. The **submersible transmitters** used in basins and channels must be able to operate in the presence of grease and solids, noxious gases, and heavy buildup. WIKA manufactures several grades of submersible level transmitters that are suitable for a range of wastewater applications. Attaching the anti-clog LevelGuard attachment (see p. 13) makes the device immune to surface disturbances such as fats and foam, and thus eliminates the need for additional equipment or extra maintenance.



Submersible Transmitters

LS-10
General Applications



LH-10
General Applications



LF-1
Demanding Applications



LH-20
High Performance



IL-10
Intrinsically Safe,
Explosion Protection



Pressure Transmitters

S-20
Demanding
Applications



Monitoring Pressure on Skids

Skid-mounted systems are modular solutions found throughout a wastewater facility. Some skids even offer complete wastewater treatment on a small scale. An essential aspect of these self-contained assemblies is pressure monitoring and switching.

The PSD-4 is an easily configurable electronic pressure switch that's ideal for use with the pumps, compressors, and hy-

draulics found on skid-mounted systems. This compact sensor – only 3.6 inches (9.2 cm) tall – is simple to mount and intuitive to use, and has a large rotating display so that it always faces the operator. An optional output signal means pressure switching can be integrated into automated systems. Moreover, its accuracy is $\pm < 0.5\%$ of span, and this robust device is design for over 100 million switching cycles.

Secondary Treatment

Cleared of heavy solids, plastics, and grease, the raw sludge now contains mostly suspended solids and biodegradable organics. It's time to encourage the existing beneficial bacteria to break down the biomass.

Again, pressure instruments are key to safe and efficient operations. **Process gauges** monitor the pressure of blowers in aeration basins, and **differential pressure gauges** indicate whether aeration discs are clear or blocked. The anaerobic activity in digesters produce enormous amounts of methane, and **pressure sensors** monitor this explosive biogas.

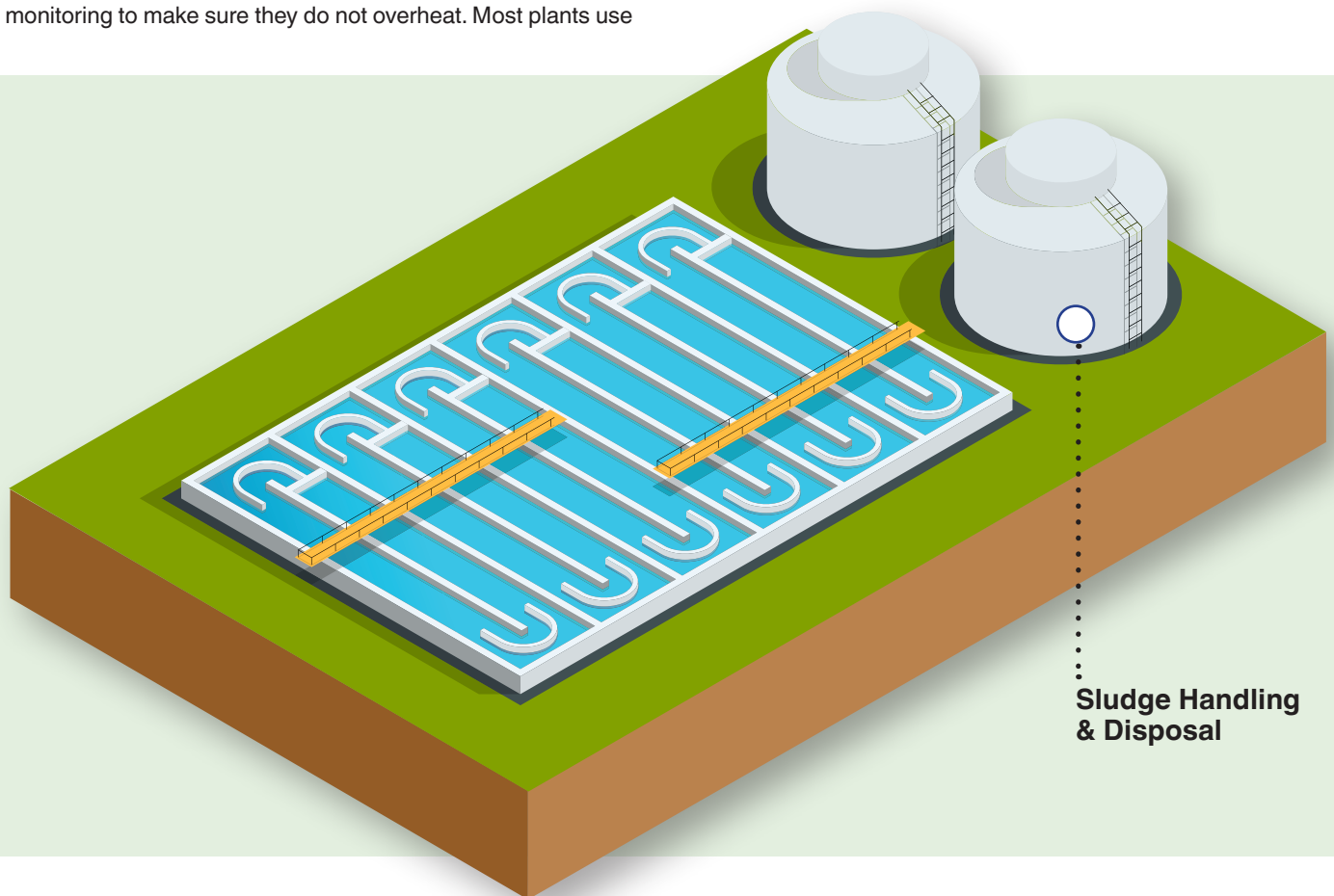
These instruments not only have to measure very low pressures and differential pressures, they also need to withstand the corrosiveness of hydrogen sulfide (H_2S) – another byproduct of anaerobic digestion. Thus, pressure instruments for use in digesters should be made of a corrosion-resistant alloy like NiCrCo and/or stainless steel, and be certified for H_2S service.

Mixing and rotating equipment require continual temperature monitoring to make sure they do not overheat. Most plants use

resistance thermometers (RTDs) to monitor blowers and bearings. Also, digesting bacteria do their best work within a narrow temperature range. Below that, they become sluggish. But if the sludge gets too hot, beneficial microbes will start to die off.

Temperature sensors and transmitters make sure digesters' temperature zone is just right.

In aeration basin and digesters, **level sensors** prevent overflow and track the biological activity. Yet this stage comes with challenging conditions such as viscous or corrosive fluids, turbulence, two-phase media (foam and liquid), and mixed media. WIKA submersible transmitters (see previous page) have a durable cable sheath, and the addition of LevelGuard further protects the instrument from damage. Another WIKA innovation in level measurement for closed vessels is the Electronic DP, an extremely accurate and easy-to-use differential pressure system comprising two interconnected process transmitters.



**Sludge Handling
& Disposal**

Pressure Gauges



422.12
Industrial Series



432.50
Stainless Steel

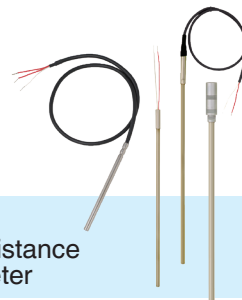


632.51
Capsule

Resistance Thermometers



233.54
Stainless Steel



TR40
Cable Resistance
Thermometer



TR10
RTD Sensor

Temperature Transmitters

T32
HART® Transmitter

TIF50
HART® Field Transmitter

Differential Pressure Gauges

732.51
NiCrCo alloy and stainless
steel wetted parts, certified
for H₂S service

Level Measurement

**Electronic Differential
Pressure**

LevelGuard: Innovative anti-clogging attachment

Sludge, slurry, and turbulence make it difficult to accurately determine liquid level. These conditions are also hard on instruments. To overcome these issues, WIKA has come up with the innovative LevelGuard attachment for our submersible liquid-level pressure transmitters.

This robust piece has a 2-inch diaphragm that is sensitive enough to monitor very

low liquid levels, even when buried under a layer of muck. No additional supports or connections are required; the cable that comes with the transmitter is enough. Its all 316 stainless steel construction increases durability and protects the transmitter from turbulence and damage, and the added weight helps hold the sensor in place.



Tertiary Treatment

At this stage, the secondary effluent flow may look clean – but it isn't. There are still plenty of silt, nutrients, and pathogens in the total suspended solids (TSS).

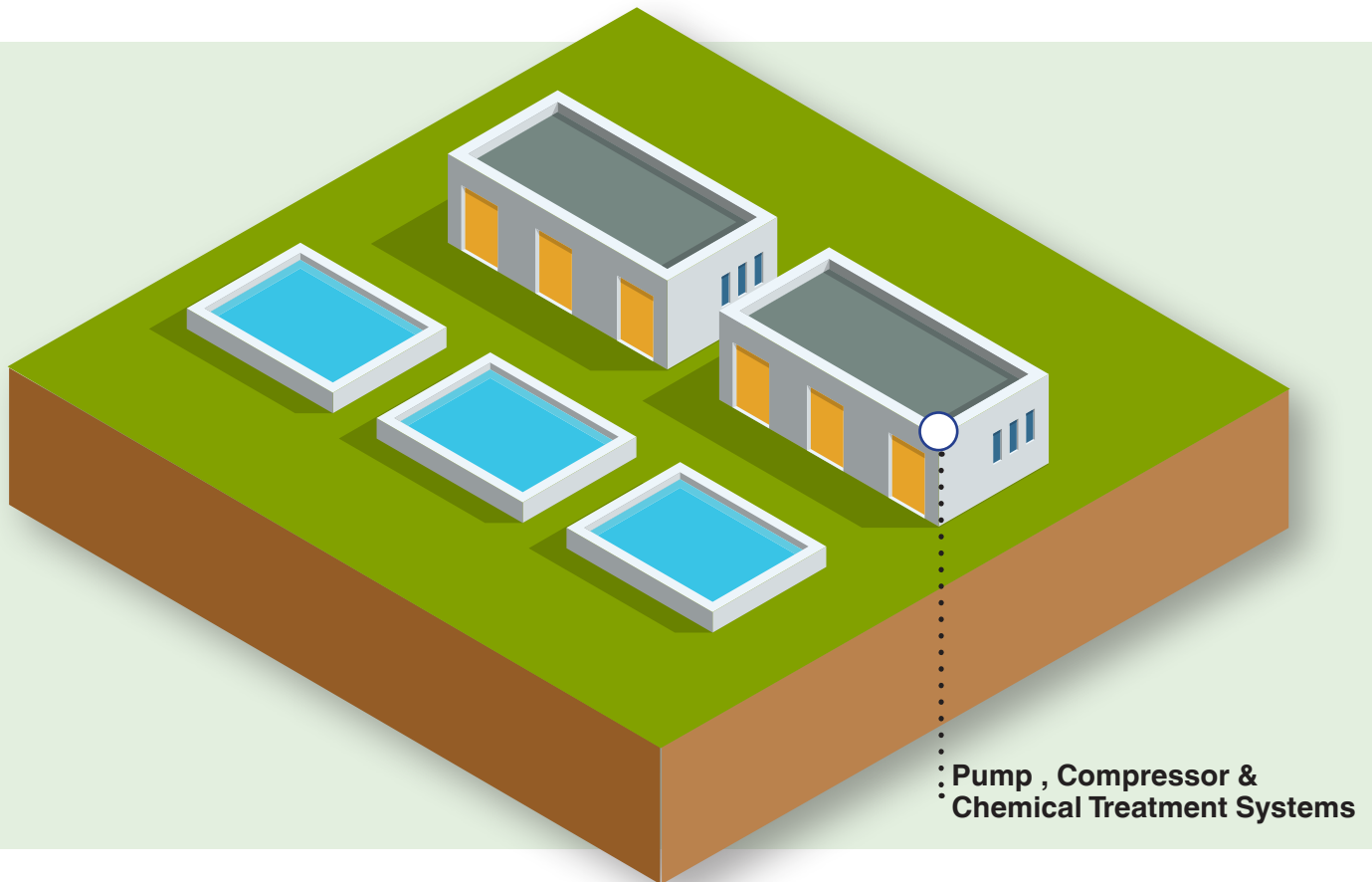
If the plant did not remove nutrients in the previous stage, it will do so now using chemical precipitates. A reverse osmosis

(RO) membrane filter sifts out silt and larger parasites, while a chemical agent – usually chlorine or ozone – or UV light disinfects the water by killing bacteria, viruses, and smaller parasites.

Pressure gauges, especially ones with **diaphragm seals**, play an important role in this stage by monitoring the pressure of RO membranes.

Diaphragm Repair Service by WIKA USA

A diaphragm seal (DS) makes measuring pressure safer and more reliable, even in extreme working conditions, and is ideal for protecting pressure instrumentation and process transmitters. In addition to manufacturing a wide range of diaphragm seal systems, WIKA USA offers a Diaphragm Seal Service with 24-hour turnaround. By repairing or replacing only the damaged pieces rather than buying a completely new assembly, this service is also a great way to save money. We make repairs on any make or model of diaphragm seal on any transmitter, regardless of the original manufacturer.



Pressure Gauges



233.54
Stainless Steel



632.51
Capsule

Valves & Accessories

Needle valves, ball valves,
block & bleed valves, valve
manifolds

Flushing rings

Overpressure protectors

Pressure snubbers

Diaphragm Seals



990.31
Plastic Body
Threaded



990.27
Flush
Diaphragm



990.36
Threaded
Process

CPG1500

Wastewater plants rely on hydraulic systems, valves, and pressure instruments, all of which require regular calibration and testing. The CPG1500 simplifies this otherwise time-consuming process with simple onsite calibrations. This digital pressure gauge's industry-leading features include:

- Accuracy up to $\pm 0.025\%$ of span (calibration certificate included)
- Pressure range of 0 ... 150,000 psi (0 ... 10,000 bar)
- Vacuum and absolute pressure ranges
- Battery-powered for portability
- Easy-to-use interface
- Bluetooth communication with WIKA-Cal software over WIKA-Wireless



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