JUMO

Water and Wastewater Engineering

Innovative solutions for your success

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Dear Reader,

"Water is a friendly element to whomever is familiar with it and knows how to treat it."
Johann Wolfgang von Goethe

Water is the most important element for life on this planet. Many of the unique qualities of the water molecule H_2O are unique and not yet totally explained by science. Despite that water has only in recent years been viewed more and more as a valuable resource – water is being referred to as the "crude oil of the 21st century" – this precious element has always been indispensable for humans.
People need water in all areas of their daily lives. We use it as food, solvents, cleaning agents, production means, and transport. We also use it as cooling, highly-purified, and process water. Other uses include bathing. The agricultural sector requires it for plants and animals. After use, we have the responsibility and task of restoring the used water – wastewater – to a non-toxic state so that it can be used again.
As a producer for sensor and automation solutions JUMO offers optimal components for water and wastewater. Other than sensors and devices for the most important parameters of liquid analysis, the JUMO product portfolio also includes proven and innovative solutions for water treatment. The tasks include measuring and controlling pressure, level, flow, and temperature.
Equipping water, process, and wastewater treatment plants with high-quality measurement and control components will be an area to which increased attention will be paid within the framework of Industry 4.0. Here, increased demands towards operational safety as well as ecological and economic aspects play just as much a part as the trend towards a wastewater-free water cycle (ZLD – Zero Liquid Discharge).
Other than established products you will also find innovations such as the digital analysis sensors of the JUMO digiLine family in this brochure. From the digital networking of sensors to easy accessibility of complete measuring points from the Internet, JUMO is setting standards for equipping the most modern plants in many different areas of the water and wastewater industry. Complete control solutions can be implemented with JUMO mTRON T and the high-quality multichannel measuring devices from the JUMO AQUIS touch series.
We hope that we can inspire you and we look forward to hearing from you. After all, Goethe tells us the valuable resource water should be treated in a friendly, positive manner.

Matthias Kremer

P.S.: Detailed information about our products can be found under the specified type/product group number at **www.industry.jumo.info**.

Contents

Measurement and control technology

Liquid analysis

The beginnings of JUMO are closely tied to glass processing for the production of technical measuring devices in temperature measurement. Based on this more than 70 years of experience in glass processing, electrochemical glass sensors for measuring the important water parameters pH and redox potential have been produced since the 1980s. Later JUMO added sensors for measuring electrolytic conductivity and for disinfection measurands such as free and combined chlorine, chlorine dioxide, and ozone as well as hydrogen peroxide and peracetic acid. For the first time, a Plug and Play compatible galvanic sensor for dissolved oxygen featuring very easy maintenance was brought to the market in the mid 1990s. Today, JUMO also offers optical sensors for dissolved oxygen and for turbidity that are used in wastewater or in fish farms, thereby completing the program. The JUMO digiLine system (see page 6 and 7) meets the highest requirements for easy startup, safe operation, and digital access. The digital networking of sensors for liquid analysis enables a higher level of automation and functionality.

Many sensors for measurands pertaining to water analyses require proper fittings for installation into the process. The fittings protect the sensors against mechanical or hydraulic loads, ensure the correct inflow for measurement, and allow the removal/installation of the sensor without process interruption (retractable holders). Automatic cleaning of the sensors can also be implemented with the appropriate fittings. This way, service life and the metrological availability of the sensors can be significantly increased in critical processes.

JUMO tecLine pH/Rd series
pH and redox combination electrodes
Types 201020, 201025, 201021, 202026

JUMO tecLine CR/CR-4P
Conductive two/four electrode conductivity sensor
Types 202924, 202930

JUMO immersion fitting
Types 202820, 202821

JUMO retractable holder Manual/pneumatic
Types 202822, 202823

JUMO ecoLine NTU
Optical turbidity sensor with JUMO AQUIS 500 RS indicating device/controller
Types 202569, 202670

JUMO flow fittings
Types 202810, 202811

JUMO tecLine Cl2, TC, ClO2, O3, H2O2, PAA
For free chlorine, chlorine dioxide, total chlorine, ozone, peracetic acid, and hydrogen peroxide
Types 202630, 202631, 202634, 202636

Pressure – Temperature – Level – Flow

Water and wastewater must be able to move through pumps. Containers and treatment plants must be able to be filled and emptied automatically. The transported liquid amounts must be monitored or controlled. Robust and proven measuring devices as well as built-in sensors are available for these important parameters. Solutions with ATEX approval are also available. Check out the successful and proven device series JUMO dTRANS p and JUMO MIDAS for pressure and differential pressure, the level probes in the JUMO MAERA series, or the highly-precise flowmeter program in the JUMO flowTRANS MAG series. A high material and variant diversity allow the user to select the right sensor for the respective application. As a result, an optimal operating life of the implemented sensors is achieved and the availability as well as reliability is increased.

JUMO MAERA series
Level probes
Types 402090, 404391, 404392, 404393, 404753

JUMO flowTRANS MAG S01
Electromagnetic flowmeter for industrial applications
Type 406015

JUMO PINOS L02
Calorimetric flow sensor
Type 406041

JUMO PROCESStemp
RTD temperature probe for process technology
Type 902820

JUMO dTRANS p20
Process pressure transmitter with display
Type 403025

JUMO dTRANS p30
Pressure transmitters
Type 404366

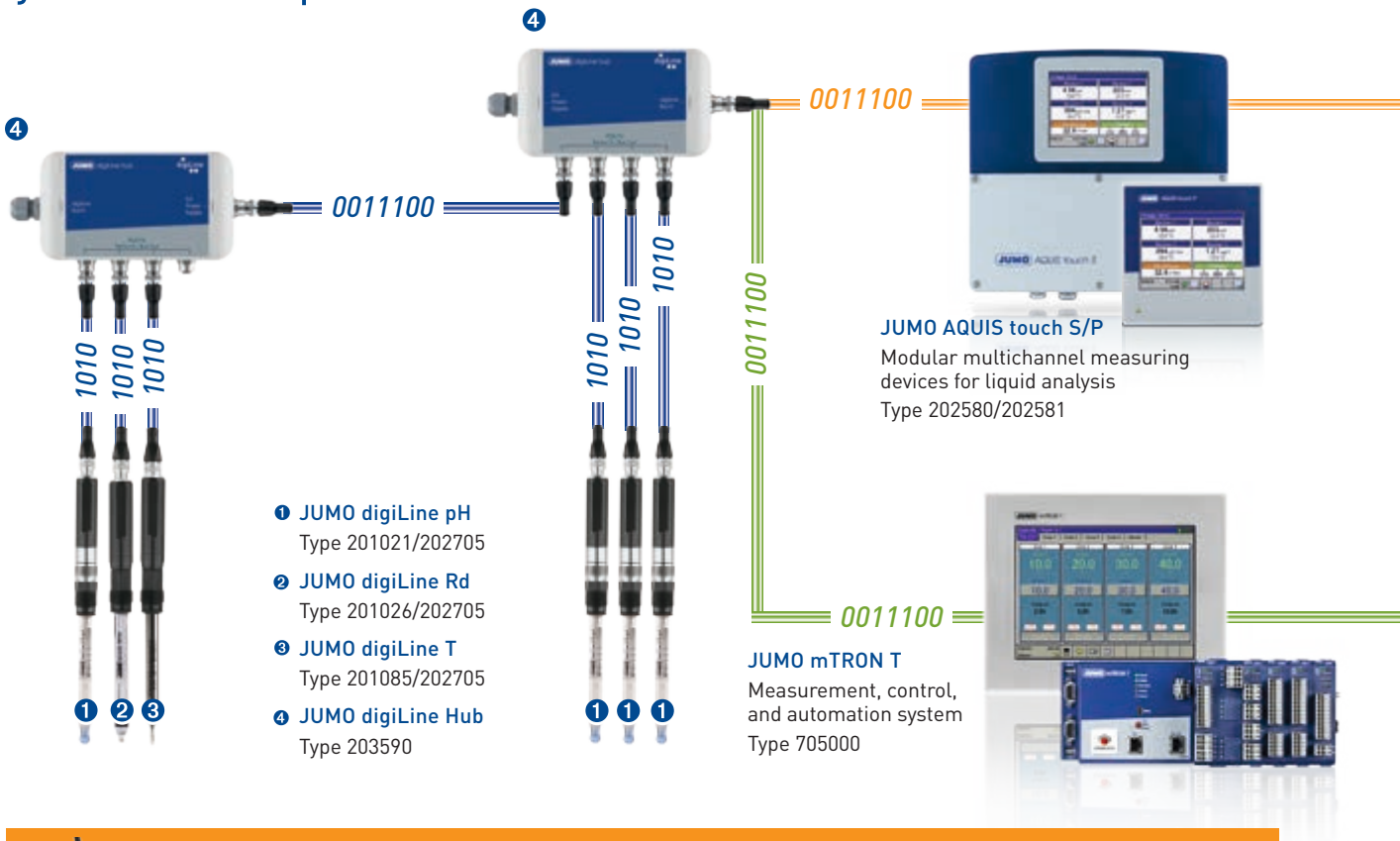
JUMO MIDAS C18 SW
OEM pressure transmitter – seawater
Type 401012

JUMO digiLine

Intelligent, bus-compatible connection system for digital se

With JUMO digiLine, JUMO presents a bus-compatible connection system for digital sensors in liquid analysis which also offers Plug and Play functionality.
JUMO digiLine enables simple construction of sensor networks in which sensors are connected to each other in a star or tree structure. A single shared signal line is used for communication with the next evaluation unit or controller. This way plants in which several parameters need to be measured at the same time in different places can be wired efficiently and quickly.

System example



❶ **JUMO digiLine pH**
Type 201021/202705

❷ **JUMO digiLine Rd**
Type 201026/202705

❸ **JUMO digiLine T**
Type 201085/202705

❹ **JUMO digiLine Hub**
Type 203590

JUMO AQUIS touch S/P
Modular multichannel measuring devices for liquid analysis
Type 202580/202581

JUMO mTRON T
Measurement, control, and automation system
Type 705000

Ready for measurement in just three steps – thanks to Plug and Play

1) Connect sensor

2) Sensor is detected automatically

3) Sensor is linked and ready for measurement

ensors

Connection option 1

The multichannel measuring devices in the JUMO AQUIS touch series were designed especially for liquid analysis. They are ideal as a central platform for the display and further processing of measurement data. Up to six digiLine sensors can be connected to the modular devices and as many as 25 sensors can be connected using corresponding input modules and interfaces. In addition to measured value recording, up to four independent control loops can be implemented and process values can be recorded in a tamperproof manner with an integrated paperless recorder.

Connection option 2

JUMO digiLine sensors can also be connected to the universal measuring, control, and automation system JUMO mTRON T. This means that entire automation solutions can be implemented while the scalability also enables individual adaptation to a particular task.
An integrated PLC is used to integrate up to 62 JUMO digiLine sensors.

digiLine

Measure various liquid analysis measurands with just one system

- Measurands: pH value, temperature, redox potential, conductivity, oxygen concentration, turbidity
- Disinfection measurands for industrial applications in the process, food, pharmaceutical, and water industry
- Fail-safe digital data transfer for optimal process monitoring
- Modular system: for both individual measuring points and for setting up sensor networks
- Plug and Play function for connection to transmitters from the JUMO AQUIS touch series: facilitates the replacement of expended sensors or the brief exchange of sensors for calibration purposes
- The digiLine electronics can still be used when the sensor becomes worn
- Simple and reliable calibration of sensors as well as comprehensive measuring point management can both be easily done on a PC with the JUMO DSM (Digital Sensor Management) software tool

Measuring – Displaying – Controlling

Other than reliable sensor technology, effective processing of the measuring signals is an important part in a water and wastewater plant. For all measurands the appropriate display, switch, and control devices are available. Different installation types (DIN-rail, control cabinet, or on-site installation with high protection class) as well as single channel and multichannel variants can be selected. JUMO measurement and control devices can be used internationally due to the multilingual user interface. It is available through proven key operation or through modern touchscreens. PID control algorithms enable effective processes through perfect control results.

Modern process interfaces or fieldbus systems are possible depending on the measurand and device family. JUMO offers solutions here such as Ethernet, Modbus, HART®, PROFIBUS, PROFINET, CAN-Bus, or IO-Link. Wireless transmission of pressure and temperature values is also possible.

JUMO ecoLine O-DO

Optical sensor for dissolved oxygen with JUMO AQUIS 500 RS display unit/controller

Types 202569, 202613

JUMO AQUIS 500 pH/CR/Ci/AS

Transmitter/controller series for pH value, redox, ammonia concentration, chlorine, chlorine dioxide, ozone, conductive and inductive conductivity, and temperature

Types 202560, 202565, 202566, 202568, 202569

JUMO AQUIS touch S/P

Multichannel measuring devices for liquid analysis

Types 202580, 202581

JUMO CTI-500 and CTI-750

Inductive conductivity transmitter with plastic or stainless steel case

Types 202755, 202756

JUMO ecoTRANS pH/Lf 03

Microprocessor transmitter/switching device for pH value/redox voltage, conductivity, and temperature

Types 202723, 202732

JUMO dTRANS pH/CR/AS 02

Transmitter/controller series for pH value, redox voltage, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature

Types 202551, 202552, 202553

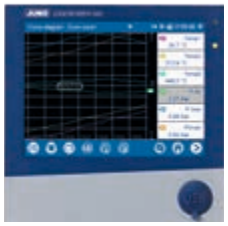
Recording – Automation – Engineering – Service

Recording important process parameters in a tamperproof data format continues to be a legal obligation for operators in aquiferous plants. Here, JUMO offers measurement and control devices with integrated recording function as well as standalone paperless recorders up to the highest security level with FDA audit trail functionality.
Whether you use the process visualization software SVS3000 or the extensive, complete automation system JUMO mTRON T with integrated PLC software, JUMO offers all required components ranging from single-channel monitoring of a parameter to complete process control. JUMO Engineering provides support including planning, implementation, and startup of complex plant controls. After sales service includes the technical hotline, maintenance contracts, and calibration services.

JUMO LOGOSCREEN fd
Paperless recorder for FDA-compliant measurement data recording
Type 706585

JUMO LOGOSCREEN nt
Paperless recorder with TFT display, CF card, and USB interfaces
Type 706581

JUMO LOGOSCREEN 600
Paperless recorder with touchscreen
Type 706520



JUMO mTRON T – central processing unit
Measuring, control, and automation system with controller module and input/output modules
Type 705000

JUMO SVS3000
Visualization software
Type 700755

Drinking water

Drinking water is humanity's most important food resource which cannot be replaced by other substances.

JUMO pH, conductivity, and level sensors support your process and ensure that your drinking water is of a consistent quality no matter which method of water treatment you use.

Measuring pH in drinking water

Different parameters are measured to ensure that the drinking water is reliably monitored. One of the most important parameters is the pH value. The pH value of drinking water should not be less than 6.5 and not more than 9.5. pH in drinking water is measured by JUMO tecLine pH electrodes in conjunction with the JUMO AQUIS 500 pH transmitter/controller.

Level measurement in groundwater

In ground or well water the level height should be measured regularly via changes in hydrostatic pressure using a level probe. The JUMO MAERA S28 level probe with a piezo-resistive measuring cell is particularly suited for this task. It has an integrated overvoltage protection which protects the electronic components of the level probe from an indirect lightning strike.
With the additional high overload resistance and long-term stability the JUMO MAERA S28 offers a high level of security.

Turbidity measurement in groundwater

Continuous turbidity measurement with JUMO ecoLine NTU is an easy method of monitoring the raw water quality for undissolved substances in water. Furthermore, knowing the turbidity of the raw water makes the estimation of flocculating agents and the energy input in the flocculation stage easier.

JUMO tecLine pH/Rd series

pH and redox combination electrodes
Types 201020, 201025, 201021, 202026

JUMO tecLine CR

Conductive two-electrode conductivity sensor
Type 202924

JUMO tecLine Cl2

For free chlorine
Type 202630

JUMO AQUIS 500 pH/CR/Ci/AS

Transmitter/controller series for pH value, redox-voltage, ammonia concentration, chlorine, chlorine dioxide, ozone, conductive and inductive conductivity, and temperature
Types 202560, 202565, 202566, 202568

JUMO dTRANS pH/CR/AS 02

Transmitter/controller series for pH value, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature
Types 202551, 202552, 202553

JUMO AQUIS touch S/P

Multichannel measuring devices for liquid analysis
Types 202580, 202581

JUMO ecoLine NTU

Optical turbidity sensor with JUMO AQUIS 500 RS display unit/controller
Types 202569, 202670

JUMO flowTRANS MAG S01

Electromagnetic flowmeter for industrial applications
Type 406015

JUMO MAERA S28

Level measurement probe
Type 404392

Groundwater

Where does our drinking water come from?

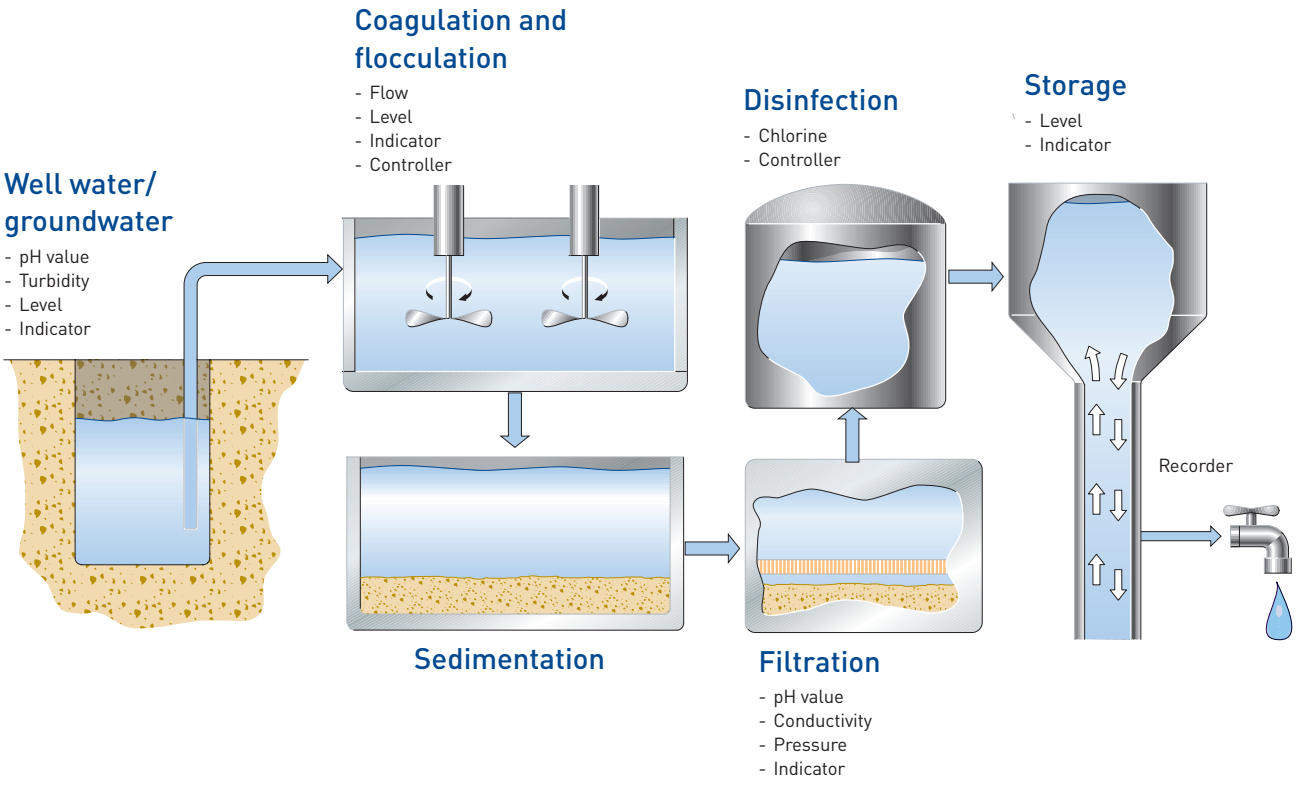
Drinking water treatment refers to the treatment of spring water, surface water, or groundwater.

Spring water refers to water that emerges out of the earth from underground water sources. Surface water is taken from standing or flowing bodies of water above ground. Dam reservoir water, lake water, and river water are three types of surface water. Groundwater is part of the natural water cycle. It comes predominantly from rainwater seeping through the soil and the subsoil into the aquifer.

From groundwater to drinking water

Most drinking water comes from groundwater. The treatment of drinking water involves a number of different processes.

Flocculation is a process of wastewater and drinking water treatment that reduces existing turbidity. The finest, suspended, or colloidal particles in the water coagulate and then settle or can be filtered. The solid matter and turbidities can be isolated by sedimentation. Filtration describes the process whereby a solid matter/liquid mixture in the water or wastewater can be separated or segregated by filters. Disinfection either removes microorganisms from the water or kills them so that hygienically perfect water is attained.



Brackish water and seawater

Desalination of brackish water and seawater

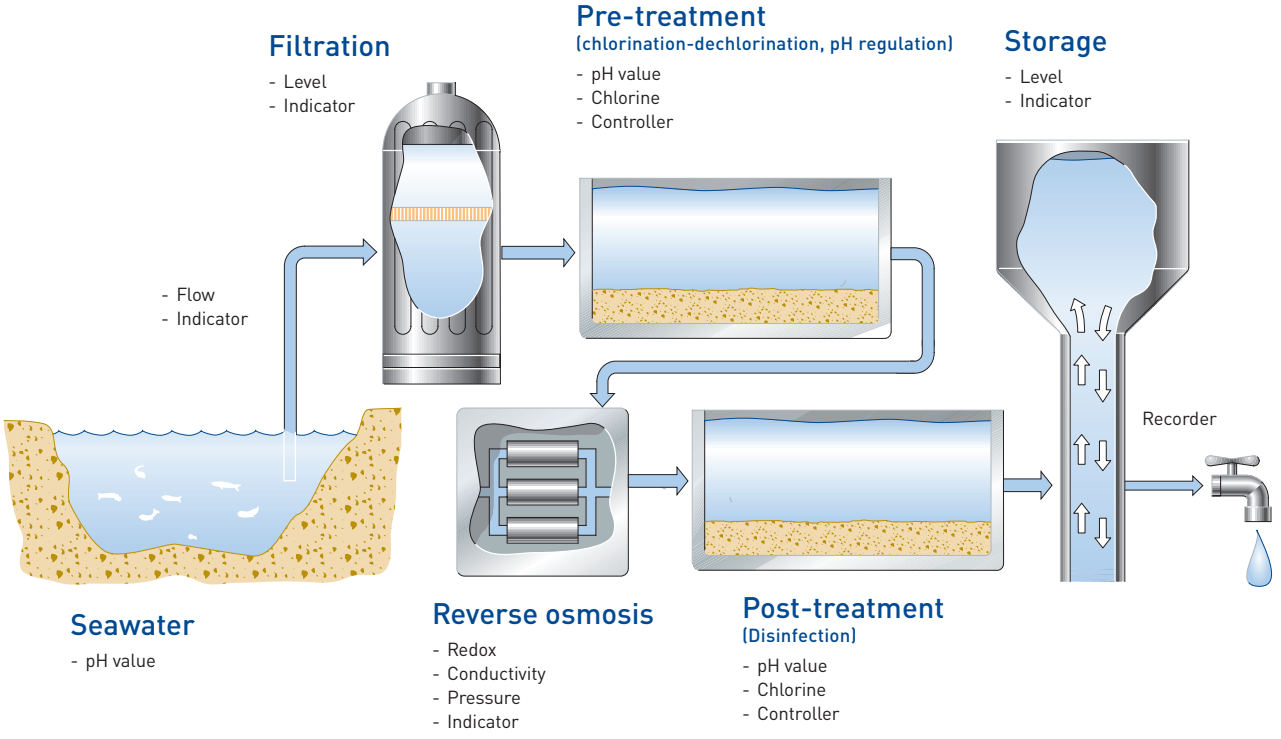
According to UNESCO the supply of drinking water is highly problematic in many parts of the world. A limited amount of water is available on our planet and 97.5 % of the water in the world is salty. Because the availability of drinking water is limited, seawater is an important source of drinking water.

Seawater desalination is defined as the attainment of drinking water or process water from seawater by reducing the salt content.

Pressure measurement before reverse osmosis

The crucial element in seawater desalination plants is the reverse osmosis unit. During reverse osmosis the seawater is pushed through a semi-permeable membrane at high pressure. This membrane functions like a filter and only allows specific ions and molecules to pass through.

Because seawater has such high salinity, a pressure of 60 to 80 bar is required. To ensure safe system operation, the pressure before reverse osmosis must be monitored. The obvious choice for this task is the JUMO MIDAS C 18 SW pressure transmitter.



Swimming pool water

Swimming is a popular and healthy leisure activity – as long as the water has the right quality. To keep it consistent, swimming pools are continuously monitored and controlled.

Here, too, JUMO provides solutions that you can rely on.

Measuring pH in swimming pools

The pH value is one of the most important parameters in swimming pool water. The optimum pH value for swimming pool water lies between 7.2 and 7.8. pH values that are too low or too high cause various problems as well as the risk of corrosion and skin/eye irritation.

JUMO provides the following solution for monitoring the pH value: JUMO tecLine pH electrodes in conjunction with the JUMO AQUIS 500 pH transmitter/controller.

Concentration of the disinfectant

In addition, disinfectant content can be determined on a weekly basis. With chlorine, for example, this content ideally lies between 0.3 and 0.6 mg/l (free chlorine). JUMO amperometric measuring cells for free chlorine, chlorine dioxide, and ozone (type 202630) with the JUMO AQUIS 500 AS transmitter/controller are particularly suitable for this task.

JUMO tecLine pH/Rd series

pH and redox combination electrodes

Types 201020, 201025, 201021, 202026

JUMO tecLine Cl2

For free chlorine

Type 202630

JUMO AQUIS 500 pH/CR/Ci/AS

Transmitter/controller series for pH value, redox-voltage, ammonia concentration, chlorine, chlorine dioxide, ozone, conductive and inductive conductivity, and temperature

Types 202560, 202565, 202566, 202568

JUMO dTRANS pH/CR/AS 02

Transmitter/controller series for pH value, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature

Types 202551, 202552, 202553

JUMO AQUIS touch S/P

Multichannel measuring devices for liquid analysis

Types 202580, 202581

JUMO ecoTRANS pH/Lf 03

Microprocessor transmitter/switching device for pH value/redox voltage, conductivity, and temperature

Types 202723, 202732

JUMO flowTRANS MAG I02 and paddle wheel flow sensor

Types 406011, 406020

JUMO surface-mounted thermostat

Type 603026

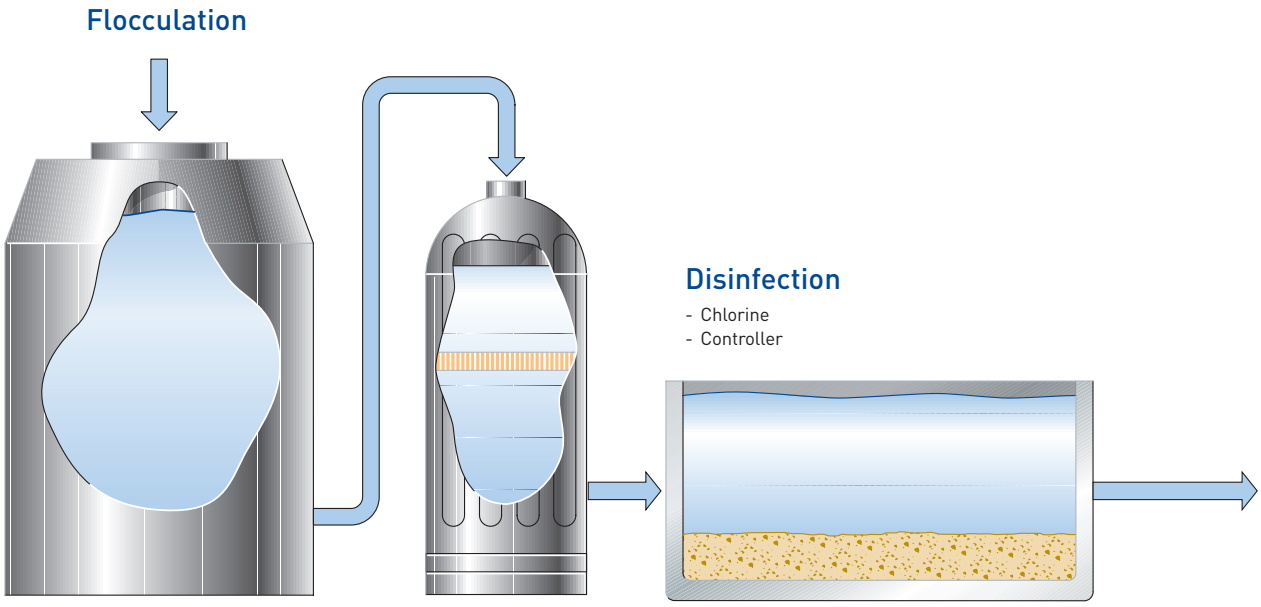
Swimming pool water production

Swimming pools include certain risks such as infections so that they must always have a guaranteed water quality. As a result, all swimming pools have to be continuously monitored and controlled.

Water is primarily treated to kill or reduce the microorganisms within it (bacteria, viruses, etc.). This process can also be called disinfection or sterilization. Chlorination is the most commonly used method for water disinfection.

The usual practical procedure is to first prepare a chlorine gas or hypochlorite solution in water and then to add an appropriate quantity of it to the water to be treated.

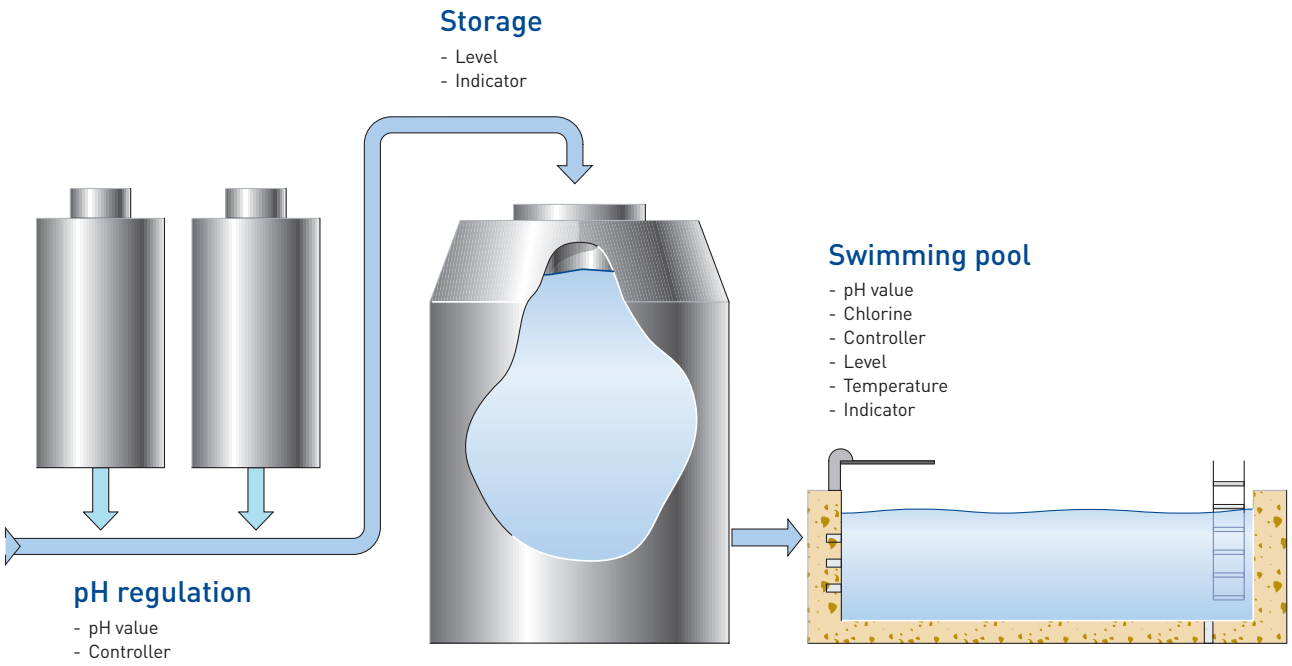
When the water is treated the aim is to get as few undesirable byproducts as possible to be formed by disinfection. To a certain extent this outcome can be controlled by the conditions (amount of chlorine, temperature, pH value) prevailing at the time of disinfection.



Level measurement

The term "pool hydraulics" refers to the continuous circulation of water in swimming pools. Good pool hydraulics ensure good distribution of disinfectants.
Pool hydraulics include not only the economical skimmer system to remove water from the surface, but also the more effective overflow system. Here the water that is pushed into the pool by the jets is directed over the edge of the pool into an overflow channel from where it goes to a splash water tank.
This tank is designed so that when the pool is used the tank can hold the volume of water that is displaced – and when the pool is not used it has sufficient water stored for back washing.

Level measurement in the backwash water tank protects the filter pump against dry-running if not enough water is available. Such a measure causes fresh water to be added to the swimming pool when too little water is in it as a result of backwashing. Level measurement also reactivates the pump if too much water is in the splash water/overflow tank. Level measurement can occur hydrostatically. For this purpose level measurement probes are available in unpressurized or open tanks. Level measurement probes are pressure measuring devices that are especially developed for level assessment. In coordination with your specified guidelines JUMO offers a wide variety of level measurement probes out of stainless steel or plastic. These have different process or electrical connections as well as special cables.



Highly-purified water

Highly-purified water is required in a wide variety of production processes such as a cleaning agent in the semiconductor industry, as a cleaning operation after the actual washing with cleaning agents in the food industry, and for cleaning and dilution purposes in the pharmaceutical industry.

Whatever water quality you require for your process JUMO products provide pure water of a quality that you can rely on.

pH measurement in highly-purified water

In some areas a pH measurement in highly-purified water is mandated. But the low conductivity and low ionic strength of highly-purified water cause technical problems when measuring the pH value. JUMO's solution here is the refillable JUMO tecLine pH electrode with a KCl storage vessel.

Conductivity measurement

Monitoring the quality of highly-purified water through conductivity is the safest and most reliable method. A complete measurement chain for conductivity in highly-purified water consists of a highly-purified water transmitter/controller – JUMO AQUIS 500 CR, JUMO dTRANS CR 02, or JUMO ecoTRANS Lf 03 – a conductivity sensor with the integrated JUMO tecLine CR temperature probe, and a connecting cable.

JUMO highly-purified water measurement converters offer you an exact entry of the cell constants, temperature compensation according to ASTMD 1125-95, and limit value monitoring according to USP (water conductivity <645>).

JUMO tecLine pH

pH combination electrode with liquid KCl filling, refillable

Type 201020

JUMO ecoTRANS pH/Lf 03

Microprocessor transmitter/ switching device for pH value / redox voltage, conductivity, and temperature

Types 202723, 202732

USP<645>

JUMO dTRANS pH/CR/AS 02

Transmitter/controller series for pH value, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature

Types 202551, 202552, 202553

USP<645>

JUMO AQUIS touch S/P

Multichannel measuring devices for liquid analysis

Types 202580, 202581

digiLine

JUMO tecLine CR

Conductive two-electrode conductivity sensor out of stainless steel and titanium

Type 202924

ASTM certificate

JUMO Process and retractable holders

Made of stainless steel

Types 202822, 202825, 202831

JUMO MIDAS C18 SW

OEM pressure transmitter – seawater

Type 401012

JUMO flowTRANS MAG S01

Electromagnetic flowmeter for industrial applications

Type 406015

JUMO LOGOSCREEN fd

Paperless recorder for FDA-compliant measurement data recording

Type 706585

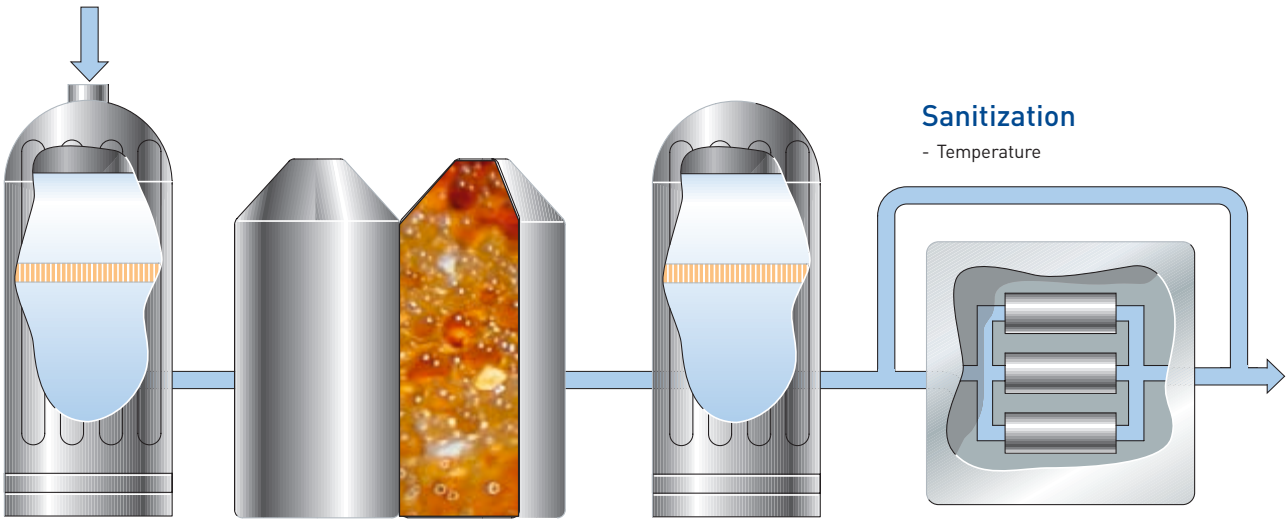
Highly-purified water in the pharmaceutical industry

The production of highly-purified water is one of the most important processes in the pharmaceutical industry. Without it, the manufacture of most substances would not be possible as highly-purified water quality is the prerequisite for a consistently high product quality.

Monitoring the quality of highly-purified water through conductivity is the safest and most reliable method.

The quality of highly-purified water (pure water, high purity water, water for injection, etc.) is described in several standards and recommendations. These include ASTM International (American Society For Testing and Materials), EP (Pharmacopoea Europaea, Ph. Eur.), USP (United States Pharmacopeia), and DIN or ISO standards.

The JUMO tecLine CR conductive conductivity measuring cells meet all requirements for use in highly-purified water.



Prefiltration
- pH value
- Pressure
- Indicator

Softening
(ion exchanger)
- Conductivity

Filtration

Sanitization
- Temperature

Reverse osmosis
- Conductivity
- Pressure
- Indicator

Highly-purified water production

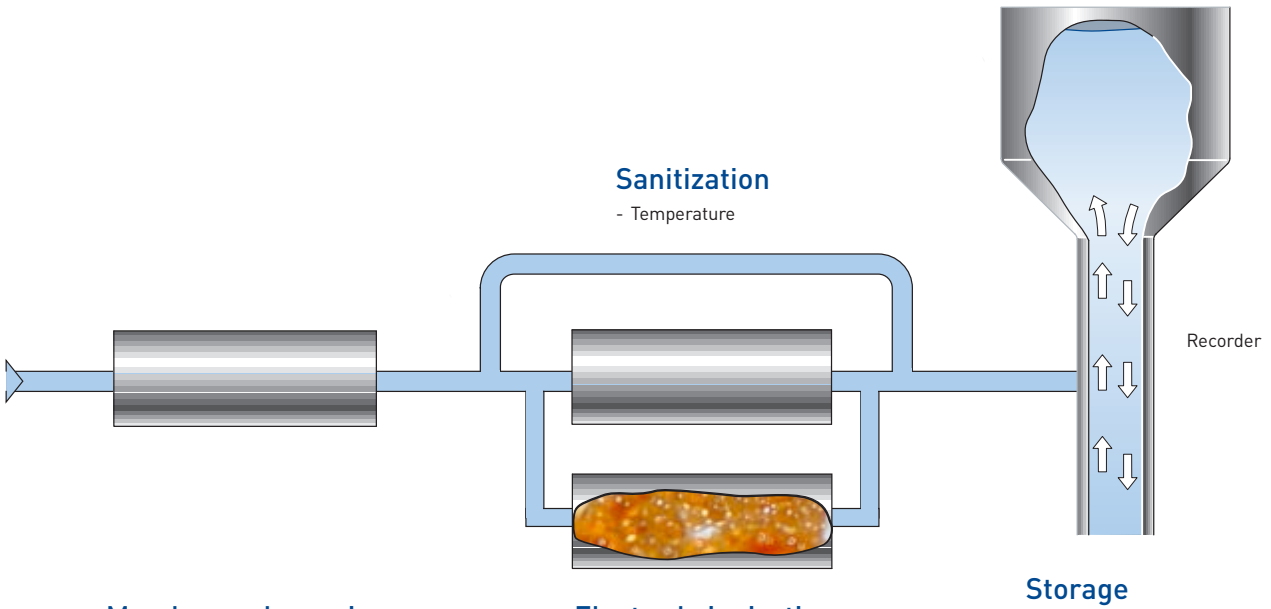
Highly-purified water is required in a wide variety of production processes such as a cleaning agent in the semiconductor industry, as a cleaning operation after the actual washing with cleaning agents in the food industry, and for cleaning and dilution purposes in the pharmaceutical industry.

Depending on the demands on highly-purified water, different processing steps have to be upstreamed or downstreatmed. Common production processes include reverse osmosis, ion exchanger, ultrafiltration, and electrochemical deionization.

Ion exchangers contain mobile ions. Their chemical structure enables them to exchange these ions for other ions charged in the same way.

Ultrafiltration is a typical membrane process. The pores are very large for ultrafiltration. Matter is excluded by size so that components larger than the membrane pores are retained.

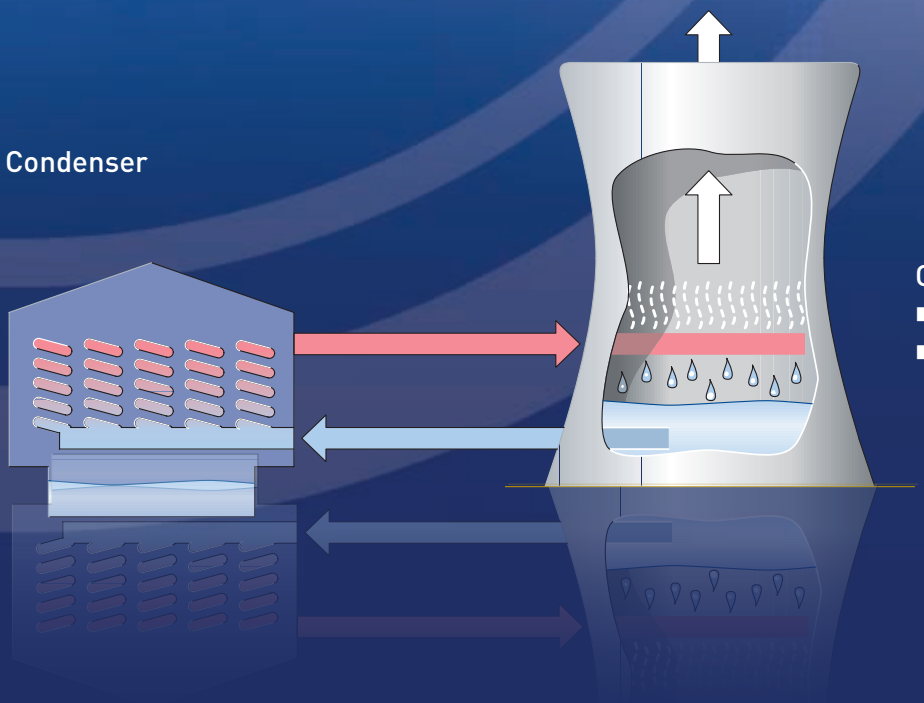
Electrochemical deionization is the latest technology in highly-purified water production. When a voltage is applied across the anode and cathode, the anions and cations combine and the resulting ions are removed with ion exchangers from the water stream.



Cooling water

Heat has to be dissipated in many industrial plants. Here, cooling water is used as the heat carrier in technological processes. Monitoring water quality makes sense in all applications where water or aqueous solutions is/are used as the cooling medium or as a cooling additive.

Inductive conductivity sensors by JUMO are the ideal solution for this task.



Measurement technology for the hygienic operation of cooling towers

As of January 2015, a new technical guideline (VDI2047, Sheet 2) has been established for manufacturers and operators to safeguard the sanitary operation of evaporative cooling towers. In addition, a legislative initiative was proposed. This directive and the planned law make operators liable for hygienic maintenance, care, and operation. These regulations are meant to apply retrospectively for existing installations.

JUMO supplies suitable measurement and control devices for equipping new cooling towers – particularly so for the retrofitting and conversion of existing installations. The JUMO AQUIS touch modular multichannel measuring device designed for liquid analysis is designed to ideally suit the recommendations of the VDI Directive. In addition to the desalination of the cooling tower through conductivity measurement, the device also enables controlled dosing of biocides for cooling tower hygiene. The desalination lock during biocide dosing, the compliance with exposure time of the biocide, and limit value monitoring of all important parameters are also controllable.

JUMO tecLine Rd/HD Rd

Redox combination electrodes

Types 201025, 201026

JUMO tecLine Cl2/Br

For free chlorine or bromine

Types 202630, 202637

JUMO dTRANS pH/CR/AS 02

Transmitter/controller series for pH value, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature

Types 202551, 202552, 202553

JUMO AQUIS touch S/P

Multichannel measuring devices for liquid analysis

Types 202580, 202581

JUMO AQUIS 500 pH/CR/Ci/AS

Transmitter/controller series for pH value, redox-voltage, ammonia concentration, chlorine, chlorine dioxide, ozone, conductive and inductive conductivity, and temperature

Types 202560, 202565, 202566, 202568

JUMO CTI-500

Inductive conductivity transmitter with plastic case

Type 202755

JUMO ecoTRANS pH/Lf 03

Transmitter/switching device for pH value/redox voltage, conductivity, and temperature

Types 202723, 202732

JUMO flowTRANS MAG S01

Electromagnetic flowmeter for industrial applications

Type 406015

Wastewater

Wastewater is treated in sewage treatment plants. Biological and chemical processes as well as mechanical ones are used here.

Whether pressure, level, or flow: with JUMO, you are ready for everything. Our pressure measuring devices can be adapted to all wastewater engineering processes.

Controlling the oxygen supply in the aeration tank

To create optimum living conditions for the bacteria, the aeration tank must be continuously supplied with oxygen (O_2). Because ventilation – with a power consumption of 50 to 80 % – is the single greatest energy user in a sewage treatment plant, the first and obvious starting point for saving energy is the oxygen content in the aeration tank. Determining and continuously regulating the oxygen content in the aeration tank is absolutely essential. The JUMO dTRANS O2 01 two-wire transmitter provides a sturdy and cost-effective measuring device.

Monitoring digestion

To survive in the digester the bacteria need a constant temperature of 35 to 37 °C. As a result, monitoring the temperature in the digester is absolutely essential. The JUMO PROCESStemp RTD temperature probe with ATEX approval and the JUMO di 308 digital indicator are the right products for this task.

Additional measurands to be monitored in the digester are level and pressure. The JUMO dTRANS p20 pressure transmitter and the JUMO dTRANS p33 level probe are the ideal solution for measuring the pressure and level in Ex-areas.

To monitor measurements, the measuring points can be connected to the JUMO LOGOSCREEN nt recorder.

JUMO tecLine Rd/HD Rd

Redox combination electrodes

Types 201025, 201026

JUMO AQUIS touch S/P

Multichannel measuring devices for liquid analysis

Types 202580, 202581

JUMO ecoTRANS pH/Lf 03

Microprocessor transmitter/switching device for pH value/redox voltage, conductivity, and temperature

Types 202723, 202732

JUMO ecoLine O-DO/NTU

Optical sensor for dissolved oxygen and turbidity with JUMO AQUIS 500 RS indicating device/controller

Type 202613, 202569, 202670

JUMO flowTRANS MAG S01

Electromagnetic flowmeter for industrial applications

Type 406015

JUMO LOGOSCREEN nt

Paperless recorder with TFT display, CF card, and USB interfaces

Type 706581

JUMO exTHERM-AT

Explosion-proof surface-mounted thermostat for zones 1, 2, 21, and 22

Type 605055

JUMO MIDAS S21 Ex

Pressure transmitters

Type 404710

JUMO dTRANS p20

Process pressure transmitter with display

Type 403025

JUMO PROCESStemp

RTD temperature probe for process technology

Type 902820

JUMO dTRANS p33

Pressure transmitter and level probe

Type 404753

JUMO MAERA S29

Titanium level probe

Type 404393

Industrial wastewater

Industrial wastewater refers to the wastewater that arises from industrial production processes (e.g. in the food, paper, chemical, textile, and metal industries). The composition of the industrial wastewater can vary greatly depending on which branch of industry is involved. Wastewater in the paper industry contains organic substances that are not easily degradable. Oils, greases, and heavy metals are found in metalworking.

Industrial wastewater must be cleaned before disposal. The treated water can either be returned to the production process or discharged into the sewers.

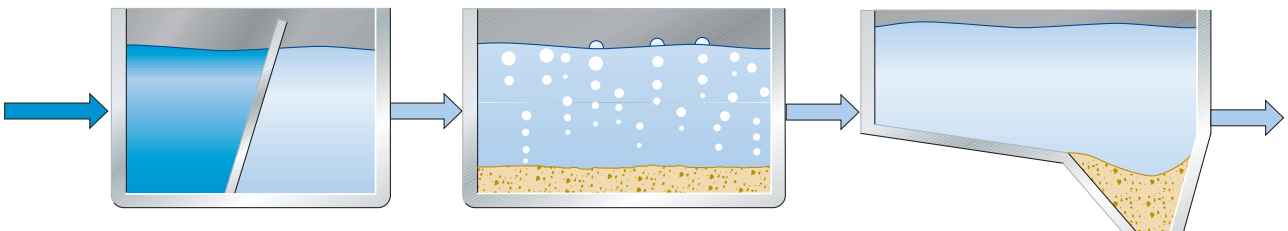
Example: treating wastewater from electroplating

In a plating bath, objects made of base metals such as zinc or iron are given a protective finish. This coating can consist of chemical elements such as copper or nickel. The first wastewater treatment stage for plating wastewater is cyanide and chromate detoxification. Detoxification is performed in continuous-flow systems. Once detoxification is complete the next stages take place: neutralization precipitation, removal of the precipitation products, and disposal of the sludge. At this point the cleaned wastewater is delivered to the sewer system.

pH measurement in plating plants

A pH value of at least 10 is necessary for cyanide detoxification. Chromate is removed from the wastewater in the acidic range. Here, pH measurement is used to monitor the plating baths and the detoxification processes. The tecLine pH electrodes with the JUMO AQUIS 500 pH transmitter/controller are the right products for this task.

Sewer system



Screening system
- Level
- Indicator

Grit chamber
- pH value
- Conductivity

Primary settlement tank

Municipal wastewater

Wastewater is treated in sewage treatment plants. Biological and chemical processes as well as mechanical ones are used here. Most of the clogging material is caught by the screening system.

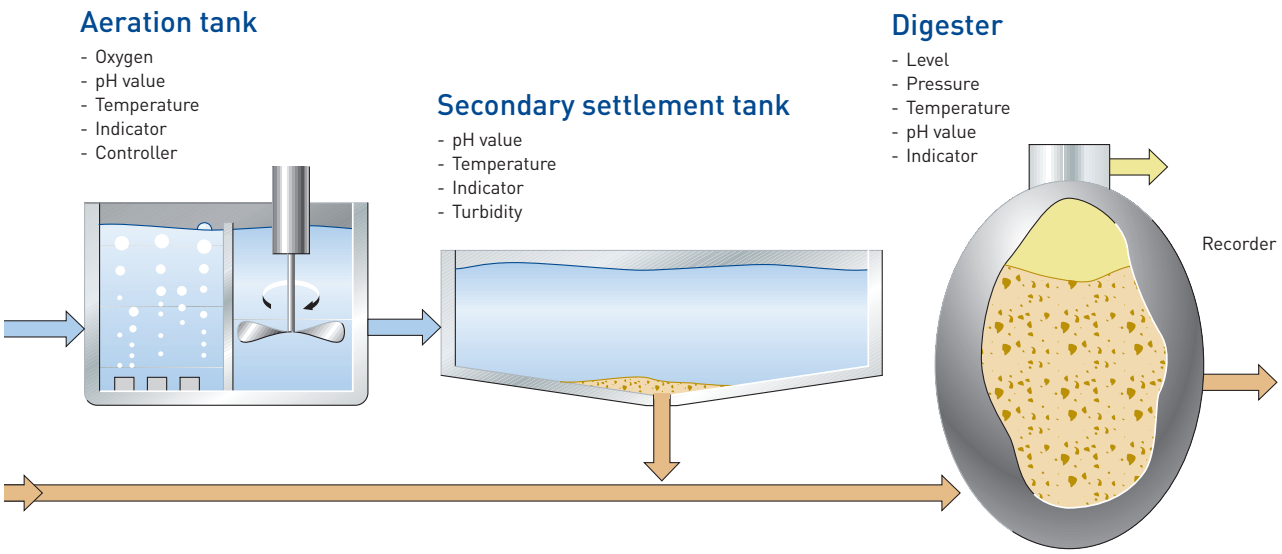
Heavy matter, such as particles of sand that are being carried along, should settle here.

The final station of the mechanical treatment stage is the primary settlement tank. All the lighter materials that are still in the wastewater and which have not been removed in the grit chamber settle to the floor of this tank to form so-called raw sludge. While the pretreated water is forwarded to the aeration tank the raw sludge is conveyed to the digesters.

The biological treatment of the wastewater takes place in the aeration tank. Before the wastewater gets to this tank the wastewater is mixed with activated sludge. This sludge contains countless microorganisms (e.g. bacteria) that are able to break down the colloidal, organic contaminants dissolved in the wastewater.

The activated sludge settles in the secondary settlement tank and collects at the bottom. The collected sludge is either removed and taken back to the aeration tank as return activated sludge or the collected sludge is conveyed to the digesters as surplus activated sludge.

Digestion is the last station of the biological treatment stage. The sludge is stabilized in the digester. Stabilization refers to the most advanced anaerobic degradation of organic compounds with the aid of specific bacteria. These bacteria convert the organic components of the anaerobic digested sludge into biogas.



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