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ProMinent[®]

Reliable measuring and control

Precision by design



Precision in detail

Overall perfection – the optimum in control circuits



Working together for **accurate** results

The precise interplay between metering pumps, controllers and sensors is a guarantee for optimum metering.

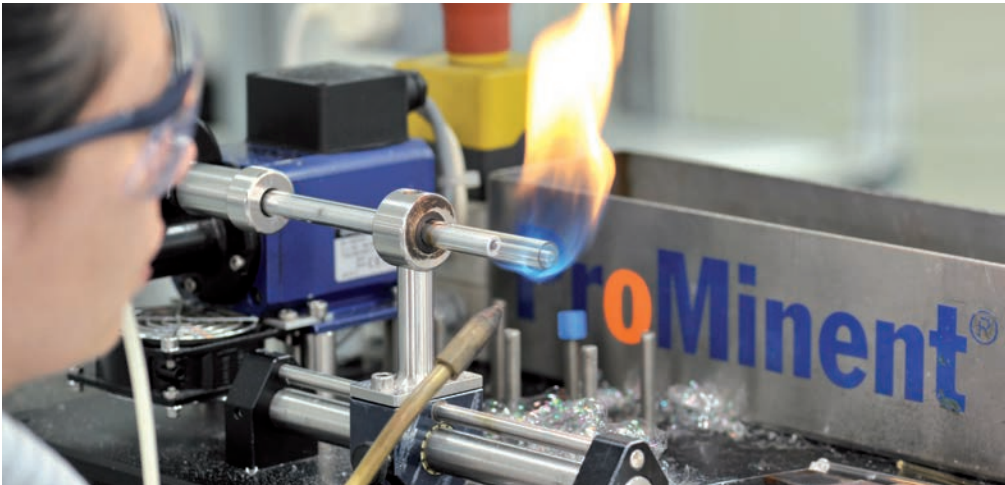
ProMinent provides you with the best possible safety through its use of perfectly coordinated components.

- Metering pumps that only meter the volume of chemicals needed at any time
- Sensors that deliver absolutely reliable and precise measured values in real time
- Controllers that match your customer-specific applications with technical precision

Choose your efficient complete solution from ProMinent for your specific metering task.



Comprehensive solutions for precise metering, measuring and controlling



Metering pumps

Chemical metering is the core task of any metering pump – and ProMinent offers metering pumps covering every performance class and design. The market leader in solenoid diaphragm pumps also offers an exceptional range of medium- and high-pressure pumps.

- Solenoid diaphragm pumps: up to 75 l/h
- Motor-driven diaphragm pumps: up to 1,000 l/h
- Hydraulic diaphragm pumps: up to 50,000 l/h
- Plunger pumps: up to 38,000 l/h
- Non-standard metering pumps

Sensor technology

The DULCOTEST® line of sensors offers the wide availability of online chemical measuring parameters that enable a limit value to be monitored or a closed control circuit to be constructed.

- pH value
- ORP
- Electrolytic conductivity
- Turbidity
- Free chlorine
- Total available chlorine
- Combined chlorine
- Total chlorine
- Chlorine dioxide
- Chlorite
- Bromine
- Ozone
- Dissolved oxygen
- Hydrogen peroxide
- Peracetic acid
- Fluoride
- Temperature

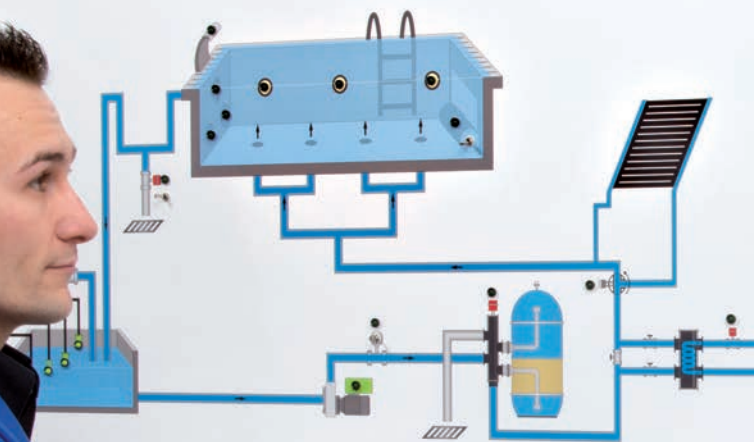
DULCOTEST® sensors deliver precise, reliable, application-specific measured values in real time. The sensors can be optimally integrated into the ProMinent control circuit along with controllers and metering pumps. Suitable bypass, installation and immersion fittings are also available for specific integration into the process.

Measuring and control technology

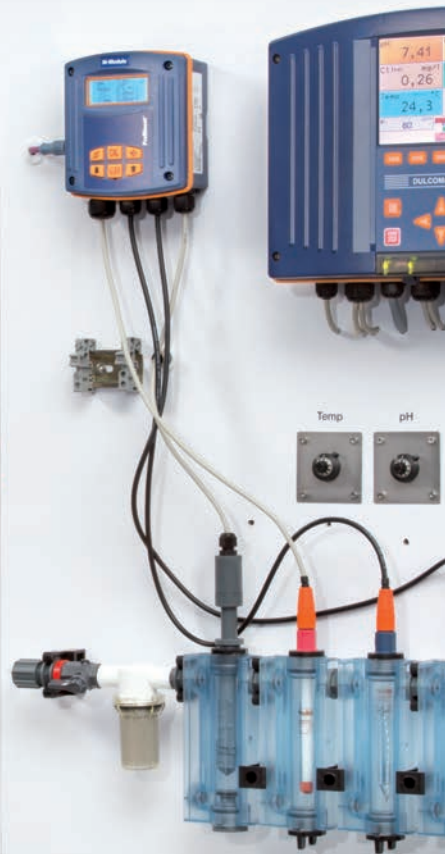
ProMinent's controllers can be easily adapted to your specific application. Closely graded performance classes and application-optimised functions provide the right solution for every measurement and control task. ProMinent offers complete product ranges covering everything from simple measurement signal conversion tasks, forwarding of data to central controllers and calibration of devices with measured value displays through to specialist controllers for complex, application-specific control tasks for various industrial sectors. PROFIBUS® DP, PROFINET and Modbus RTU components are available for integrating circuits into a higher-level control system.

- Compact controller
- 1-channel controller D1C
- 2- and 3-channel multi-parameter controller DACb
- Multi-channel controller DULCOMARIN®
- Various measuring transducers / transmitters
- Manual measuring instruments

DULCOMARIN® II für beste Wasserqualität
in Ihrem Pool-Kreislauf



DULCOMARIN® II for optimum water quality
in your pool circulation system



Measuring and control technology made easy

Process measurement stations fully assembled and ready for operation



Online process measurement stations are fully assembled and quickly started up. They are central components of control circuits for metering chemicals. The measured values are available in real time around the clock: this applies equally to the efficient control of chemical parameters in process water and determining the quality of treated water.

ProMinent measuring and control stations are offered with DULCOTROL® and DULCODOS® Pool as complete online measuring and control units for potable water, food and beverage applications, waste water and swimming pools. Different designs are available to suit a range of applications. Individual configurations are also offered for customer-specific applications.

- Reliable and precise measurements
- Simple and flexible installation
- Economical thanks to minimal maintenance requirements
- Long operational lifetime thanks to high-grade materials and robust construction
- Precise handling

Users profit from extremely quick delivery times and straightforward commissioning thanks to plug & play technology. All of the components required for measurement, control and monitoring of the different types of water are coordinated with each other and mounted on a PE plate wired ready for connection.

Benefits

- All of the components are perfectly coordinated and wired ready for connection
- Configuration of 1-3 measuring points, depending on the measuring, control or monitoring task
- The application-specific ordering system enables straightforward, quick and correct configuration of your measuring and control station



Measuring and control technology

Perfection for every requirement



Maximum safety

DULCOTROL® potable water

Panel-mounted measuring and control stations for reliable treatment and monitoring of potable and similar water as well as for rinsing water and industrial/process water for use in the food and beverage industry:

- Disinfection
- CIP (Cleaning In Place)
- pH adjustment
- Monitoring

Water to be measured

- Potable water
- Process water, product water
- Rinsing water, industrial water

Available measured variables (one or a combination of 2 measured variables)

- Free chlorine
- Combined chlorine (chloramine)
- Total chlorine
- pH value
- ORP
- Chlorine dioxide
- Chlorite
- Hydrogen peroxide
- Peracetic acid
- Conductivity, temperature
- Ozone
- Fluoride
- Dissolved oxygen

Optimally purified

DULCOTROL® waste water

Panel-mounted measuring and control stations for waste water treatment:

- pH neutralisation and pH adjustment
- Disinfection of purified water
- Elimination of reducing agents and oxidants for the purpose of detoxification
- Desalination of process water
- Monitoring of rinsing water
- Control of dissolved oxygen at the biological clarifying stage

Water to be measured

- Clear waste water
- Waste water with viscous media (turbid)
- Waste water with fluoride and $\text{pH} < 7$

Available measured variables (up to 3 combinations)

- pH value
- ORP
- Total chlorine
- Conductivity
- Chlorine dioxide
- Ozone
- Hydrogen peroxide
- Fluoride
- Temperature

Metering, measuring and control systems DULCODOS® POOL

DULCODOS® Pool, the right type for every requirement.

The metering systems DULCODOS® Pool ensure the best water quality. The

systems come in four different designs. It's easy to work out which type is best suited to your requirements.



DULCODOS® Pool Soft

DULCODOS® Pool Soft is especially suited to private pools used by a small number of people. It uses active oxygen compounds, which are less effective than chlorine. Water treatment with active oxygen is a good alternative for ecologically-minded pool owners or if users are allergic to chlorine. DULCODOS® Pool Soft uses no chlorine chemicals.

- For swimming pools with volumes of up to 100 m³



DULCODOS® Pool Basic

DULCODOS® Pool Basic regulates the pH and chlorine content via the ORP. This is the direct measurement of effective oxidation in the water and is therefore an indication of the disinfectant effect and concentration of the metered chlorine. The concentration of chlorine cannot be determined with accuracy with this process. ORP measurements allow a particular range of chlorine to be set. DULCODOS® Pool Basic is robust and requires little maintenance.

- For swimming pools with circulation capacity of up to 200 m³



DULCODOS® Pool Comfort

DULCODOS® Pool Comfort uses highly specific chlorine measuring cells to control the chlorine content. The concentration of chlorine in the water can be determined and set with accuracy. The effectiveness of the swimming pool filter is boosted by an integrated feeder assembly for flocculant – resulting in crystal-clear water! Numerous features to enhance operating convenience, such as measured values being mapped by a screen plotter or remote control from your PC, iPad or other tablet device using an integrated web server, make the metering system very popular with customers.

- For swimming pools with circulation capacity of up to 225 m³



DULCODOS® Pool Professional

In addition to the features described above, DULCODOS® Pool Professional also measures the combined chlorine. This is an important parameter in public pools. It can be incorporated in the building management system via Modbus RTU and alarm messages can be sent by e-mail. Eco!Mode reduces the amount of energy consumed by the filter pumps.

The swimming pool controller becomes the central control unit for all the swimming pool technology.

- For swimming pools with circulation capacity of up to 1,130 m³

Transmitter DULCOMETER® and controller DULCOMETER® Compact

Simple and compact



Transmitters

DULCOMETER® DMT

DULCOMETER® transmitters of type DMT are compact two-wire transmitters for use with the measured variables of pH, ORP, chlorine, conductive conductivity and temperature. They convert the primary sensor signal into a standard 4-20 mA signal and enable disturbance-free connection of the sensor to remote controllers (e.g. PLC Programmable Logic Controller) or DULCOMETER® controllers.

- With display and calibration of the measured value at the location of the sensor
- Optional connection to PROFIBUS® DP

Basic controller

DULCOMETER® Compact

The DULCOMETER® Compact controller for the measured variables of pH, ORP, chlorine, conductive and inductive conductivity is supplied with the standard functions for basic applications in water treatment. The measured variables of pH and ORP are available in a single controller and can easily be selected. Operation is language-independent.

Measured variable	Measuring and adjustment range
pH value	0-14
ORP	-1,000–1,000 mV
Chlorine	0.05–5 ppm
Conductive conductivity	0.5 µS/cm–20 mS/cm (auto-ranging)
Inductive conductivity	20 µS/cm - 2000 mS/cm

Controller

DULCOMETER® D1Cb/D1Cc

Universal standard



Controller

DULCOMETER® D1Cb/D1Cc

The controllers DULCOMETER® D1Cb (wall-mounted) and D1Cc (control cabinet installation) are the standard controllers for applications in potable water, waste water and cooling water treatment. Its basic model is equipped with 14 measured variables.

- Sensor monitoring and safety function to prevent incorrect metering
- 22 operating languages in the controller
- 14 measured variables selectable from the menu

Key applications

- Potable water and waste water treatment
- Industrial and process water treatment
- Swimming pool water treatment

Measured variables

- pH/ORP
- Conductive conductivity via mA
- Chlorine dioxide
- Chlorine
- Chlorite
- Ozone
- Fluoride
- Hydrogen peroxide
- Peracetic acid
- Dissolved oxygen
- Temperature
- Analogue signal

Controller DULCOMARIN®

Multi-parameter controller diaLog DACb

Intelligent control



Controller DULCOMETER® diaLog DACb

The new two- or three-channel multi-parameter controller diaLog DACb was specially developed for the continuous measurement and control of parameters needed in liquid analysis. Sensors from 14 freely selectable measured variables can be connected per channel.

The standard field buses are available for communication with the control level. The incorporated data, calibration and event logger records all measured values, control variables, digital inputs, calibration values, warning and error messages on the SD card with a time stamp. The diaLog DACb controller uses intelligent controller functions to complete the control circuit between ProMinent DULCOTEST® sensors and ProMinent® metering pumps, offering special functions as required in water treatment.

- Three 2-page PID controllers
- Integral data logger with SD card
- Disturbance variable processing (flow) as standard
- pH compensation for chlorine as standard
- Various field buses

Key applications

- Potable water and waste water treatment
- Industrial and process water treatment
- Swimming pool water treatment

Measured variables

- pH/ORP
- Bromine
- Conductive conductivity
- Chlorine dioxide
- Chlorine
- Chlorite
- Ozone
- Fluoride
- Hydrogen peroxide
- Peracetic acid
- Dissolved oxygen
- Temperature
- Analogue signal



Advanced controller DULCOMARIN® 3

The multi-parameter, multi-channel measurement and control system DULCOMARIN® 3 guarantees complete transparency of all measurement and control processes within networked systems. As the world's first bus system for potable water treatment and swimming pool engineering, it networks sensors and actuators at the field level. DULCOMARIN® 3 can be easily operated via a large 7" touch display and can control up to 16 filtration circuits. Modbus RTU and LAN are available for communication with the superordinate systems (e.g. building management systems) as standard. Wi-Fi is optional. Remote control uses a VNC app.

Measured variables

- pH value
- ORP
- Free chlorine
- Total available chlorine
- Combined chlorine

Sensors for pH/ORP and fluoride sensor technology

DULCOTEST® potentiometric sensors

Application-optimised measurements

pH and ORP

The DULCOTEST® range of pH and ORP electrodes provides a wide range of options for solving key measurement tasks in the monitoring and treatment of different types of water. The fields of application cover everything from simple water treatment tasks through to complex industrial process applications with stringent requirements in terms of temperature, pressure, contamination tolerance and chemical resistance.

Fluoride

Ion-selective electrodes are offered in two measuring ranges to measure fluoride for potable and waste water applications.

- Excellent durability thanks to high-end glass quality (pH) and the optimum combination of automated and manual manufacturing
- Precise and reliable measurement for efficient processes and maximum process safety
- Custom process integration through special designs with individual fitting lengths, cable lengths and plugs available
- Optimum operational lifetime yield for electrodes thanks to rapid delivery and short storage duration
- Ultra-simple installation and maintenance by means of rotating cable connection, with fixed cable and plug-in versions



Medium	Temperature / pressure	Sensor type	Application
clear, pH 3–14	max. 100°C, 3 bar max. 25 °C, 6 bar	PHEP-H	Chemical processes
clear, pH 2–12	max. 80°C, no overpressure	PHEN	Chemically contaminated water Low-conductivity water >50 µS/cm
		RHEN	Chemically contaminated water Low-conductivity water >50 µS/cm
	max. 60 °C, 3 bar	PHEs	Swimming pool water, potable water (glass shaft)
		PHEK	Swimming pool, aquarium (plastic shaft)
		RHEs	Swimming pool water, potable water (glass shaft)
		RHEK	Swimming pool, aquarium (plastic shaft)
	max. 80 °C, 6 bar	PHEP/PHEPT	Process water
		RHEP-Pt	Process water
		RHEP-Au	Chemically contaminated water, e.g. CN ⁻ , ozone treatment
Solid residues, turbidity	max. 80 °C, 6 bar	PHED	Chemically contaminated water, e.g. Cr ⁶⁺ , CN ⁻
		PHER/PHEI RHER/RHEIC	Cooling water, waste water Cooling water, waste water
Solid residues, not transparent	max. 80 °C, 6 bar	PHEX	Suspensions, sludge, emulsions
		RHEX	Suspensions, sludge, emulsions
Clear, containing fluoride, pH < 5	max. 50 °C, 7 bar	PHEF	Exhaust air scrubber, semiconductor industry, electroplating

Sensors for disinfectants and oxidising agents

DULCOTEST® amperometric sensors

Maximum process reliability thanks to innovation

Amperometric sensors in the DULCOTEST® product range provide measured values for the most diverse disinfectants, such as chlorine, bromine, chlorine dioxide, ozone and their resulting by-products. The selective and precise measured values guarantee maximum process reliability and are available round the clock for monitoring or control in real time. ProMinent sets new standards in sen-

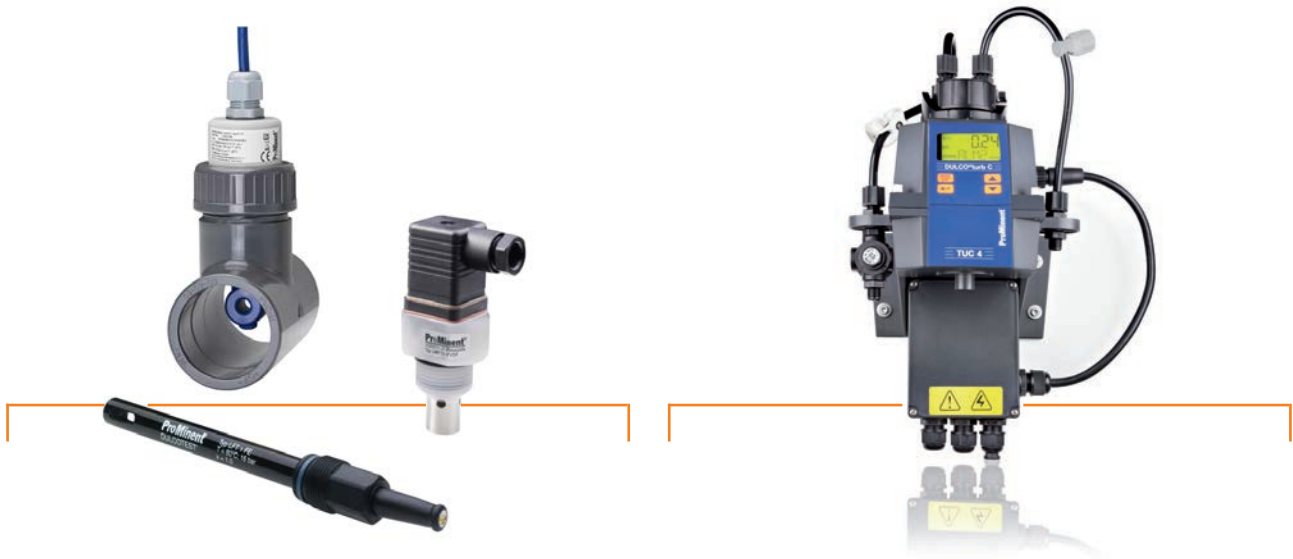
sor technology: Innovative sensors, such as those for chlorite, total chlorine, peracetic acid, hydrogen peroxide and the contamination-tolerant xxR types, open up whole new applications. The sensors are available with a broad spectrum of measuring ranges, various designs and connection versions for DULCOMETER® controllers as well as custom versions for special applications.



Measured variable	Applications	Graduated measuring ranges	Connection to DULCOMETER®	Sensor type	
Free chlorine	Potable water, swimming pool water	0.01 – 100 mg/l	D1C, DAC	CLE 3-mA-xppm, CLE 3.1-mA-xppm	
	Process and waste water	10 – 200 mg/l	D1C, DAC	CLR 1-mA	
	Potable water, swimming pool water	0.01 – 10 mg/l	DULCOMARIN®	CLE 3-CAN-P-xppm, CLE 3.1-CAN-P-xppm	
	Potable water, swimming pool water, in-situ electrolysis (without diaphragm)	0.02 – 10 mg/l	D1C, DAC, AEGIS II	CLO 1-mA-xppm	
	Swimming pool water, uncontaminated potable water and process water; can also be used together with diaphragm-free electrolysis processes	0.01 – 10 mg/l	DULCOMARIN®	CLO 1-CAN-P-10ppm	
	Hot water up to 70 °C (legionella), in situ electrolysis (without diaphragm)	0.02 – 2 mg/l	D1C, DAC, AEGIS II	CLO 2-mA-2ppm	
	Potable water, swimming pool water		0.01 – 50 mg/l	DMT	CLE 3-DMT-xppm
			0.05 – 5 mg/l	COMPACT	CLB 2-µA-xppm
			0.05 – 5 mg/l	COMPACT	CLB 3-µA-xppm
Cooling water, process water, waste water, water with higher pH values (stable); seawater (free chlorine exists as bromine)		0.01 – 10 mg/l	D1C, DAC, AEGIS II	CBR 1-mA-xppm	
Total available chlorine / free chlorine	Swimming pool water with organic chlorine disinfectants and in situ electrolysis (without diaphragm)	0.02 – 10 mg/l	D1C, DAC, AEGIS II	CGE 3-mA-xppm	
		0.01 – 10 mg/l	DULCOMARIN®	CGE 3-CAN-P-xppm	
Total chlorine	Potable water, industrial water, process water and waste water	0.01 – 10 mg/l	D1C, DAC, AEGIS II	CTE 1-mA-xppm	
		0.01 – 10 mg/l	DMT	CTE 1-DMT-xppm	
		0.01 – 10 mg/l	DULCOMARIN®	CTE 1-CAN-P-xppm	
Combined chlorine	Swimming pool water	0.02 – 2 mg/l	DAC	CTE 1-mA-2 ppm and CLE 3.1-mA-2 ppm	
		0.01 – 10 mg/l	DULCOMARIN®	CTE 1-CAN-P-xppm and CLE 3.1-CAN-xppm	
Total available bromine	Cooling water, waste water, swimming pool, spa pool water, bromine with BCDMH	0.01 – 10 mg/l	D1C, DAC	BCR 1-mA-xppm (replaces earlier type BRE 1)	
	Cooling water, swimming pool water, spa pool water with organic or inorganic bromine compounds	0.02 – 10 mg/l	DULCOMARIN®	BRE 3-CAN-10ppm	
Free and combined bromine	Cooling water, process water, waste water, water with higher pH values (stable); seawater	0.02 – 20 mg/l	D1C, DAC, AEGIS II	CBR 1-mA-xppm	
		0.02 – 20 mg/l	DULCOMARIN®	CBR 1-CAN-P-10 ppm	
Chlorine dioxide	Potable water	0.01 – 10 mg/l	D1C, DAC	CDE 2-xppm	
	Bottle washing system	0.02 – 2 mg/l	D1C, DAC	CDP 1	
	Hot water up to 60 °C, cooling water, waste water, irrigation water	0.01 – 10 mg/l	D1C, DAC, DULCOMARIN®	CDR 1-xppm, CDR 1-CAN-xppm	
	Potable water, washing water	0.02 – 2 mg/l	D1C, DAC, DULCOMARIN®	CLT 1-mA-xppm, CLT 1-CAN-xppm	
Ozone	Potable water, swimming pool water	0.02 – 2 mg/l	D1C, DAC	OZE 3-mA-2 ppm	
	Process water, industrial water, cooling water	0.02 – 2 mg/l	D1C, DAC	OZR 1-mA-2 ppm	
Dissolved oxygen	Aeration tanks, clarification plants, fish farming, potable water, surface water	0.1 – 20 mg/l	D1C, DAC	DO 3-mA-xppm	
	Aeration tanks, clarification plants	0.05 – 10 mg/l	D1C, DAC	DO 2-mA-xppm	
Peracetic acid	CIP (cleaning in place), aseptic foodstuff filling	1 – 2,000 mg/l	D1C, DAC, AEGIS II	PAA 1-mA-xppm	
Hydrogen peroxide	Clear water, fast control	1 – 2,000 mg/l	DAC	Perox sensor, PEROX-H2.10 P	
	Process water, swimming pool water	0.5 – 2,000 mg/l	D1C, DAC	PER1-mA-xppm	

Conductivity sensors DULCOTEST® Turbidity measuring points DULCO® turb C

Versatile and precise



Conductivity sensors

DULCOTEST®

The broad range of DULCOTEST® conductivity sensors offers the perfect choice of sensor with optimum cost-effectiveness for any task, from simple water treatment through to complex industrial process water applications.

- 26 different sensor types for a broad range of requirements: measuring range, temperature, pressure, chemical resistance, contamination tolerance and process integration
- From simple conductometric 2-electrode sensors to inductive high-end sensors
- Precise and reliable measurement enables efficient processes and maximum process reliability
- High operational service life and long maintenance intervals reduce downtime and increase the availability of the measured values
- Complete pre-assembled kits containing fitting and sensor for easy, fast and error-free installation

Turbidity measuring points

DULCO® turb C

The DULCOTEST® measuring points for turbidity DULCO® turb C, which come in the TUC1, TUC2, TUC3 and TUC4 versions, are compact online turbidity measuring points, comprising sensor, flow fitting and measuring device.

They are used primarily in potable water treatment applications for all treatment stages, from raw water monitoring and filter monitoring through to measurement of fine turbidity in dispensed potable water at 0.02 NTU (FNU).

Further applications include the turbidity monitoring service water and waste water with slight contamination as well as water to be treated from the food and beverage industry up to turbidity values of 1,000 NTU.

- Depending on the selected design, the system conforms to the worldwide standard ISO 7027 and the European standard DIN EN 27027 or the US standard USEPA 180.1
- Optionally available with sample cell ultrasonic cleaning system

First-class measuring and control technology for an exclusive wellness experience



"A premium classspa"

The Dolder Grand Hotel & "Curhaus" in Zurich is among the most beautiful wellness hotels in Switzerland. The water treatment technology provided by ProMinent is a major contributor to ensuring that the exclusive experience in this breathtaking spa remains unforgettable.

Pumps and controllers from ProMinent ensure effective disinfection and neutralisation of the pool water in the gigantic 4,000 m² spa.

The water for the swimming pool, whirlpools and aroma pools is efficiently treated in multiple stages using seven separate circuits. The control signals to all the metering pumps are sent via LAN from the central control unit DULCOMARIN® II DULCO®-net, which forms the "brains" of the water treatment system. In an interview, Carsten Behr, Director of Engineering for the spa area, gives his assessment of the control system.

Mr Behr, what is the purpose of the DULCOMARIN® II DULCO®-net in your facility?

Carsten Behr: "The innovative controller from ProMinent is responsible for accurately controlling all the metering pumps in the system and displaying all the relevant information for the operator."

How does this affect the water quality?

Carsten Behr: "The safe and controlled neutralisation and disinfection in the Aqua Zone of the Dolder Grand ensures that premium water quality is guaranteed around the clock."

Do you benefit in any other ways?

Carsten Behr: "Our running costs are reduced in two ways: firstly due to the minimal use of chemicals and secondly due to automated water care, which is achieved through the integration and connection of intelligent measuring, control and metering technology within the higher-level process control system."

Service



Global service locally

You can benefit from ProMinent's services even if you are not yet our customer.

Our pre-sales service will ensure that you obtain the optimum solution to meet your individual needs.

Thanks to our worldwide presence in over 100 countries, our service is available wherever you need it.

- Advice on product selection
- Application and process optimisation
- Project planning

However, our commitment does not end with delivery. We also provide you with a comprehensive after-sales service, which lasts for the entire service life of your equipment. This maximises your productivity and minimises your operating costs.

- Assembly/installation
- Commissioning
- Maintenance
- Spare parts service
- Repairs
- Troubleshooting

Worldwide contacts



Ready for you. Any time, anywhere.

ProMinent is at home in more than 100 countries across the globe. This guarantees the worldwide availability of our products and comprehensive expertise on the ground with close proximity to the customer. We offer the same high quality standards for our solutions and services all over the world. And we work day in, day out to keep our promise: Ready for you. Any time, anywhere.

You can find the contact details of local branches and agencies at www.prominent.com/en/locations

You can find the ProMinent app for iPad and iPhone in the iTunes App Store or at www.prominent.com/app



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