

Reliable measuring and controlling

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 optimal metering.

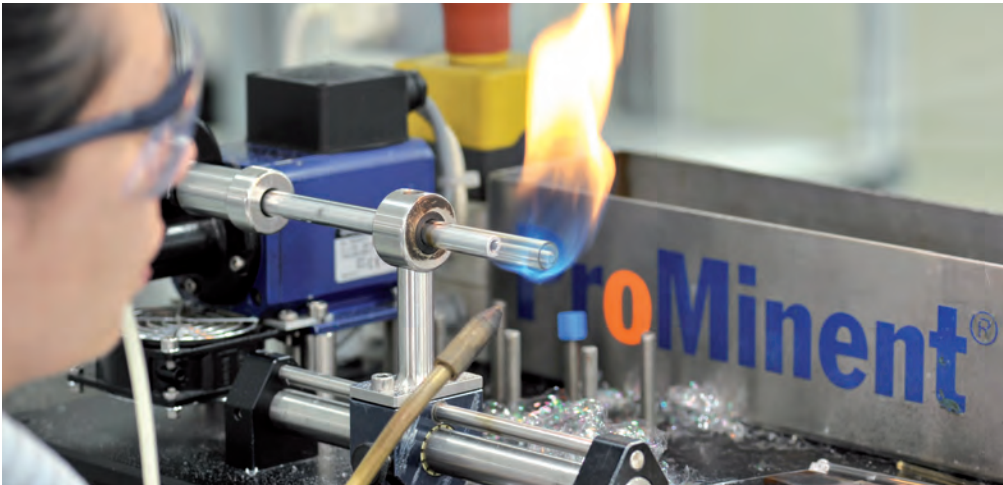
ProMinent provides you with the best possible safety thanks to optimally coordinated components.

- 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
- Piston pumps: up to 38 000 l/h
- Non-standard metering pumps

Sensor technology

The DULCOTEST® range 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.

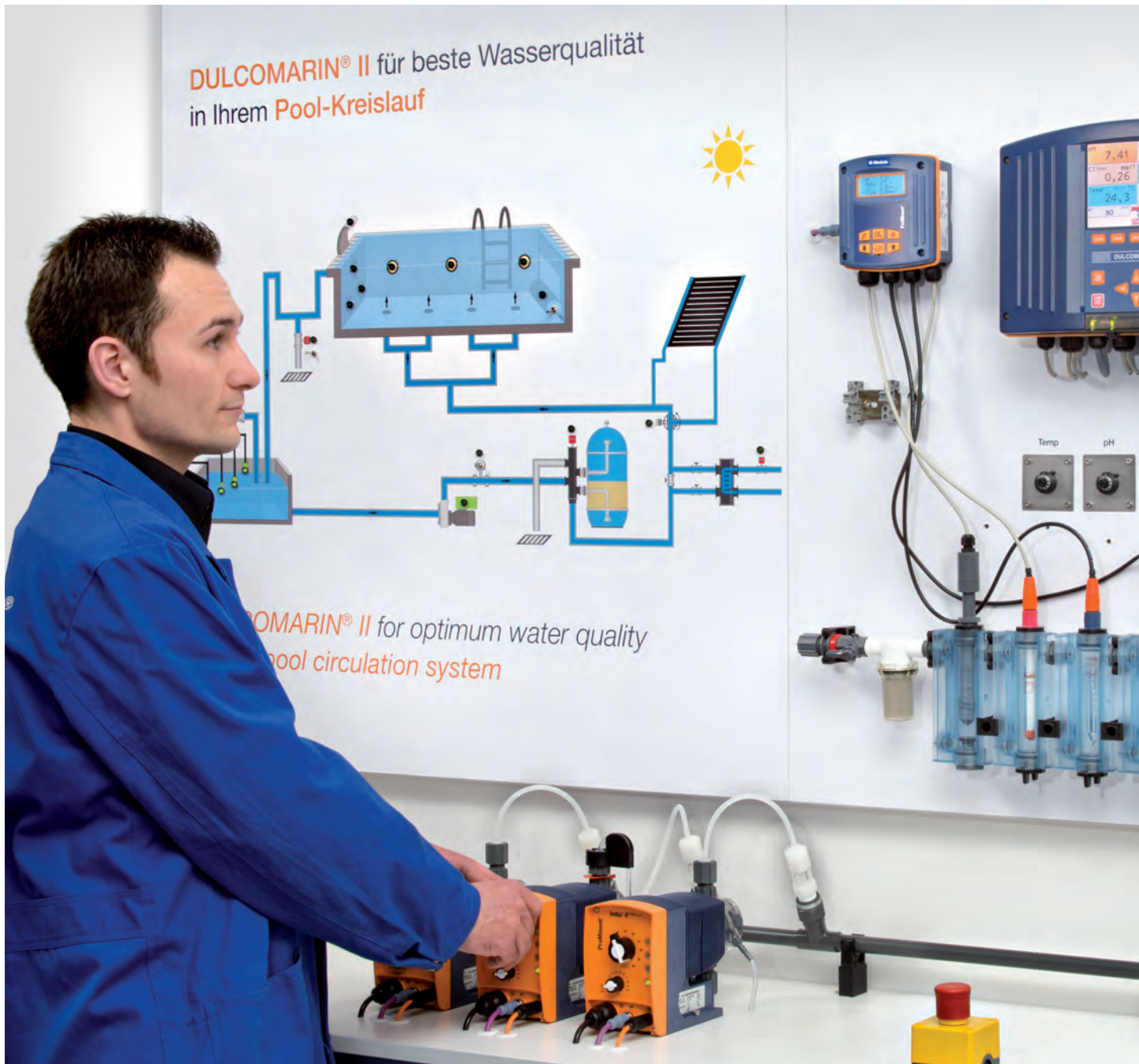
- pH
- ORP
- Electrolytic conductivity
- Turbidity
- Free chlorine
- Total available chlorine
- Chlorine dioxide
- Chlorite
- Bromine
- Ozone
- Dissolved oxygen
- Hydrogen peroxide
- Peracetic acid
- Fluoride
- Temperature

DULCOTEST® sensors offer 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 measuring and control instruments can be easily adapted to your specific application. Gradual performance increments and application-optimised functions offer the perfect solution for every application. ProMinent offers complete product ranges from simple measuring signal conversion for transmission to a central control unit to calibratable instruments with measured value displays and controllers optimised for complex, application-specific control tasks in various industries. PROFIBUS® DP and Modbus RTU components are available for integrating circuits into a higher-level control system.

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



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, 24 hours a day. 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, cooling water, waste water and swimming pools. Different versions are available to suit a range of applications. Individual configurations are also offered for customer-specific requirements.

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

The user profits 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 panel wired ready for connection.

Advantages

- 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



Maximally safe

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 (Clean In Place)
- pH adjustment
- Monitoring

Water to be measured

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

Available measured variables: (up to 3 combinations)

- Free chlorine
- Total available chlorine
- pH
- ORP
- Chlorine dioxide
- Chlorite
- Hydrogen peroxide
- Peracetic acid
- Conductivity, temperature
- Ozone
- Fluoride
- Dissolved oxygen

Ideally conditioned

DULCOTROL® cooling water

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

- Automatic bleeding (cooling tower) based on conductivity measurement
- Disinfection with non-oxidative biocides and oxidative disinfectants
- pH adjustment
- Metering of corrosion inhibitors

Water to be measured

- Cooling water

Available measured variables: (up to 3 combinations)

- Conductivity
- Free chlorine
- Total available chlorine
- Organic bromine
- Free bromine
- ORP
- pH
- Chlorine dioxide
- Ozone
- Hydrogen peroxide

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 purposes 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 viscous media (containing sludge)
- Waste water with fluoride and pH < 7

Available measured variables: (up to 3 combinations)

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

Metering, measuring and control systems

Precise, reliable and hygienic



Swimming pool panels from the DULCODOS® Pool range

Complete control circuits in gradually incremented performance classes are available for the treatment of swimming pool water, including metering system, sensors, and measuring and control technology.

pH adjustment and disinfection in gradually incremented performance classes for

- Private swimming pools
- Hotel swimming pools
- Therapy pools
- Public swimming pools

Available measured variables (up to 4 combinations)

- pH
- ORP
- Free chlorine
- Total available chlorine
- Hydrogen peroxide (active oxygen)

DULCODOS® Pool DSPa PC2

Expert control of chlorine concentration for private swimming pools, with measured variables for pH and chlorine. The system offers 100 % risk-free swimming with no chlorine smell and no red eyes.

The DULCODOS® Pool metering, measuring and control system is a ready-assembled compact system for water treatment in private swimming pools. The chlorine probe accurately measures the chlorine concentration in the pool so the system can react immediately to any variations.

- Sensors (pH and chlorine)
- Sensors for pH and chlorine content
- Two-channel controller DAC
- Peristaltic pump DF2
- Max. capacity 2.4 l/h



DULCODOS® Pool DSPa PC7

Ideal monitoring and optimum reduction in operating costs for exclusive leisure and hotel pools. The system guarantees risk-free swimming.

The DULCODOS® Pool metering, measuring and control system PC7 is a ready-assembled compact system for individually adjusting and monitoring hygiene parameters such as pH, ORP and chlorine.

- Sensors for all measured variables, e. g. pH, ORP, chlorine
- Multi-channel controller DULCOMARIN® II for one or more pools
- DF2 peristaltic pumps optionally as CAN bus pumps
- Max. capacity 5.3 l/h

Measuring transducer DULCOMETER® and measuring and control unit DULCOMETER® Compact

Simple and compact



Measuring transducer DULCOMETER® DULCOPAC

The DULCOPAC measuring transducer is designed for top hat rail mounting in switch cabinets. It measures and controls the measured variables of pH, ORP, chlorine, bromine, peracetic acid, hydrogen peroxide and conductivity in aqueous solutions. A typical application for the DULCOPAC is general water treatment and waste water treatment.

- Compact housing for installation on top hat rails
- Up to 10 measuring and control modules per power supply module

Measuring transducer DULCOTEST® PHV1, RH V1, Pt 100 V1, FPV1 and FP100V1

- For pH, ORP, fluoride and temperature
- Space-saving installation on the sensor
- Cost-effective measuring transducer without display and calibration function

Measuring transducer DULCOMETER® DMT

DULCOMETER® transducers of type DMT are compact 2-wire transducers for use with the measured variables pH, ORP, chlorine, conductive conductivity and temperature. They convert the primary sensor signal into a standard 4-20 mA signal and enable the disturbance-free connection of the sensor to remote controllers (e.g. PLC) or DULCOMETER® controllers.

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

Basic measuring and control equipment DULCOMETER® Compact

The measuring transducer/controller for the measured variables of pH, ORP and chlorine provides basic control functions for water treatment applications. The pH and ORP variables are available in a single controller and can be easily selected. Operation is language-independent.

Measured variable	Measuring and control range
pH	0–14
ORP	–1 000–1 000 mV
Chlorine	0.05–5 ppm
Conductive conductivity	1 µS/cm–200 mS/cm (autoranging)

Measuring and control unit DULCOMETER® D1C

Universal standard



Standard measuring and control unit DULCOMETER® D1C

The controller DULCOMETER® D1C is the standard unit in ProMinent's comprehensive range of controllers and measuring transducers. It is reliable, universally deployable and capable of measuring and controlling all measured variables offered by ProMinent.

DULCOMETER® D1C

- Universally deployable for 14 different measured variables
- Optimised processes thanks to special functions such as feedforward control, pH compensation for chlorine, base load metering, timer and limit value functions
- Menu-based operation in 15 languages

Measured variable	Measuring and control range
pH	0-14
ORP	-1,000 – 1,000 mV
Chlorine	0.05 – 100 ppm
Bromine	0.02 – 10 ppm
Conductive conductivity	0.00 µS/cm – 200 mS/cm
Inductive conductivity	0.00 µS/cm – 2,000 mS/cm
Chlorine dioxide	0.05 – 20 ppm
Chlorite	0.05 – 2 ppm
Ozone	0.05 – 2 ppm
Fluoride	0.05 – 10 mg/l
Hydrogen peroxide	1 – 2,000 ppm
Peracetic acid	1 – 2,000 ppm
Dissolved oxygen	0.1 – 20 ppm
Temperature	0 – 100 °C
Analog signal	0/4 – 20 mA

Measuring and control unit DULCOMARIN® Multi-parameter controller dialog DACa

Intelligent control



Two-channel measuring and control unit DULCOMETER® dialog DAC

The diaLog DACa has been specifically developed for the continuous measurement and control of liquid analysis parameters in water treatment processes in environmental engineering and industry. The DULCOMETER® multi-parameter Controller diaLog DACa is available with one or two measuring channels and can work with conventional analogue sensors and actuators. It is also equipped to communicate with digital sensors and actuators via the CANopen sensor/actuator bus. The diaLog DACa controller intelligently completes the control circuit between ProMinent DULCOTEST® sensors and ProMinent metering pumps, offering special functions as required in water treatment. The diaLog DACa can also be installed in a control cabinet using the optional mounting kit.

Typical applications

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

Measured variables

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



Advanced measuring and control unit DULCOMARIN® II

The multi-parameter, multi-channel measurement and control system DULCOMARIN® II 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® II is simple to operate via the large illuminated colour display and can control up to 16 water systems or filtration circuits. An OPC server, web server and PROFIBUS® DP are available for communication with the superordinate systems (e.g. building management systems).

Measured variables

- pH
- ORP
- Free chlorine
- Total available chlorine
- Combined chlorine
- Chlorine dioxide
- Chlorite
- Temperature
- Turbidity (via mA inputs)
- Fluoride, ammonia, UV intensity, flow

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 to solve key measurement problems in the monitoring and treatment of different types of water. The field of application covers 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.

- High durability thanks to high-end glass quality (pH) and the optimal 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 connectors available
- Optimal operational lifetime yield for electrodes thanks to rapid delivery and short storage duration



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
	max. 80 °C, 8 bar	PHED	Chemically contaminated water, e.g. Cr ⁶⁺ , CN ⁻
Solid residues, turbidity	max. 80 °C, 6 bar	PHER	Cooling water, waste water
		RHER	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

High process safety thanks to innovation

The 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 safety and are available round the clock for monitoring or control in real time.

ProMinent sets new standards in sensor 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 variants for DULCOMETER® measuring and control equipment as well as custom versions for special applications.



Parameter	Application	Graduated meas. ranges	Connection to DULCOMETER®	Type
Free chlorine	Potable water, swimming pool water	0.01 – 100 mg/l	D1C, D2C, DAC	CLE 3 - mA - xppm
		0.01 – 10 mg/l	DULCOMARIN® II	CLE 3.1 - mA - xppm
	Potable water, swimming pool water, in situ electrolysis (without diaphragm)	0.02 – 10 mg/l	D1C, D2C, DAC	CLE 3 - CAN - xppm
	Hot water up to 70°C (legionella), in situ electrolysis (without diaphragm)	0.02 – 2 mg/l	D1C, D2C, DAC	CLE 3.1 - CAN - xppm
	Potable water, swimming pool water	0.01 – 50 mg/l	DMT	CLO 1 - mA - xppm
		0.05 – 5 mg/l	COMPACT	CLO 2 - mA - 2ppm
Total available chlorine	Cooling, industrial, waste water, water with increased pH (stable)	0.01 – 10 mg/l	D1C, D2C, DAC	CLE 2 - µA - xppm
	Swimming pool water with organic chlorine disinfectants	0.02 – 10 mg/l	DMT	CLE 3 - µA - xppm
		0.01 – 10 mg/l	DULCOMARIN® II	CBR 1 - mA - xppm
Total chlorine	Potable, industrial, process and cooling water	0.01 – 10 mg/l	D1C, D2C, DAC	CGE 2 - mA - xppm
			DMT	CGE 2 - CAN - xppm
			DULCOMARIN® II	CTE 1 - mA - xppm
Combined chlorine	Swimming pool water	0.02 – 2 mg/l	D1C, D2C, DAC	CTE 1 - DMT - xppm
		0.01 – 10 mg/l	DULCOMARIN® II	CTE 1 - CAN - xppm
				CTE 1 - mA - 2ppm+ CLE 3.1 - mA - 2ppm
Total available bromine	Cooling, waste, whirlpool, swimming pool water, bromine with BCDMH	0.01 – 10 mg/l	D1C, D2C, DAC	CTE 1 - CAN - xppm+ CLE 3.1 - CAN - xppm
	Cooling, whirlpool, swimming pool water, bromine with inorganic bromine compounds (e.g. NaBr/HOCl)	0.04 – 10 mg/l	D1C, D2C, DAC	BCR 1 - mA - xppm
	Cooling, whirlpool, swimming pool water with organic or inorganic bromine compounds	0.02 – 10 mg/l	DULCOMARIN® II	BRE 1 - mA - xppm
				BCR 2 - mA - xppm
Free and combined bromine	Cooling, industrial, waste water, water with increased pH (stable)	0.02 – 20 mg/l	D1C, D2C, DAC	BCR 3 - CAN - 10ppm
Chlorine dioxide	Potable water	0.01 – 10 mg/l	D1C, D2C, DAC	CBR 1 - mA - xppm
	Bottle washing system	0.02 – 2 mg/l	D1C, D2C, DA	CDE 2 - mA - xppm
	Hot water up to 60°C, cooling, waste, irrigation water	0.01 – 10 mg/l	D1C, D2C, DAC	CDP 1 - mA
Chlorite	Potable water, washing water	0.02 – 2 mg/l	DULCOMARIN® II	CDR 1 - mA - xppm
			D1C, DAC	CDR 1 - CAN - xppm
Ozone	Potable, swimming pool, industrial, process water	0.02 – 2 mg/l	D1C, DAC	CLT 1 - mA - xppm
Dissolved oxygen	Potable water, surface water	2 – 20 mg/l	DULCOMARIN® II	CLT 1 - CAN - xppm
	Aeration tanks, clarification plants	0.1 – 10 mg/l	D1C, DAC	OZE 3 - mA - xppm
Peracetic acid	CIP (Clean in Place), antiseptic foodstuff filling	1 – 2,000 mg/l	D1C, DAC	DO 1 - mA - xppm
Hydrogen peroxide	Clear water, fast control	1 – 2,000 mg/l	D1CA ... H1 ...	DO 2 - mA - xppm
	Process, swimming pool water	0.5 – 2,000 mg/l	D1C, DAC	PAA 1 - mA - xppm
				PEROX sensor PEROX - H2.10
				PER 1 - 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 optimal cost-effectiveness for any task, from simple water treatment through to complex industrial process water applications.

- 25 different sensor types for a broad range of requirements: measuring range, temperature, 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 safety
- High operational durability and long maintenance intervals reduces downtime and increases the availability of the measured values
- Complete pre-assembled sets containing fitting and sensor enables easy, fast and trouble-free installation



Turbidity measuring stations

DULCO® turb C

The DULCOTEST® measuring stations for turbidity DULCO® turb C, which come in the TUC1, TUC2, TUC3 and TUC4 versions, are compact online turbidity measuring stations, 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 turbidity monitoring of lightly contaminated industrial water and waste water 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 version, the system fulfils the worldwide standard ISO 7027 and European standard DIN EN 27027 or 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 class spa”

The Dolder Grand Hotel & “Curhaus” in Zürich 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 measuring and control equipment 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 the LAN from the central control unit, the 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 our 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



Experts in Chem-Feed and Water Treatment

The ProMinent® Group is at home in over 100 countries across the globe. We supply products, systems and service solutions with the same standards

all over the world: quality and reliability. All our experience and expertise in water treatment and metering technology is at your disposal – anytime, anywhere.

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