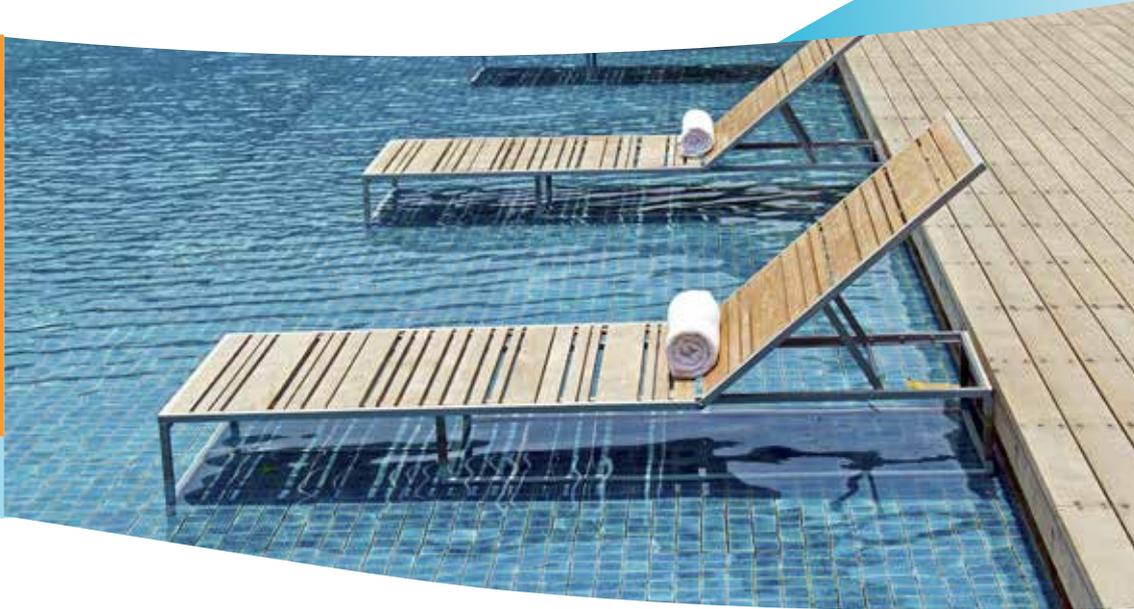




eVOQUA

WATER TECHNOLOGIES



POOL WATER MAINTENANCE SYSTEMS

WALLACE & TIERNAN® PRODUCTS AND SERVICES

EVOQUA WATER TECHNOLOGIES FACILITIES IN EUROPE



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Evoqua Water Technologies is one of the world's leading providers for water treatment equipment and service. The extensive portfolio includes the Wallace & Tiernan® product line with complete solutions for disinfection, chemical feeding, measurement and control systems.

About 240 employees work in the facility in Guenzburg. It is center of research & development, production plant and sales and service facility as well.



LAWS AND REGULATIONS

Pursuant to section 11 of the German Infection Protection Act, swimming pool water in public pools or commercial operations must be of a high enough quality so that its use is not associated with harming human health through pathogens. To meet this requirement, it is necessary to treat and disinfect swimming pool water. Chlorine and inorganic compounds of chlorine are used as disinfectants. The disinfectant concentrations may not represent a health risk for swimmers or staff.

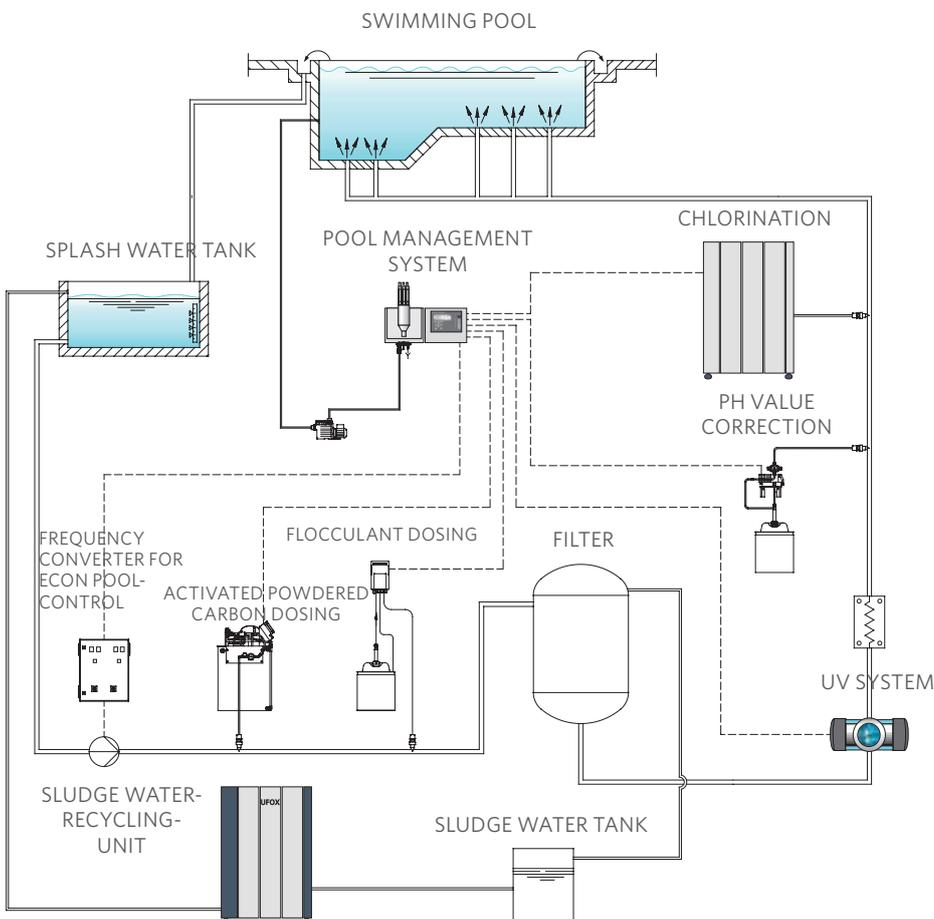
According to DIN 19643, Part 1 "Treatment of water of swimming pools and baths", trihalomethanes are unavoidable secondary reaction products of chlorination and, same as the combined chlorine, are considered health hazards. Free chlorine and pH values must be measured, controlled, and recorded continuously according to DIN 19643.

This means that automatically controlled dosing systems for the chlorination and pH adjustment must be installed for each swimming and spa pool (exception: cold water plunge pool with content < 2 m³). The redox voltage must be measured and logged continuously using "stationary measuring instruments."

DIN 19643 IN DETAIL

free chlorine pool water	0.3 - 0.6 mg/l
<ul style="list-style-type: none"> in warm water whirlpools 	0.7 - 1.0 mg/l
combined chlorine	0.2 mg/l
<ul style="list-style-type: none"> in cold water plunge pools < 2 m³ 	no limits
THMs	max. 0.020 mg/l
pH value, sweet water	6.5 - 7.5
pH value, sea water	6.5 - 7.8
redox voltage (ORP), sweet water	min. 750 resp. 770 mV
redox voltage (ORP), sea water	min. 700 resp. 720 mV

THE INFECTION PROTECTION ACT AND DIN 19654 ARE BINDING FOR GERMANY. PLEASE NOTE THE RESPECTIVE PROVISIONS IN THE INDIVIDUAL COUNTRIES.



VARIOUS POSSIBILITIES TO USE WALLACE & TIERNAN PRODUCTS IN POOL WATER APPLICATIONS



EXACT DOSING DUE
TO V-NOTCH

PROVEN GAS FEED SYSTEMS

THE ORIGIN OF THE NAME WALLACE & TIERNAN

It has been more than a hundred years ago that the namesakes Charles F. Wallace and Martin F. Tiernan discovered the disinfecting effect of chlorine in water. Still today, Wallace & Tiernan® chlorine gas dosing systems are the epitome of safety and accuracy – around the globe. All the while the principle has remained the same.

Wallace & Tiernan chlorine gas dosing units function based on the full vacuum principle. The V10k™ full vacuum dosing system is also suitable for dosing carbon dioxide (CO₂) to lower pH values. The unit is designed for capacities up to 10 kg/h and features numerous configuration options.

The Wallace & Tiernan V-notch control orifice is used successfully worldwide and offers a large control range, very good reproducibility and high dosing accuracy. Pressure/vacuum controllers mounted directly to the gas tank or manifold reduce the pressurized gas to a process vacuum. The pressure/vacuum controller is available in power levels of 4 kg/h, 10 kg/h and higher.

SERVICES FOR DISINFECTION SYSTEMS

Evoqua Water Technologies not only offers a wide range of systems and devices for water treatment and disinfection, but also a suite of related service offerings.

Services for disinfection systems

- On-site service
- Service contracts
- Repairs
- Technical consulting
- Use of original spare parts
- Safety audits performed by qualified personnel
- Manufacturer service

From maintenance on installed systems to optimisation and upgrades, whether for treatment and dosing systems, electrolysis systems, UV disinfection units or measuring and control devices, the comprehensive service toolkit distinguishes Evoqua Water Technologies as partner of choice.



V10k™ FEEDER WITH
MANUAL CONTROL



SMALLEST DIOX-A SYSTEM FOR 3 G/H ClO₂



ELECTROLYSER CELL OF OSEC® B-PAK

DISINFECTION METHODS

CHLORINE DIOXIDE IN POOL WATER

The occurrence of legionellae in pool water is a problem that must be taken seriously. Water used for showering is affected primarily. This water is part of the drinking water system and as such subject to the same rules and regulations. Whirlpools, other water-spraying systems and pool water filters play an important role as well.

Since the occurrence of legionellae may result in serious consequences including closure of the bath or pool facility, it is important to implement precautionary and preventative measures.

Chlorine dioxide is successfully used for fighting and preventing legionellae. The available treatment and dosing units produce chlorine dioxide starting at 3 g/h and are integrated into the warm water system. The corresponding measuring and control unit offers additional control options.

Environment-friendly

Experienced technologies: whether UV systems, chlorine dioxide generation and dosing, electrolyzers or ultrafiltration for recycling of sludge water recycling

OSEC SERIES

Sodium hypochlorite is an effective alternate disinfectant wherever fill water has a low acid capacity (carbonate hardness) or if the use of chlorine gas is inadvisable or to be avoided. Since commercially available sodium hypochlorite solutions have a limited shelf life, resulting in loss of active chlorine content, sodium hypochlorite should be generated directly onsite with an electrolysis process. The starting materials are sodium chloride solution (common salt) or – in case of salt water pools – ocean water.

Tubular cell electrolyzers

The OSEC®-B and OSEC B-Pak (brine) and OSEC-S (sea water) systems function as undivided, single-flow electrolysis cells without membranes. The concentration of the prepared sodium hypochlorite solution amounts to approx. 2 g/l active chlorine when using ocean water and approx. 6 to 8 g/l active chlorine when using brine.

Membrane electrolyzers

The OSEC-A unit is designed for smaller pools and generates 12, 25 or 50 g/h chlorine based on the membrane process.

The OSEC-NXT chlorine membrane electrolysis system is offered in a power range from 6 kg to 60 kg of chlorine per day. Constant electrode materials, a chlorine free brine solution container and a process that does not recycle brine are the main differences to commonly available chlorine membrane electrolysis systems.

It consists of user-friendly touch panel controls and an integrated power control. The underlying process employed by these systems is considered the safest and most economical of all processes used to produce chlorine.

SAVING WITH TECHNOLOGY

UFOX 10: SAVINGS THROUGH ULTRA FILTRATIONS

The Wallace & Tiernan® UFOX sludge water recycling unit recycles filter backwash water in swimming pools. Ultra filtration is the central treatment stage carried out with two UF modules. This recycled water may be used as pool or back wash tank refill water or grey water. The UFOX 10 system treats up to 10 square meters of water per day. Daily, automatically function and integrity tests as well as self-optimizing rinse intervals keep the operation safe.

Assuming that the cost for fresh water and wastewater as well as energy amounts to approx. 4 €/m³, a UFOX system can save up to 15,000 € annually.

Rinsing the pool filter results in sludge water, which is collected in sludge water tanks first and then routed into the sewer. When the UFOX system is used, this water does not go to waste. Instead, most of it is returned to the pool process along with the thermal energy it still carries.

The UFOX system is a multi-stage system and ensures that the collected filtrate can be transferred to the overflow tank. The number of water treatment stages required depends on the composition of the sludge water to be treated. Ultra filtration is the central treatment stage; in addition, the UFOX system also contains a pre-filtration and disinfection stage.



UFOX UNIT

UV FOR NOTICEABLY IMPROVED WATER QUALITY

UV systems are used in pools primarily for the reduction of combined chlorine, chloramines or ozone, respectively. This effect is achieved only with polychromatic lamps based on the medium pressure principle and emitting a corresponding broad wavelength spectrum. These types of lamps are integrated into the Barrier® M units. Fewer chloramines in the water also result in an improved pool environment.

The Barrier® M UV systems for volume flows up to 1000 m³/h impresses with its hydrodynamic chamber. The electronic ballast equipment provides the highest possible efficiency to be achieved. The irradiance to be adjusted with pinpoint accuracy using an infinitely variable controller, lets you to optimize the quantity of UV radiation delivered.

Evoqua provides high quality lamps and components to extend their life-cycle and reduce costs on their UV disinfection systems. The Barrier M unit is easy to install, maintain and clean. An UV sensor and cleaning mechanism are available as additional equipment.



BARRIER® M SYSTEM



WE MAKE SURE YOU ARE ECONOMIC

Contact us to find out how much you could be saving right now: We gladly advise you. The investments will pay for themselves within a very short time, while providing the means to achieve savings. Moreover, you will be employing the latest, modern technology: For optimized operations and safe water fun.



JETPAK ACTIVATED CARBON DOSING SYSTEM

Various additives are used in swimming pools to condition water. The types of additives depend on the applied treatment technology and fill water. Wallace & Tiernan® systems dose accurately and safely. Please contact us for assistance with technical process questions.

SYSTEMS TO CORRECT PH-VALUE

According to DIN 19643, pH values are among the hygiene assistance parameters and should be between 6.5 and 7.6. The acid capacity of the water, measured as $KS_{4,3}$, is a parameter that affects many procedural steps of the water treatment process. This value should be at least 0.7 mol/m^3 , especially for flocculation.

Depending on the condition of the raw water, the utilized disinfection method, and the treatment process, different measures to condition the water are used. These include the addition of the following:

- Marble gravel for neutralization
- Sodium bicarbonate for hardening
- Additives to raise/lower pH values (e.g. sulfuric acid, sodium hydroxide)
- Carbonic acid for neutralization

If the chlorine activated process is used, marble gravel is the most economical means to minimize a drop in pH. It stabilizes the acid capacity and helps to achieve good flocculation results.

Sodium bicarbonate is also used to increase the capacity of the acid. The Wallace & Tiernan® dosing system is a two-chamber system: It is geared towards the slow dissolution rate of sodium bicarbonate in water. An additional water softener unit is recommended for hard water. The dosing system can be linked to the control of pH value correction and disinfectant.

POWDERED ACTIVATED CARBON DOSING SYSTEMS

Powdered activated carbon or a UV system can be used as an adsorption step to adhere with the combined chlorine values prescribed by DIN 19643.

Both alternatives are usually more economical than supplying a greater amount of fresh water. Powdered activated carbon is even the substance of choice when the primary objective is to eliminate trihalomethanes.

Powdered activated carbon has been proven to improve pool water quality significantly. This means less secondary reaction products of the chlorination process as well as a higher oxidizability of the water. The compact JETPAK powdered activated carbon dosing system uses a special injector and supplies up to three dosing points with the prepared suspension.

ACCURATE DOSING OF FLUID SUBSTANCES

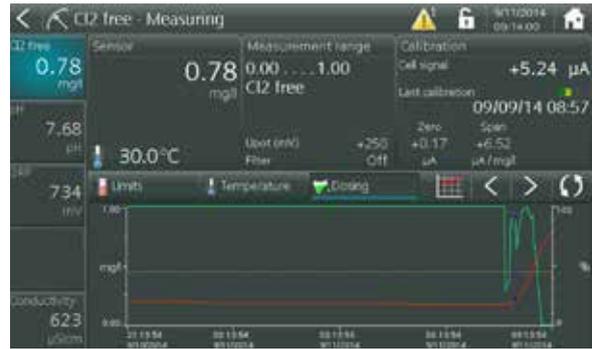
Evoqua Water Technologies provides sophisticated concepts for the dosing of liquid chemicals, including storage fixtures, dosing station, control unit, as well as the lines to the application points.

The Chem-Ad® series A to D diaphragm pumps cover a capacity range from 0.2 to 750 l/h. The Chem-Ad VPP/VPP-E/VPP-S peristaltic dosing pumps meter even small quantities with a level of accuracy and work reliably with degassing liquids such as sodium hypochlorite used as a disinfectant.





DEPOLOX® POOL E 700 P POOL MANAGEMENT SYSTEM



FREE CHLORINE DISPLAY WITH LINE DIAGRAM

WALLACE & TIERNAN® ANALYZERS & CONTROLLERS

MEASURING AND CONTROL SYSTEMS DESIGNED FOR ANY SWIMMING POOL SIZE: ALWAYS MATCHING NEEDS AND REQUIREMENTS PERFECTLY

Pool Management with DEPOLOX® Pool E 700 P system

The DEPOLOX® Pool E 700 P system is the central measuring, control, and regulating unit for public pools. It measures and controls such hygiene assistance parameters as free chlorine and combined chlorine, pH value, redox voltage, and conductivity. Preset applications can be adjusted to meet on-site conditions.

The multi function system is usually able to control the addition of chlorine, as well as the pH correction and the flocculant dosing, the UV or the powder activated carbon unit. Additional functions such as "economic operating mode" reduce the circulation rate if the measured values correspond with DIN 19643 specifications.

The redox-based chlorine overfeed control adjusts to the current needs and reduces operating costs. This CEDOX control considers the redox voltage, which expresses the water quality as a composite parameter, as a second control parameter parallel to the chlorine value. This means that the added chlorine is sufficient but no more than required. This saves consumables while still complying with DIN requirements.

For the time being the precursor DEPOLOX Pool system is still available

PCS plus unit - Well-built and compact

Compact and practical, the PCS plus system measures the most important parameters consisting of free chlorine, pH value, redox voltage and temperature. It is available as a standalone unit or complete system with integrated tube dosing pumps. The dual measuring of free chlorine is also possible with the PCS plus unit, for example, when two pool basins are connected to one filter circuit.

SFC series

SFC series devices are available for the measurement and control of individual parameters. For example, the disinfection of the sludge water tank is controlled with this precise measurement and control technology.

GMS plus gas detection system

The GMS plus system can be used wherever gases such as chlorine, chlorine dioxide, or ozone are generated, stored and metered. The reliable dual channel measuring system monitors gas concentration and temperature of up to two measuring locations. It uses the tried and tested Chloratek® sensors to measure chlorine, chlorine dioxide, and ozone; other sensors with mA output can be connected as well to measure other gases.

Photometer - simple and with perfect timing

In conjunction with the P42 i-cal photometer, the DEPOLOX Pool system can be calibrated in real-time using an IR time-stamp function. This function ensures that the calibration is carried out exactly in relation to the measured value at the time of the zero calibration. This optimizes the measurement and control quality of the device and makes it especially accurate. Input errors are not possible. In addition, the photometer P15 plus unit is available to measure the most important water treatment parameters such as chlorine and pH value quickly, reliably and precisely.



PCS PLUS SYSTEM WITH TWO FLOW CELL MODULES FOR DOUBLE MEASUREMENT OF FREE CHLORINE

DATA MANAGEMENT PRODUCTS

FOR INTEGRATION, VISUALIZATION AND CONTROL

Internet-capable with Process Monitoring System

The Wallace & Tiernan® Process Monitoring System consists of a data management device that is independent of the operating system and makes it possible to collect and visualize data of equipment and devices connected to the RS 485 bus. Four password-protected user levels control access to operational data via PC, laptop or Smartphone.

Use universal standards with OPC

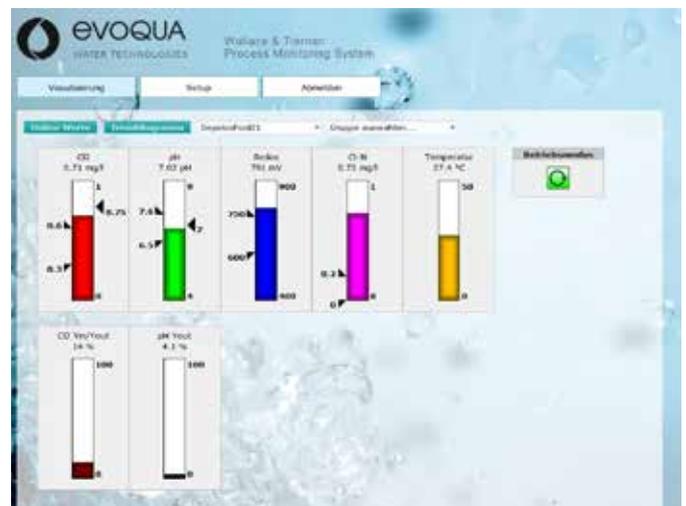
OPC (OLE, Object Linking and Embedding, for Process Control) is a uniform, networked, Windows®-based software standard for interaction in the area of process automation technologies. It allows complete data transfer across different levels (from field to control center level) and provides maximum flexibility and independence for the user. The Wallace & Tiernan OPC Server easily connects all RS 485 devices to Windows-based visualization systems. The interface supports bidirectional data flow, i.e., the OPC client can both read and write process data.

Linking with higher-level controllers

For the measurement and control systems DEPOLOX® Pool E 700 P, DEPOLOX Pool and the devices of the SFC series Evoqua Water Technologies offers fieldbus converters to connect to the most prevalent fieldbus systems: Data exchange between various, manufacturer independent devices is thus possible using the standardized fieldbus systems Profibus® DP, PROFINET® IO, or Modbus® TCP.



WALLACE & TIERNAN® PROCESS MONITORING SYSTEM



BARGRAPH VIEW

TRADITION CONNECTS

NEW NAME RELIES ON RENOWNED BRANDS

Evoqua Water Technologies revives Wallace & Tiernan - the renowned global brand for water treatment and disinfection.

The company history is especially evident in the technical rooms of many pools because the equipment is proven and durable. Evoqua continues this tradition with new products as well. You can rely on it.

Wallace & Tiernan[®]

an EVOQUA brand



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