



WEDECO TAK 55

THE SAFEST SOLUTION FOR WASTE WATER
DISINFECTION USING UV LIGHT

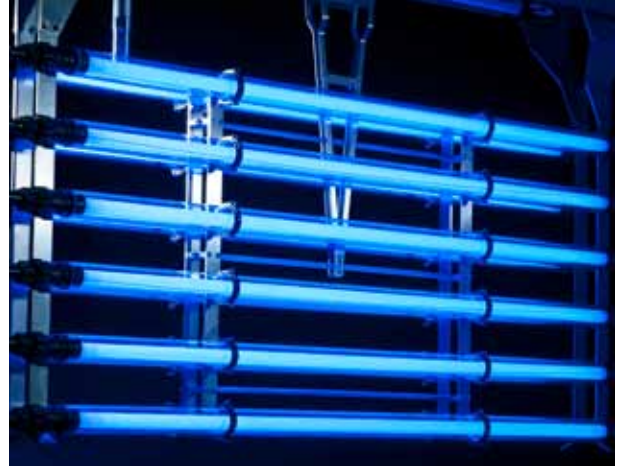
WEDECO

a xylem brand

Waste water disinfection using UV light

Wherever waste water can enter water used for bathing or drinking, or when waste water is to be recycled - e.g. in agriculture, targeted disinfection of the waste water is necessary. The modularly designed UV system WEDECO TAK 55 allows practically unlimited quantities of waste water to be disinfected - absolutely safely and energy-efficiently.

The inactivation of pathogen bacteria, viruses and parasites is necessary for comprehensive health and environmental protection. Biological waste water treatment does not enable, even when combined with secondary sedimentation and filtration. Irradiation with ultraviolet light, however, is a tried, tested, recognised and environmentally friendly method of disinfecting waste water. In contrast to chemical disinfection, UV irradiation does not develop damaging by-products, nor does it place additional strain on flora and fauna.



Overview of a typical waste water treatment plant with WEDECO TAK 55 UV disinfection as final treatment stage



The safest choice: WEDECO TAK 55

The UV system WEDECO TAK 55 is Xylem's solution for safe, more environmentally friendly waste water disinfection. The philosophy behind WEDECO TAK 55 is absolutely reliable operation and objective performance for long-term deployment. The system has been validated according to standards recognised across the globe such as NWRI and US EPA.

The WEDECO TAK 55 UV system has been specially developed for the disinfection of waste water from clarification plant processes. Installed within the effluent channel, the modular, compact construction of the TAK plant allows for the treatment of practically unlimited flow quantities.

The advantages at a glance

- ▶ Safe, chemical-free disinfection of large quantities of waste water
- ▶ Free of by-products, completely safe for human beings, wildlife and the environment
- ▶ Simple to install in open waste water channels
- ▶ Reliable, long-term operation
- ▶ Validated performance according to NWRI and US EPA
- ▶ Compact design, low space requirements



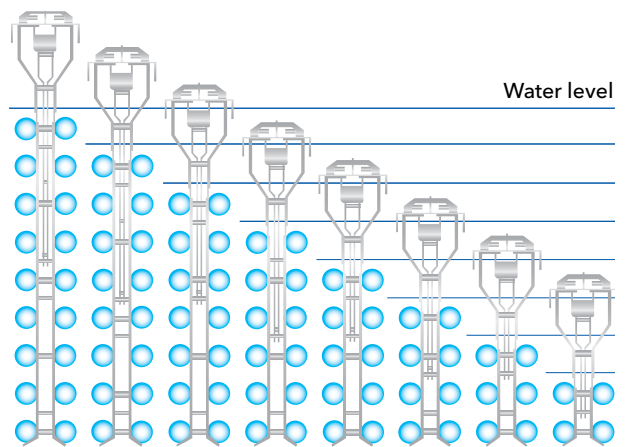
WEDECO TAK 55 lamp module

The WEDECO TAK 55 lamp modules stand out with their robust, hydraulically optimised design - designed for long-term use. The compact UV lamp arrangement allows for highly concentrated power in a very small space. The result is disinfection performance secured at all times even with larger volume flows and low UV transmission from the waste water.

Depending on local circumstances and performance requirements, both the entire TAK system and the arrangement of the individual UV lamp modules can be customised - the number and arrangement of the modules, number of lamps per module and the distance of the UV lamp from one another - just about every detail is taken into consideration with the client's wishes being the focus.

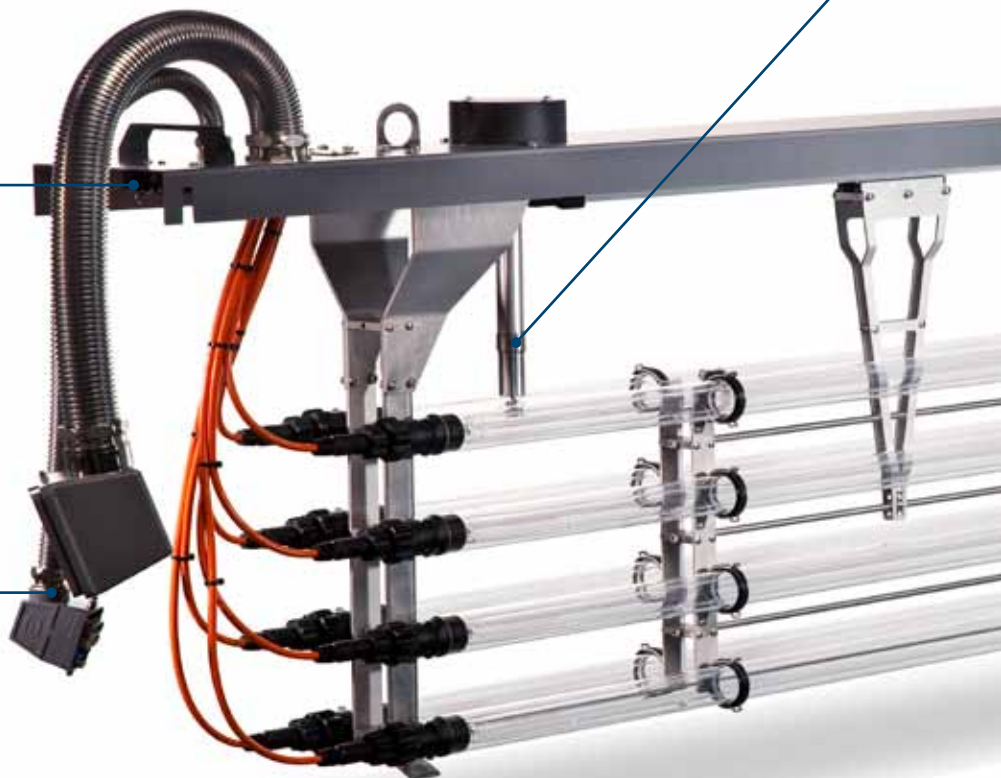
The advantages at a glance

- ▶ Robust and hydraulically optimised design
- ▶ High power density thanks to compact lamp arrangement
- ▶ Simple maintenance without tools
- ▶ Individual, client-focused design



If a module is removed from the channel, a trigger switch automatically switches the UV lamps off.

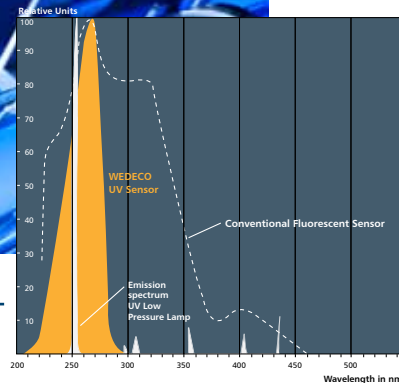
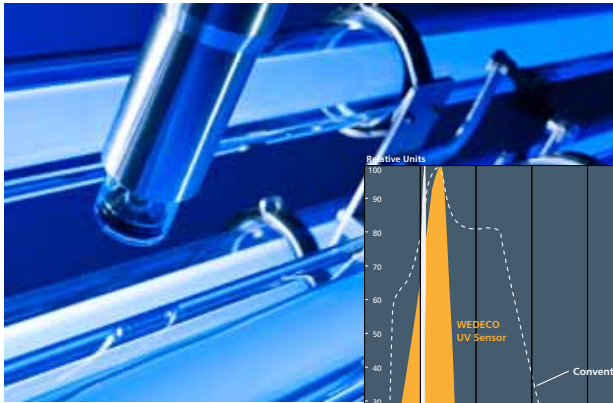
Connectors transmit energy, sensor signals and air pressure for the automatic wiper system. The connector can be released quickly and easily for maintenance work.



Leading sensor technology

The UV intensity in the water is influenced by the age of the lamp, the cleanliness of the quartz tube and the UV transmission in the water. This is why the WEDECO TAK 55 system monitors and measures the actual UV radiation emitted using integrated sensors constantly.

The WEDECO UV intensity sensor is integrated into the TAK module in such a way that it is automatically purified. This calibrated sensor stands out with its high UV selectivity, highly stable operating performance and a long service life.



The highly selective UV sensor measures where disinfection takes place - in the water

Fully-automatic preventive cleaning

Depending on the water quality, organic or inorganic deposits may form on the quartz protection tubes of the lamps, which limit the effects of the UV light. The fully-automatic wiping system eliminates this problem. The excellent cleaning performance has been confirmed by independent institutions and reduces the formation of deposits significantly.

The wiping system is equipped with specially designed PTFE wiper rings. They do not interrupt the disinfection process and clean without the addition of chemical additives. The continuously working wiper frequency can easily be adapted to the properties of the waste water. A pneumatic drive system and the complete avoidance of chemicals in usage also contribute to making the deployment of the TAK system safe.



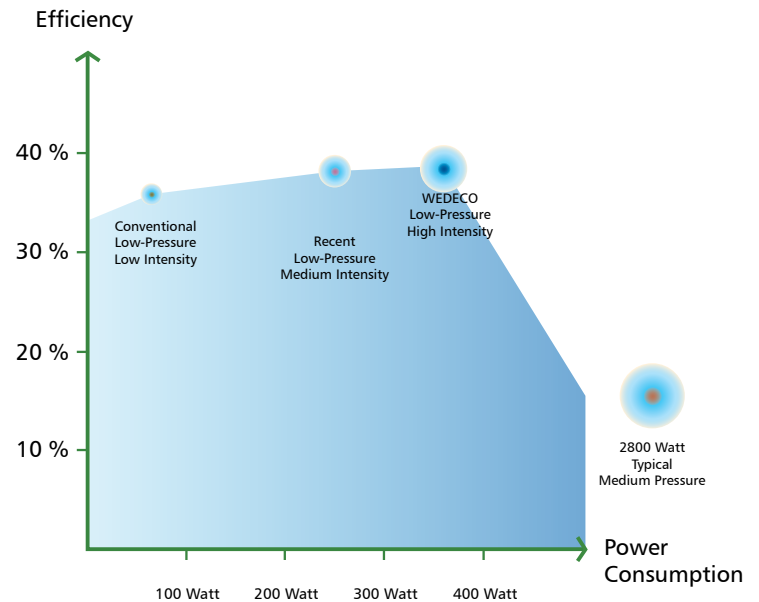
WEDECO Spektrotherm® Technology

Especially powerful Spektrotherm® UV lamps form the core of WEDECO TAK 55 systems. They have a long life, work continuously even under varying water temperatures and are far superior to conventional UV lamps with their high efficiency.

Spektrotherm® UV lamps are unique in their special doping and one-of-a-kind LONG-LIFE coating. This enables consistently high UV-light output combined with a guaranteed long lamp life of 12,000 hours to be achieved. In addition, this technology enables the use of liquid mercury inside the lamp to be avoided.

The most effective solution: an Xylem speciality

WEDECO Spektrotherm® UV lamps are now unsurpassed in their economic viability. In relation to the energy consumed, a particularly large amount of UVC energy is emitted in the spectral range of 254 nm (nanometres). This UV light range is particularly effective in inactivating viruses, bacteria and parasites. High light yield also means less heat generation. This makes WEDECO Spektrotherm® UV lamps less susceptible to formation of biofilms on the quartz tubes. The lamps also ages significantly more



slowly than with alternative UV lamp technology. Equipped with the Spektrotherm® technology, the WEDECO TAK 55 provides more disinfectant light with a maximum power drain of 360 watts per UV lamp than alternative systems with low-pressure UV lamps. The result - the number of UV lamps, the lamp modules and the space requirements are considerably lower.



Long-life WEDECO Spektrotherm® UV lamp with maximum energy efficiency

Intelligent electronics - optimally arranged

Effectiveness of the UV lamps is increased by means of electronic ballast devices with intelligent modules specially adapted to the lamp. The output is continuously adjustable, allowing them to be optimally adapted to changing flow quantities and waste water quality levels.



Only enough energy is emitted that is actually needed for safe disinfection. This not only saves energy - the life of the lamp is also optimised even more.

As with all of the critical electronic components, the ballast devices are housed in separate control cabinets to keep them dry and safe. This ensures constantly optimal operating conditions in terms of temperature, humidity and voltage protection.

Easy access to all electronic components is another advantage. Depending on environmental conditions and plant size, it is possible to add an optional cooling system to protect the electrical elements. This makes the system reliable for constant operation even when placed under heavy load or in hot climates.



Ideally arrange electronics for constant maximum performance even under extreme conditions

The advantages at a glance

- ▶ High UVC output with maximum efficiency
- ▶ Long lamp life of guaranteed 12,000 hours
- ▶ Free of liquid mercury
- ▶ Reduced formation of deposits on the quartz tubes
- ▶ Stable UVC output even with varying water temperatures
- ▶ Continuous adjustment of the lamp power
- ▶ Automatic restart and ignition
- ▶ Electronics arranged safely in separate control cabinets
- ▶ Easy to maintain thanks to easy access to all components

WEDECO TAK 55 system design

Electronic components - installed to ensure safety and protection



Electronic components are generally housed in separately erected control cabinets away from the area where water is being carried to ensure operational safety and reliability. They

are erected according to local conditions in fixed constructions, under roofs or in container structures. They can be erected around the lamp modules, with the positioning being flexible.

Monitoring and control system

As far as the control system, data acquisition (System Control & Data Acquisition = SCADA) and data transmission (BUS connection) are concerned, WEDECO TAK 55 offers maximum flexibility. Each TAK system is fitted with an integrated PLC system



that can be flexibly adapted to client requirements. It is possible to monitor it both locally and remotely depending on the specific requirements of the project at hand.

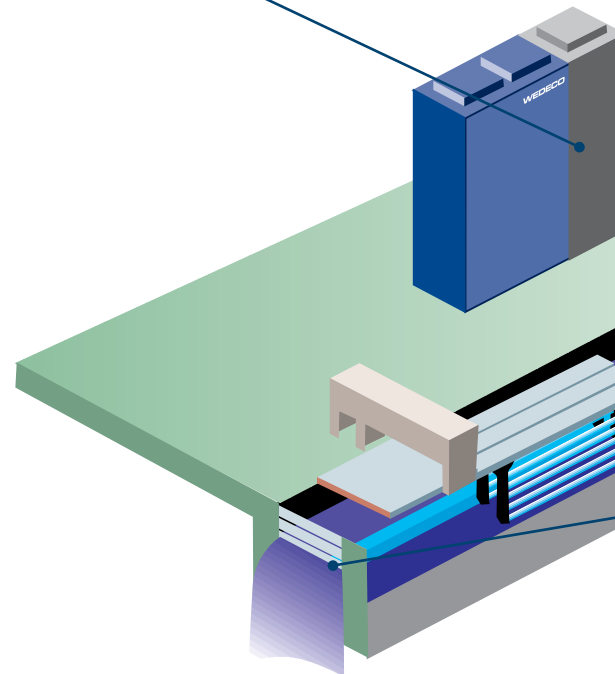
WEDECO TAK 55 Outdoor

A compact version of the TAK system designed for outdoor installation provides an alternative arrangement. The integration of the electronic ballast devices, control and power supply units and junction box into a compact stainless steel cabinet is its main feature.



This allows the expenditure and effort for wiring the UV lamps to the ballast devices to be reduced.

The control cabinet unit is installed over the channel and connected directly with the UV modules. The TAK outdoor systems are especially suitable for small to medium-sized plants with limited space.

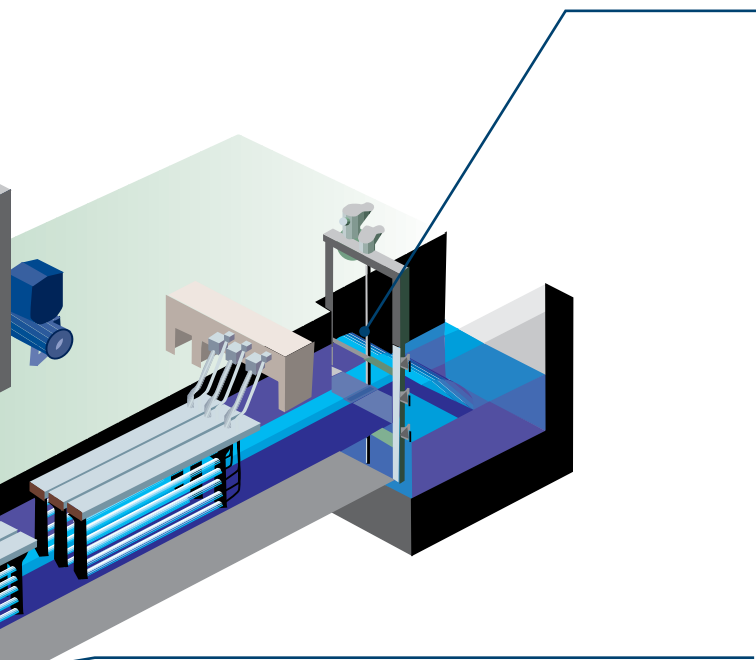


Example installation of a WEDECO TAK 55 system. Depending on the amount of waste water, the number of UV modules, module banks and parallel waste water channels may vary.

References across the globe

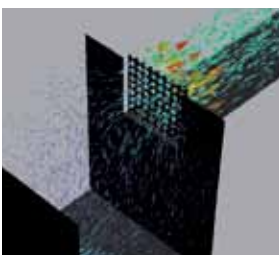
Water level control

An important factor in assuring disinfection performance is a consistent water level under varying volume flow conditions. Weirs are installed after the UV disinfection unit for this purpose. Depending on the design of the entire system, fully-automated penstocks or fixed weirs can be installed. Both variants provide a low head loss and prevent interferences or „wave build-up“ in the water, as occurs in flap gates.



Flow regulation

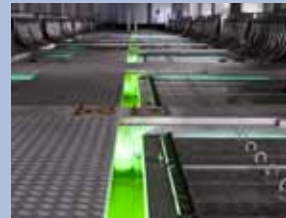
Special baffle plates installed before the UV disinfection units regulate the flow of water and allow waste water to pass the UV lamps evenly. They also protect the UV lamps from damage caused by solid bodies in the water.



Xylem has more than 30 years of experience in the development and production of UV systems for waste water disinfection. More than 1,000 WEDECO TAK systems installed worldwide demonstrate their performance and reliability every day.

Manukau, New Zealand

The 12 channels in the UV gallery contain a total of 7,776 UV lamps with a maximum discharge rate



of 16,000 l/s (365 MGD). They achieve a 10,000-fold reduction in pathogens discharged into the harbor. It is one of the largest and most sophisticated UV installations in the world.

Munich, Germany

To improve water quality of the river Isar, all sewage treatment plants south of Munich were equipped with a WEDECO UV disinfection step. One of them is the largest UV plant in the area, disinfecting a



maximum flow of 21,600 m³/h, including rain flow. The project has resulted in a drastically reduced bacterial load and remarkable improvement in the hygienic water quality of the Isar.

Lincoln (California), USA

The UV system is designed to meet California Title 22, one of the most stringent standards for water



reclamation (2.2 FC/100 ml, 5-log poliovirus inactivation). Up to 900 lamps, installed in 5 channels, are required to treat the max flow of 30 MGD (4,732 m³/h).

Validated disinfection performance - Bioassay



The existing bacteria (number and type) and the maximum permissible bacteria contamination after UV disinfection units are installed are in particular the most important parameters in the design of any UV system. The latter is particularly specified by statutory regulations and the subsequent intended purpose of the waste water. The key to success in disinfection is the correct UV dosage.

Our philosophy is to provide the greatest possible security of investment with regards to the design of the most effective UV dosage. We make use of our many years of experience in UV disinfection, internationally recognised calculation methods and biosimetric validation tests.

The powerful WEDECO UV lamp technology with adjustable output, combined with superior sensor monitoring technology, also helps to avoid excessive or insufficient dosages. This ensures success in disinfection and also saves valuable resources.

Validated in accordance with NWRI and US EPA

Whatever the disinfection performance demands - Xylem can demonstrate reliable and objective performance data for the entire dosage range for the WEDECO TAK 55. The system is validated in accordance with leading international standards such as US EPA and NWRI. Safe UV disinfection for a wide range of usage is officially guaranteed - from re-introduction into open waters to recycling for use in agriculture or drinking water supplies.

In special cases we offer the possibility of testing the UV disinfection on-site before making long-term investments. Our mobile pilot plants provide real, meaningful data while taking individual local circumstances into consideration.

The advantages at a glance

- ▶ Extensive experience in the design of UV disinfection treatment plants
- ▶ Use of recognised calculation methods
- ▶ Validated performance in accordance with NWRI (high UV dosage = reuse)
- ▶ Validated performance in accordance with US EPA (low UV dosage = discharge)
- ▶ Pilot plants for gathering real qualified data



Simple maintenance, less expenditure

Ease of maintenance was an important factor in the developer of WEDECO TAK 55. Ultimately, the success of a UV disinfection plant is particularly dependent on the length of maintenance intervals and the scope of the required repair work.

The use of state-of-the-art solutions such as optimised lamp modules, separately installed electronics and an effective wiping system has allowed maintenance expenditure to be reduced to a minimum.

Ease of access and the simple installation/dismantling of all components also contribute to the simple maintenance of the TAK system.



More performance = fewer UV lamps = less maintenance

The high power input of each Spektrotherm® UV lamp and the dense lamp arrangement in each module results in fewer UV lamps and fewer modules in comparison to alternative low-pressure UV systems. This results in reduced maintenance effort and expenditure with regard to replacing UV lamps and handling modules.



Separation of UV modules and electronics

Separate control cabinets set up away from areas where water is being carried enable rapid, comfortable access to all electronic components, including ballast devices.



Less cleaning required

The optimised design of the modules and an effective, non-chemical wiping system minimise the manual cleaning required. There is no longer a need to refill with chemical additives on a regular basis.



Maintenance without tools

Easy replacement of lamps, quartz tubes and wiper rings with a practical clip mechanism - no need to dismantle the UV module.



Easy module removal with no need to use force

The lamp modules can be lifted individually using a lift or all together in the bank magazine (optional).



No manual adjustment of the weirs

Motor-driven penstocks together with the water level sensors automatically regulate the water level and flow volume.



Xylem ['zīləm]

- 1) The tissue in plants that brings water upward from the roots
- 2) A leading global water technology company

We're 12,000 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

For more information on how Xylem can help you, go to xylem.com.

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