WEDECO TAK 55

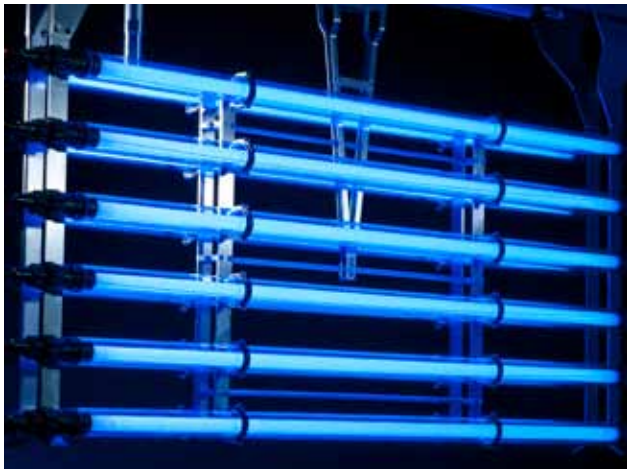
THE SAFEST SOLUTION FOR WASTE WATER
DISINFECTION USING UV LIGHT

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 disinfect, even when combined with secondary sedimentation and filtration. Irradiation with ultraviolet light, however, is a tried, tested, recognized and environmentally friend 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

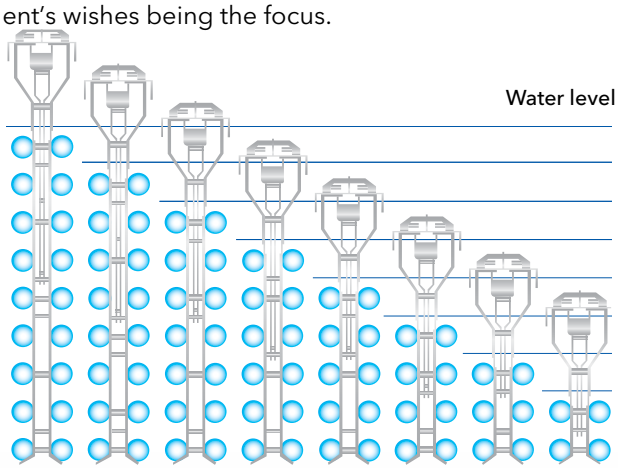
WEDECO TAK 55 lamp module

The WEDECO TAK 55 lamp modules stand out because they are designed for long term use, very robust and hydraulically optimized. 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.

The advantages at a glance

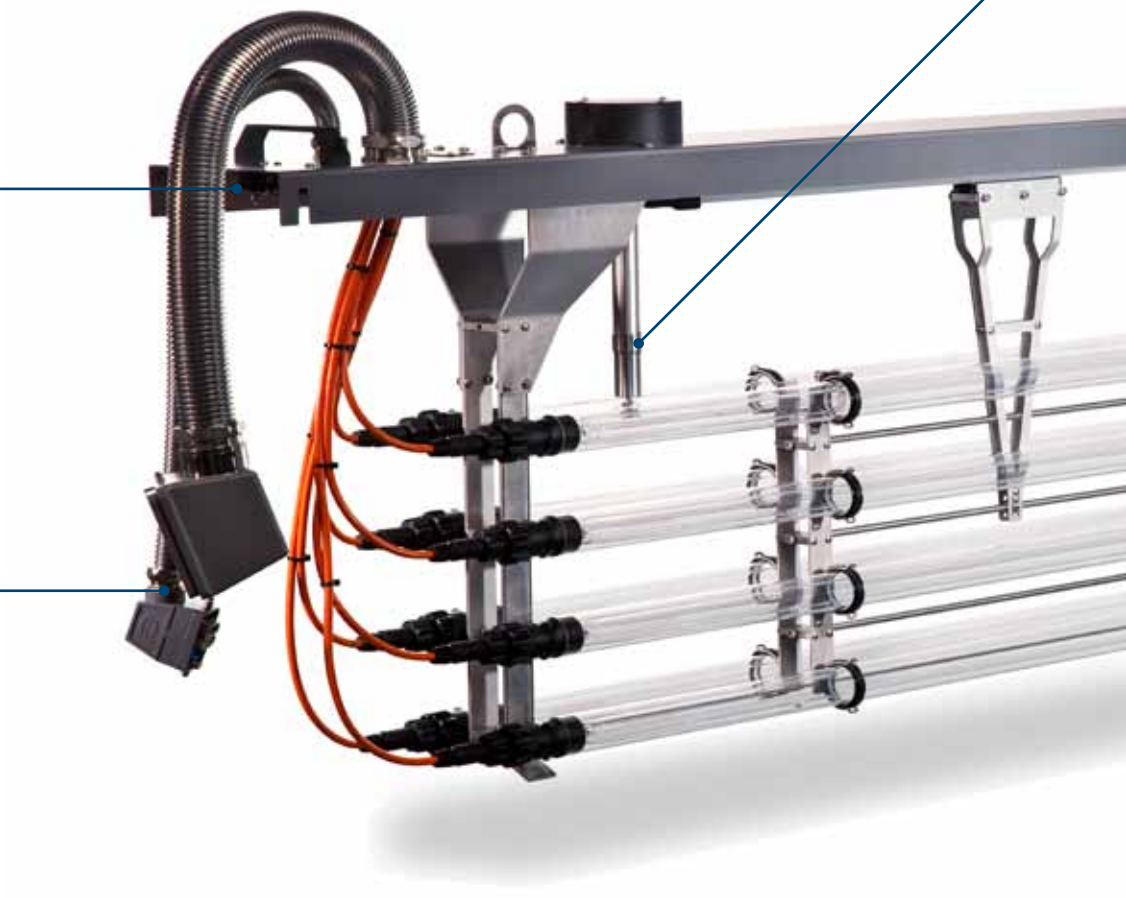
- Robust and hydraulically optimized design
- High power density thanks to compact lamp arrangement
- Simple maintenance without tools
- Individual, client-focused design

Depending on local circumstances and performance requirements, both the entire TAK system and the arrangement of the individual UV lamp modules can be customized - 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.



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

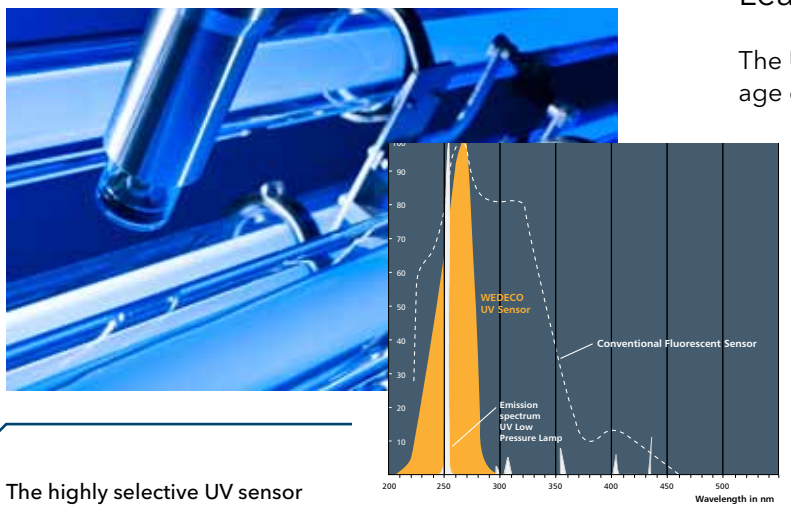
Connectors transmit energy, sensor signals and air pressure for the automatic wiper system. The connector can be released quickly and easily for maintenance work.



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

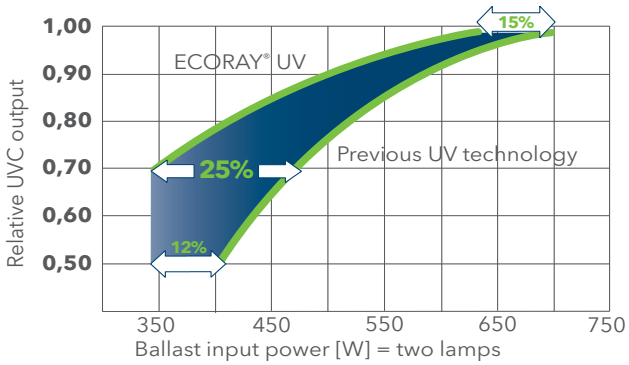
Depending on the water quality, organic or inorganic deposits may form on the quartz protection tubes of the lamps, which limit the effects of the UV light. The fully-automatic wiping system eliminates this problem. The excellent cleaning performance has been confirmed by independent institutions and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

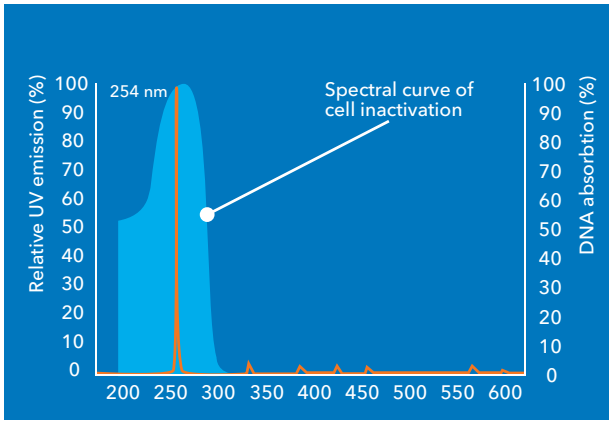
The wiping system is equipped with specially designed PTFE wiper rings. They do not interrupt the disinfection process and clean without the addition of chemical additives. The continuously working wiper frequency can easily be adapted to the properties of the waste water. A pneumatic drive system and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

WEDECO ECORAY® Technology

The TAK55 units are equipped with the latest ECORAY UV lamp and ballast technology. In combination with the option of variable power output control, they feature excellent energy efficiency under all operating conditions. In dim mode, the ECORAY lamps realize average energy savings of up to 20 percent. Ecoray lamps also use up to 80 percent less mercury than the previous lamp generation, making them a sound choice.for the environment. With respect to sustainability, the UV lamp's associated power savings translate to an atmospheric reduction of up to 500 kg of CO2 per lamp over the lamp's life cycle.

In addition, ECORAY UV lamps provide long-lasting, trouble free operation due to excellent, validated aging properties and improved overall robustness.





The monochromatic ECORAY UV lamp emits at a wavelength of 254 nm, which is in the maximum of the effective disinfection range of the spectrum

Long-life WEDECO ECORAY UV lamp with highest 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 is guaranteed for up to 14,000 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

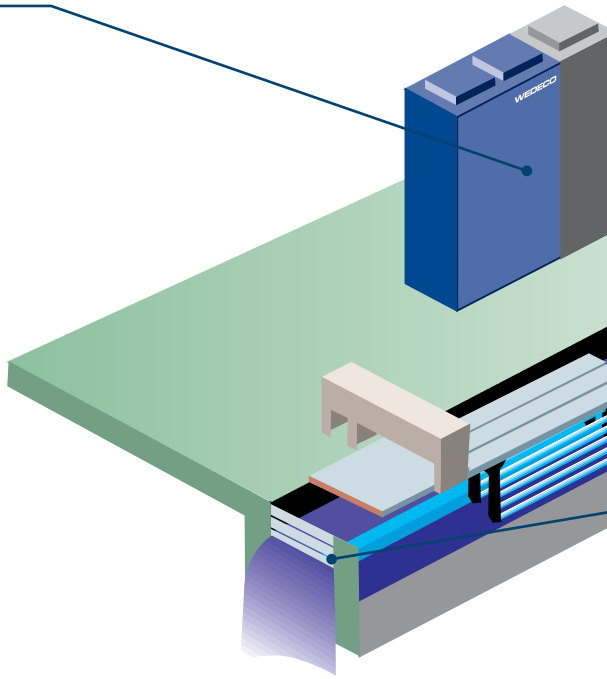
As far as the control system, data acquisition (System Control & Data Acquisition = SCADA) and data transmission (BUS connection) are concerned, WEDECO TAK 55 offers maximum flexibility. Each TAK system is

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 Smart UV System

The WEDECO TAK 55 Smart UV system makes the disinfection of low wastewater flows as easy and cost-effective as possible, without any compromise in quality or flexibility.

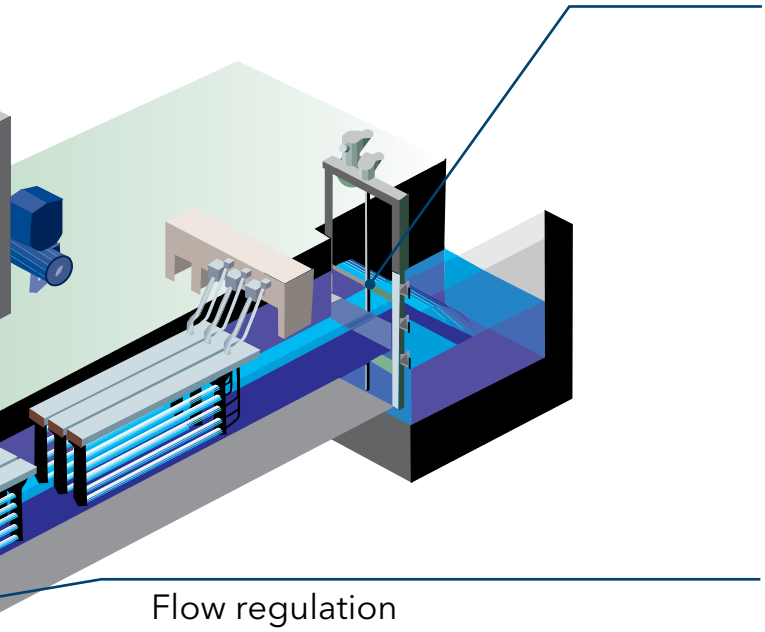
Similar to it's big brother the TAK 55, 'TAK Smart' systems, feature the same UV lamp configuration and set of common equipment options. Fully preassembled including the disinfection channel, it is available in five sizes and can be customized with different types of channel material, an optional automatic wiping system, various cabinet designs as well as sophisticated UV monitoring & control features.



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.

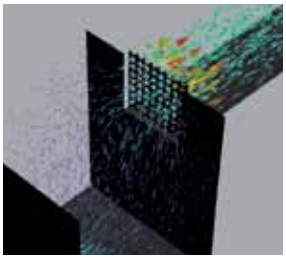
Water level control

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.

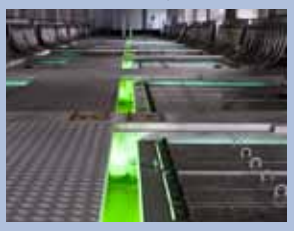


References across the globe

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.



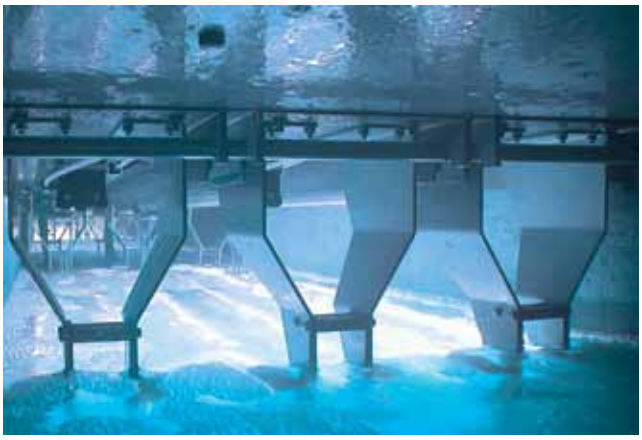
Munich, Germany

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 recognized calculation methods and biodosimetric validation tests.

The advantages at a glance

- Extensive experience in the design of UV disinfection treatment plants
- Use of recognised calculation methods
- NWRI bioassay sizing for high dose reuse and virus control
- US EPA and IUVA bioassay sizing for normal discharge applications
- Pilot plants for gathering real qualified data

The powerful WEDECO UV lamp technology with adjustable output, combined with superior sensor monitoring technology, also helps to avoid excessive or insufficient dosages. The 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.

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 optimized lamp modules, separately installed electronics and an effective wiping system has allowed maintenance to be reduced to a minimum.

Ease of access and the simple installation 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 ECORAY® 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 the disinfection channel enable rapid, comfortable access to all electronic components, including ballast devices.

✓ **Less cleaning required**
The optimized 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 **www.xyleminc.com**

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