RIDDER

Solutions for
Controlled Environment Agriculture

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RIDDER

Disinfect water safely
without adding chemicals

Ridder VitaLite

Helping you grow
your way

Water disinfection

Are you also facing the challenge of having to increase crop production? All while trying to make production cheaper, safer and more reliable? How do you achieve that? And how do you avoid your crops becoming too expensive by applying too much water and fertilizer? Fresh water is becoming increasingly scarce, and fertilizer use needs to be reduced due to environmental concerns and the depletion of phosphate resources. A key part of meeting this challenge is recycling the irrigation water that hasn't been absorbed by your plants. Much of this drain water still contains a large proportion of costly fertilizers. By recycling your drain water, you will not only be saving money on both water and fertilizers, but you will also be contributing to a cleaner environment. However, you need to be 100% sure that the recycled water doesn't contain any pathogens, otherwise it could ruin your entire crop. The answer to this problem is simple: sterilize or disinfect your drain water before reuse.

Disinfection methods

There are various methods of water disinfection. Well-known methods include disinfection based on heating, ozone, ultra-filtration and chlorine dioxide. Although all methods have the potential to neutralize pathogens (such as fungi, bacteria and viruses), not all methods are equally efficient or effective. Substances can be added to the water, but they may affect the nutrients present. This may render nutrients less available to your plants and could cause substances to build up in the system. As a result, substances such as acid and alkali (base) are needed to restore the water's pH balance so it is most conducive to plant growth. If the water is heated, it must first be allowed to cool before it can be applied in the greenhouse. Every disinfection method has its pros and cons. We believe, however, in working with a method that is both proven and reliable.

Low-pressure UV disinfection: healthier for your crops

To avoid the disadvantages of the above disinfection methods, our VitaLite water treatment system is based on low-pressure UV technology. Low-pressure UV disinfection is the most efficient, effective and reliable method of recycling drain water. Research by Wageningen University has shown that the best way to kill waterborne pathogens is by UV (ultraviolet) radiation with a wavelength of exactly 254 nm, since it breaks down their DNA. This is achieved with low-pressure UV. The main benefits of low-pressure UV disinfection are:

Leaves water composition unchanged

Disinfection with UV light doesn't affect the water's composition. Nothing is added to the water. Costly fertilizers still present in the drain water can be recycled, allowing you to save up to 50% on fertilizer costs.

Tried-and-tested solution

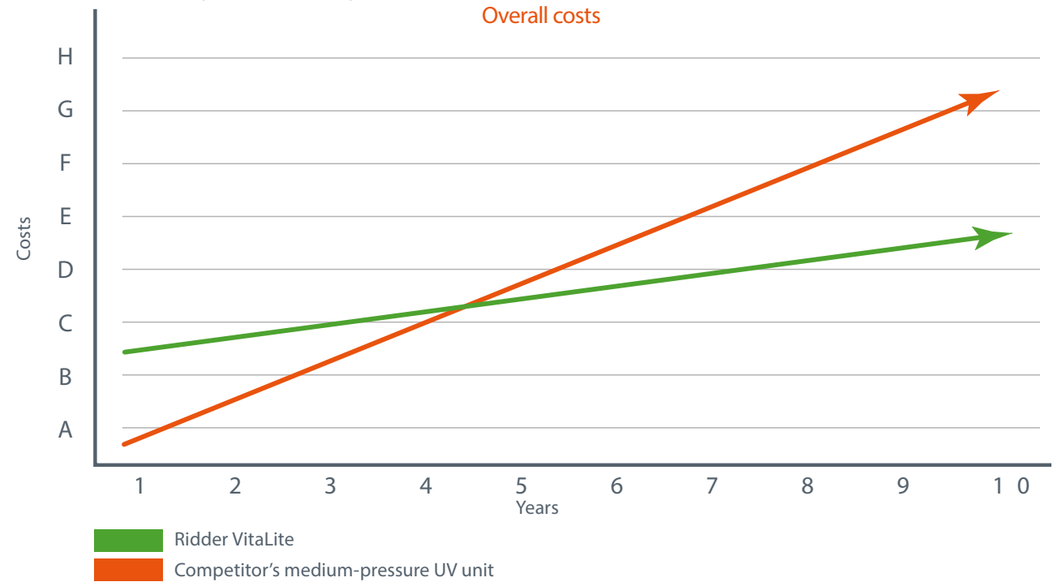
Low-pressure UV disinfection kills 99.9% of all pathogens. This method is controlled based on guaranteed and measured output (999 out of 1000 pathogens are killed) rather than capacity. The quality of the treated water even meets the standards of the drinking water sector (i.e. 3-log reduction).

Low-pressure UV versus medium-pressure UV disinfection

Ridder water disinfection systems use low-pressure UV light. This has significant advantages over using medium-pressure UV:

	Low-pressure UV (HMX)	Medium-pressure UV	Advantages low-pressure UV vs. medium-pressure UV
Power per lamp	550 Watts	1000 – 40000 Watts	Up to 3x less power consumption.
UV-C efficiency	30-40%	10%	About 3x higher output (capacity per Watt)
Lamp temperature	40-90°C	600-900°C	Low temperature: water is not heated.
Start-up time	seconds	1 - 5 minutes	Very fast start-up time.
Expected lamp lifespan	12000 hours	2500 - 6000 hours	Lamps last much longer.
Reduction in iron chelates	5%	25%	Up to five times less degradation of iron chelates, so less correction required afterwards.
Cleaning of quartz glass	Automatic acid flushing	Cleaning using wiper blade	No mechanical wiper blade that needs to be replaced every year.

As a disinfection method, low-pressure UV has the greatest operational benefits. Although the initial investment is slightly higher than other UV methods, the operating costs in subsequent years are significantly lower. This means that the extra investment cost of low-pressure UV technology can be recouped quickly. The following graph shows the difference between a Ridder unit and a competitor's medium-pressure UV unit in terms of the total cost over time:



Effective disinfection with the VitaLite

The VitaLite is designed specifically for water disinfection. The VitaLite provides the most reliable, effective and efficient disinfection method for treating drain water, reservoir water or irrigation water. This low-pressure UV disinfection unit kills 99.9% of all pathogens without adding chemicals to the water.

Some benefits of our new generation VitaLite:

1. The new VitaLite is easy to program and set up. This is made possible by simple menu-driven functions, allowing the VitaLite to be used worldwide.
2. The new VitaLite features a new type of digital UVC sensor. This means that you no longer need to calibrate the radiation sensor, as was the case with previous versions of the VitaLite.
3. The VitaLite can be used as an independent unit.
4. The VitaLite is available in several basic models (E-series), as well as a fully customized version (Custom C units). The number of UV lamps that you need depends on the desired capacity of the unit.
5. The unit is equipped with uniform radiation chambers and uniform UV lamps.

Fast return on investment

The VitaLite will improve both the health and growth of your plants, resulting in higher crop yields. The system will also allow you to make significant water savings, as well as maximize fertilizer use. It's an investment that will quickly pay for itself - in some cases in as little as six months.

VitaLite benefits at a glance

- Lets you save on water and fertilizers
- Safe disinfection method without adding chemicals
- Less energy consumption and maintenance
- Reliable, safe and controlled

Applications

Our VitaLite models can be used for water recirculation at different capacities and UV transmission rates. The UV transmission rate is the degree to which UV light can pass through the water:

			Water thickness	
Water treatment	Type of water	UV transmission rate	Thin	Thick
Recycling or recirculating water	Drain water	20-35%	E-series C-series	
	Drain water Mineral water River water	+/- 40%		C-series
	Ebb + flow water	+/- 80%		

VitaLite models

Our VitaLite range consists of various models for every type of crop, required capacity and UV transmission rate.

VitaLite E-series

Our VitaLite E-series are standard models. These models have a fixed number of options, can be supplied at short notice and are competitively priced. Selecting the best water layer thickness, UV transmission rate and number of lamps depends on your situation, the type of crop grown and your country. The VitaLite E-series can be equipped with two, four or six lamps (VitaLite E2, E4 and E6). The capacity per lamp is around 1000 litres per hour, depending on the water layer thickness.

Options

3x 400 V (with neutral) @ 50 Hz
3x 230 V (without neutral) @ 60 Hz
pH monitoring sensor
Acid tank

VitaLite Custom

The VitaLite Custom is a disinfection system that is fully customized to your individual needs.

Options

1. Standard and non-standard voltages
2. Frequency (50 or 60 Hz)
3. Neutral wire present or not present
4. Flow [m^3/h]
5. Pressure: 1.5 - 7 bars
6. Self-priming pump
7. Number of lamps [#] (1-192)
8. Number of drain water groups (1-8)
9. Number of drain water tanks
10. Number of disinfected water tanks
11. Pre-blending control
12. EC-based pre-blending adjustment
13. EC monitoring sensor
14. pH monitoring sensor
15. Filter

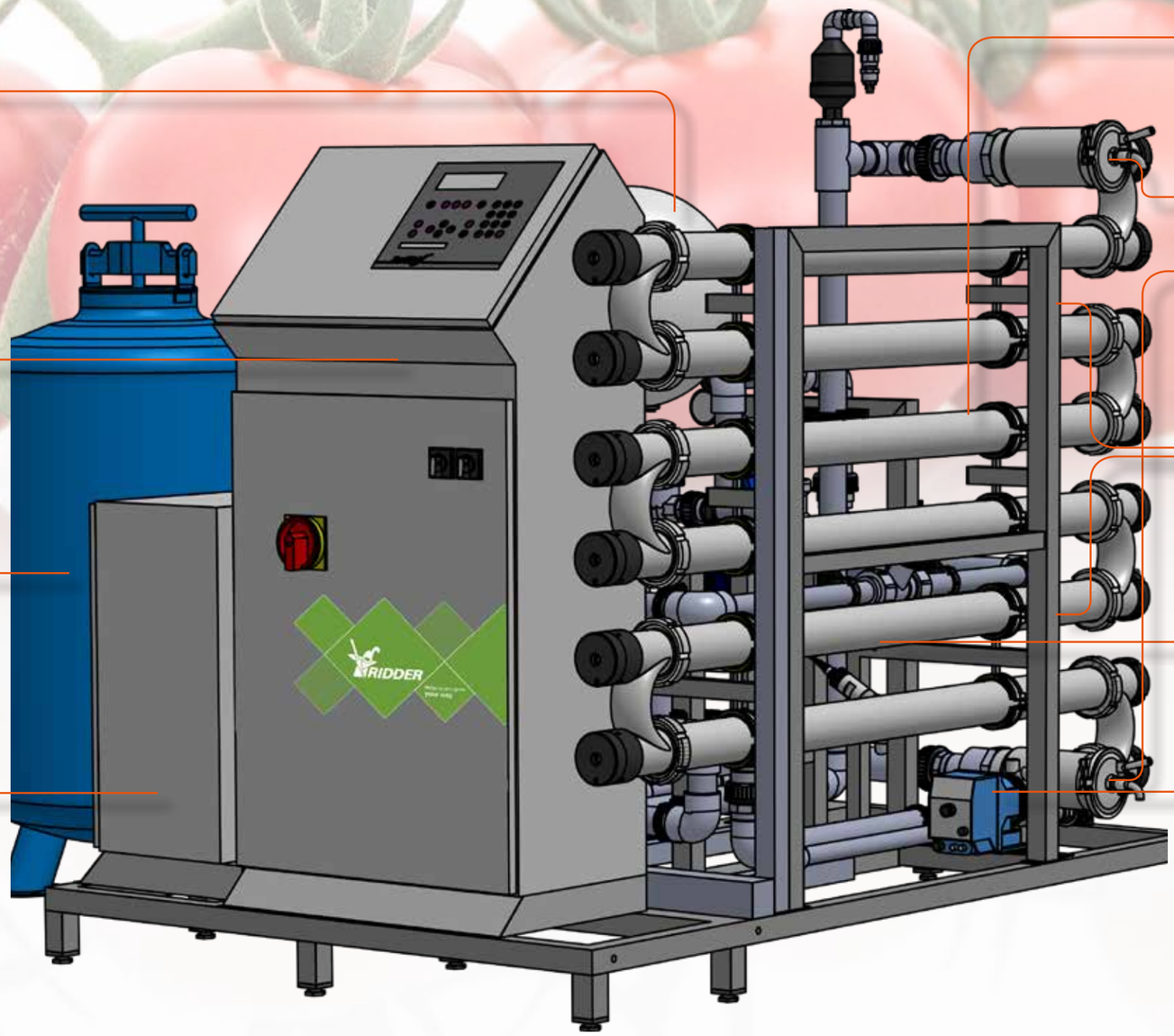
The design of the VitaLite

The expansion tank ensures a better pressure distribution within the unit.

Control cabinet with built-in computer: includes a display and push buttons, pump control, valve controls and sensor amplifiers. This controller features pre-installed software. If the computer is connected to Synopta, the VitaLite can be operated from any location with Internet access.

The VitaLite must always be fitted with a sand filter to ensure the proper operation of the equipment and effective water treatment.

The VitaLite is equipped with ballasts with a Modbus interface. These allow more information on the unit's operation to be shown, such as power consumption and the status of the lamps. This means that you can monitor and control virtually every aspect of the disinfection process.



The radiation chambers have been optimized, resulting in extremely reliable and efficient water disinfection. The unique flow management system and specially-designed couplings between the chambers ensure a sustainable disinfection process. Depending on the UV transmission rate, the unit can be fitted with different quartz tube diameters.

The VitaLite is equipped with two water sampling taps. The taps are heated continuously to sterilize them, preventing water samples from being contaminated.

Thanks to its modular design, the VitaLite is easy to expand as your needs change. This is done in sets of two lamps.

550-watt low-pressure lamps with a high output and long lifespan. The required lamp quartz tubes depend on the desired UV transmission rate and unit capacity. The most common transmission rates are between 20 and 30%.

The acid pump is used to clean the radiation chambers automatically.

How the VitaLite works

In a closed growing system, the irrigation water that hasn't been absorbed by the plants, including the unabsorbed fertilizers, doesn't disappear into the ground and isn't discharged, but is fully reused (in a process called recirculation). However, before reuse, this reclaimed irrigation water (or drain water) first needs to be purified, as pathogens such as bacteria, fungi and viruses, from one plant can infect an entire crop. This would not only spell disaster for production, but also your profits. The VitaLite neutralizes pathogens safely and effectively using UV disinfection.

Disinfection process

The VitaLite can be used at various stages of the water recirculation process. At which stage the VitaLite should be used depends on the desired capacity and desired risk reduction. The VitaLite is activated automatically based on the measured water level in the drain water tanks. The VitaLite can disinfect drain water from up to eight tanks.

Pre-blending

The VitaLite can also be used to blend drain water and fresh water based on a pre-set ratio that can be corrected automatically based on the EC level. This will make absolutely sure that not only your drain water, but also the fresh water you've applied is disease-free.

Disinfection control

The operation of the VitaLite depends on the UV transmission rate. This is the percentage of UV radiation that can pass through a water layer of one centimetre. The UV transmission rate is measured by a sensor. Heavily fouled water requires more UV radiation than water that is less fouled. During the disinfection process, the radiation level is monitored constantly and compared with the pre-set level. The flow of water through the unit is adjusted based on this measurement, so the water is subjected to the desired radiation dose and will always be of the desired quality.

Sand filter

As standard, the VitaLite is equipped with a steel sand filter that filters out dirt particles in the water that are larger than approx. 30 microns. This not only prevents the particles from casting shadows in the radiation chambers, but also prevents germs in the pores of the particles from being able to pass through the system. The sand filter is cleaned automatically.

Radiation chambers clean for longer

The pH level of drain water is usually too high, causing fertilizers to settle in the UV system and thus the radiation level to drop. That's why the VitaLite includes the ability to dose concentrated nitric acid (pH control), so the optimum pH level can be maintained. This keeps the radiation chambers clean for longer, so you will have nothing to worry about.

UV lamp monitoring

The VitaLite monitors the operation of the UV lamps constantly and will immediately generate an alarm should a lamp fail. The VitaLite will also warn you automatically when the service life of a lamp expires.

Advanced control software

To guarantee the effectiveness of the disinfection process, the VitaLite comes with integrated and advanced control software as standard. This software includes the following features:

- Control and monitoring of the UV system.
- Control program for the disinfection process.
- Filter backflush program.
- Water tank selection.
- Radiation intensity monitoring.
- UV dose control and registration.
- Monitoring from valve to disinfected water tank.
- Flow monitoring during disinfection: An alarm is generated if the water flow stagnates, as this could affect the quality of the disinfected water. Regardless of the water's UV transmission rate, the VitaLite always applies the optimum radiation dose by automatically adjusting the water flow through the system.
- Integrated lamp monitoring: the software will generate an alarm should a lamp fail.
- Registration of process data, such as the drain water quantity, number of disinfection starts and UV lamp operating time.
- Automatic disinfection based on the water tank level, programmable in four periods.
- Manual start and stop of disinfection based on water tank level for treating small quantities of water.
- Disinfection time start.
- pH control during disinfection, so the radiation chambers are kept clean for longer and salts are unable to crystallize. This pH control can be enabled or disabled.
- Cleaning program for the radiation chambers.
- Delayed acid cleaning and delayed filter flushing.
- Four programmable periods a day allow cleaning to be performed during off-peak hours when electricity is cheaper.

Control remotely with Ridder Synopta

Operating the VitaLite couldn't be simpler. Each VitaLite can be connected to our Synopta management software that runs on a PC. This will give you fully integrated process control of your entire greenhouse!

The solution that fits

If you are interested in our VitaLite unit and would like to know more, please contact your local Ridder dealer. Based on your wishes and requirements, they can generate a quote for you online. This will not only provide you with a fast estimate of your investment cost, but will also tell you how quickly you can expect a return on your investment. Our dealers will be happy to assist you.

"We are glad to help, wherever you are in the world"

Ridder is a fast-growing international company with more than 300 enthusiastic employees, a global dealer network and offices in various countries. This enables us to stay close to our customers.

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