

VGE PRO

UV DISINFECTION SOLUTIONS



2020



MEMBER OF:  Sinvest Group BV



Company Introduction

VGE INTERNATIONAL B.V.

VGE International B.V. is a prominent company focused on improving people's lives through timely innovations. As a manufacturer we provide high-quality UV-C equipment for the private, recreational and industrial sectors. As a manufacturer of a unique range of UV-Cz disinfection systems, we provide high-quality products and harmonious collaboration with customers from our premises at the Ekkersrijt industrial area in Son, the Netherlands. We're proud to be a part of Holland's top technology region, the Brainport Region. We regularly introduce new products and we continuously improve our existing products. Environmental friendliness and saving energy are major points of interest at VGE International B.V. Years of experience (since 1982) have resulted in technically advanced products that are used in more than 70 countries around the globe.

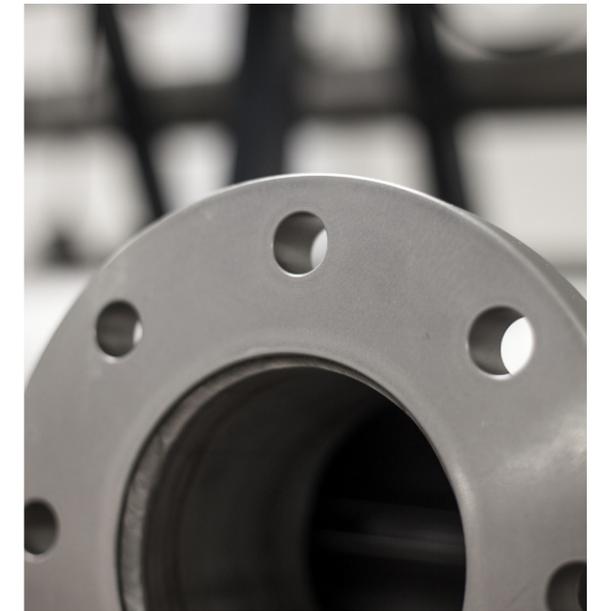


"Combining our passion for technology and knowledge of water"

Clean and safe water is of vital importance. That's why sustainable developments in the field of water disinfection are an important topic worldwide. As a manufacturer of professional UV-C equipment VGE International B.V. is well aware of this. We are therefore focused on new, sustainable developments, solutions and technologies in the field of water disinfection. We do this by combining our passion for technology and our knowledge of water, resulting in top-quality products and innovations.

VGE PRO: UV DISINFECTION SOLUTIONS

The VGE Pro product range consists of a complete range of industrial UV-C disinfection systems. The units provide a reliable and efficient disinfection of your water. VGE Pro UV-C disinfection systems are the finishing touch in a water treatment installation; they have the ability to keep the water free of bacteria, viruses, protozoa, algae and fungi. It is essential that the UV-C disinfection system seamlessly connects to the design and the components used in the water treatment installation. By choosing VGE Pro, you choose for guaranteed quality for a fair price.



WHAT MAKES THE VGE PRO UV-C SYSTEMS UNIQUE?

- VGE Pro UV-C units are equipped with a 316L Stainless Steel reactor or a high quality HDPE reactor.
- Lamp (re)placement while unit is pressurised.
- Each unit is equipped with transparent parts to monitor the UV-C lamp.
- VGE Pro units can be equipped with a UV-C sensor and/or watertemperature sensor.
- VGE Pro units are equipped with the unique Smart Pin Technology (SPT) (patented technology) for easy and safe lamp (re)placement without disconnecting electrical connection.
- Low pressure amalgam lamps for high performance levels irrespective of the temperature of the water.
- Extreme high quality lamps with a lifetime up to 16.000 hours!
- Single systems can handle flows ranging from 0,5 m³/h up to 550 m³/h.
- Customization of the device to your own specifications possible.

Featured applications:

Agriculture and horticulture

Whether there is a need to disinfect dirty drain water, preserved rain water or water used in hydroponic systems. VGE Pro UV-C systems ensure a reliable and efficient disinfection of the process water and makes re-use of the water possible without worrying about bacteria, fungi and viruses that can be harmful for your crops. In addition, VGE Pro UV-C systems in combination with an oxidator such as H₂O₂, can significantly reduce the amount of pesticides in the water.

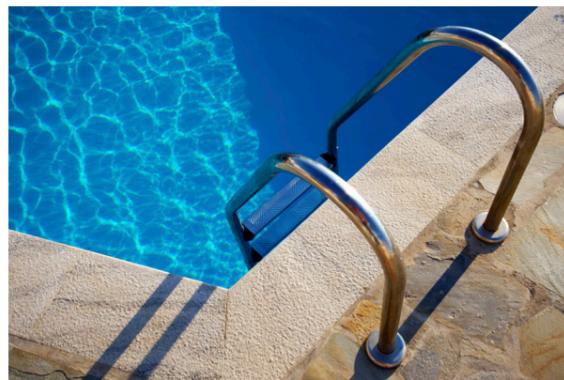


Aquaculture

Pathogens are the scourge of fish farmers and are often controlled with antibiotics. This has a negative impact on the water quality and thus also on the quality of the fish. UV-C radiation is safe and protects against fish diseases. This results in a pure, untainted product: better and healthier fish, without residual medications. In addition, VGE Pro UV-C systems are superbly suited to combat bacteriological and microbiological hazards and to bring water to the quality level the sector is required to meet.

Swimming pool and spa

The water quality in large private, commercial and public swimming pools and water parks is of great importance. Disinfecting swimming pool water with UV-C radiation is an environmentally friendly technology, which eliminates even chlorine-resistant microorganisms. This can reduce the chlorine concentration and use of other chemicals. The treatment of swimming pool water with UV-C radiation protects swimming enthusiasts against pathogens such as fungi, viruses, protozoa and bacteria. In addition, UV-C breaks down chloramines. This eliminates the unpleasant smell of bound chlorine and helps prevent red eyes and irritation of skin and the respiratory tract.



Swimming ponds

A balance in pond water ensures a pleasant swimming experience, but it is also important to maintain a healthy environment for plants and any fish you may have. UV-C disinfection eliminates microbiological contamination and floating algae, without the use of chemicals. The result is a clear, healthy pond that protects swimmers, plants and fish from pathogens such as fungi, viruses, protozoa and bacteria.



Food and process industry

Water used in production processes that comes into contact with products must be safe. VGE Pro UV-C systems take care of a reliable disinfection of the water which results in a healthier product. This microbial reduction ensures that products last longer and reduces spoilage. VGE Pro UV-C systems can also disinfect wastewater, making it perfectly suitable for reuse.

Drinking water and water reuse

Safety and hygiene are vital when it comes to drinking water. You want to drink water from the tap and use it for countless purposes without any concerns. VGE Pro UV-C systems ensure a reliable and efficient disinfection according to the legal and regulatory requirements. VGE Pro devices are also ideal for advanced oxidation.



MORE INFORMATION

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VGE Pro UV systems

Medium Pressure UV

A Medium Pressure UV system is always composed of a UV irradiation chamber and a control panel. The irradiation chamber is provided with one or two medium pressure UV lamp(s) which combines a compact design with a high lamp power. An inline design of the irradiation chamber has been chosen with a UV lamp placed perpendicular to the direction of the flow. This in order to obtain good irradiation of the water in combination with a very low hydraulic pressure loss. The choice of the irradiation chamber and the UV lamp type is tailored to the application in order to realize a reliable irradiation of the water with the least possible loss of pressure.

The medium pressure UV lamps emits a wide spectrum of Ultraviolet (UV) light gives very good disinfection results. The single ended lamp in combination with the S.B.T. and the on-chamber visual lamp status indication makes the systems extremely user friendly.

COMFORT CONTROLLER

The Comfort controller can be combined with a 600-85 and 1200-85 unit. It is suitable for a UV sensor, temperature sensor or a ModBus. The controller is available in different languages.



COMPACT CONTROLLER

The Compact controller is a basic controller, suitable for a Multimax and 600-85 unit. It's equipped with a LED lamp life indication.



Advantages:

- Compact chamber design
- Easy to (re)place single ended lamp
- Visual lamp indication in the lamp head
- Fast lamp replacement without tools
- Less use of chemicals
- Glass bead-blasted chamber of 316L stainless steel

- Effective chloramine reduction
- Cross flow irradiation chamber design with low pressure loss
- Electronic lamp power supply
- Long lamp life
- The internal irradiation chamber finish is RA 0,8 µm

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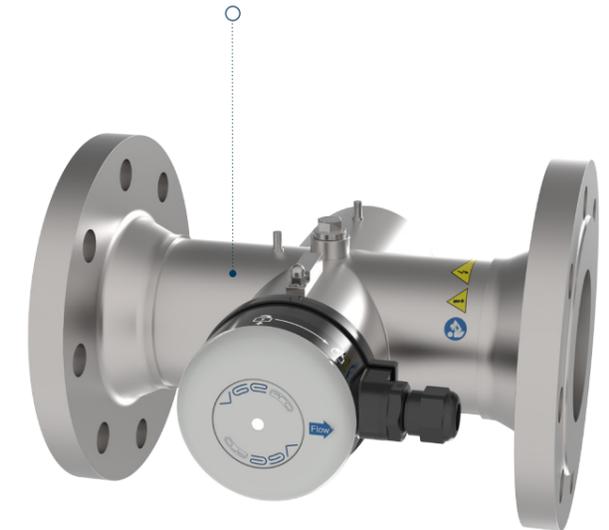
MULTIMAX

The Multimax is a perfect choice for private pools. With a 2" BSPT male thread and a 400 W S.B.T. lamp. Possible with a Compact controller



600-85

The 600-85 is perfect for installing in bigger systems because of the DN80 flange and comes with a 600 W S.B.T. lamp. Possible with a Compact or Comfort controller



1200-85

The 1200-85 ensures a reliable water treatment due to extra mixing of the water flow through the double lamped UV treatment chamber.



Single end Bayonet Technology (S.B.T.)

The lamp base is equipped with a bayonet technology closure. The lamp itself has one end which makes it easy to replace. The single-sided end ensures that the lamp can be installed in various ways, by only keeping one side free for replacement. The lamp also has a visual lamp indication.

Overview complete VGE Pro UV INOX or HDPE system

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○ VGE Pro UV-C control units

Each VGE Pro UV-C disinfection system is equipped with a control cabinet. There are several control units which can be combined with a suitable VGE Pro unit and several other options like a temperature sensor and a flow switch.

○ UV-C & temperature sensor

VGE Pro UV-C units can be equipped with a UV-C & temperature sensor. These digital sensors can be delivered in teflon (only the UV-C sensor) or stainless steel. The VGE Pro control monitors are designed to work with these UV-C & temperature sensors.



Smart Pin Technology

The VGE Pro UV-C disinfection systems are equipped with the unique Smart Pin Technology (SPT). This innovative system is a reliable way to integrate the UV-C lamp(s) in a safe, efficient and smart way in a reactor. The SPT makes it possible to replace the lamp safely, although the system is filled with water and pressurized.

BENEFITS

- Prevents the release of harmful UV-C radiation
- Changing the UV-C lamp with water in the system
- Resistant to corrosion
- Splash proof
- Visual inspection for operation of the lamp
- Clamping system for optimal seal function
- Lamp replacement without tools

○ Reactors

INOX

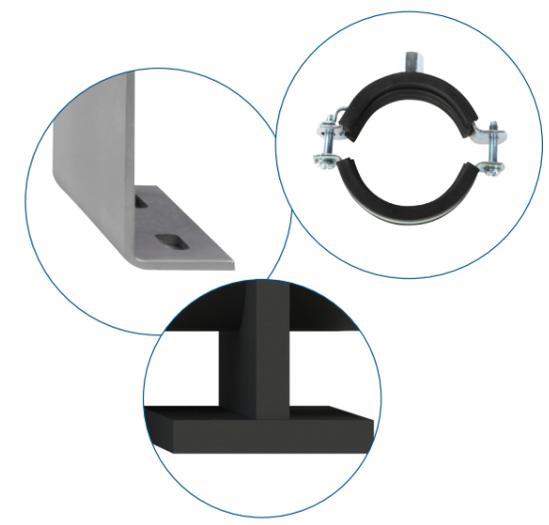
The high quality 316L stainless steel reactor of the VGE Pro INOX series have been designed to perform. After the high quality welding process the units are leak tested. After this process they get a pickling and passivation treatment which drastically improves the corrosion resistance and lifetime of the unit. Another last treatment with glass pearls (shot peening) gives the units a nice, matt grey surface.

HDPE

The high quality HDPE reactors of VGE Pro HDPE series have been designed to treat highly corrosive water. They are suited for all kinds of disinfection and UV-C treatment applications and can even be used for the production of ultrapure water, semiconductor-, pharmaceutical- and cosmetic industry. Other applications: swimming pools, saltwater systems, process water treatment and aquaculture.

Supports

The high quality reactors of VGE Pro series are or can be equipped with supports.



Overview complete VGE Pro UV INOX IMMERSION

Cable

The VGE Pro UV-C INOX Immersion units are equipped with a 9 metre long cable which can easily be connected to the control panel. The cable glands with strain relief protect the cable against kinks which improves the durability.



Fixture

The fixture is made out of 316L stainless steel which allows the use in multiple applications. Because of the grip surface on the operating parts no tools are required for installation or service, all can be done by hand.



Mounting and connection flange

The VGE Pro UV-C Immersion systems can be used in filter tanks and containers without introducing extra resistance of headloss. A special mounting and connection flange is available for installing a system in the wall of a tank or container, the wall thickness doesn't matter.



VGE Pro UV-C control units

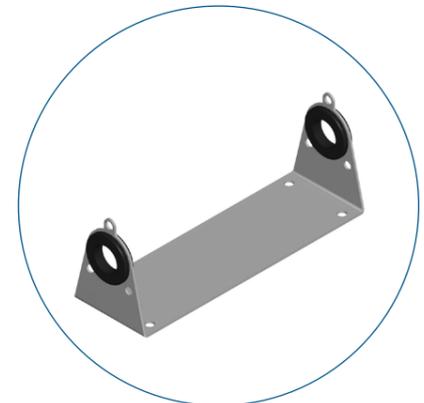
Each VGE Pro UV-C disinfection system is equipped with a control cabinet. Depending on the requirements the suited control panel can be selected in combination with a treatment chamber and selected options.

Lamp

The VGE Pro UV-C Immersion system can be delivered with several UV-C lamps, varying in power from 40 watt up to 325 watt. The lamp is installed in a protective quartz sleeve and can withstand vibrations and strong water flows. The UV-C lamps are based on amalgam lamp technology with a lamplife of 16.000 hours. This results in low maintenance costs.

Brackets

Special stainless steel mounting brackets are available for an easy and stable installation of the VGE Pro UV-C Immersion units. The brackets can be used for horizontal and vertical installation of the immersion units inside a tank or container. By installing multiple brackets on a frame the unit can also be immersed in a channel.



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Working pressure and depth

The immersion units are designed for a working pressure of 6 bar which results in an installation depth of 60 metre. The system can operate fully submerged.

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VGE Pro UV-C control units

For the VGE Pro UV-C systems 4 different control units are available, knowing: Basic, Control Timer, Control Monitor and Control Monitor Plus. The Basic version is suited with an electronic ballast to drive the lamp(s). The Control Timer has additionally a LED display for showing the operational lamp hours. The Control Monitor has a colour display and an optional UV sensor can be connected for monitoring the treatment process. The most complete control panel is the Control Monitor Plus. A UV sensor, temperature sensor and a flowswitch can be connected and the control unit has alarm and warning functions build in.

BASIC



CONTROL TIMER



CONTROL MONITOR



CONTROL MONITOR PLUS



Electronic lamp drivers

Standard the power supply of the UV-C lamps is realized by electronic ballasts which drive the lamps with a much higher frequency (over 30.000 Hz) compared to conventional electromagnetic ballasts (50/60 Hz). This has the following advantages:

- Higher ballast efficiency, so less heat production
- Longer lamp life of the UV-C lamps
- Higher UV-C lamp efficiency
- Direct start, no conventional ignitor required
- Some UV-C lamps require a short pre-heat time to improve lamp start and to increase lamp life. An electronic ballast can be perfectly set up to take care of this
- In some versions the power of the UV-C lamps can be adjusted stepless to prevent overdosing (energy loss).

Hour counter

If a UV-C lamp is in operation natural aging of the lamp will take place which results in a reduction of UV-C radiation and disinfection capacity. Therefore it is important to replace a UV-C lamp in time. An operational hours counter is a usefull tool to make sure that you change the UV-C lamp on time and keep up a reliable UV-C disinfection of your water.

Communication

Several ways of communication with a control unit are available such as: ModBus connection, analog 4 - 20 mA signal, via potential free contacts and of course via the HMI. By using these options the control of your disinfection process is easy and efficient.

Control functionality

Depending on the selected control units several control features are available for an optimal and efficient disinfection result. Also options as lamp power adjustment, remote control and communication are available for some control units.

Temperature monitoring

When there is no flow or water in the treatment chamber when the lamp is switched on, the temperature in the chamber can reach a dangerous level. Choosing for the optional temperature sensor in combination with the Control Monitor Plus the temperature inside the treatment chamber is monitored. If the limit is reached the system will be switched off and an alarm will be activated.

UV-C intensity measurement

The VGE Pro UV-C systems can optionally be equipped with a UV sensor to measure the UV-C intensity inside the treatment chamber. Depending on the application a certain UV-C intensity must be realized for a reliable disinfection result. The measured UV-C intensity is affected by the natural aging of the lamp, fouling of the quartz sleeve/ measuring window and by a changing water quality. The digital UV sensor is available in a SS or Teflon execution.

Multilingual

The display language of the Control Monitor and Control Monitor Plus are selectable for an easy configuration and operation.

Flowswitch

A flowswitch can be connected to the Control Monitor and Control Monitor Plus to switch off the UV-C system when there is no water flow through the treatment chamber. This to prevent malfunctioning of the system.

Advanced Oxidation Processes

Advanced Oxidation Processes (AOP): are chemical treatments methods to reduce organic and inorganic components from water via oxidation. AOP's use the oxidative power of the hydroxyl radical ($\bullet\text{OH}$), which has the second best oxidation potential and is the strongest oxidiser that can be used in water. The $\bullet\text{OH}$ radical, which can be generated by combining UV-C radiation with f.i. H_2O_2 or ozone, can be used to reduce or eliminate micropollutants (bio-, pesticides, pharmaceutical residuals, heavy metals, etc.) in your water. The process converts the contaminant materials to a large extent in stable compounds such as water, carbon dioxide and salts, i.e they are mineralized. In general, when used in the correct way, AOP's can significantly reduce the COD and TOC levels in your water. In general it is advised to apply the AOP as final treatment step in a water treatment system so that all natural present scavengers of the hydroxyl radical are reduced as much as possible, especially bicarbonate ions (HCO_3^-) are a strong $\bullet\text{OH}$ scavenger.

Possible AOP applications

Although there are many applications for AOP, three types of AOP applications provide effective treatment and are cost effective when compared to other technologies, being:

- Micropollutant treatment;
- Treatment of taste-and-odour compounds;
- Recycled water treatment.

VGE International B.V. has a modular system in its extensive portfolio which can handle any flow no matter the water quality. In some cases, depending on the pollutant, UV-radiation can oxidize undesired components from your water directly without any additive, this process is called photolysis which also can be realised with our modular UV system.



Overview VGE Pro products and applications

VGE PRO INOX

Model	Reactor shape	Max. pressure [bar]	Connection	Capacity ⁽¹⁾ [m³/h]	Quality water ⁽²⁾			Aquaculture	Agri- & Horticulture	Food & Process industry	Drinking water	Swimming ponds	Swimming pool & Spa
					Good	Medium	Bad						
400-54	Z	6	1"	18		✓	✓		✓				
40-76	L	6	3/4"	3	✓	✓		✓	✓	✓	✓	✓	✓
75-76	L	6	3/4"	6		✓		✓	✓			✓	
140-76	U	6	1 1/2"	12	✓	✓		✓	✓	✓	✓	✓	✓
200-76	U	6	2"	17	✓	✓		✓	✓	✓	✓	✓	✓
75-114	U	6	2"	10	✓	✓		✓	✓	✓	✓	✓	✓
140-114	U	6	2"	20	✓	✓		✓	✓	✓	✓	✓	✓
200-154	U	6	DN80	38	✓			✓		✓	✓		✓
420-168	U	6	3"	78	✓	✓		✓	✓	✓	✓	✓	✓
400-204	U	6	DN100	92	✓			✓		✓	✓	✓	✓
600-219	U	6	DN125	140	✓			✓		✓	✓	✓	✓
975-306	L	6	DN250	306	✓			✓		✓	✓	✓	✓
1950-306	L	6	DN250	600	✓			✓		✓	✓	✓	✓

VGE PRO HDPE

75-110	U	6	2"	10	✓	✓		✓	✓	✓	✓	✓	✓
140-110	U	6	2"	17	✓	✓		✓	✓	✓	✓	✓	✓
200-110	U	6	2"	23	✓	✓		✓	✓	✓	✓	✓	✓
200-160	U	6	DN80	35	✓	✓		✓	✓	✓	✓	✓	✓
400-200	U	6	DN100	83	✓			✓		✓	✓	✓	✓
600-225	U	6	DN125	124	✓			✓		✓	✓	✓	✓
975-315	U	2	DN150	278	✓			✓		✓	✓	✓	✓
1950-315	U	2	DN200	544	✓	✓		✓		✓	✓	✓	✓

VGE PRO INOX 3S/3L

3S	L	6	3/4"	2,7	✓	✓		✓	✓		✓	✓	✓
3L	L	6	3/4"	5,7	✓	✓		✓	✓		✓	✓	✓

VGE PRO UV INOX MP

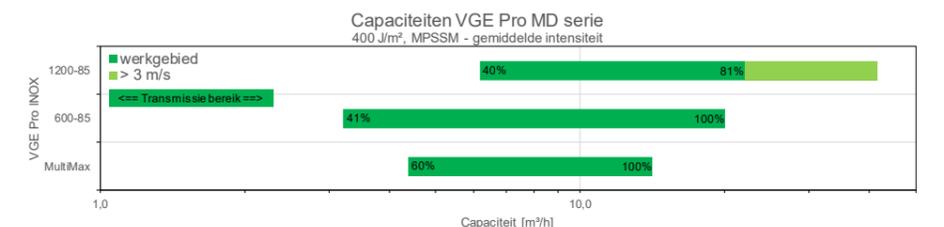
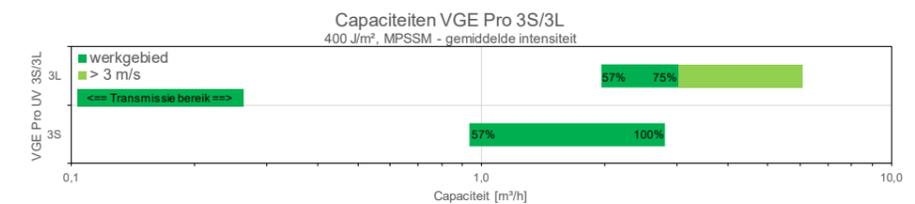
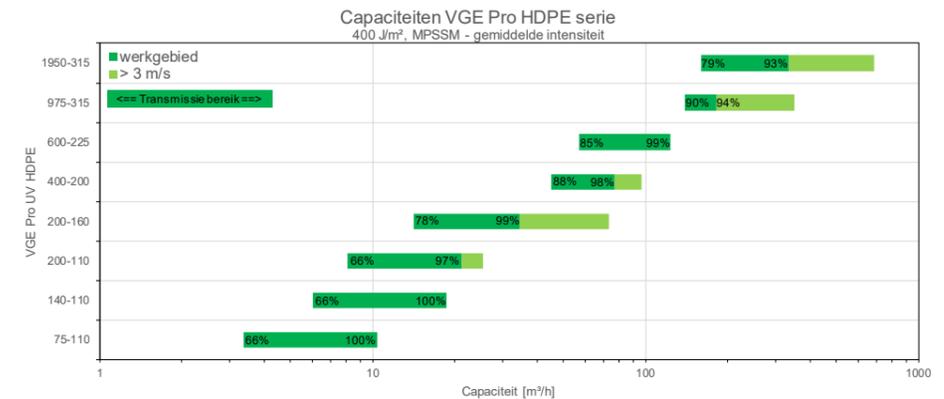
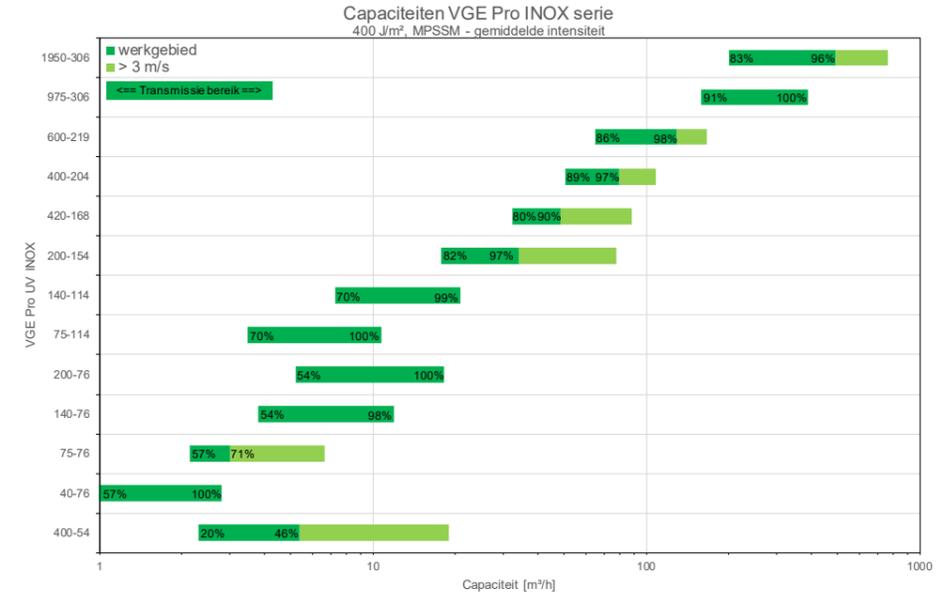
MultiMax	I	10	2"	13,3	✓	✓		✓	✓	✓	✓	✓	✓
600-85	I	10	DN80	18,7	✓	✓	✓	✓	✓	✓	✓	✓	✓
1200-85	I	10	DN80	38,5	✓	✓	✓	✓	✓	✓	✓	✓	✓

⁽¹⁾ Capacity based on 400 J/m², T_{10mm} @ 254 nm = 98 %, MPSSM-average intensity (max. flow of 3 m/s not included)

⁽²⁾ Water quality based on water transmission, T_{10mm} @ 254 nm: Good = 100 % - 80 %, Medium = 80 % - 50 %, Bad < 50 %

Capacity VGE Pro series

The diagrams give an impression of the working range of the listed VGE Pro UV-C systems. Within the specified quantity and quality range (capacity and transmittance of the water) a reliable disinfection of the water with an UV-C dose of 400 J/m² is realized. For other UV-C dosages, transmittances or flow rates please contact us for a specific specialized advice.



An UV-C dose of 400 J/m² equals 40 mJ/cm² and the transmittance of the water is measured with UV-C light (254 nm) through 10 mm of water.

Combinations of VGE Pro reactors and controllers

VGE PRO INOX

Reactor	Basic	Control Timer	Control Monitor	Control Monitor Plus
400-54 *	-	-	-	-
40-76	✓	✓	✓	-
75-76	✓	✓	✓	-
140-76	✓	✓	✓	✓
200-76	✓	-	✓	✓
75-114	✓	✓	✓	-
140-114	✓	✓	✓	✓
200-154	✓	-	✓	✓
420-168	✓	-	✓	✓
400-204	✓	-	-	✓
600-219	✓	-	-	✓
975-306	✓	-	-	✓
1950-306	✓	-	-	✓

* Always a customized solution

VGE PRO HDPE

Reactor	Basic	Control Timer	Control Monitor	Control Monitor Plus
75-110	✓	✓	✓	✓
140-110	✓	✓	✓	✓
200-110	✓	-	✓	✓
200-160	✓	-	✓	✓
400-200	✓	-	-	✓
600-225	✓	-	-	✓
975-315	✓	-	-	✓
1950-315	✓	-	-	✓

VGE PRO INOX MP

Reactor	Compact controller	Comfort controller
MultiMax	✓	-
600-85	✓	✓
1200-85	-	✓

VGE PRO INOX 3S/3L

Reactor	Basic	Control Timer	Control Monitor	Control Monitor Plus
3S	-	✓	-	-
3L	-	✓	-	-

VGE PRO UV INOX IMMERSION

Immersion unit	Basic	Control Timer	Control Monitor	Control Monitor Plus
40	✓	✓	✓	-
75	✓	✓	✓	-
80	✓	✓	✓	-
130	✓	✓	✓	✓
200	✓	-	✓	✓
325	✓	-	-	✓

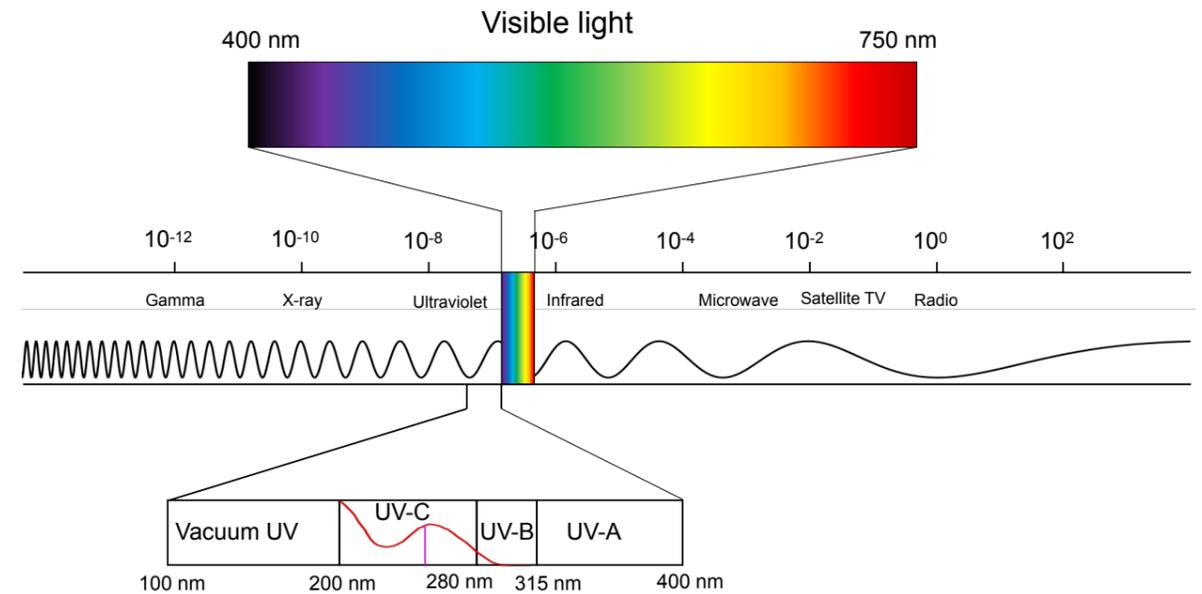
- Basic:** Lamp power supply
- Control Timer:** Lamp power supply, LED display indicating remaining lamp lifetime
- Control Monitor:** Lamp power supply, basic control functions, optional UV sensor
- Control Monitor Plus:** Lamp power supply, extensive control functions, optional UV sensor, optional temperature monitoring
- Compact controller:** Lamp power supply, LED lamp life indication
- Comfort controller:** Lamp power supply, LED lamp life indication, optional UV sensor, optional temperature sensor, optional ModBus

More information at page 10 and 11.

UV-C Treatment

UV light can be divided in four main categories, UV-A, UV-B, UV-C and Vacuum UV. The UV-C spectrum (200 to 280 nanometers) is the most lethal range of wavelengths for microorganisms. UV-C light has the ability to cause permanent damage to microorganisms. Each type of microorganism requires a specific UV-C radiation exposure rate to successfully complete the disinfection process. The targeted microorganism must be directly exposed to the UV-C radiation long enough for the radiation to penetrate the microorganism's cell wall. However, it takes only a fraction of a second for UV-C light rays to inactivate waterborne microorganisms by breaking through the microorganism's cell wall and damaging their DNA. This often totally destroys the organism, or at the very least will impair its ability to reproduce.

Electromagnetic spectrum





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