

Automatic desinfection of surfaces



in professional kitchens and in the health sector

Efficient desinfection – without manual procedures, chemicals or water

With the introduction of the UV-C-based desinfection of surfaces, we now add yet another field of application to our patented UV-C technology, which has been awarded the EU Environmental prize and which since 1993 has been used in self-produced air cleaners – systems which i.a. are used for removing obnoxious smells, improving the indoor climate as well as reducing the danger of fire and infection. .

The fact that it is now possible to disinfect surfaces, which would normally require a manual treatment, involves a large number of advantages for the operating economy, the environment as well as the work environment.

Why choose an automatic desinfection of surfaces?

- ▶ You will avoid time-consuming manual desinfection with water and chemicals
- ▶ You will save litres of water by the thousand as well as energy for heating and drying
- ▶ You will desinfect more efficiently in corners, chinks and ventilation ducts, cooling surfaces.
- ▶ You will avoid strong chemicals, which have an impact on the environment and work environment
- ▶ Avoid an environmentally harmful release of chlorinated waste water

Fast payback

The desinfection module can with advantage be used with Jimco's UV-C air sterilization solutions that are typically installed in connection with existing ventilation systems. In this way, the customer will have a total solution, which cleans the air in the production rooms during working hours – and desinfects all surfaces after closing time, when the daily cleaning of machines and surfaces is complete and there are no longer any people in the room.

The start-up can take place automatically via a foregoing programming, e.g. when a given process is ended, or manually by pressing a button, when the last person leaves the room. Besides production rooms, the solution can with great advantage be applied in i.a. cooling and storage rooms, laboratories as well as in the health sector for the desinfection of bed units, etc.

In most environments, the system will provide savings on manpower, water and heat in amounts that are so high that the repayment period will only last approximately one year.

**JIMCO A/S is receiver of:
the EU Environmental Award
1999-2000 for Cleaner Technology**

Very positive results – of tests as well as practical use

Prior to the introduction of our solutions for UV-C & Ozone-based disinfection, we have for some time conducted full scale tests in various companies in co-operation with DTU (Technical University of Denmark) and The National Institute for Aquatic Resources. The results were very positive.

Furthermore, various tests carried out in co-operation with The South Danish university have shown that concentrations of for instance listeria and salmonella bacteria can be almost completely removed by means of our technology and within only one hour.



Hygiene that is on level with or better than traditional disinfection

At the fish factory Vega Salmon A/S in Esbjerg, Jimco's system for UV-C & Ozone-based disinfection has been installed in the production. Tests from the factory show that the total bacterial concentration after a UV-C & Ozone-based disinfection is better/lower than after a traditional disinfection. At the same time, the concentration of fungal spores is reduced. This goes to prove that saving tons of water and chemicals has no hygienic consequences.

**- Find out how much
you can save...**

- It is easy to calculate the amount of savings that your company will be able to gain in terms of manpower, water, heat, electricity and chemicals simply by shifting to an automatic, environmentally and work environment friendly disinfection.

Solutions for UV-C & Ozone-based disinfection can be rented at Jimco A/S, and at our dealers.



Contact us for further references

JIMCO A/S

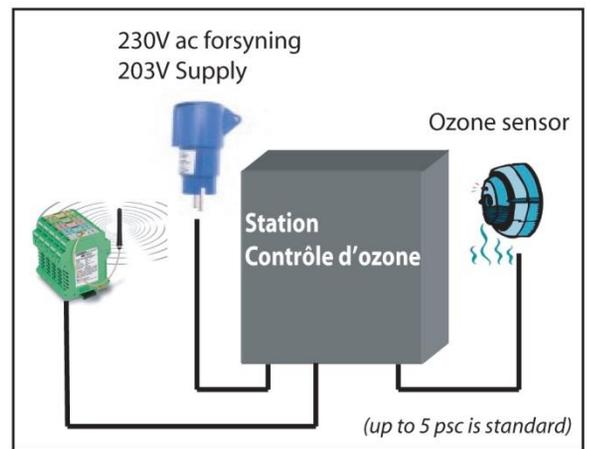
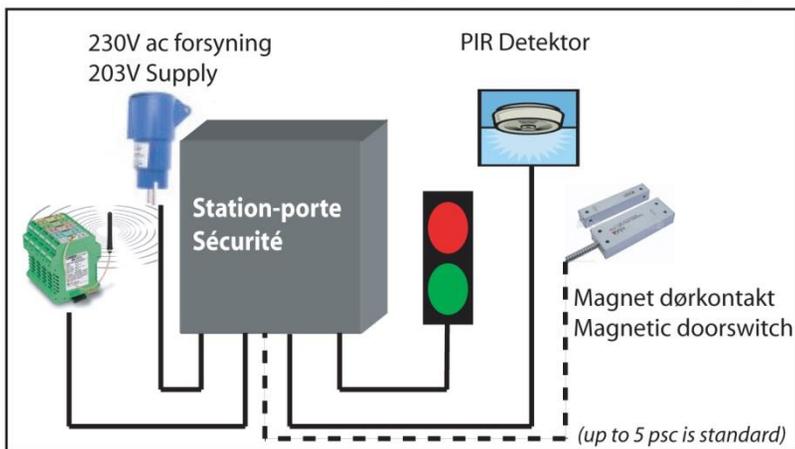
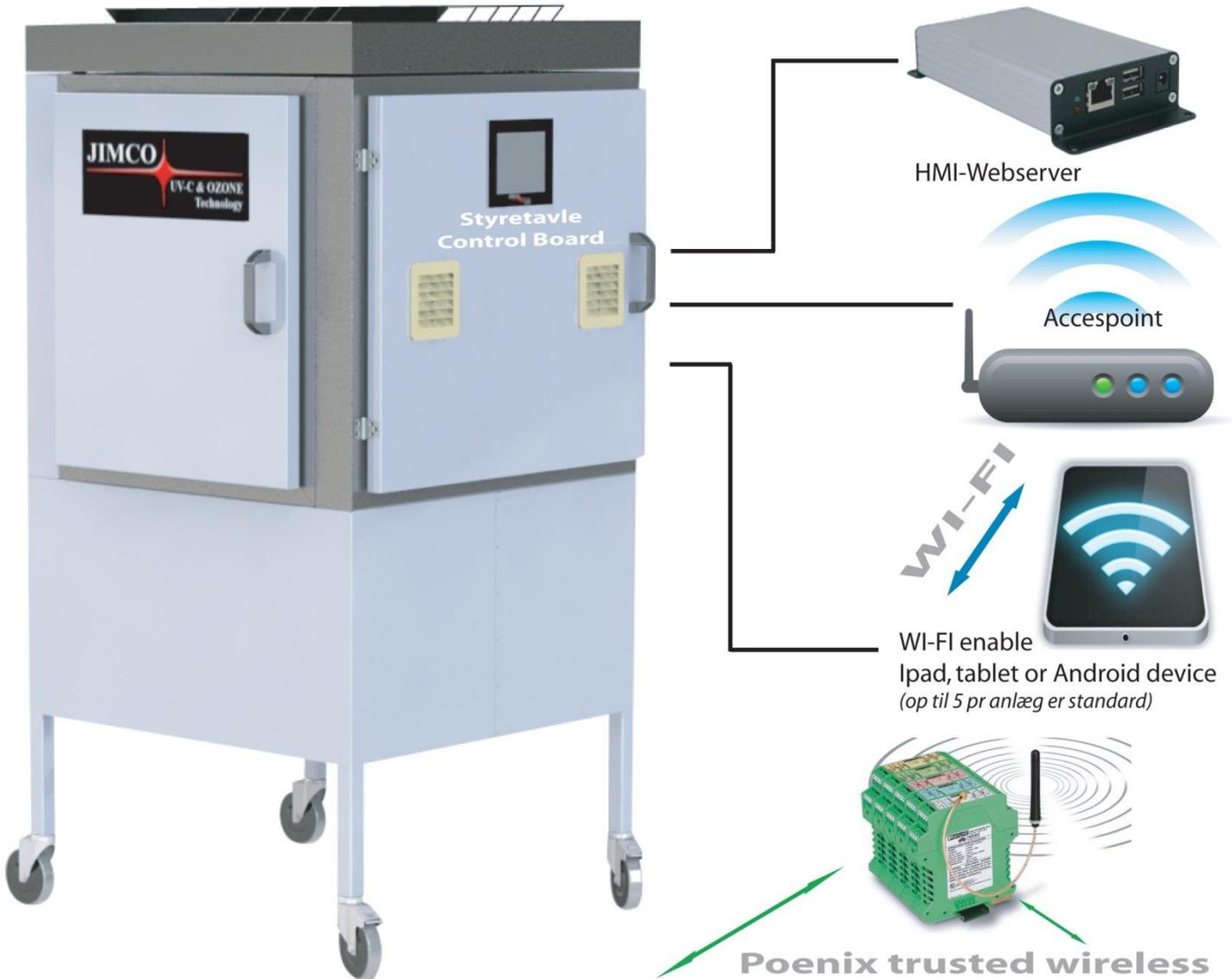
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Please call us for additional information – we shall be pleased to assist you!

FLO-D Technology Flow:



- Each input is monitored by PIR sensor or magnetic door switch

There are warning lamps at each input
Status of ozone levels can be read via FLO-D's website outside the room with handheld Web browser (tablet, Iphone etc)

- All signals from the doors and ozone sensor handled wirelessly. However, all stations must have a 230V supply.

Single-station and measuring stations are up to: 5 pieces per. installations by default, but it is possible to connect multiple.



Test of Jimco FLO-D disinfections equipment based on UV-C/Ozone

UNIVERSITY OF SOUTHERN DENMARK

Aim of project

To investigate the bactericidal effect of UV-C produced ozone on chosen bacteria strains that are regarded as relevant contaminants in the food processing industry. Furthermore, it was desirable to determine a setting for the ozone concentration and the time of exposure, in achieving the desired effect.

Experimental setup

The test were performed in a specially design ozone chamber, where the ozone concentration and the temperature were measured during the experiments. 10 µl of bacteria culture was applied on stainless steel plants and spread to an area of 1 cm². The bacteria culture was diluted in sterile milliQ H₂O to a concentration of 10⁵-10⁷ cells/ml. The steel plates were incubated at room temperature for one hour until the applied culture had dried out. The plants were then placed in the ozone chamber and ewposed to various ozone concentrations for time point.

Exposure time	Ozone concentration	Loaded	Control	Ozone	Reduction
		CFU/cm ²	CFU/cm ²	CFU/cm ²	
2 hour	10 ppm	2,40E+03 (2400)	4,00E+00 (4)	0,00E+00 (0)	
		3,30E+03 (3300)	8,00E+00 (8)	0,00E+00 (0)	
		3,00E+03 (3000)	7,00E+00 (7)	0,00E+00 (0)	
			1,60E+01 (16)	0,00E+00 (0)	
	Average	2,90E+03 (2900)	8,75E+00 (8,75)	0,00E+00 (0)	100,00%
2 hour	10 ppm	2,00E+04 (20.000)	3,00E+00 (3)	0,00E+00 (0)	
		2,00E+04 (20.000)	1,40E+01 (14)	0,00E+00 (0)	
		2,00E+04 (20.000)	2,80E+01 (28)	0,00E+00 (0)	
			1,50E+01 (15)	0,00E+00 (0)	100,00%
	Average	2,00E+04 (20.000)	1,50E+01 (15)	0,00E+00 (0)	100,00%
2 hour	10 ppm	3,60E+04 (36.000)	3,00E+01 (30)	0,00E+00 (0)	
		2,20E+04 (22.000)	1,13E+02 (113)	0,00E+00 (0)	
		2,60E+04 (26.000)	3,40E+01 (34)	0,00E+00 (0)	
			5,90E+01 (59)	0,00E+00 (0)	100,00%
	Average	2,80E+04 (28.000)	5,90E+01 (59)	0,00E+00 (0)	100,00%
2 hour	10 ppm	3,60E+05 (360.000)	3,98E+02 (398)	0,00E+00 (0)	
		2,20E+05 (220.000)	2,85E+02 (285)	1,00E+00 (1)	
		2,60E+05 (260.000)	2,97E+02 (297)	0,00E+00 (0)	
			3,27E+02 (327)	3,33E-01 (0,33)	99,90%
	Average	2,80E+05 (280.000)	3,27E+02 (327)	3,33E-01 (0,33)	99,90%

Bacteria survival was measured by washing the applied area on the steel plates with 2x50 µl 0,9 % NaCl, which was obtained and spread on agar plates for CFU determination by overnight incubation at 37 °C. As a reference, the CFU of bacteria applied on stainless steel that were not exposed to ozone, was also performed. The experiments were preformed at room temperature that did not exceed 23 °C during the experiments

Conclusion

In these sxpperiments the largest effect was observed after two hours of exposure at 10 ppm. When the time exposure was reduced to one hour, or the concentration of ozone was lowered to 5 ppm the reduction og bacteria wad distinctively decreased. Futhermore, the effect of ozone was limited by the amount og bacteria applied on the steel plates.

When the level of bacteria exceeded 10⁵ bacteria per cm², the effect of ozone also decreased after two hours of exposure at 10 ppm.

-However, with a reduction that is within the accepted rage. Also, this amount of bacteria exceed the level of what would be representative of well cleaned food production facilities wich is the premise for the application of the device..

