ZERO+

Air purification with UV light and ozone for restaurant and catering ventilation

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Specially developed for restaurant ventilation

UVtech ZERO+ is specially developed for the big challenges in commercial kitchen ventilation: removing grease and reduce odour concentration, while being designed for easy maintenance and cost-effective servicing. ZERO+ is mounted directly in the filter housing of the kitchen ventilation hood, which keeps the entire ventilation system clean of grease and makes the equipment easily accessible for pipe wiping. When it's time for servicing, the UV tubes are replaced more easily than standard fluorescent tubes, saving time and costs.

Prevents grease build-up in ventilation systems

UVtech ZERO+ is mainly used in restaurant environments to prevent the build-up of grease deposits in the ventilation system. ZERO+ should be installed as a complement to a well-functioning ventilation hood for restaurants with effective mechanical grease filters. ZERO+ then breaks down the grease into polymerised carbon compounds. Thanks to this, the ventilation ducts can be kept free of grease all year round.

Olfactometer tested equipment

Odour reduction can only be measured in a standardised way: via olfactometer testing. UVtech is the only manufacturer of UV purifiers to report the results of olfactometer tests carried out by independent test institutes. For ZERO+ in combination with cartridge carbon filters, the odour reduction is between 74% and 96%.

What is an olfactometer test?

Olfactometer test standardised according to European standard DIN EN 13725 and is a test used to describe the odour concentration in an air sample.

A panel of qualified assessors performs the odour assessment and can determine how much the odorous sample must be to eliminate the odour. This dilution factor is referred to in the Convention as the odour concentration and is measured in a are called GEE/m³.

Reduction of organic odours

In addition to preventing the build-up of grease deposits, ZERO+ also reduces the odour concentration in the exhaust air. UVtech ZERO+ provides the best conditions for effective reduction of organic odours.

Organic odours are incredibly complex in their chemical composition; thousands of substances with different chemical bases and odour characteristics occur in different mixtures and concentrations. The combination of treatment with UV light, ozone and specific radicals means that ZERO+ solves the problem of complaints about odours from local residents. M&H believes that local residents should not be disturbed by a constant and intrusive odour load. But at the same time, M&H says that in an urban environment, residents must expect the occasional odour of, for example, exhaust fumes, rubbish or perhaps food fumes from a restaurant. Installing ZERO+ solves the problem of constant odour nuisance and therefore provides an alternative to having to move, or even having to close a business.

Cost-effective

For a restaurant, the investment calculation is always simple: the costs of investing in UVtech ZERO+ are more than covered just by the fact that the annual costs of cleaning the ducts can be reduced by up to 75%. Other costs, such as energy costs, can also be drastically reduced thanks to ZERO+.

For a restaurant facing an injunction from Environment & Health due to complaining neighbours, the savings can be huge as ZERO+ offers a simple and effective solution to odour problems. Not having to close or move the business saves a huge amount of money.

Simple service

Unlike other air purifiers, ZERO+ is very easy to service: the UV tubes are easier to change than the fluorescent tubes in a standard light fitting.

Thanks to this, replacing the UV tubes can be done in less than ten minutes, compared to several hours for other air purification techniques. Saving both time in the kitchen and costs.

Enabling heat recovery in catering kitchens

Because ZERO+ effectively removes the grease from the kitchen exhaust air, heat recovery units serving the restaurant can be designed in - and the exhaust air from the kitchen hoods can also pass through.

Savings of hundreds of thousands of kWh each year can be unlocked by installing ZERO+ in restaurant exhaust air. Note here that UVtech recommends using rotary exchangers only in cases where the heat exchange takes place only within the restaurant cell. If the exhaust air from the restaurant is to be exchanged for supply air to other spaces such as offices, shops or apartments, rotary exchangers should be avoided as no exchanger supplier can guarantee that odour contamination can always be 100% avoided.

References

Salt & Brygga, Malmö

The transformation of the old Kockumsvarvet shipyard in Västra Hamnen in Malmö began with the Bo01 exhibition, which showed construction at its best, both technically and in terms of design. The former director of Malmö Konsthall installed this exclusive restaurant on the site. He has made huge demands on the environment and won international awards for his organic and eco-labelled brand.
Naturally, the ventilation solution had to follow in the same footsteps, and ZERO+ air purification has been installed in the kitchen hood. Today, the exhaust air is released onto the roof in the direct vicinity of exclusive penthouses and associated terraces, without the neighbours feeling disturbed by Salt & Brygga.

Crown Casino, Melbourne

The Crown Casino almost forms its own little district in Melbourne, its buildings spread out over several blocks along the Yarra River that runs through the city centre. As Australia's largest and one of the world's most visited casinos, it has players visiting from all over the world.
With over fifty restaurants, Crown's management has realised the huge savings in maintenance costs that can be made by eliminating grease from the ventilation system. The investment in ZERO+ cleaning pays for itself in less than 18 months thanks to reduced costs for cleaning ventilation ducts. In addition to the cost savings, the reduced fire risk is also a key factor, especially in the restaurants on the 40th floor that serve the VIP lounges at the top of one of the hotel towers.

RMS Queen Mary 2, World Harbour

Queen Mary 2 is one of the world's most exclusive cruise liners, mainly making transatlantic crossings, but once a year she also embarks on a round-the-world cruise.
She can take on board just over 3,000 people who want a few days of total relaxation and enjoyment. Of course, a ship of this calibre should have the latest equipment to avoid guests being disturbed by unwanted odours. But perhaps even more importantly, any risk fire must be prevented so that it is reduced to an absolute minimum.

Technical specification

Product description

ZERO+ is a standardised system of cassettes with UV tubes that are mounted directly in the filter housing of the ventilation hood using standardised fasteners. ZERO+ fits the vast majority of professional hoods on the market today.

The ZERO+ has a double integrated safety system that ensures that the UV tubes are always switched off if the exhaust fan stops or if the UV tubes are made visible by, for example, someone removing a grease filter from the ventilation hood. The control system displays operating time, three different types of alarms, reminders for cleaning intervals (programmable) and a warning that the replacement of the UV tubes is .
The control system can be connected and programmed to pass on two of the three alarms to the higher-level monitoring system via the NC/NO port.

Assembly

ZERO+ is preferably mounted directly in filter housing in the ventilation hood. ZERO+ is installed mechanically using standardised fasteners. The integrated safety system is easily installed by attaching hoses to the supplied nipples. The electrical connection is made to a normal single-phase 230 V earthed socket, which is advantageously connected via an external work switch.
The control panel of the control system displays reminders for cleaning and any alarms. It should therefore be placed in a location where it is regularly checked by service personnel.

Operation & Maintenance

UV tubes require cleaning at regular intervals. UVtech's general recommendation is that the tubes are cleaned every two weeks. When cleaning, the tubes are wiped with damp micro cloth, normally no cleaning agent is needed.
UV tubes have a lifetime of 12,000 hours or 2 years, whichever comes first. After that they need to be replaced. The control system includes functions for both cleaning schedule reminders (programmable) and warnings when the life of the UV tubes is coming to an end.

Technical data: See table on last page.

Project guide

ZERO+ is designed in 5 steps.

1 Determine the location of ZERO+.

1.1 ZERO+ cassettes are always placed in the filter housing of the ventilation hood, which automatically means that cleaning always starts as close as to the source of grease and odours.

1.2 ZERO+ is only needed in hoods above machines that emit grease. For example, ZERO+ is not normally used in dishwashing or condensing hoods.

1.3 In order to achieve complete purification, the exhaust air, after leaving the hood's filter housing, must have a residence time of at least 2 seconds inside the ventilation duct before it reaches the unit, or before it is released into the environment. Shorter reaction times risk poorer treatment results.

2 Dimensioning ZERO+ cassettes.

2.1 ZERO+ is dimensioned based on the calculated exhaust air volume. Note also that the calculation for exhaust air is done in the traditional way without changes even when the project includes UV treatment. The cassettes are named by their capacity in l/s, for example a ZERO+400 has the capacity to treat a total exhaust air flow of 400 l/s. The total capacity of the selected cassettes in the filter housing should be equal to or greater than the amount of air extracted.

2.2 Then check that there is physical space for the selected cassettes and that the cassettes can also be positioned so that all the connections in the filter housing can be completely covered by the UV tubes in one of the selected cassettes. The capacities and dimensions of the cassettes are given in Table 1 on the last page. The three different standard lengths and the three different power modes are specifically designed to ensure that it is always possible to assemble a set of cassettes that fits a commercial kitchen ventilation designed according to our local calculation model.

3 Check the kitchen machinery.

3.1 If the kitchen equipment includes any of the following machines: Go to point 3.2.
the kitchen does not contain the following machines: Go to point 4.1.

- charcoal grill
- Gas grill
- Broiler

3.2 In cases where the kitchen is specified with any of the three above, special solutions are required for the air purification in the hood located above the machines. This is due to the extremely high temperatures and the risk of excessive soot: we recommend contacting us at UVtech for rapid assistance with the design of a special solution.

4 Check conditions at the exhaust air valve.

4.1 In cases where ZERO+ is installed in a ventilation system where the exhaust air is released in the direct vicinity of the area where people are permanently present, for example in a courtyard, loading bay, garage or similar, ZERO+ must be combined with an activated carbon filter of the cartridge type. This is because the residual ozone in the exhaust air from the process can otherwise be perceived as a disturbing odour in itself.
The carbon filter should then be placed as close to the exhaust air outlet as possible and always after the two-second reaction time according to point 1.2 above. It is also important that the air passes slowly through the carbon filter, so the number of carbon filter cartridges should be designed so that the pressure drop across the carbon filter does not exceed 30Pa.

Example: Design guide

New construction of a restaurant in the ground floor of a shopping centre. Projected exhaust air flow: 1000 l/s. 800 l/s from kitchen hood and 200 l/s from dishwasher hood. Ventilation hood in the kitchen 2400x1100 with filter house with 2 pieces of nozzles Ø400 symmetrically placed with CC dimension 800. The ventilation duct Ø500 runs 11 metres through the building to the shopping centre's garage where the fan is located just before the wall of the garage and the exhaust air outlet is located on the other side of the wall near the garage exit.

1

1.1 The location of the ZERO+ cassettes is marked on the ventilation drawing in the filter housing of the ventilation cabinet.

1.2 ZERO+ cassettes are only placed in the kitchen hood, not in the dishwasher hood.

1.3 Reaction time check: 1000 l/s at Ø500 gives 5.1 m/s air velocity in the duct. From the ventilation hood there are 11 metres of ventilation duct left before the fan and exhaust. The minimum reaction time is 2 seconds, which means that 2*5.1=10.2 metres of duct are required before the fan or exhaust. There are 11 metres , which means that the reaction time is sufficient.

2

2.1 Total exhaust air flow in the kitchen hood is 800 l/s and the total length of the hood 2400 mm means that we have two suitable choices:

a) 1xZERO+825 Total capacity: 1x825=825l/s> 800l/s = OK. Physical location: 1x1690=1690< 2400= OK.

b) 2xZERO+400 Total capacity: 2x400=800l/s > 800l/s= OK. Physical location: 2x930=1860< 2400= OK.

2.2 Both options mean that both bumpers can be covered with UV tubes:

a) A cassette 1690 mm long can be positioned to cover both bumpers

b) The two cassettes can be positioned so that they each cover a different spigot. In this case, the projector selects 1 x ZERO+825

3

3.1 The equipment list is checked against the three listed machine types. The kitchen is not specified with any of these.

3.2 Not applicable in this example. However, you are of course always welcome to contact UVtech for assistance with the design anyway.

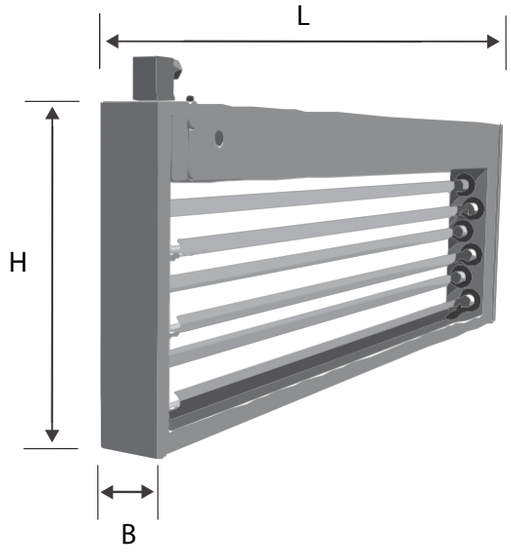
4

4.1 The air outlet is located inside the garage where people are present. Therefore, the installation must be completed with an activated carbon filter. 48 filter cartridges in filter cabinets measuring 1200x900x700 are placed just before the exhaust air unit.

The pressure drop across the filter is then 20 Pa.

Table 1 ZERO+ cassettes

Designation	Capacity		UV tubes		Fire data	Dimensions (mm)	
	(l/s)	(m³/h)	Length	Number	(V/W)	LxHxW	
ZERO+205	200	720	410	4	230 / 65	450x328x65	
ZERO+305	300	1080	410	6	230 / 100	450x328x65	
ZERO+200	200	720	870	2	230 / 80	930x145x65	
ZERO+400	400	1440	870	4	230 / 160	930x315x65	
ZERO+600	600	2160	870	6	230 / 240	930x145x65	
ZERO+275	275	1000	1640	2	230 / 160	1690x145x65	
ZERO+550	550	2000	1640	4	230 / 320	1690x315x65	
ZERO+825	825	3000	1640	6	230 / 480	1690x315x65	



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