

DUCT

Air purification with UV light and ozone for direct installation in ventilation ducts



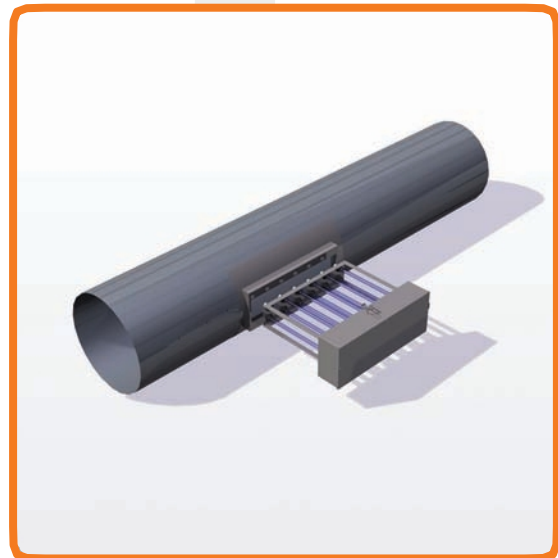
Flexible air purification for all types of exhaust air systems

UVtech DUCT is a compact air cleaner that effectively removes grease and reduces odours in the exhaust air. DUCT is installed directly in the ventilation duct with the help of a simple adapter and is ideal when a pre-built exhaust air system needs to be supplemented with effective air purification, or when, due to lack of space or other physical limitations, the air purifier needs to be placed somewhere along the route of the exhaust air duct. DUCT can be used with advantage in the exhaust air in both general ventilation and in restaurant and process ventilation.

Reduction of organic odours

The most common use for DUCT is to reduce the odour load in the exhaust air. UVtech DUCT 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 UVtech DUCT can solve most situations where neighbours or nearby residents complain about disturbing odours from a process.



Environment and Health makes the assessment that local residents should not have to be disturbed by a constant and intrusive odour load. Installing DUCT solves the problem of constant odour load and therefore provides an alternative to having to move, or having to close a business where you have received an injunction from Environment & Health.

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 testing institutes. For DUCT 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.



Prevents grease build-up in ventilation systems

In addition, UVtech DUCT is often used in catering environments to prevent the build-up of grease deposits in the ventilation system.

DUCT should be installed as a complement to a well-functioning restaurant ventilation hood with efficient mechanical grease filters. The UV cleaner then breaks down the remaining grease into polymerised carbon compounds. Thanks to this, the ventilation ducts can be kept free of grease.

Cost-effective

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

For a restaurant facing an injunction from Environment & Health due to complaining neighbours, the savings can be enormous by DUCT offering a simple and effective solution to the odour problem, not having to close or move the business saves a lot of money.

Enabling heat recovery in catering kitchens

Since DUCT effectively removes the grease from the exhaust air from the kitchen, it is possible to design in heat recovery units and also allow the exhaust air from the hoods in the kitchen to pass through.

Savings of hundreds of thousands of kWh each year can be unlocked. Note here that in cases where the exhaust air from the restaurant is to be exchanged with supply air also to other spaces outside the restaurant cell such as offices, shops or apartments, rotating exchangers should be avoided as no exchanger supplier can guarantee that odour contamination can always be 100% avoided.

Integrated security system

DUCT comes with a dual safety system that must be switched on before the equipment can be started. As both UV light and ozone are regulated based on human exposure, a well-functioning safety system is needed to prevent either UV light or ozone from spreading outside the ventilation system.

Easy installation

DUCT is mounted directly in the existing ventilation duct by making a hole and installing an adapter where the UV cleaner itself is inserted and attached. The cleaner is then connected to the control system via standard 230V.

References



Team Ugglarp

Residents of Hörby are now much happier to have one of Sweden's most successful slaughterhouses as a major employer in the town. In the past, the intrusive and unpleasant odours from slaughterhouse waste often spread over large areas, This is despite the fact that Team Ugglarp has made major investments in chimneys and purification equipment over the years. In 2013, Team Ugglarp received the tip to install DUCT in the ventilation system reduce the odour load. Since then, local residents have experienced tremendous relief - for long periods, no odours are felt at all.

The Oket

The exhaust air from the four buildings is served by DUCT inlet cleaners before it is fed to rotary exchangers for supply air heating. The exhaust air is then discharged via a jet hood located on the roof.



Bjeredsparken

The exhaust air is released in garages under the buildings. The exhaust air is served by the DUCT before it is led into the exchanger and then further out into the garage. Before the carbon cartridge filters are fitted to reduce the ozone concentration.

Technical specification

Product description

UVtech DUCT is a standardised system with plug-in modules that are mounted directly in the exhaust air duct using adapters designed for the market's standard dimensions of ventilation ducts. For odd duct dimensions or other special projects, DUCT can be customised.

The plug-in modules and adapters are built in stainless steel as standard, but are also available in acid-proof where the process requires it.

The DUCT has an 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.

The control system displays operating time, three different types of alarms, reminders for cleaning intervals (programmable) and warning of UV tube replacement. 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

The DUCT is mounted directly in the ventilation duct. A hole with dimensions 460 x 110 mm is made in the exhaust air duct. An adapter is fitted that automatically optimises the position of the inlet cleaner in the duct. Finally, the plug-in module is inserted into the adapter and . The electrical connection is made to a normal single-phase 230 V earthed socket, which is advantageously connected via an external working switch.

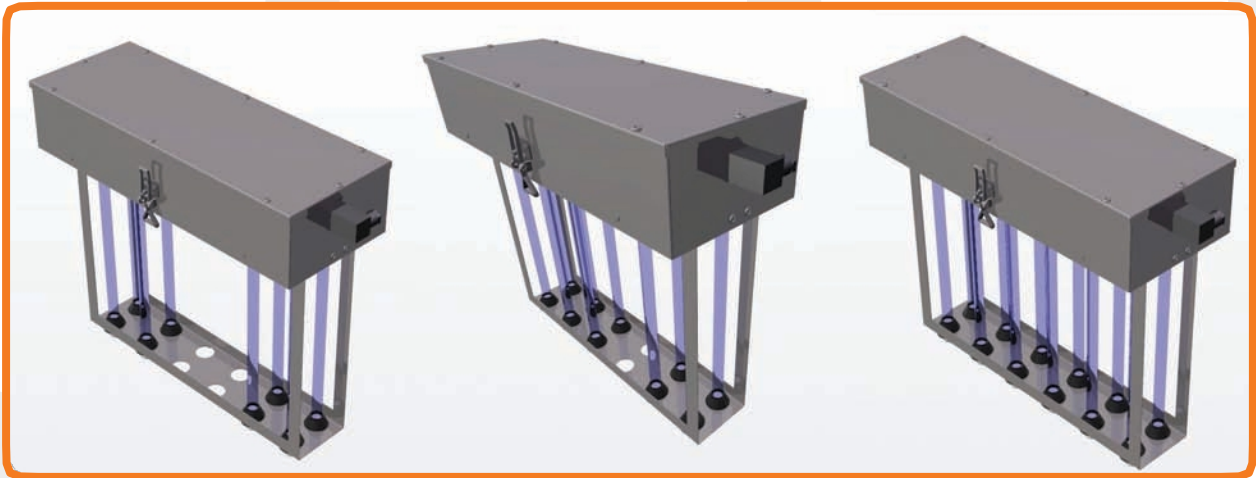
The control panel of the control system displays reminders for cleaning and any alarms. It should therefore be placed in a location where it is regularly checked by service personnel.

Operation & Maintenance

UV tubes require cleaning at regular intervals. UVtech's general recommendation is to clean the tubes every two weeks. When cleaning, the tubes are wiped with damp micro cloth, normally no cleaning agent is needed. UV tubes have a lifespan of 12,000 hours or 2 years, whichever comes first. After that they must be replaced. The control system includes functions for both cleaning interval 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

DUCT is designed in 5 steps.

1 Determine the location of the DUCT.

1.1 The plug-in modules are placed in the exhaust air duct as close as possible to the source of grease and odours and so that the treated air has at least 2 seconds left inside the ventilation duct before it reaches the unit, or before it is released to the environment. Shorter reaction times may lead to poorer results.

1.2 Ensure that the module is placed in the ventilation duct in such a way that there is sufficient free space to insert and remove the plug-in module. The positioning of the DUCT must also take into account that it must be easy for service personnel to access the plug-in module for cleaning and servicing.

1.3 The plug-in module is placed parallel to the air flow in the duct. To facilitate handling during servicing and cleaning, the DUCT should, as far as possible, also be designed so that the plug-in module is inserted horizontally into the duct.

2 Dimensioning DUCT plug-in modules.

2.1 The modules are named by their capacity in l/s, for example a DUCT400 has the capacity to treat a total of air flow rate of 400 l/s, see Table 1 "DUCT Inserts". The total capacity of the selected plug-in modules in the duct shall be equal to or greater than the air volume passing through.

2.2 The capacity of the cleaners should also be evenly distributed in the cross-sectional area of the ventilation duct. In case of high exhaust air volumes and thus duct dimensions with diameter larger than 630 mm or horizontal dimension larger than 600 mm, plug-in modules should be mounted from both sides of the duct. (When this double-sided placement in the duct is not possible from a space point of view, "INDU" UV cleaners are chosen instead).

3 Select the DUCT adapter.

3.1 For round ducts, adaptors are selected according to the duct diameter from Ø315mm up to Ø630 mm, see Table 2 "Adaptors for round ducts". (For larger ducts, contact UVtech for a special solution, or use the UV cleaner "INDU")

3.2 For square ducts with max horizontal dimension 600 mm, choose Adapter 300-600, see Table 3 "Adapters for square ducts". (For larger ducts, contact UVtech for a special solution, or use UV cleaner "INDU")

4 Step 4. Check the air speed past the plug-in modules.

4.1 The air velocity in the ventilation duct where the DUCT is located should not exceed 5 m/s, as higher velocities may lead to poorer cleaning results. If the air velocity is above 5 m/s, the DUCT must either be relocated or the duct dimension must be increased.

5 Step 5. Check conditions at exhaust air outlets.

5.1 In cases where the DUCT is installed in a ventilation system where the exhaust air is released in direct proximity to the area where people are permanently present, for example in a courtyard, loading bay, garage or similar, DUCT 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 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 never exceeds 25Pa.

Example: Design guide

Conversion of café to restaurant. Projected exhaust air flow: 600 l/s. Ventilation duct: Ø400. The ventilation duct runs 12 metres through the building to the rear, where the exhaust air outlet is located on the facade in the courtyard.

1 Example: Determine the location of the DUCT.

1.1 The DUCT is placed in the ventilation duct in the ceiling, directly where the duct is accessible above and outside the side wall of the ventilation cabinet. The DUCT is placed in the centre of one of the tiles in the ceiling so that it is easily accessible for cleaning and servicing.

Reaction time check: 600 l/s at Ø400 gives 4.78 m/s air velocity in the duct. From the point where the DUCT is installed, there is 11.5 metres of ventilation duct left before the fan and exhaust. The minimum reaction time is 2 seconds, which means that the length of the duct before the air reaches the fan or exhaust must be at least $4.78 \times 2 = 9.56 < 11.5$ metres = OK.

1.2 Control of barrier area, distance from side of duct to next barrier is 815mm > 475mm, OK. DUCT is placed so that it ends up in the centre of one of the tiles in the ceiling so that DUCT is easily accessible for cleaning and service.

1.3 The insert cleaner is placed parallel in the duct and so that it is pushed in horizontally.

2 Example: Dimensioning DUCT plug-in modules.

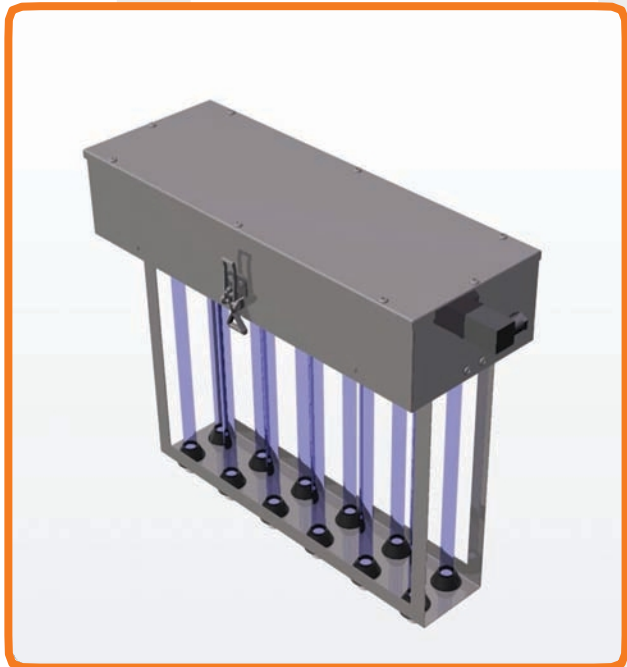
2.1 Total exhaust air flow is 600 l/s also makes the choice of plug-in module easy, see Table 1 "DUCT Plug-in modules" - select 1 X "DUCT 600"

2.2 The project requires only one plug-in module, so there is no need to think more about the distribution of cleaner in the cross-sectional area.

3 Example: Select DUCT adapter.

3.1 See Table 2 "Adapter for round duct" Diame-
=In the step above we have selected the number of plug-in modules, in this case one (1), therefore select 1 X "Adapter Ø400".

3.2 As the duct is round, no square duct adapter is selected.



4 Example: Check the air speed past the plug-in modules.

4.1 : The air velocity for 600 l/s at Ø400 is 4.78 m/s, which is lower than the maximum velocity of 5 m/s and thus OK to use.

5 Example: Check conditions at air vents.

5.1 : The air outlet is located directly on the facade to release the exhaust air in the courtyard where people are staying. Therefore, the installation must be completed with an activated carbon filter. With Acticon carbon filter cartridges, 32 filter cartridges are selected and placed in filter cabinets measuring 1200x600x700. The pressure drop across the filter is then 20 Pa.

Table 1 DUCT plug-in modules





	Capacity		Number	Fire data	Dimensions	
	(l/s)	(m³/h)	UV tubes	(V/W)	(mm)	
DUCT 300	300	1080	6	230 / 100	485x435x180	
DUCT 400	400	1440	8	230 / 140	485x435x180	
DUCT 500	500	1800	10	230 / 170	485x435x180	
DUCT 600	600	2160	12	230 / 200	485x435x180	

Table 2 Round duct adaptors

	Max	Insertion depth	Restricted area	Superstructure
	diameter			
Adapter Ø315	315	309	475	126
Adapter Ø400	400	319	475	116
Adapter Ø500	500	319	475	116
Adapter Ø600	600	319	475	116

Table 3 Adapters for square duct

	Horizontal dimension		Insertion depth	Restricted area	Superstructure
	Min	Max			
Adapter 300-600	300	600	296	475	139

