Air Handling Units

Geniox VOClean

Ecology Units

geniox

systemair

Ecology Units

Why?

Ecology units are ventilation equipments whose use is recommended in kitchen exhaust systems, which serve to clean greasy and dirty exhaust air. With the increase of environmental consequences in the 21st century, severe restrictions have been imposed on the release of industrial wastes to the environment, and particularly on the release of flue gas and kitchen exhaust systems to the atmosphere. It is known that the volatile organic compounds (VOC) and other particular based substances in the kitchen exhaust systems creates a huge pollution in the air. In many countries, significant restrictions have been imposed on the release of odorous and other substances to the atmosphere by the regulation issued by the Ministeries of the Environment.

Grease, smoke and odor particles resulting from cooking in kitchens causes negative effects on human health and comfort conditions in homes, restaurants, hotels and such areas. Also in the absence of measures, the accumulation in ducts exhaust equipment of substances such as grease, soot and smut that are released during cooking raises fire risk to high levels later on. In addition to fire risk, the accumulation of these substances causes the intake fans and filters to be quickly clogged, the ducts to be quickly contaminated and consequently lead to a rapid rise in expenses.

In order to meet the needs arising from all these problems, German VDI 2052, British DW/172 and ASHRAE 154 standards have been established, which specify some requirements for kitchen exhaust systems.

Design Criteria

The most significant design criterion in the selection of ecology units is the type of catering establishment. Since the amount of grease, steam, and particles in the exhaust air will vary according to the type of food cooked, different models should be selected for various kitchens.

Thus we can divide common catering establishment types under four main headings according to the density of odour and grease. This classification as low, medium, high, and heavy density kitchen types can be seen in the following table.

	Density			
	Light	Medium	High	Heavy
Fast Food / Fried Food			✓	
Middle East / Kebab Rest.			✓	
Cafe / Tea Shop	✓			
Indian / Thai Rest.			✓	
Pub		✓		
Pizza Rest.		✓		
Dishwashing	✓			
Steakhouse				✓
Italian / French Rest.		✓		

In line with this information; different levels of control are applied for different concentrations of odor and grease. The configurations proposed by Systemair in accordance with the kitchen densities specified in the ASHRAE 154 standard are as follows:

Light Density:

Standard kitchen exhaust fans suitable for continuous high temperature operation are sufficient.

Medium Density:

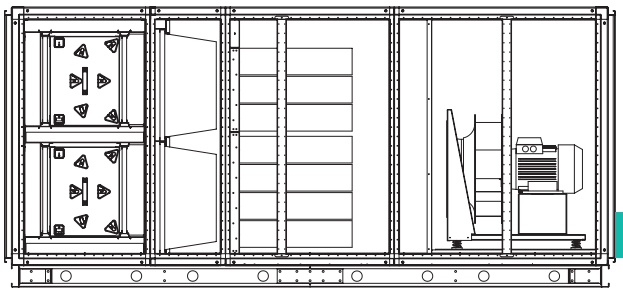
Carbon filtration is required with a contact time of at least 0.1 seconds following the electrostatic filter.

High Density:

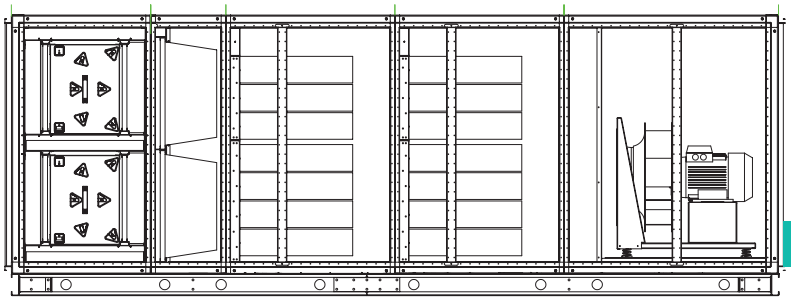
A two-stage electrostatic filter followed by carbon filtration with a minimum contact time of 0.2 seconds is required.

Heavy Density:

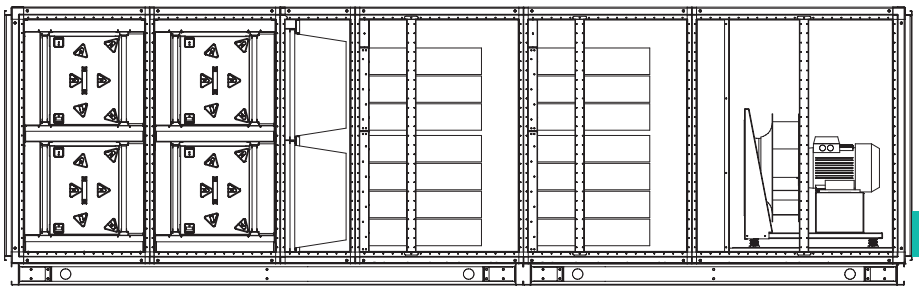
Carbon filtration with a two-stage electrostatic precipitator followed by carbon filtration with a minimum contact time of 0.2 seconds and a UV ozone system or a minimum contact period of 0.4 seconds is required.



Light Density



Medium Density

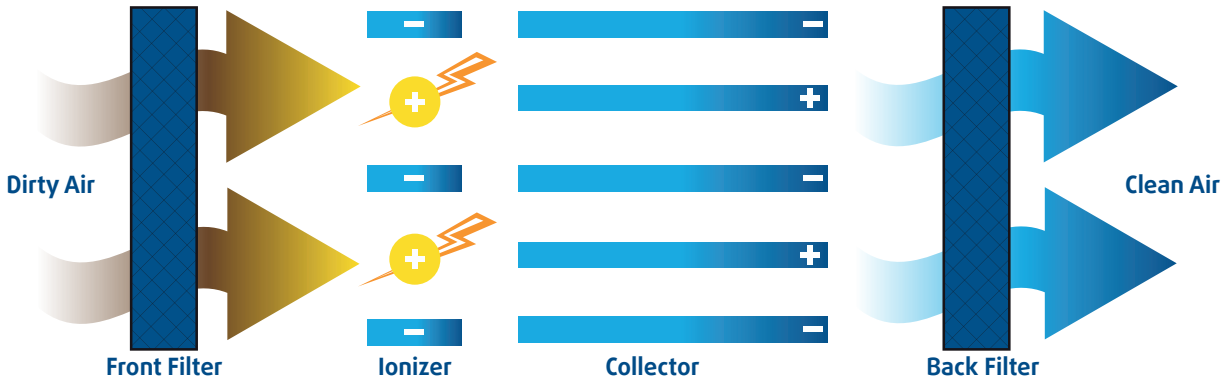


High Density

How Does Electrostatic Precipitator Work?

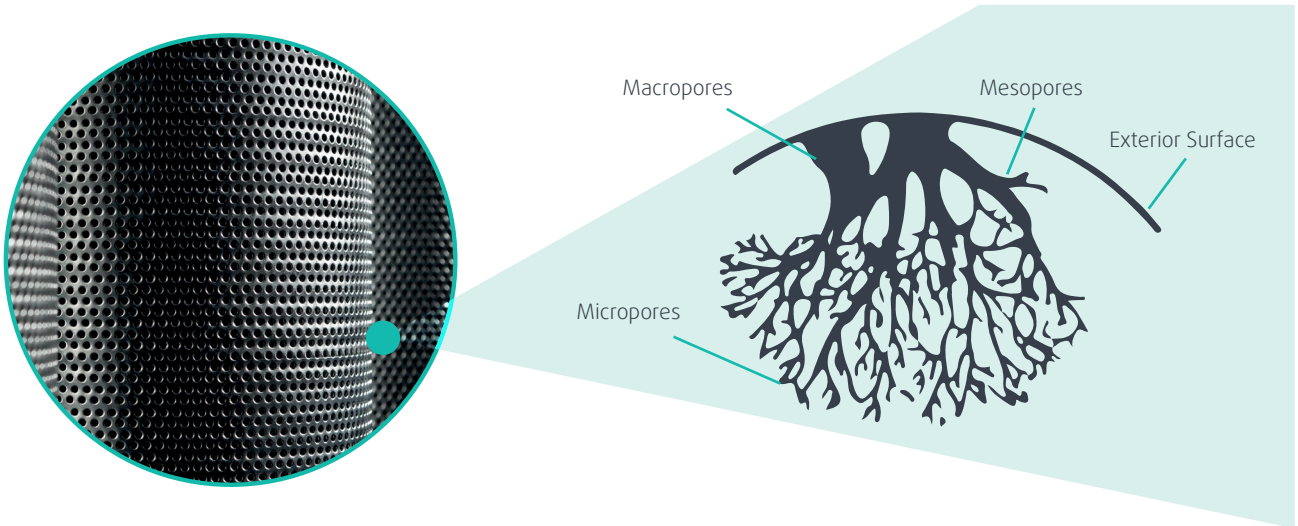
As air passes into the combined ionizer/collector cell, the particulates in the air stream are polarised to a negative potential. As they continue through the ioniser and between the collector cell plates, the polarised particulates are repelled away from the negatively charged plates and attracted to the earthed plates where they stick and so are filtered out of the air flow. In an Ecology Unit, the most crucial part is Electrostatic Precipitator. These components are shortly called as ESP and most of the dust and grease particules are being trapped by these components.

The below diagram shows, in a basic visual, how an electrostatic precipitator works.



How Does Activated Carbon Filter Remove Odour?

There are millions of pores on the surface of Activated Carbon filter and it is highly possible that each gram of activated carbon granule has higher surface area than 1000 m2. Thanks to these pores, many types of organic, hazardous gases and uncomfortable odour are being removed with adsorption. For efficient filtration both contact time between air & activated carbon and carbon weight are quite important.



To prevent grease and other solid particles to block pores on the surface of activated carbon and increase lifetime, activated carbon filters always should be placed after fine filtration (electrostatic precipitator, bag and/or hepa filter etc.) grades. Otherwise, activated carbon filter may lose its odour-removing feature in short time.

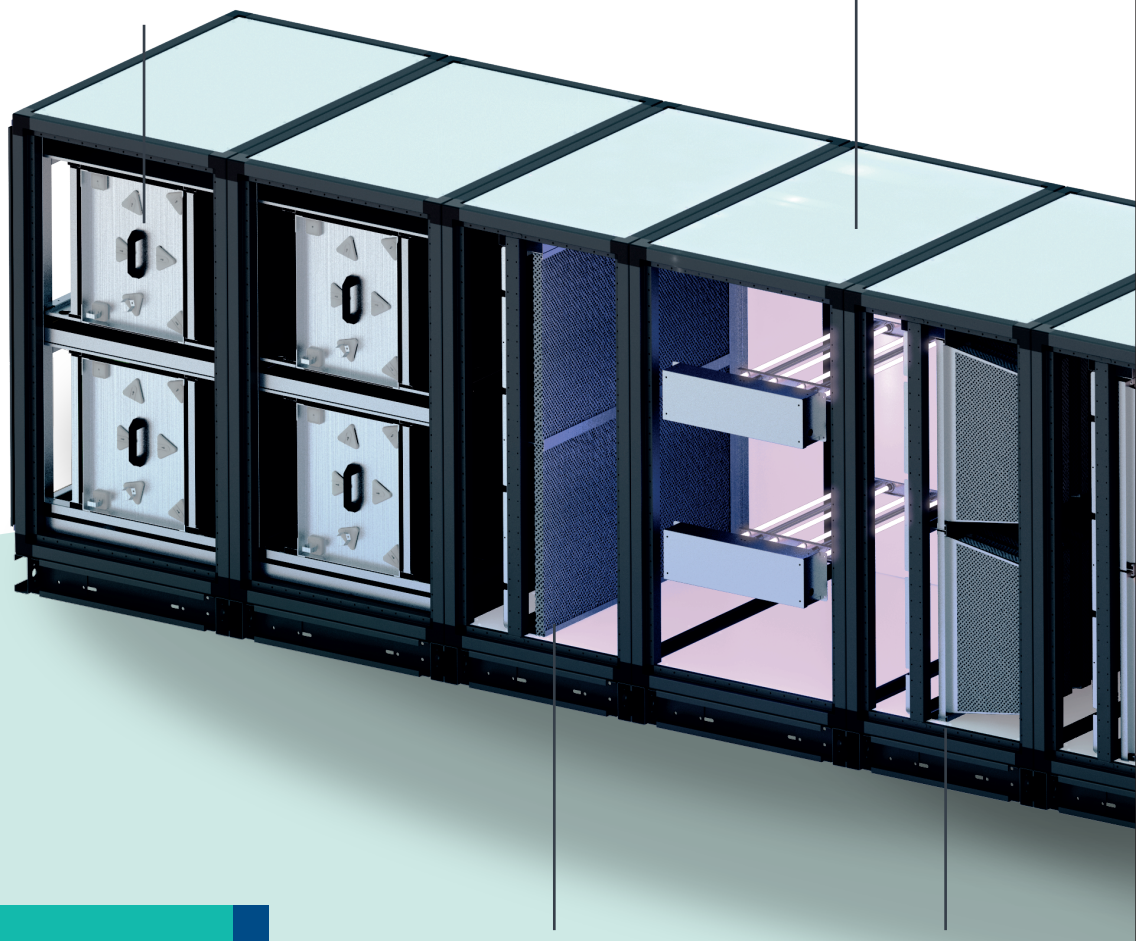
Geniox VOClean

1. a. Pre Mesh Filter

b. High Efficient Electrostatic Precipitator
Removing grease, smoke and odour from the air by ionizing the particles.

3. UV-V Lamps

Ozone producing, high energy UV-C lights.



2. a. High Efficient Electrostatic Precipitator
Secondary ESP stage for high density grease and particle control.

b. Post Mesh Filter

4. Bag Filter

Provides longer lifespan for the Activated Carbon filter by filtering particles.

Casing

Thermal Insulation Class	: T2
Thermal Bridging Class	: TB2
Deflection Class	: D1
Air Leakage Class	: L1
Filter By-pass Class	: F9

Service and Maintenance

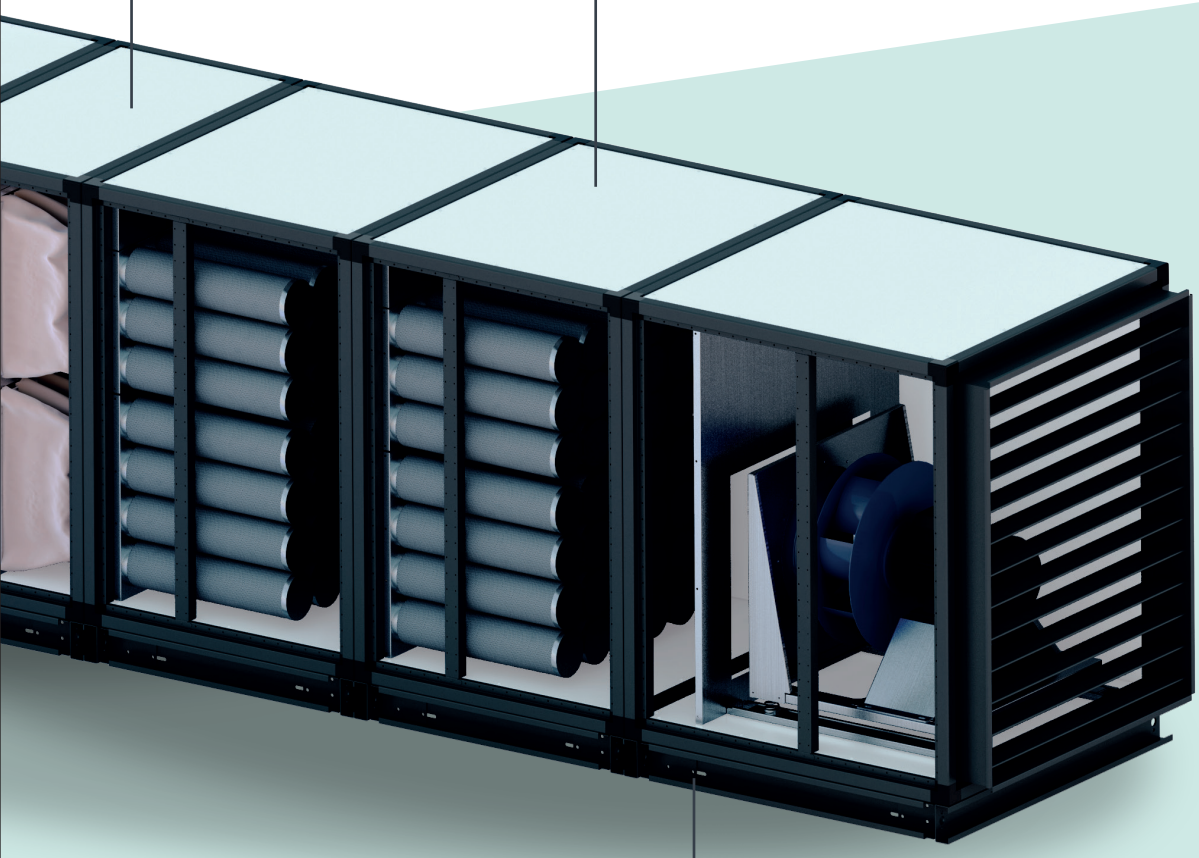
All doors provide easy access for cleaning and service.

5. EPA/HEPA Filter

Provides longer lifespan for the Activated Carbon filter by filtering particles.

6. Activated Carbon Filters

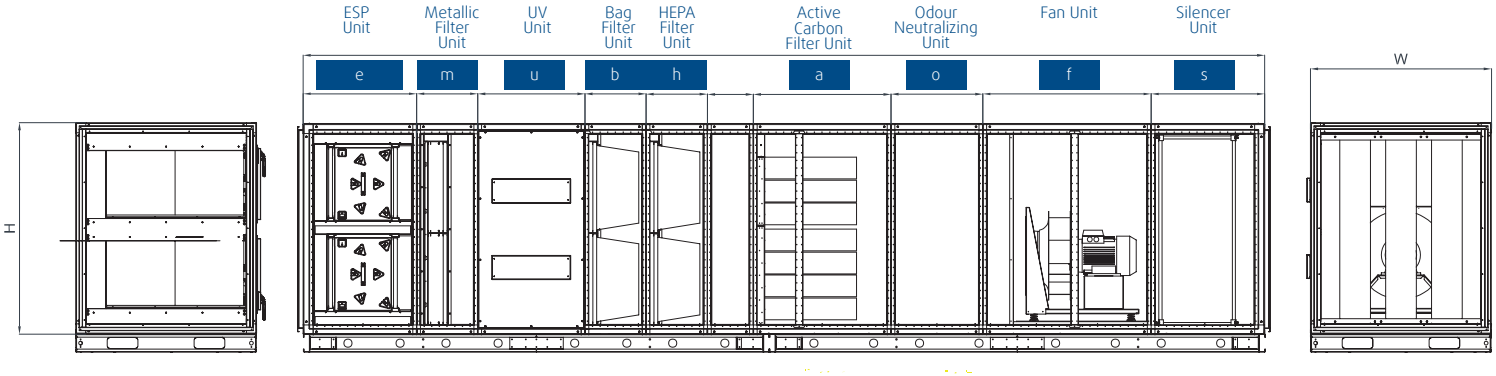
Removes odour from the air with its high contact time and carbon weight.



7. High Efficient Plug Fan-Motor

Direct driven Plug fan with standard IE3 motor efficiency.

Unit and Dimensions



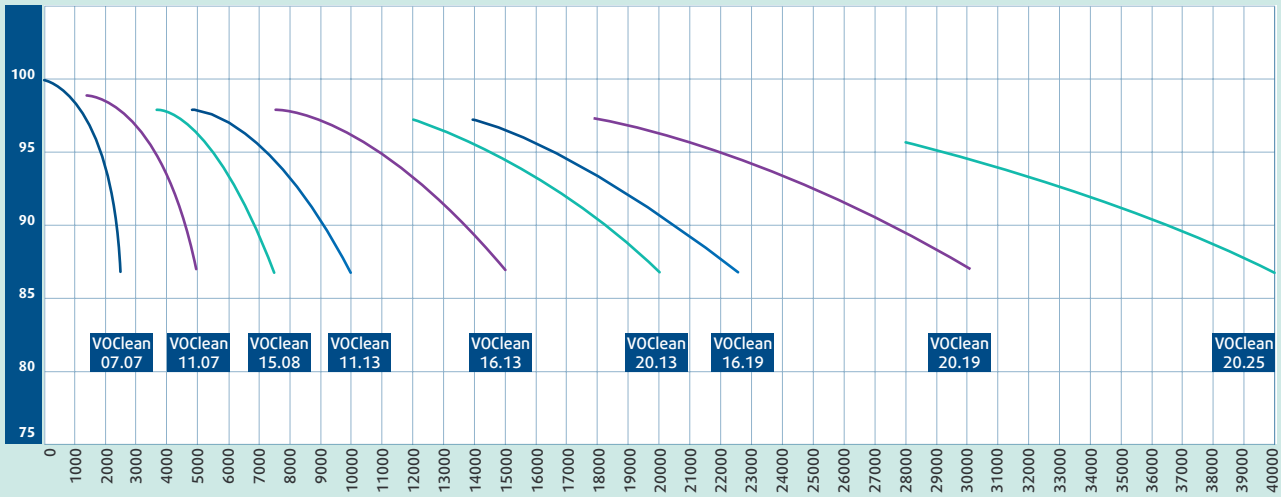
		Length (mm)									Width (mm)	Height (mm)
		e	m	u	b	h	a	o	f	s		
VOClean	VOClean 07.07	741	400	700	400	400	900	600	1100	740	782	900
	VOClean 11.07	741	400	700	400	400	900	600	1100	740	1182	900
	VOClean 15.08	741	400	700	400	400	900	600	1100	740	1582	1000
	VOClean 11.13	741	400	700	400	400	900	600	1100	740	1182	1500
	VOClean 16.13	741	400	700	400	400	900	600	1100	740	1682	1500
	VOClean 20.13	741	400	700	400	400	900	600	1100	740	2082	1500
	VOClean 16.19	741	400	700	400	400	900	600	1100	740	1682	2100
	VOClean 20.19	741	400	700	400	400	900	600	1100	740	2082	2100
	VOClean 20.25	741	400	700	400	400	900	600	1100	740	2082	2700

Unit Properties

	VOClean 07.07	VOClean 11.07	VOClean 15.08	VOClean 11.13	VOClean 16.13	VOClean 20.13	VOClean 16.19	VOClean 20.19	VOClean 20.25
Maximum Airflow (m³/h)	2500	5000	7500	10000	15000	20000	22500	30000	40000
Bag Filter	1 x F7	1 x F7	1 x F7	1 x F7	1 x F7	1 x F7	1 x F7	1 x F7	1 x F7
Active Carbon Filter	1	1	1	1	1	1	1	1	1
Cartridge Length (mm)	600	600	600	600	600	600	600	600	600
Minimum Carbon Contact Time (s)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ESP Section	1	1	1	1	1	1	1	1	1
ESP Power Consumption (W)	20	30	50	60	40	50	40	150	200
Voltage/Phase/Frequency	400V 3ph 50Hz								
Fan Motor Power* (kW)	1.1	3	4	5.5	7.5	11	11	15	18.5

Fans were selected at 300 Pa external pressure drop.

Efficiency Graph



Systemair reserves the right to modify these values.
Please contact Systemair Sales Office for exact unit selections.

Options

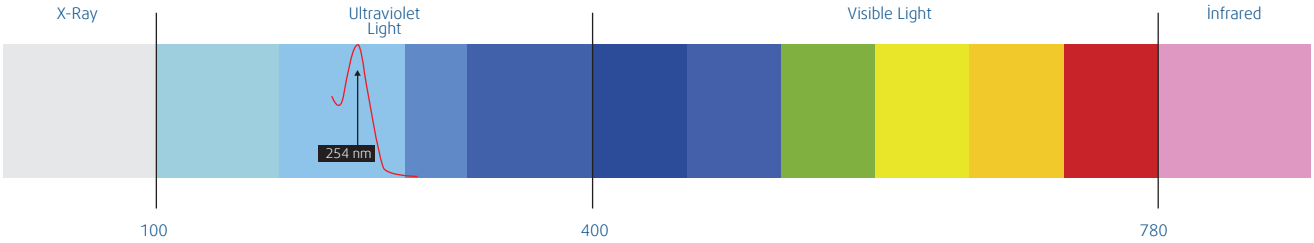
UV-V Technology

UV technology is used efficiently in kitchen ventilation as well as in many areas around the world.

Ultraviolet rays are divided into three as A-B-C. UV-V rays are in the wavelength range of 100-200 nm. As ozone (O_3) is produced within this range, optimum wavelength value is accepted as 185nm.

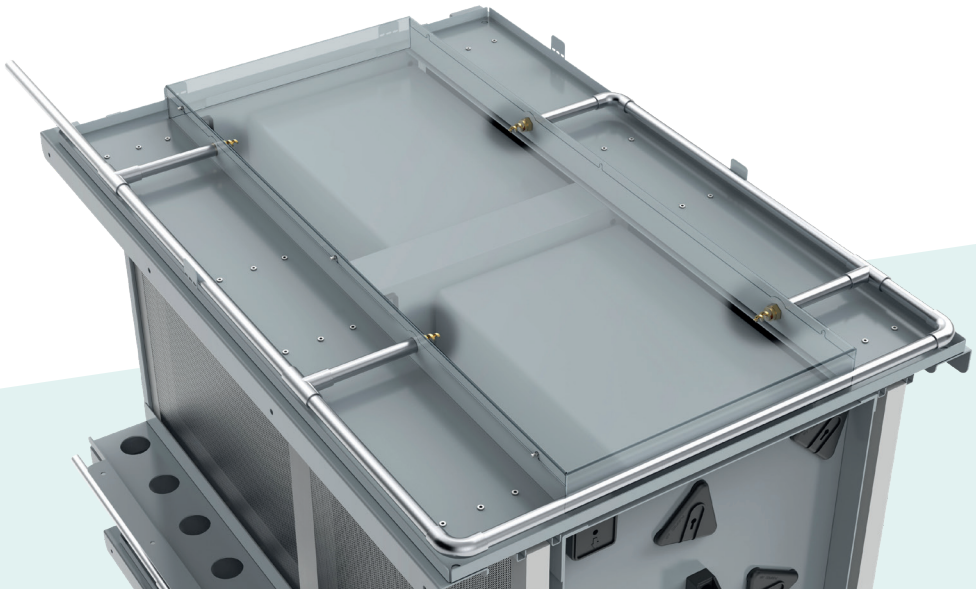
UV rays with a wavelength of 185 nm, which are frequently used in kitchen applications, allow photolysis and ozonolysis processes. While the bonds between the atoms forming the oil particles are broken by photolysis, the oxygen (O_2) atoms in the air are separated in the ozonolysis process and these atoms come together to form ozone (O_3). The resulting ozone molecules interact with oil and other organic compounds in the air, helping to contain bad odors.

Contrary to popular belief, UV-V lamps have a lifetime (9.000-10.000 h). They must be changed at the end of their lifetime.



Autowash System for Electrostatic Precipitators

Electrostatic precipitators are filtration systems that require frequent cleaning and sensitive maintenance depending on the density of use and kitchen applications. Users may prefer ecology units to be equipped with automatic washing system to reduce maintenance costs and time. This auto-wash system has its own integrated control panel coupled with ecology unit's control system and washing process can be done according to prescheduled date and hour when the unit is not in operation. The drift eliminators are always there to catch water droplets before letting them reach to next section.



High Temperature Applications

Some cooking methods and kitchen applications cause high temperature handling while extracting the air. In these conditions, standard equipment and design may not endure or loses its function after short time, causes high maintenance and renewing costs. Systemair offers completely modified construction and equipment selections to avoid risks caused by high temperature, the unit can be configured to run continuously up to 120°C.

Controls

Everything is under control!

Variable Frequency Driver

- BMS integration (Modbus RTU, BACnet MS/TP)
- Variable fan speed control

Basic Control

- Fan speed control from kitchen via potentiometer
- Bag/HEPA dirtiness info
- Damper modulation of ecology unit
- Pressure independent CAV control
- Door switch info
- Adaptation to fire safety system / fire mode
- Adaptation to the Autowash function

Advanced Control

- BMS integration (Modbus RTU, Modbus TCP/IP, BACnet IP)
- Temperature or VOC control
- Air volume set, monitoring and control from the room
- Detailed daily and weekly time scheduling
- All other Classic Control functions
- Special control scenarios on request

Cooker Hoods

As part of the exhaust system in industrial kitchens, cooker hoods play an important role. It is recommended by authorized institutions and organizations to use make-up air hoods to balance the air in the kitchen. Some of the cooker hood applications Systemair can offer with Geniox VOClean:

- Exhaust only
- Exhaust only, for low ceiling
- Exhaust with air jet
- Exhaust with air jet and air supply
- Air supply plenums

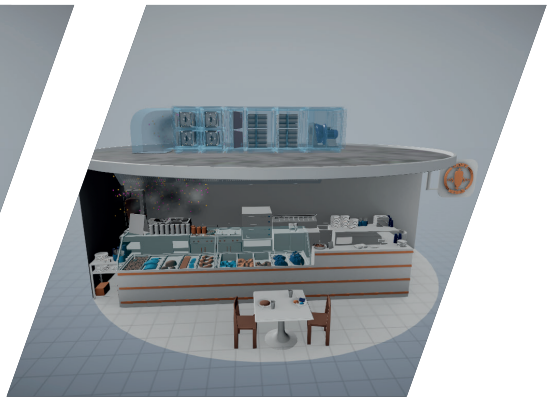
Please contact Systemair sales offices for special configurations for your project.

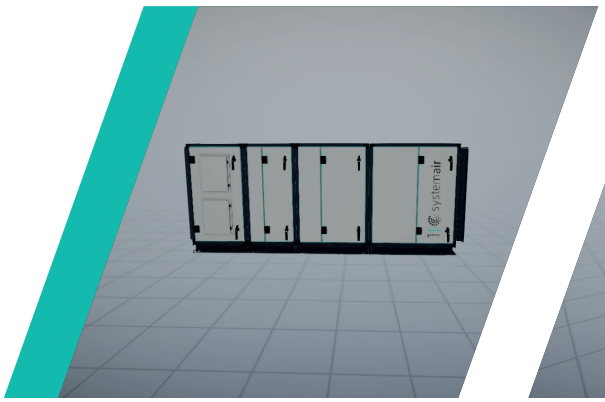
Discover Geniox VOClean with virtual reality!

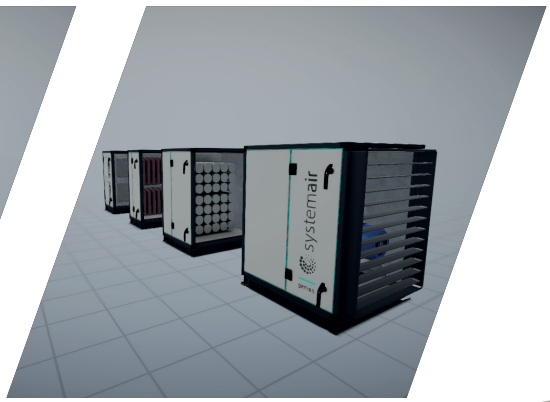
HVAC Products PRO by Systemair

Available for everyone without registration, downloadable in a single click, or by scanning the QR code below. You can explore Geniox VOClean with real-time data wherever and whenever you want.

Observe Geniox VOClean in eight different kitchen types arranged according to the densities determined by ASHRAE 154. The unit comes with the configurations we recommend and with all the other filter groups you want to try. Bring real-time operation data **at your fingertips!**

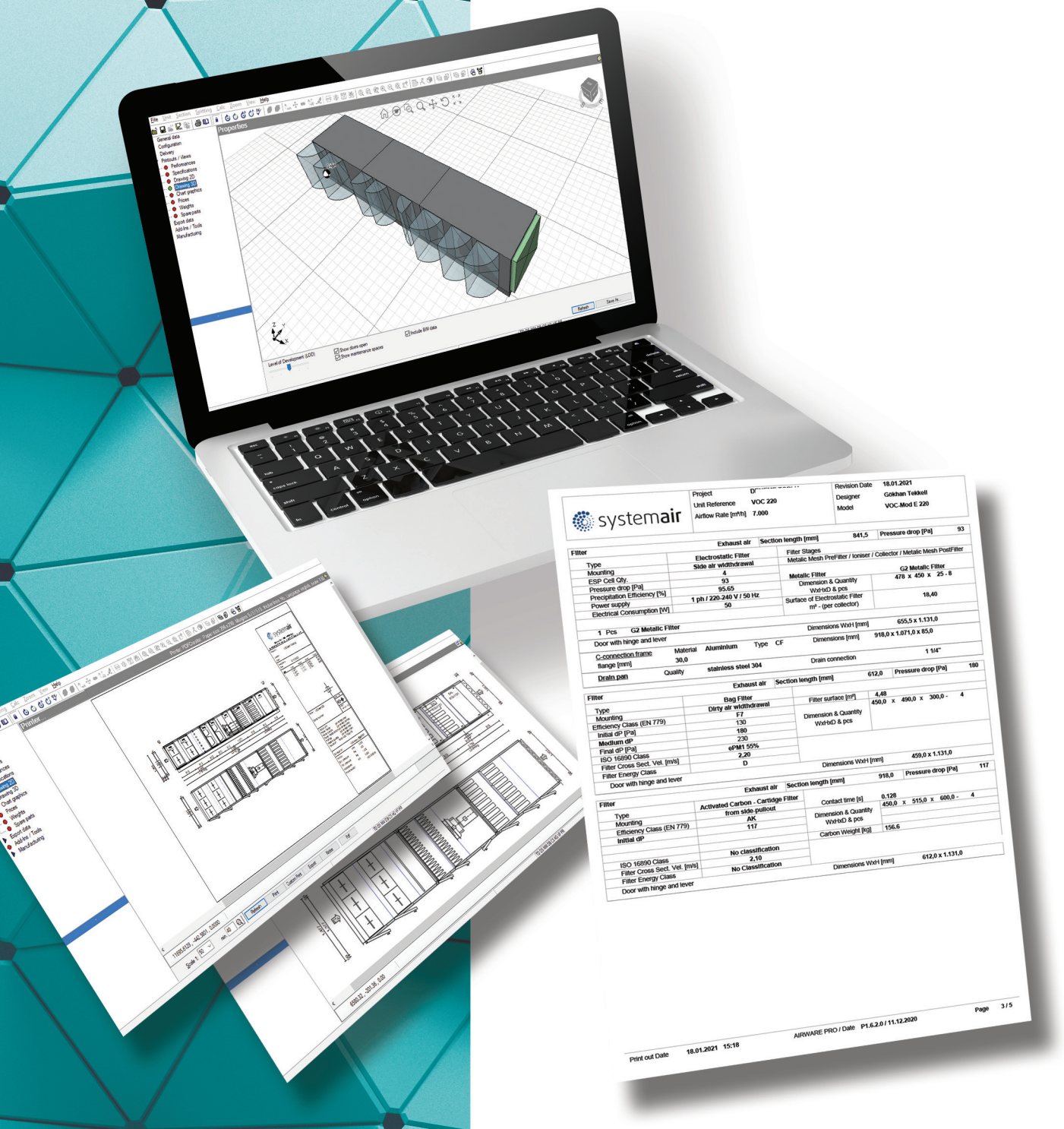






Which ecology unit is suitable for your kitchen?
Find out with Geniox VOClean:

Airware PRO


systemair
Project
Unit Reference VOC 220
Airflow Rate [m³/h] 7.000
Revision Date 18.01.2021
Designer Gökhan Tekkeli
Model VOC-Mod E 220
Filter
Exhaust air
Section length [mm] 841,5
Pressure drop [Pa] 93
Type Electrostatic Filter
Mounting Side air widthdrawal
ESP Cell Qty. 4
Pressure drop [Pa] 93
Precipitation Efficiency [%] 95.65
Power supply 1 ph / 220-240 V / 50 Hz
Electrical Consumption [W] 50
Filter Stages
Metalic Mesh PreFilter / Ioniser / Collector / Metalic Mesh PostFilter
Metalic Filter
Dimension & Quantity WxHxD & pcs
G2 Metalic Filter
476 x 450 x 25 - 8
Surface of Electrostatic Filter m² - (per collector)
18,40
1 Pcs G2 Metalic Filter
Door with hinge and lever
Dimensions WxH [mm] 655,5 x 1.131,0
C-connection frame
Material Aluminium Type CF
Dimensions [mm] 918,0 x 1.071,0 x 85,0
flange [mm] 30,0
Drain pan
Quality stainless steel 304
Drain connection 1 1/4"
Filter
Exhaust air
Section length [mm] 612,0
Pressure drop [Pa] 180
Type Bag Filter
Mounting Dirty air widthdrawal
Efficiency Class (EN 779) F7
Initial dP [Pa] 130
Medium dP 180
Final dP [Pa] 230
ISO 16890 Class ePM1 55%
Filter Cross Sect. Vel. [m/s] 2,20
Filter Energy Class D
Door with hinge and lever
Filter surface [m²] 4,48
Dimension & Quantity WxHxD & pcs
450,0 x 490,0 x 300,0 - 4
Dimensions WxH [mm] 459,0 x 1.131,0
Filter
Exhaust air
Section length [mm] 918,0
Pressure drop [Pa] 117
Type Activated Carbon - Cartidge Filter from side-pullout
Mounting AK
Efficiency Class (EN 779) 117
Initial dP
ISO 16890 Class No classification
Filter Cross Sect. Vel. [m/s] 2,10
Filter Energy Class No Classification
Door with hinge and lever
Contact time [s] 0,128
Dimension & Quantity WxHxD & pcs
450,0 x 515,0 x 600,0 - 4
Carbon Weight [kg] 156,6
Dimensions WxH [mm] 612,0 x 1.131,0
Print out Date 18.01.2021 15:18
AIRWARE PRO / Date P1.6.2.0 / 11.12.2020
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Airware PRO Selection Software

Airware Pro is the brand new selection software we use for modular and compact air handling unit selections.

Thanks to its extensively detailed technical outputs, the software allows you to view all functions and dimensions of the compact and modular air handling units selected. Geniox VOClean Ecology Unit can be selected via Airware Pro. Selections made in Airware Pro offer quick access to capacities and energy consumption values. Air handling unit templates have been pre-configured in the software to facilitate quick selection. In this way, you can modify these templates when you wish to make additions to your selection. When air handling unit selection is complete, Airware Pro automatically performs all calculations, and provides technical documentation with complete detail in seconds. The technical documentation includes all relevant technical data as well as the specification text that is valid for tender documentation. Energy consumption levels, and all components on the PDF output can be viewed as part of the complete technical documentation. 2D and 3D drawing files and Revit families are also available through the software.

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