Air Handling Units

Geniox VOClean

Ecology units

geniox

systemair

What are Ecology units?

Ecology units are ventilation equipment tailored to address the requirements of kitchen exhaust systems. The units play a vital role in maintain the indoor air quality, which is crucial in environments where grease, smoke, and odour particles emitted from cooking have negative effects on human health and impacts comfort conditions in homes, restaurants, hotels, and other sensitive hospitality and entertainment venues.

If left untreated, the accumulation of volatile organic compounds (VOCs) and other particulate matter released during cooking in ducts of exhaust equipment leads to increased risk of fire. The buildup of these substances also leads to clogging and contamination of fans and filters, which reduces the lifecycle and efficiency of the equipment.

Why is it important?

Globally, severe restrictions have been imposed on the release of industrial wastes to the environment, with a clear focus on flue gas exiting the atmosphere from kitchen exhaust systems and its contribution to air pollution. In many countries, significant restrictions have been imposed on the release of substances and particulate matter from such ventures through the regulation issued by relevant government entities. There has also been a move to implement and enforce standards to promote best practices within the industry, which can be seen in the establishment of German VDI 2052, British DW/172 and ASHRAE 154 standards, which specify design, installation, and operation 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 are suitable for various kitchens.

We can divide common catering establishment types under four main categories according to the expected density of odour and grease. This classification of 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.		✓		

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:

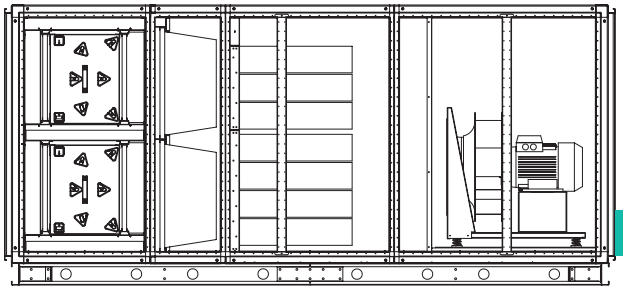
Carbon filtration is required with a contact time of at least 0.1 seconds following the electrostatic filter.

High density:

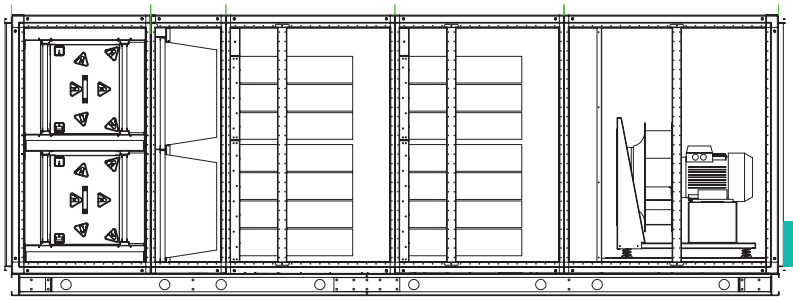
A two-stage electrostatic filter followed by carbon filtration with a minimum contact time of 0.2 seconds is required.

Heavy density:

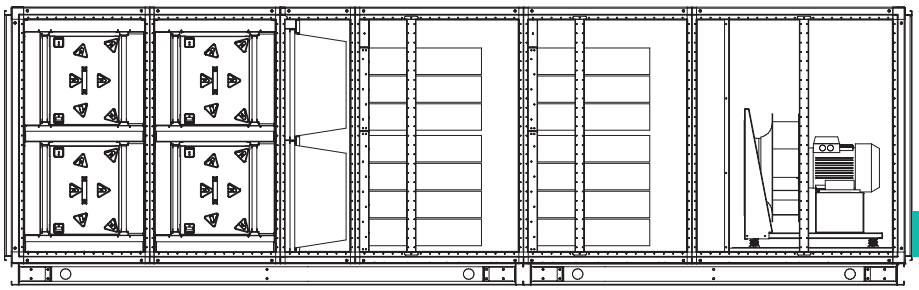
Carbon filtration with a two-stage electrostatic precipitator followed by carbon filtration with a minimum contact time of 0.2 seconds and a UV ozone system or a minimum contact period of 0.4 seconds is required.



Light density



Medium density



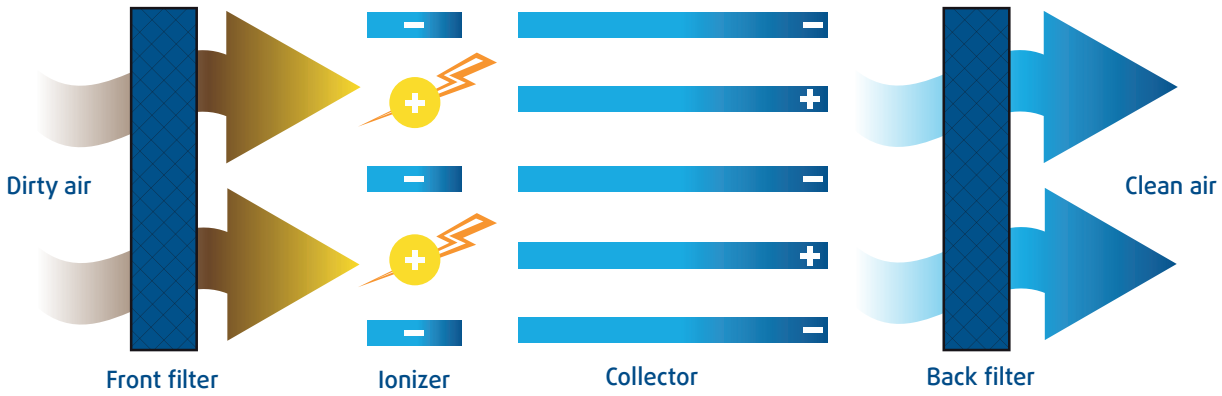
High density

How does the electrostatic precipitator work?

In an Ecology Unit, the Electrostatic Precipitator (ESP) is the most crucial part of the system, as they are the components that trap most of the dust and grease particulates.

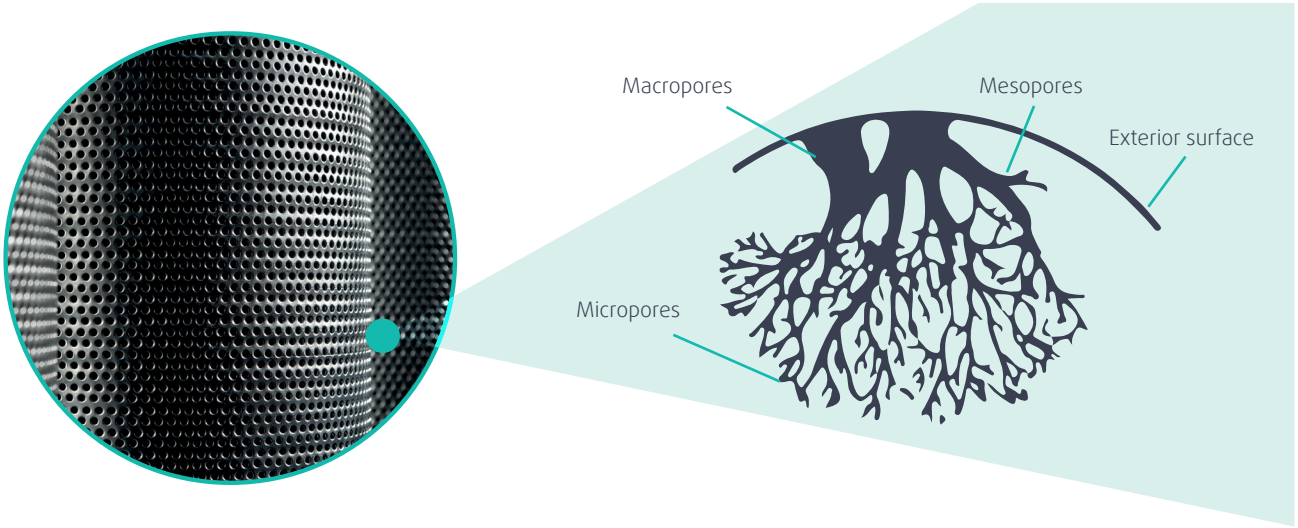
As air passes into the combined ionizer/collector cell, the particulates in the air stream are polarised to a negative potential. As they continue through the ioniser and between the collector cell plates, the polarised particulates are repelled away from the negatively charged plates and attracted to the earthed plates where they stick. This allows the particulates to be filtered out of the air flow.

The below diagram provides a brief visual overview of how an electrostatic precipitator works.



How does an activated carbon filter remove odour?

There are millions of pores on the surface of an activated carbon filter and each gram of activated carbon granule has higher surface area than 1000 m^2. Thanks to these pores, many types of organic, hazardous gases and uncomfortable odours are being removed through adsorption. For efficient filtration both contact time between air and activated carbon and carbon weight are quite important.



To prevent grease and other solid particles from blocking pores on the surface of the activated carbon filters and to increase the lifetime of the system, the activated carbon filters should always be placed after fine filtration (electrostatic precipitator, bag and/or HEPA filter) grades. Otherwise, the activated carbon filter may lose its odour-removing capabilities in a shorter period of time.

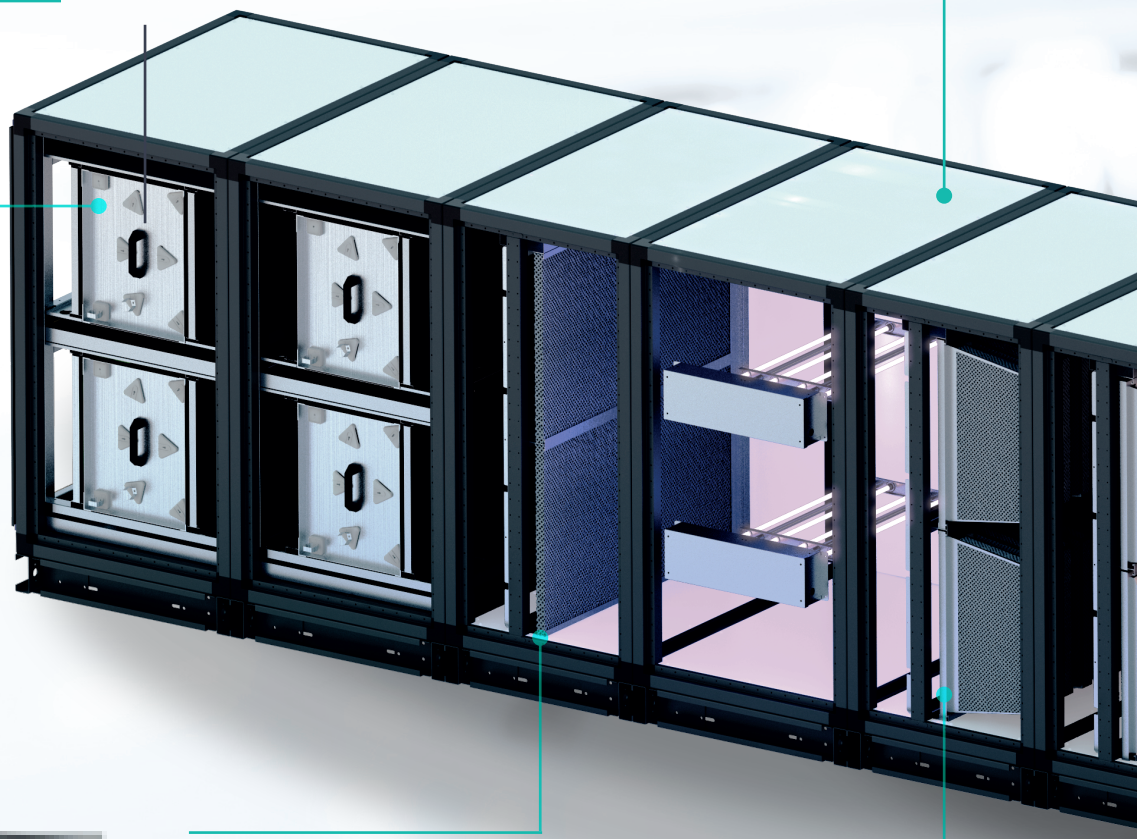
Geniox VOClean

- **Pre mesh filter**
- **High efficient electrostatic precipitator**

  Removing grease, smoke and odour from the air by ionizing the particles.

UVV lamps

Ozone producing, high energy UV-C lights.



- **High efficient electrostatic precipitator**

  Secondary ESP stage for high density grease and particle control.

- **Post mesh filter**

Casing

Thermal insulation class	: T2
Thermal bridging class	: TB2
Deflection class	: D1
Air leakage class	: L1
Filter by-pass class	: F9

Bag filter

Provides longer lifespan for the activated carbon filter by filtering particles.

Service and maintenance

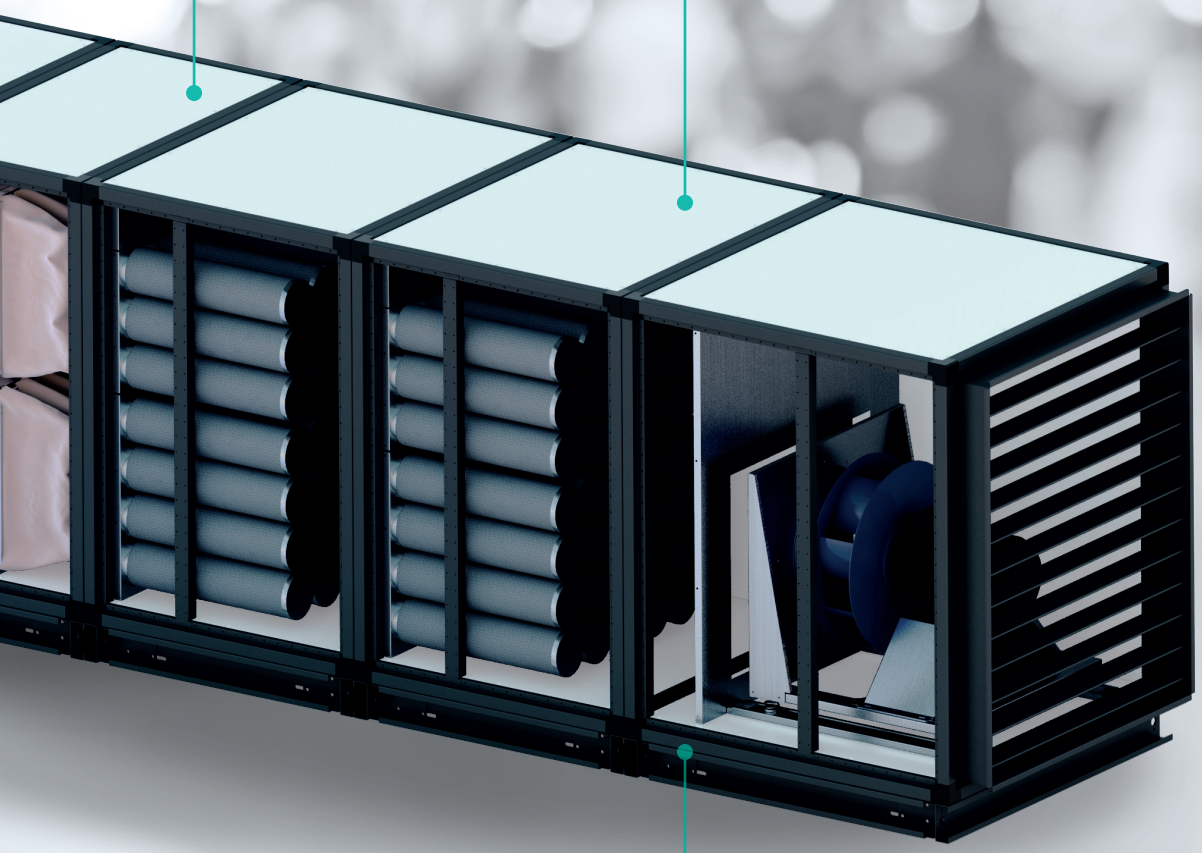
All doors provide easy access for cleaning and service.

EPA/HEPA filter

Provides longer lifespan for the activated carbon filter by filtering particles.

Activated carbon filters

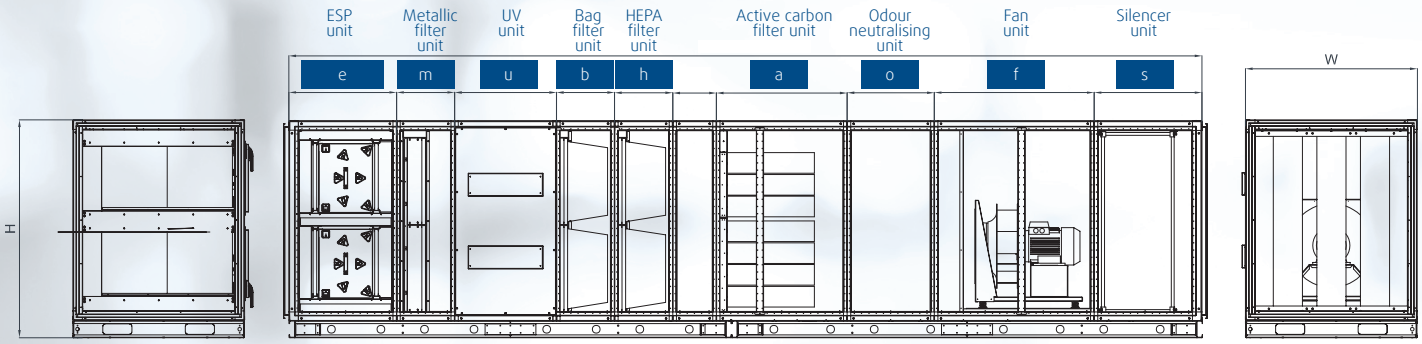
Removes odour from the air with its high contact time and carbon weight.



High efficient plug Fan motor

Direct driven plug fan with standard IE3 motor efficiency.

Unit and dimensions



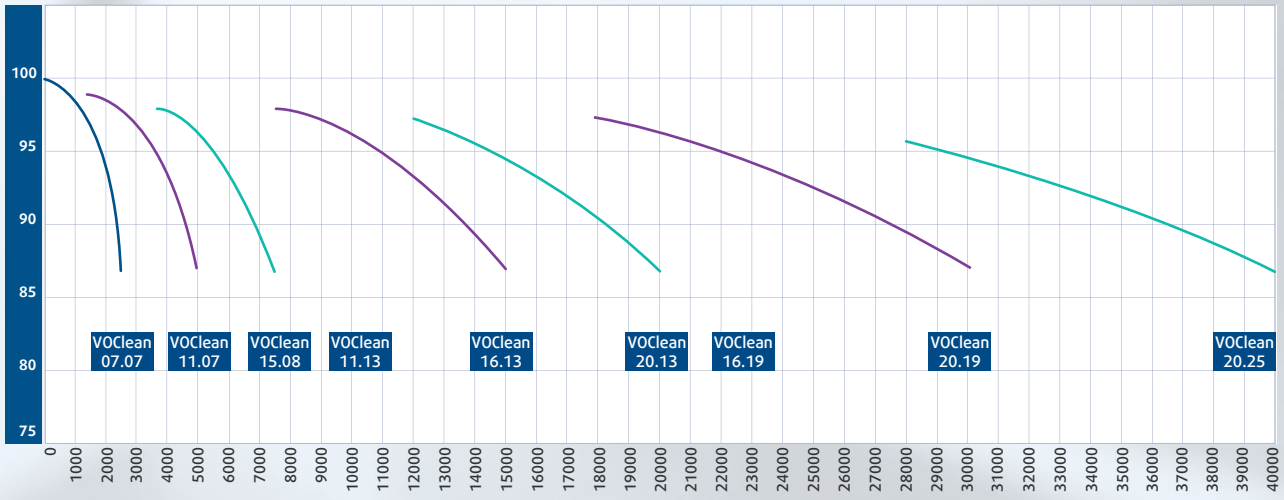
		Length (mm)									Width (mm)	Height (mm)
		e	m	u	b	h	a	o	f	s		
VOClean	VOClean 07.07	741	400	700	400	400	900	600	1100	740	782	900
	VOClean 11.07	741	400	700	400	400	900	600	1100	740	1182	900
	VOClean 15.08	741	400	700	400	400	900	600	1100	740	1582	1000
	VOClean 11.13	741	400	700	400	400	900	600	1100	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

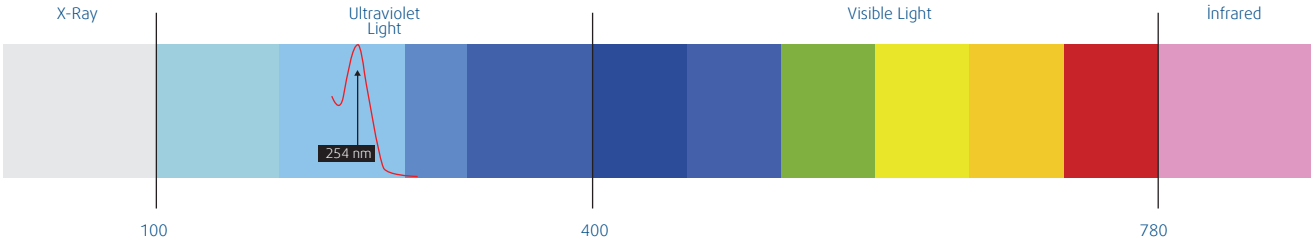
UVV technology

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

Ultraviolet rays are divided into three as A-B-C.
UVV 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.

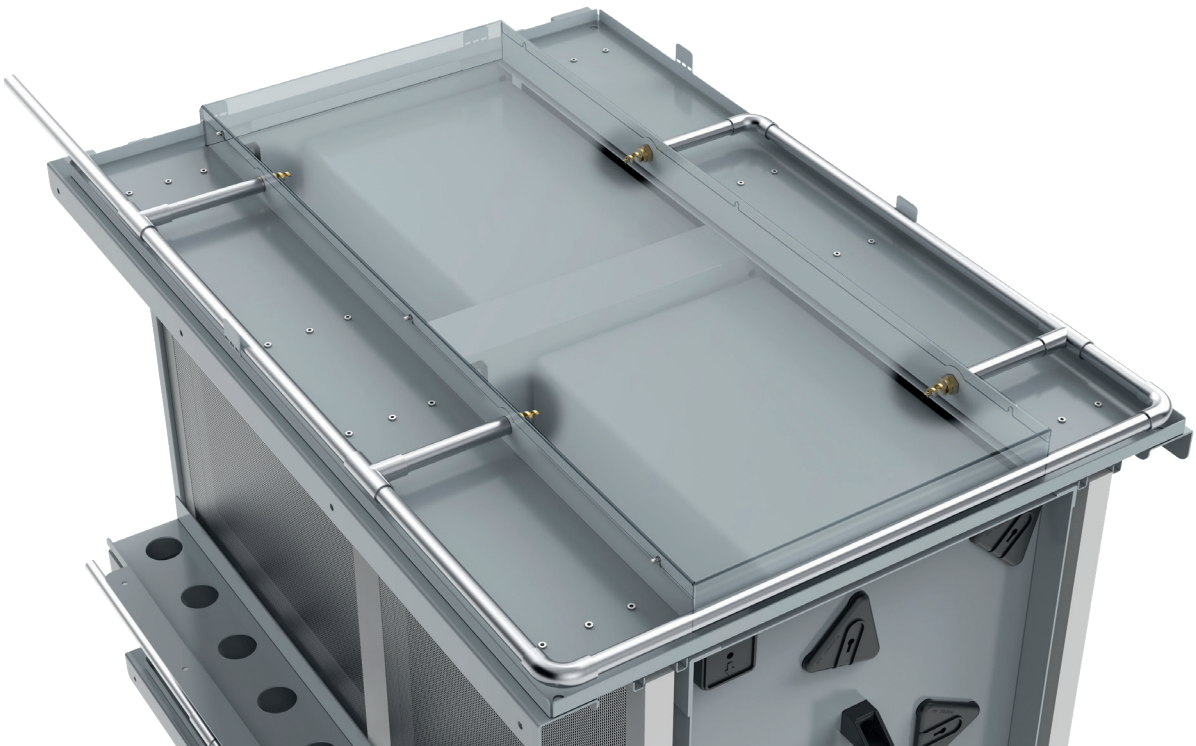
UV rays with a wavelength of 185 nm, which are frequently used in kitchen applications, allow photolysis and ozonolysis processes. While the bonds between the atoms forming the oil particles are broken by photolysis, the oxygen (O_2) atoms in the air are separated in the ozonolysis process and these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

UVV lamps have a lifetime of 9.000-10.000 hours.
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 autowash system has its own integrated control panel coupled with ecology unit's control system and the washing process can be done according to the pre-programmed schedule when the unit is not in operation. The drift eliminators are installed to catch water droplets before letting them reach the next section.



High temperature applications

Some cooking methods and kitchen applications feature high temperature handling while extracting the air. In these conditions, standard equipment and design may not be sufficient or the heavy requirement might lead to the system losing its function after a short period of time.

This leads to higher cost in terms of maintenance of possible replacement of equipment. Systemair offers completely modified casing and equipment selections to avoid risks caused by high temperatures. 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

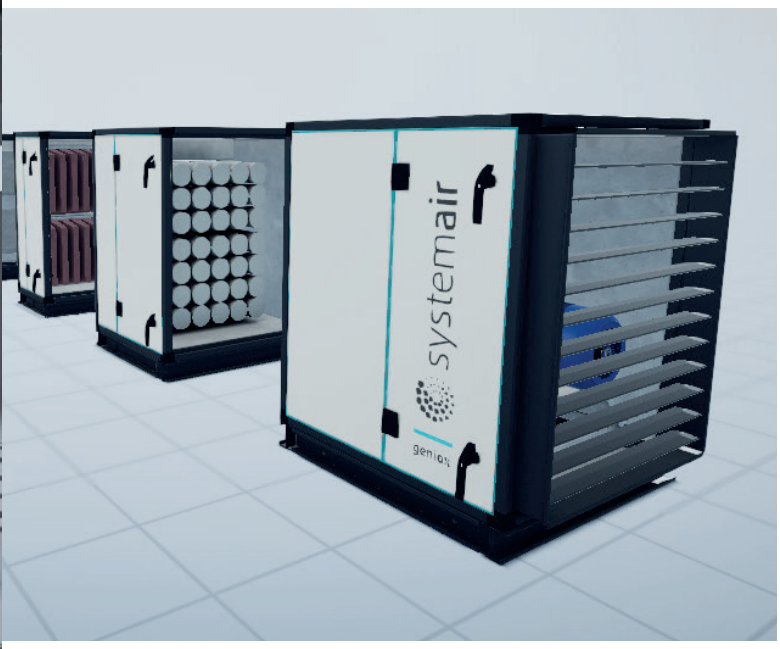
Please contact Systemair sales offices for special configurations for your project.

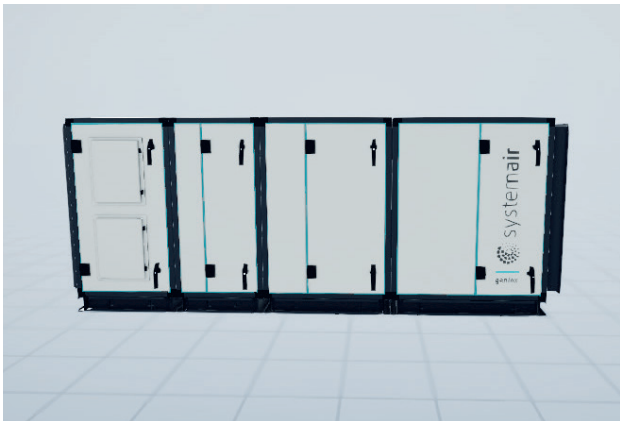
Discover Geniox VOClean with virtual reality!

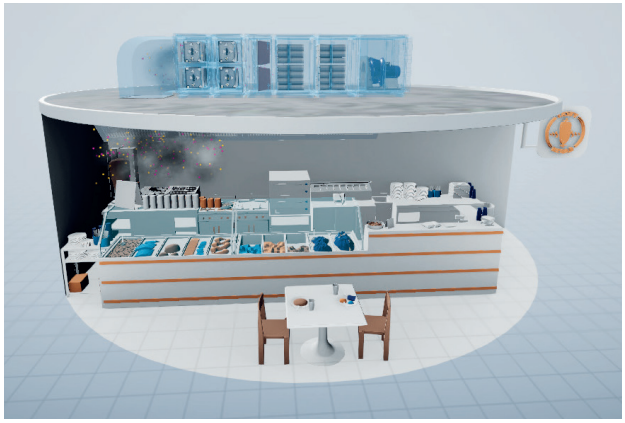
HVAC Products PRO by Systemair

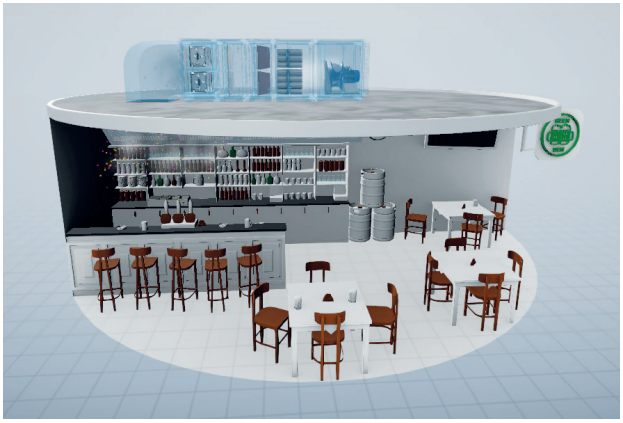
Available for everyone without registration, downloadable in a single click, or by scanning the QR code below. You can explore Geniox VOClean with real-time data wherever and whenever you want.

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!



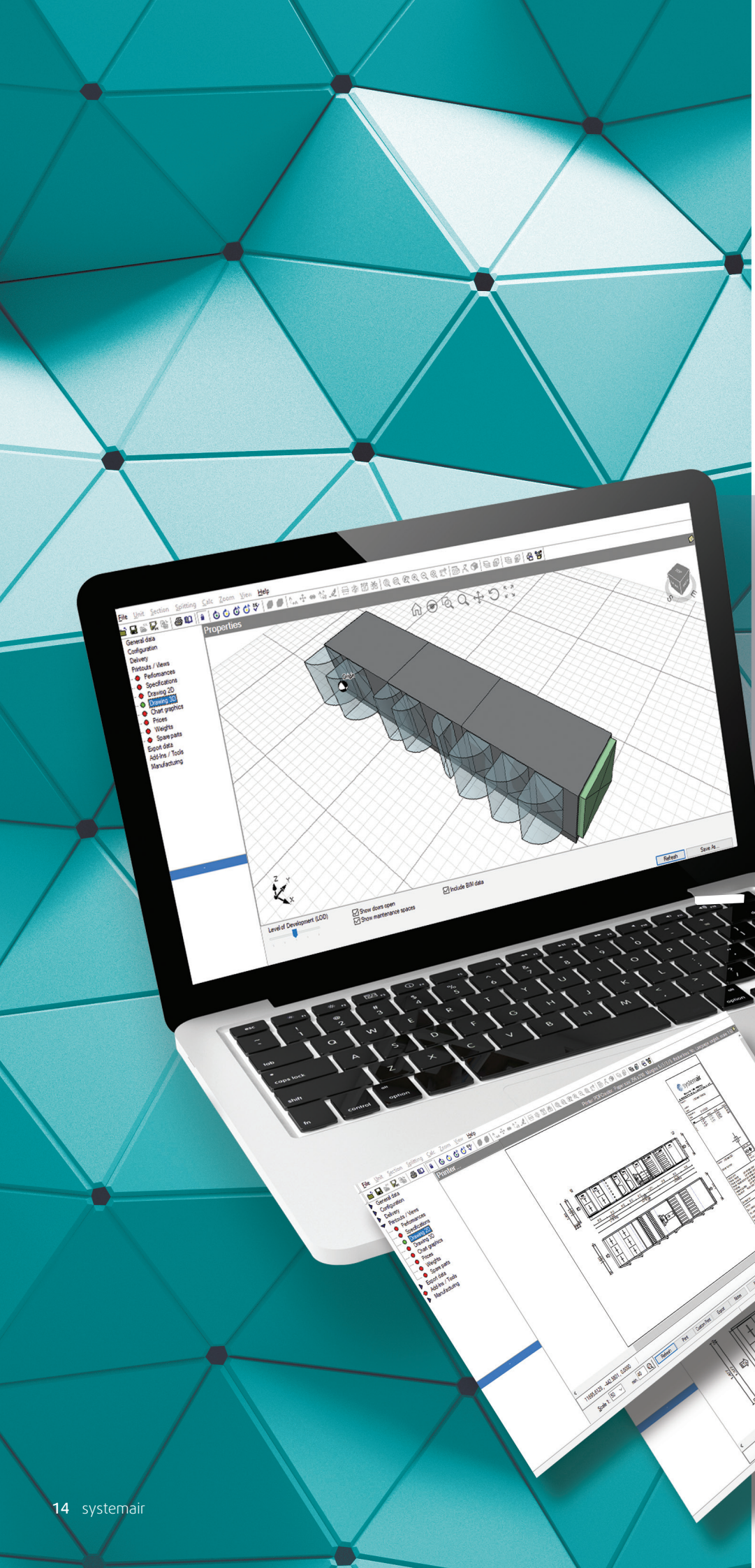






Which ecology unit is suitable for your kitchen?

Find out with Geniox VOClean:


Properties
Level of Development (LOD)
Show doors open
Show maintenance spaces
Include BIM data
Refresh
Save As...
Printer

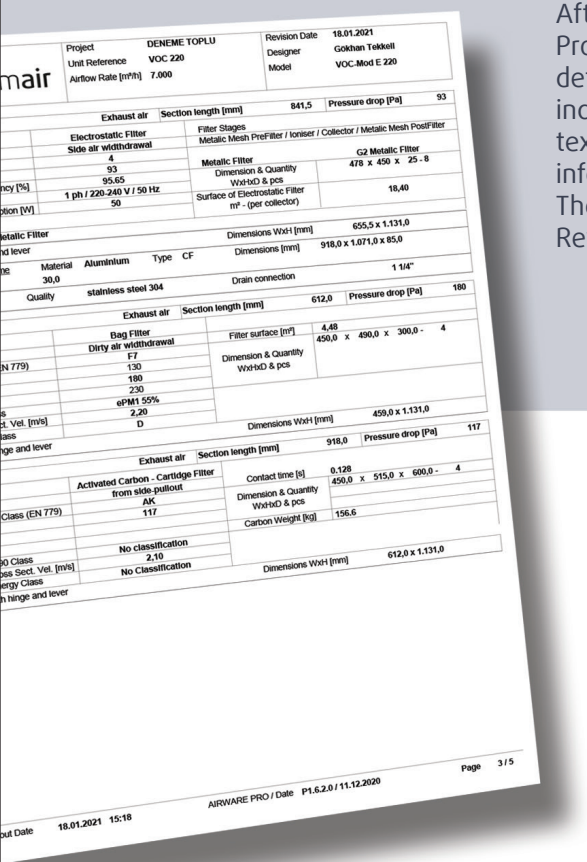
Airware PRO

Airware PRO selection software

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

The software provides a detailed overview of all functions and dimensions of the compact and modular air handling units selected. Geniox VOClean ecology unit can be selected via Airware Pro, which offers 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, customers can modify these templates according to their needs.

After the air handling unit has been selected, Airware Pro automatically runs the calculations, and provides detailed technical documentation in seconds. This includes all relevant technical data and specification texts that can be used for tender documentation. All information can be exported and viewed as a PDF. The software also offers 2D and 3D drawing files and Revit families.



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