VERT Forum 19th March 2026 – METAS, Bern-Wabern

Clean Air Enterprise AG

Raumkomfort I Leistungsfähigkeit I Lebensqualität

März 2026, Niederrohrdorf

Ventilation Industry

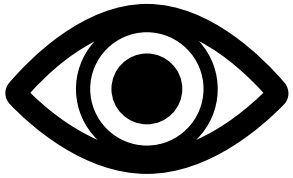
For 60 years, the ventilation industry has operated without defined indoor air quality standards, laws, or regulations.

Stakeholders: A matrix with 260 opponents

26 Cantons of Switzerland
Building owners
Architects
General contractors
Ventilation planners
Equipment manufacturers
Installers
Filter manufacturers
Facility managers
Hygiene inspectors

Situation in ventilation system

Pollution ventilation system - question: do you want to breathe this air?

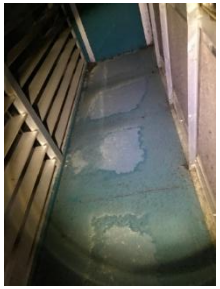


WELL Certification

Facade without floor finish.
Pigeon intrusion

Silencer to outer edge of building.
Extremely too high air velocity.
No weather protection device

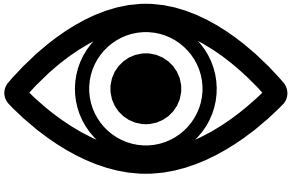
Water in the filter module.
Legionella danger



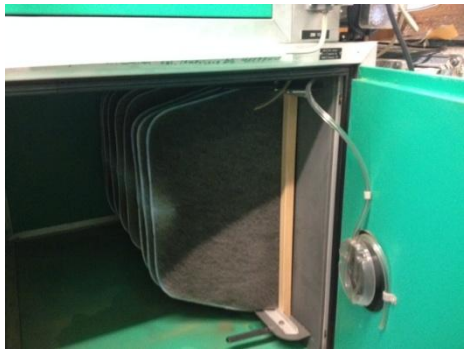
Pigeon droppings on filter in combination with water

Situation in ventilation system

Pollution ventilation system - question: do you want to breathe this air?



Cantonal Hospital
Ventilation system nuclear medicine



Wet supply air filters
High pressure drop
High energy consumption

Water in supply air module
Mold on the filter
Legionella danger

Situation in ventilation system






Situation in ventilation system

Market Reality & Experience

Picture 1
Water Presence
Client 1

Picture 2
Water Presence
Client 1

Picture 3
Water Presence
Client 2

Picture 4
Water Presence
Client 2

Picture 5
Water Presence
Client 2

Picture 6
Filter not properly sealed
Client 1

Picture 7
Only pre-filter installed – no filter
Client 2

The question is: why has the industry gotten into this state?

Indoor air quality is not defined in Switzerland. Indoor air quality is not monitored. Architects delegate responsibility to the planner. The planner allows the general contractor to remove important trades from the contract. The client trusts the architect and is unaware that they themselves are responsible for this issue. Construction inspections are mutually signed. The uninformed facility manager accompanies these problems throughout the building's lifespan. The residents get sick, go to the doctor, and we have this seven billion Swiss franc cycle...

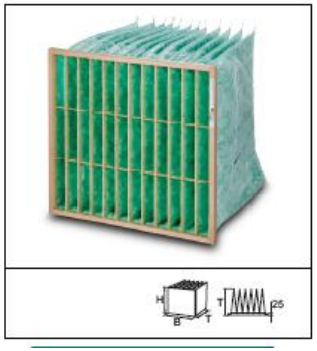
In Switzerland, approximately 14,000 hospital days are spent annually due to respiratory and cardiovascular diseases caused by air pollution. Polluted air leads to around 12,000 cases of acute bronchitis in children and approximately 2,300 new cases of chronic bronchitis in adults. Furthermore, this results in approximately 3.6 million days of reduced activity for adults. These factors generate annual healthcare costs of around CHF 7 billion.

https://www.bafu.admin.ch/de/auswirkungen-der-luftverschmutzung-auf-die-gesundheit

Today's filter selection

Außenluftqualität	Raumluftqualität			
	IDA 1 (hohe Qualität)	IDA 2 (mittlere Qualität)	IDA 3 (mäßige Qualität)	IDA 4 (niedrige Qualität)
ODA 1	F9	F8	F7	M5
ODA 2	F7 / F9	M6 / F8	M5 / F7	M5 / M6
ODA 3	F7 / GF / F9	F7 / GF / F9	M5 / F7	M5 / M6
GF) Gasfilter				

Most systems worldwide have this filtering effect.



Wet filters, water in the system

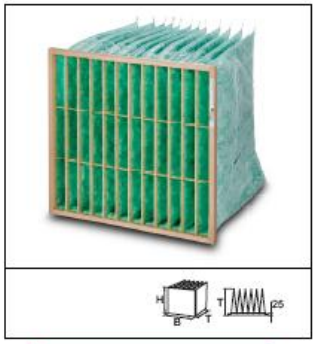
Today's energy rating

Außenluftqualität	Raumluftqualität			
	IDA 1 (hohe Qualität)	IDA 2 (mittlere Qualität)	IDA 3 (mäßige Qualität)	IDA 4 (niedrige Qualität)
ODA 1	F9	F8	F7	M5
ODA 2	F7 / F9	M6 / F8	M5 / F7	M5 / M6
ODA 3	F7 / GF / F9	F7 / GF / F9	M5 / F7	M5 / M6

GF) Gasfilter

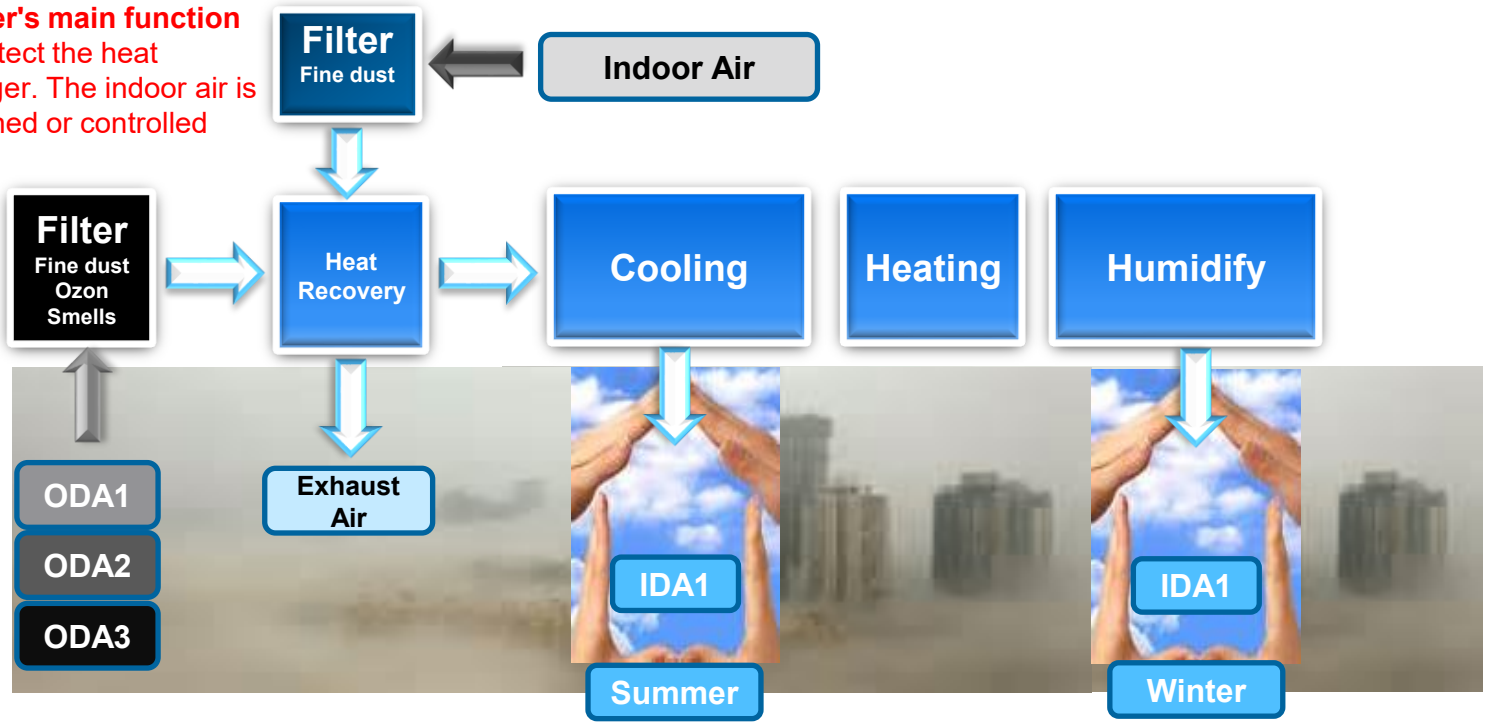
Filter klasse	M5	M6	F7	F8	F9
ME	–	–	ME ≥ 35%	ME ≥ 55%	ME ≥ 70%
	M_M = 250g ASHRAE			M_F = 100g ASHRAE	
A+	0-450 kWh	0-550 kWh	0-800 kWh	0-1000 kWh	0-1250 kWh
A	>450 kWh - 600 kWh	>550 kWh - 650 kWh	>800 kWh - 950 kWh	>1000 kWh - 1200 kWh	>1250 kWh - 1450kWh
B	>600 kWh - 700 kWh	>650 kWh - 800 kWh	>950 kWh - 1200 kWh	>1200 kWh - 1500 kWh	>1450 kWh - 1900 kWh
C	>700 kWh - 950 kWh	>800 kWh - 1100 kWh	>1200 kWh - 1700 kWh	>1500 kWh - 2000 kWh	>1900 kWh - 2600 kWh
D	>950 kWh - 1200 kWh	>1100 kWh - 1400 kWh	>1700 kWh - 2200 kWh	>2000 kWh - 3000 kWh	>2600 kWh - 4000 kWh
E	>1200 kWh	>1400 kWh	>2200 kWh	>3000 kWh	>4000 kWh

Inventory: 300,000 in Switzerland, 3 million in Germany, 30 million in Europe, 200 to 300 million worldwide



Situation in ventilation system compared to the target state

The filter's main function is to protect the heat exchanger. The indoor air is not defined or controlled



Filter: Most systems are only equipped with a single-stage **F7 pocket filter**

Ventilation Systems: most ventilation systems cannot be converted to a two-stage filter system (no place)

Today's Situation

Filter: Most systems are only equipped with a single-stage F7 pocket filter

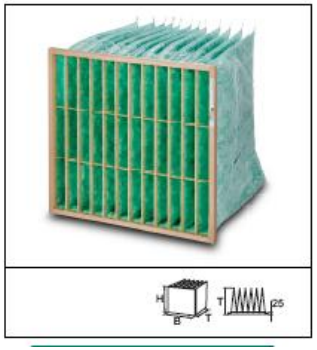
Energy Rating: Most filters have an energy rating of B or less

Indoor air quality: most rooms have an indoor air quality of IDA3 or less

Ventilation Systems: most ventilation systems cannot be converted to a two-stage filter system (no place)

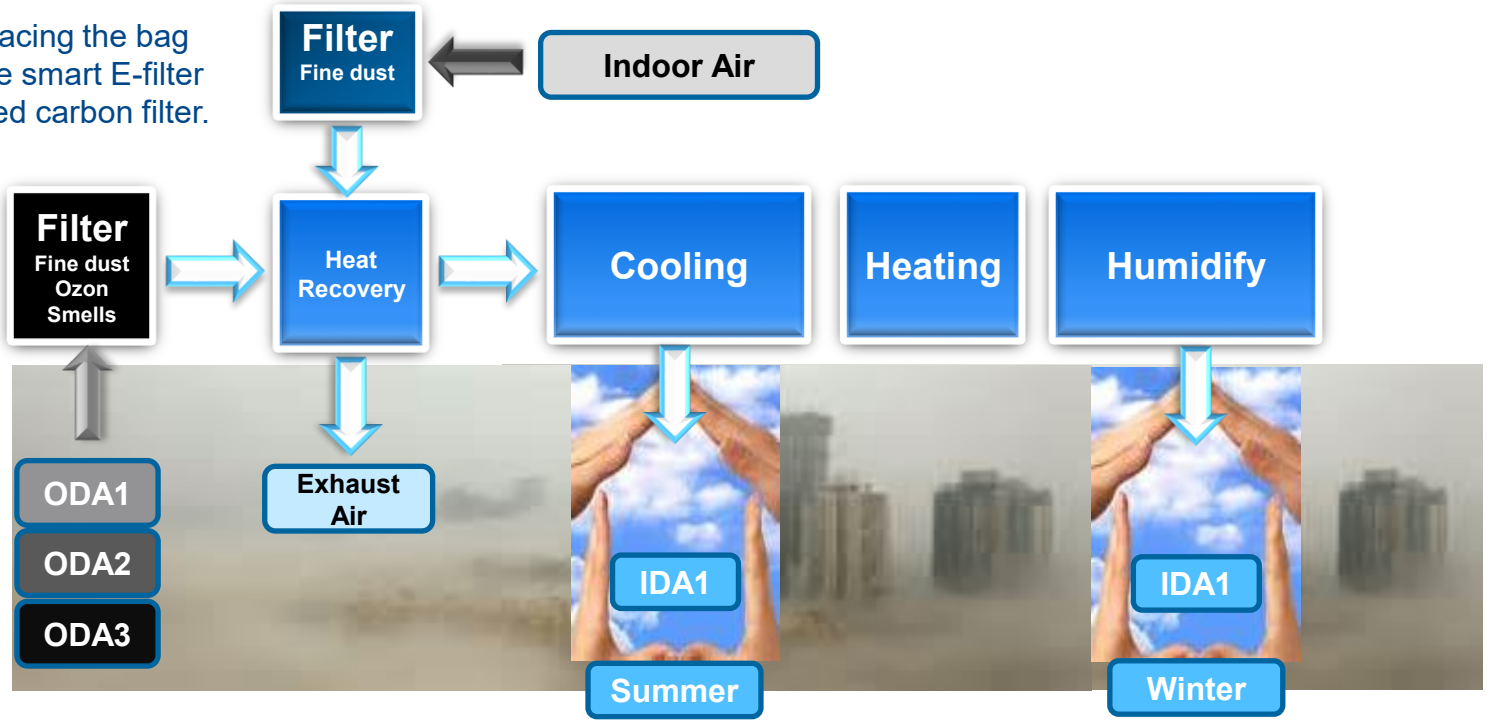
Resource consumption: 300,000 in Switzerland, 3 million in Germany, 30 million in Europe, 200 to 300 million worldwide, pocket filter are burned every year (plastic, Fiberglass, wood and package)

Saving potential (LCA): per filter 3.5 tons of CO_2 , External costs CHF 1'000.- calculated for 20 years



Creative Destruction Against the Silent Pandemic of Indoor Air Quality –The Smart E-Filter Solution

We are replacing the bag filter with the smart E-filter with activated carbon filter.

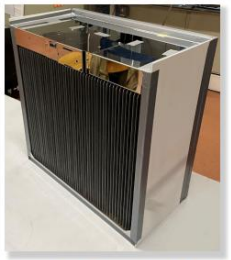


Virtually free of fine dust, ozone, viruses, bacteria, fungal spores, yeast and black carbon.
Saving (LCA): per filter 3.5 tons of CO_2 , External costs CHF 1'000.-calculated for 20 years
Since we remove 99% of the particles, we give the customer a cooling effect of 2 to 3 degrees.
We measure the PM2.5 particles before and after the filter. This allows us to know exactly how much black carbon we are removing. A black carbon certificate is available

Performance Test Report

PERFORMANCE TEST OF AN ELECTRICAL PRECIPITATOR

CAET_001.EVS
592 x 592 x 300 mm
With Aluminium plates



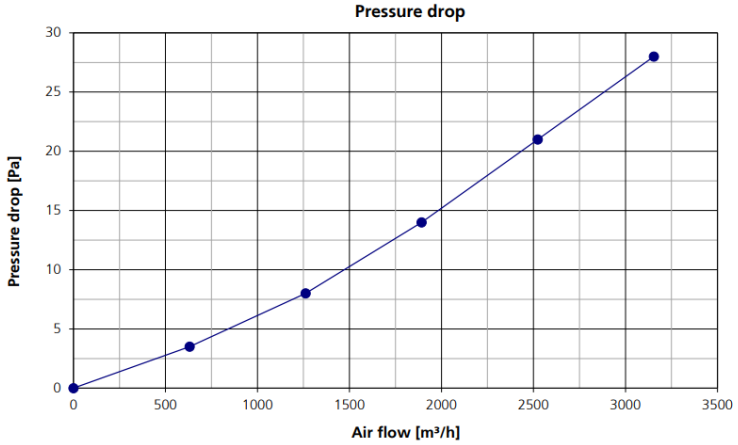
TEST REPORT: IN 230601-PL1

July 31st, 2023

According to EN 1822-1:2019
and ISO 29463-5:2022

Table 2: Efficiencies and lower limit of 95%-level of confidence - at 2,0 m/s

Particle size [µm]	Efficiency [%]	Efficiency, 95% min [%]	Penetration [%]	Penetration, 95% [%]
0,060	99,232	99,147	0,768	0,853
0,070	99,167	99,101	0,833	0,899
0,081	99,146	99,094	0,854	0,906
0,093	99,105	99,063	0,895	0,937
0,108	99,055	99,020	0,945	0,980
0,124	99,022	98,990	0,978	1,010
0,143	98,934	98,903	1,066	1,097
0,166	98,920	98,891	1,080	1,109
0,191	98,930	98,901	1,070	1,099
0,221	98,940	98,910	1,060	1,090
0,255	98,913	98,880	1,087	1,120
0,294	98,973	98,936	1,027	1,064
0,340	99,033	98,990	0,967	1,010
0,392	99,122	99,071	0,878	0,929
0,453	99,199	99,135	0,801	0,865
0,523	99,226	99,157	0,774	0,843



Life Cycle Assessment

carbotech
Umweltprojekte und Beratung

Life Cycle Assessment Clean Air Electrostatic Filter 2020

Client
Clean Air Enterprise AG
Adrian Peterhans

Authors
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Carbotech AG, Basel
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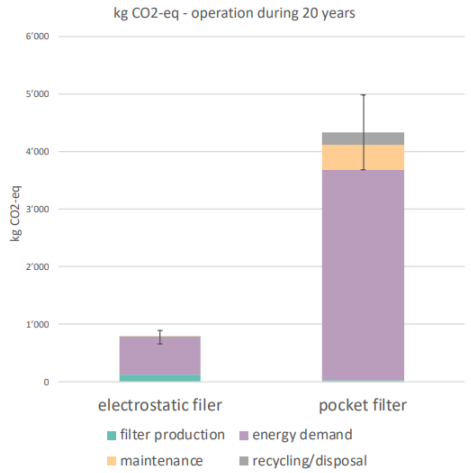
Results CO_2-footprint

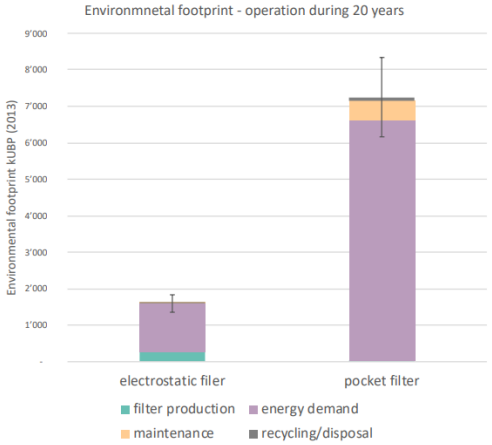
comparison scenario real - operation during 20 years



- By using the electrostatic filter, around 3.5 tons of CO_2-eq. can be saved over 20 years.
- For comparison:
  - In one year, a Swiss person causes emissions of about 12 tons of CO_2-eq .
  - This corresponds to about 10,000 km of driving.
- The main reason for this reduction is the considerably lower energy demand of the electrostatic filter during its operation.

Results environmental footprint

comparison scenario real - operation during 20 years



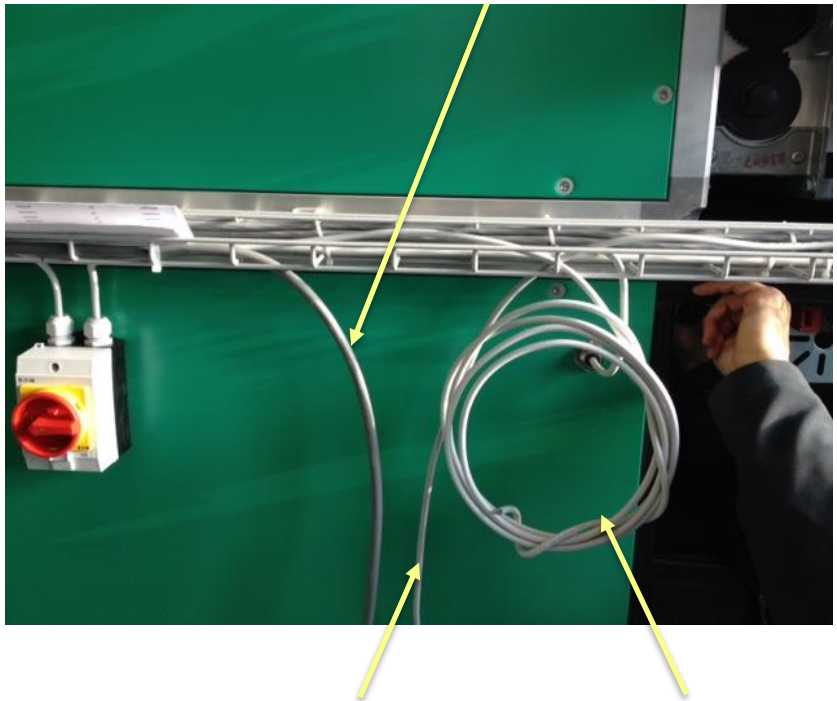
The use of the electrostatic filter has a four to five times lower environmental footprint compared to the pocket filter. The reduction of almost 6 million UBP corresponds to about 18,000 km of car travel.

The main reason for this reduction is the considerably lower energy demand of the electrostatic filter during its operation.

On-site preparation

Control cable to the control cabinet

Typ: EM-Nr.: **U 72-3 X 4/0,8 ABG NOHAL**
E-Nr.: **102078012**
Warengruppe: 6720
Kataloge: Installation ELDAS 2016 / 2017
Kapitel 01, Seite 051, Zeile 34

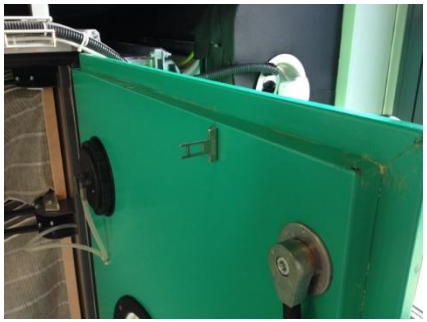


Contact switch

Typ: **OMRON D4NS-4AF**

Riegel

Typ: **OMRON D4DS-K2**



Cable to the contact switch

Typ: EM-Nr.: **G 51-1 X 2/0,6 NOHAL**
E-Nr.: **102016002**
Warengruppe: 6724
Kataloge: Installation ELDAS 2016 / 2017
Kapitel 01, Seite 050, Zeile 01

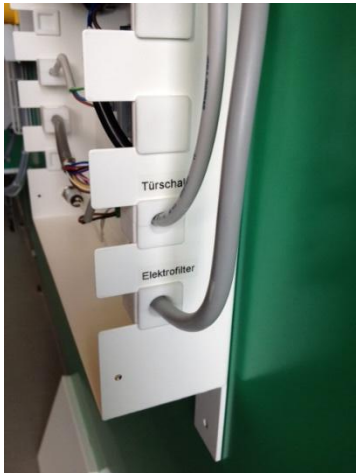
Power cable to the control cabinet

Typ: EM-Nr.: **FE 0-3 X 1,5 LNPE**
E-Nr.: **109010323**
Warengruppe: 6311
Kataloge: Installation ELDAS 2016 / 2017
Kapitel 01, Seite 009, Zeile 01

or

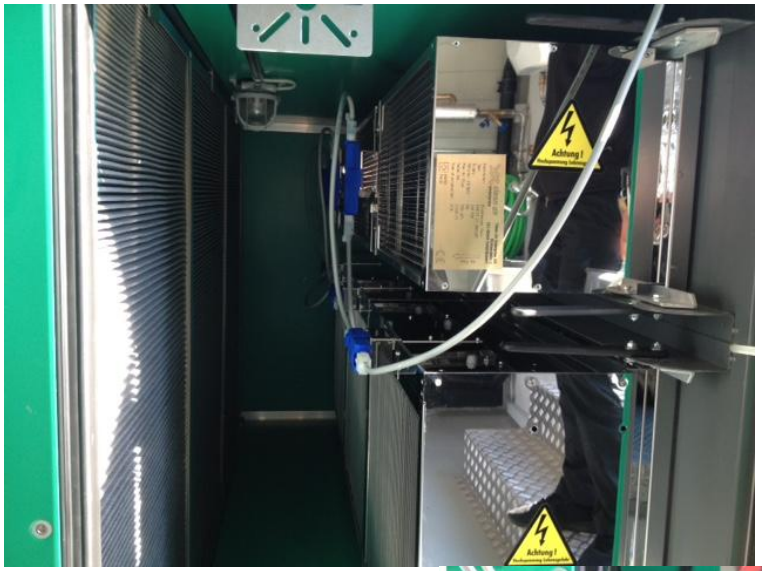
EM-Nr.: **TD 3 X 1,5 LNPE NOHAL**
E-Nr.: **114015325**
Warengruppe: 6310

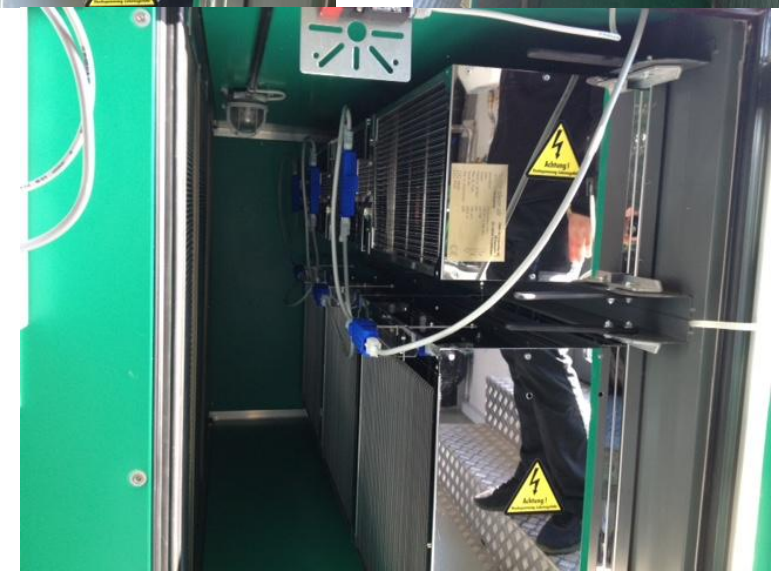
Installation Master by Clean Air Enterprise AG



Installation of activated carbon filter by Clean Air Enterprise AG

Assembly of electrostatic precipitators by Clean Air Enterprise AG





Particles in 100 million cubic meters

clean air enterprise

captures the fine particles in 100 million cubic meters of Zurich.

https://clean-air-enterprise.com/feinstaub-stadt-zuerich/

Reference projects

International Clients References

In Switzerland

AXA Tower
2018

Muri Hospital Private – 2019

RWD Minergie
Apartments – 2020

Implenia HQ
2018

Glencore HQ
2018

Hospital of Zug
2021

Swiss Re

Zurich Energy Model Wander Award 2022

Building Escherhaus - 2017
Building Lavaterhaus - 2017
Building Altbau - 2018
Building in Rüschlikon - 2021
Building NEXT - 2021
Building Soodring 6 - 2021

In United Arab Emirates

مـدينة إكـسبو دبـي
EXPO CITY DUBAI

Since 09.2024

Clean Air E-Filter brings the Indoor Air Quality to the UAE within the latest World Health Organization guidelines

*PM2.5 monitored outdoor and indoor at a pilot project in Dubai, UAE. Monitored before Clean Air E-Filter upgrade from 27.9.2024 - 14.10.2024, and then after E-Filter upgrade from 15.10.2024 till today

Expo City Dubai

Reference Client in the UAE

EXPO CITY DUBAI

CONTEXT

17 October 2024 – Al Wasl 3, Expo City Dubai, UAE - Upgrading 2x HVAC

OBJECTIVE

Bring the best Indoor Air Quality possible while reducing the carbon footprint

METHODOLOGY

Monitor the Indoor Air Quality before and after HVAC upgrade
Installation of Clean Air e-Filters

PARTNERS ENGAGED

Clean Air Enterprise – Project lead – e-Filter Supplier
Expo City Dubai – Project host
Tesenso – Air Quality Monitoring
Voj-Tech – Hygiene Report
Euroclima – Clean Air's partner for technical support

BEFORE - Paper Filters

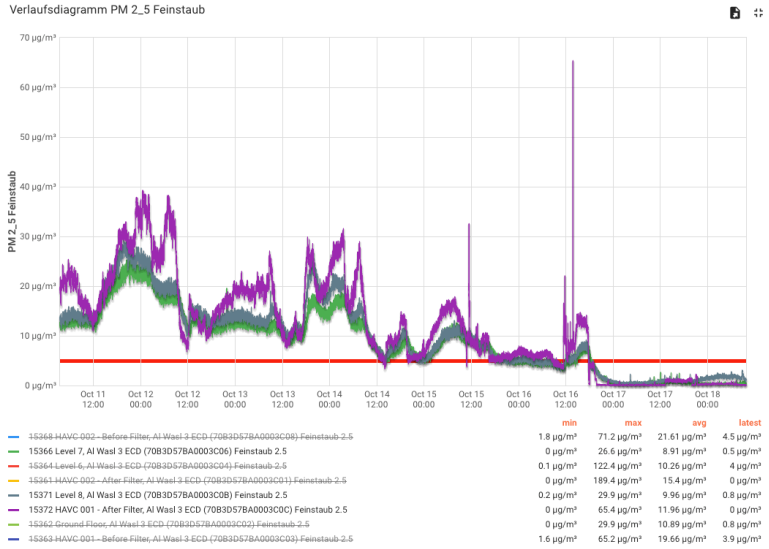
AFTER - Clean Air e-Filters

EXPO CITY DUBAI – INSTALLATION REPORT

HAVC 001 – Covering Level 6-9

BEFORE – Pocket Filters

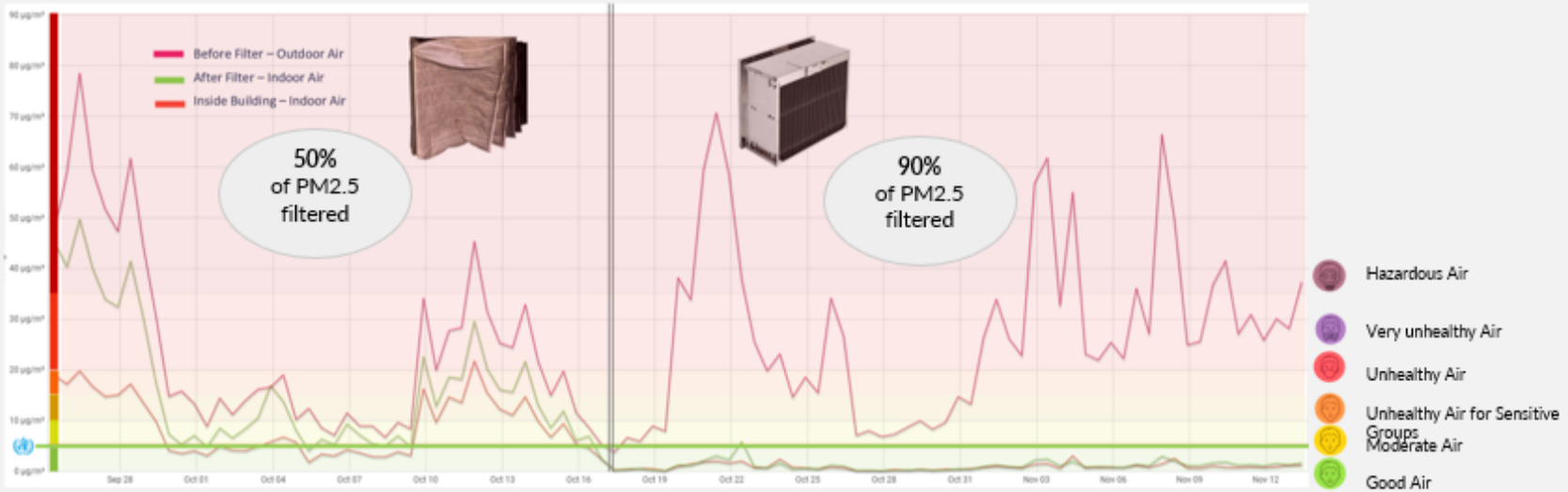
AFTER – Clean Air e-Filter



	PM2.5 Average	
	27.09 - 14.10.	16.10-18.10
15372 HAVC 001 - After Filter, Al Wasl 3 ECD	**13.57**	**0.32**
15371 Level 8, Al Wasl 3 ECD	8.63	1.06
15366 Level 7, Al Wasl 3 ECD	9.17	0.41

Expo City Dubai - IAQ Improvement

Building Al Wasl 3 upgraded with Clean Air



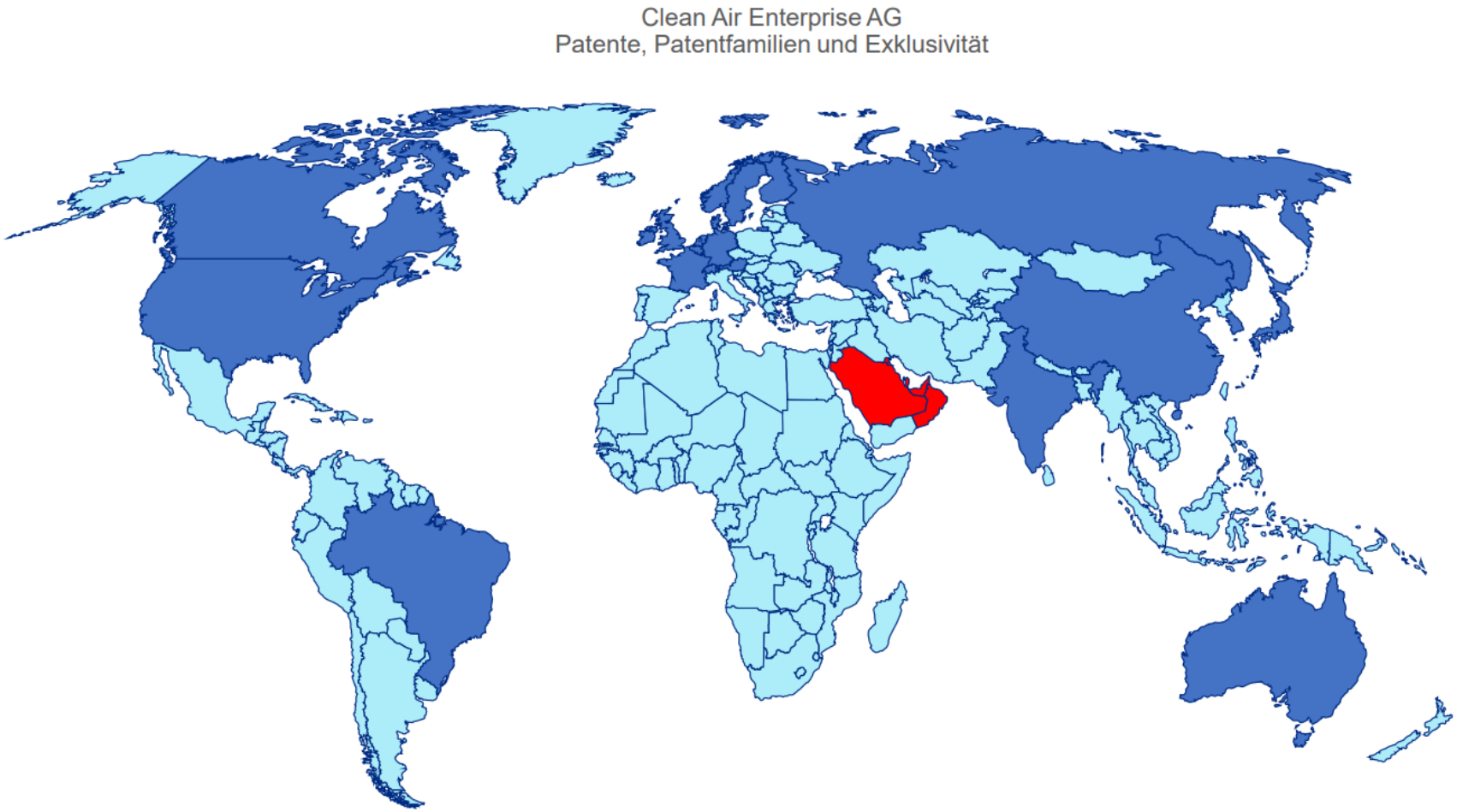
WITH POCKET/PAPER FILTER

- Indoor Air Quality **above** (WHO) Air Guidelines
- Indoor Air Quality from **unhealthy to very unhealthy**

WITH CLEAN AIR E-FILTER

- Indoor Air Quality **below** (WHO) Air Guidelines
- Indoor Air Quality is **clean and healthy**

Patents and exclusivity



Unique Selling Propositions

- WHO-aligned reduction of PM2.5 and ultrafine particles
- Reduction of black carbon with measurable climate impact
- Removal of viruses, bacteria, yeasts and fungal spores
- Electrostatic filtration technology with very low pressure drop
- Cooling curve optimization (2–3°C potential depending on application)
- Measurable energy savings through combined air movement and filtration
- Retrofit-ready integration into existing building infrastructure
- Modular and scalable system architecture
- Monitoring integration with traceable measurement processes
- 8 years of operational references in Switzerland
- Globally patented technology platform
- Reference projects including the Urban Lab at Expo City Dubai
- Certified as Solar Impulse Top 1000 Solution
- Eligible within energy-related funding programs
- ESG-relevant impact including health and productivity benefits

https://clean-air-enterprise.com/cop23-dubai/

Kontakt

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Raumkomfort I Leistungsfähigkeit I Lebensqualität