REVEN
SCHAKO Group

X-CYCLONE® high-performance separator

Guide

Basic element for kitchen ventilation and industrial air cleaners

As of 02/2024

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Tel.
www.reven.de

Contents

Introduction

Anyone involved in cleaning polluted air will ask themselves the following questions:

What is the best method for purifying air?
How can the greatest possible amount of pollutants be filtered out or separated?
Does this protect people, machines and the environment? Is the whole process sustainable and economical?

Our answer to these questions is the **X-CYCLONE® separator!**

After many years of research, including CFD analysis, we have developed and optimised this high-performance aerosol separator. Its functionality has been scientifically proven and documented.

It is at the heart of almost all our products.

We are proud to present our double-patented X-CYCLONE® separator with its wide range of features, in line with the motto of our managing director Sven Rentschler:

"Our aim is not just to be at the cutting edge. We want to shape the future of air purification."

Sales Manager Vitali La
with an X-CYCLONE® separator

The X-CYCLONE® separator

Advantages at a glance

The X-CYCLONE® separator

- **has a separation efficiency of up to 99.999%**
- **complies with VDI guidelines**
- **has flame resistance in accordance with DIN 18869-5 and DIN EN 16282 and belongs to type A**
- **has no bypass openings and is therefore flow-proof**
- **is completely maintenance-free and self-cleaning**
- **Can be cleaned and reused**
- **Comes with a lifetime guarantee when used properly**
- **has been further developed using CFD analysis and its effectiveness and functionality have been scientifically tested and documented**
- **is double patented**
- **is suitable for separating a wide range of water- and oil-containing aerosols**
- **is suitable for separating dry, sticky, solid and vapour-like substances in combination with the REVEX® spray system**
- **Can be used to replace outdated separators**
- **is available in many sizes, including customised designs**
- **can be combined with other filter stages when used in industrial air cleaners**
- **Reduces the cost of cleaning exhaust air ducts**

Stainless steel frame with aluminium profiles

Separation as a mechanical separation process is used to separate mixtures of substances (e.g. emulsions, suspensions or aerosols). The aim (which is often unachievable in practice) is to completely remove one or more components of the mixture.

Source: https://chemie.de

The X-CYCLONE® aerosol separators from Rentschler REVEN are used for the effective separation of oils, vapours, cooling lubricants and other liquid mists (aerosols).

The separators are available in two versions:

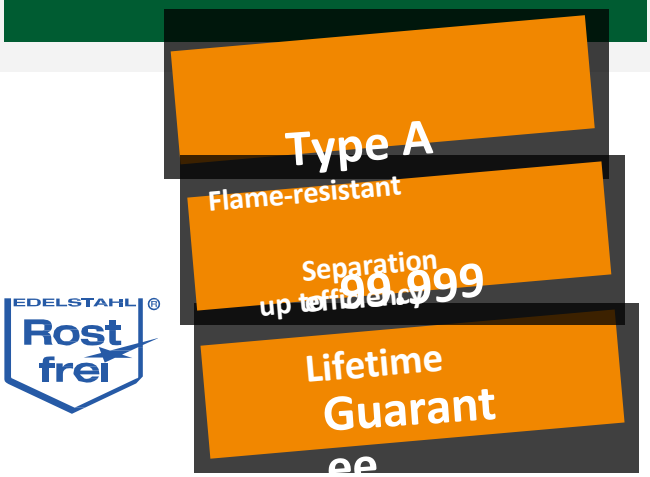
- Completely in stainless steel for commercial kitchens and the food industry
- With stainless steel frame and aluminium profiles made of a saltwater-resistant alloy
  For the processing industry

The mechanically operated separators consist of **patented** special profiles, spacer fixings and a stainless steel frame. The special profiles are arranged in two separable plate levels. The self-cleaning effect is based on the special profile design, the smooth surfaces and the easy-to-clean arrangement.

The X-CYCLONE® separator is at the heart of almost all our products.

Made entirely of stainless steel

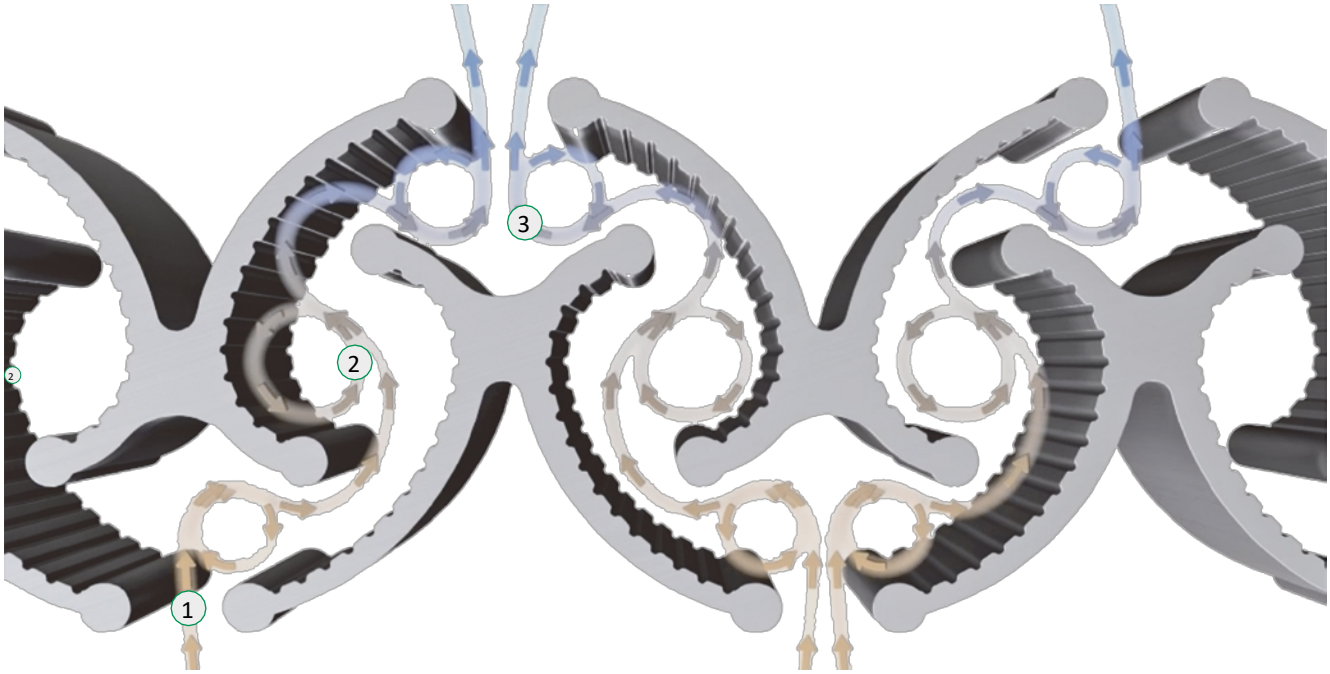
Rentschler REVEN GmbH holds a globally valid PCT patent for X-CYCLONE® technology, based on an advanced arrow geometry!



INNOVATION BW Preisträger
Innovationspreis Baden-Württemberg
Dr.-Rudolf-Eberle-Preis

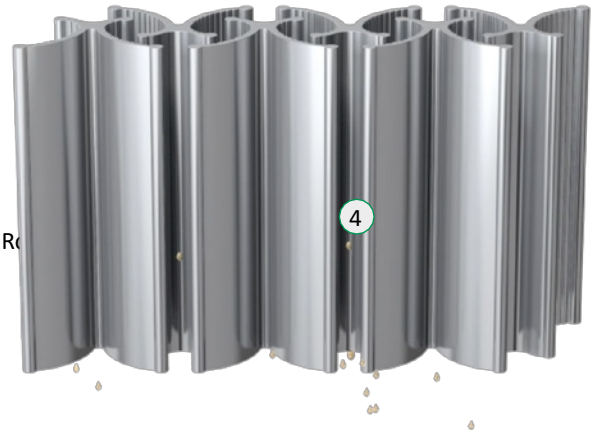
How it works

The four stages of separation in an X-CYCLONE® separator:



STAGE 1

The aerosol-contaminated exhaust air flows into the X-CYCLONE® separator. At inlet 1, the air flow accelerates rapidly, resulting in initial separation.



STAGE 2

The greatly accelerated air flow is converted into rotational energy in a R
rotary 2 which separates airborne aerosols.
vortex.

STAGE 3

At the air outlet 3 of the X-CYCLONE® separator,
air flows and rotational vortices collide, leading to agglomeration and further separation of small aerosol particles.

STAGE 4

The aerosols separated in the X-CYCLONE® aerosol separator adhere to the profile and run off as a separate fluid mass.
separated fluid mass 4 downwards.

➜ More information on "X-CYCLONE® technology":
https://www.reven.de/technologien/aerosolabscheidung/

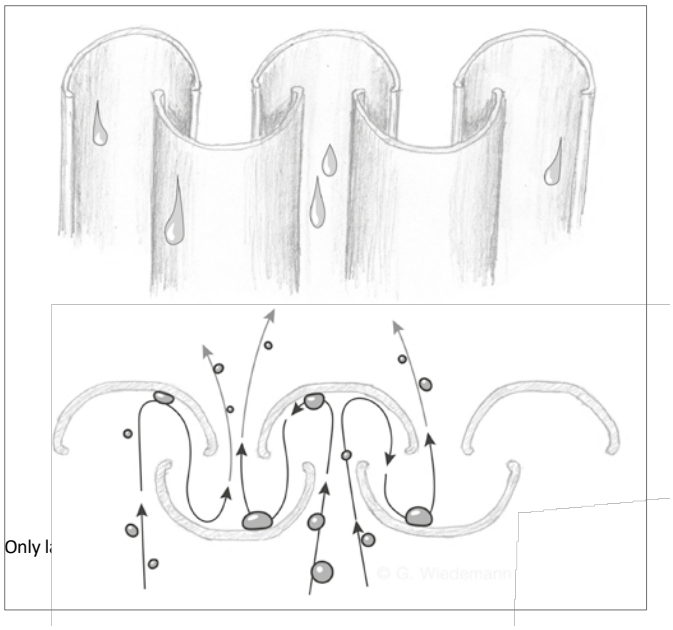
Research & Development

Anyone who wants to develop a good aerosol separator must take into account the interaction of several factors, such as the behaviour of the air flow in relation to the profile shape and profile surface structure.

In the beginning was the baffle plate separator

Impact plate separators are among the first generation of metal separators ever developed. They are characterised by smooth, simple U-shaped sheet metal profiles.

The air is deflected twice, causing the particles to be separated to collide with the metal wall and, ideally, run downwards. Not all particles adhere to the smooth metal wall, and even particles that do adhere can be carried away again by the subsequent air flow.



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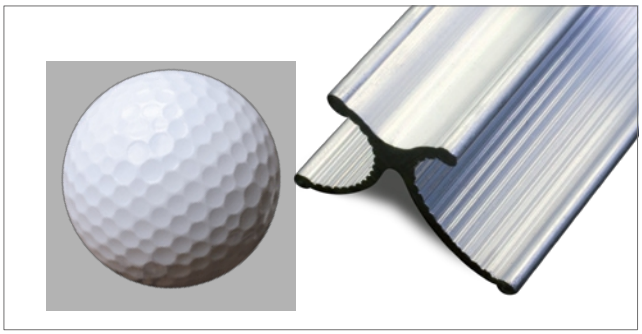
Further development of the profile surface

When a golf ball is in flight, the dimples on its surface cause pressure equalisation between the front and back, thereby reducing air resistance.
A golf ball with dimples/indentations therefore flies further than a golf ball with a smooth surface.



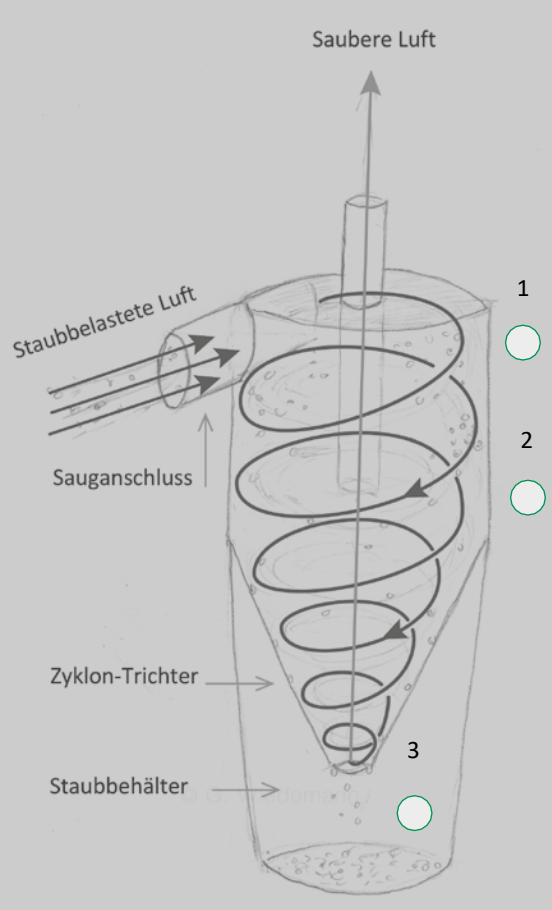
We have exploited this effect in the further development of our X-CYCLONE® profiles.
We have changed the surface structure of our separator profiles by adding dimples to the surface in order to optimise air flow. Now the air flows through the profiles at a higher speed – with the same pressure loss – resulting in improved separation performance.

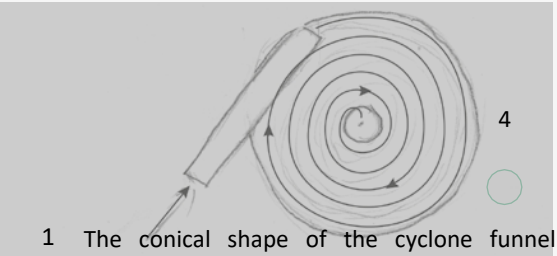
Getting the air flowing

What does an air flow need to look like in order to separate as many particles as possible?

Manufacturers such as Dysen were pioneers in this field and used cyclone separation for their vacuum cleaners.
The air is set into a rotational flow at very high speed, similar to a tornado. The higher the rotational speed, the smaller the particles that can be ejected by the air flow and thus separated.

Illustration of how a cyclone vacuum cleaner works





1 The conical shape of the cyclone funnel causes the sucked-in air to move in a spiral.

2 Centrifugal force causes the dust particles to be thrown against the wall.

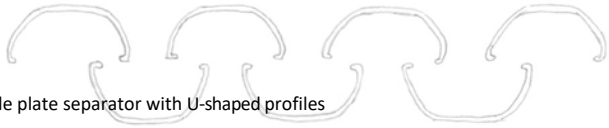
3 The dust particles are collected in a dust container.

4 Cyclone spiral seen from above

Development of X profiles

The rotating air flow creates small whirlwinds (cyclones) inside the separators. Centrifugal force causes the particles to be separated to be thrown against the wall, where they can flow downwards.

To achieve this, we used CFD analyses to change the geometry of the profiles.



Baffle plate separator with U-shaped profiles

Prototype of the X-CYCLONE® separator with X-profiles in the shape of aircraft wings

X-CYCLONE® separator with profiles in advanced X geometry for optimum air flow control

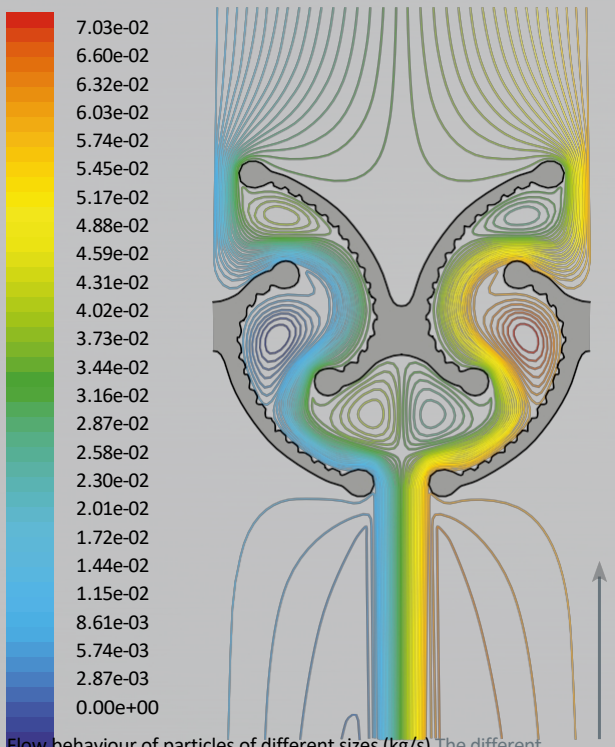
The X-CYCLONE® separator gets its name from the X-profiles, which provide cyclone separation.

CFD analysis

Flows are highly complex and cannot be captured analytically. The only way to calculate, understand and utilise them for process and product development is through CFD flow simulation (computational fluid dynamics).

The major advantage of CFD simulation over experimental methods and measurements is that it not only provides values at selected points, but also captures all physical variables at once, thus enabling functionality to be verified.

As part of the optimisation of our exhaust air devices, we first investigated the flow behaviour of airborne oil aerosols and solid particles in the X-CYCLONE® separator using CFD analysis and gained an important insight:
Airborne pollutants do not always exhibit the same flow behaviour as air molecules.

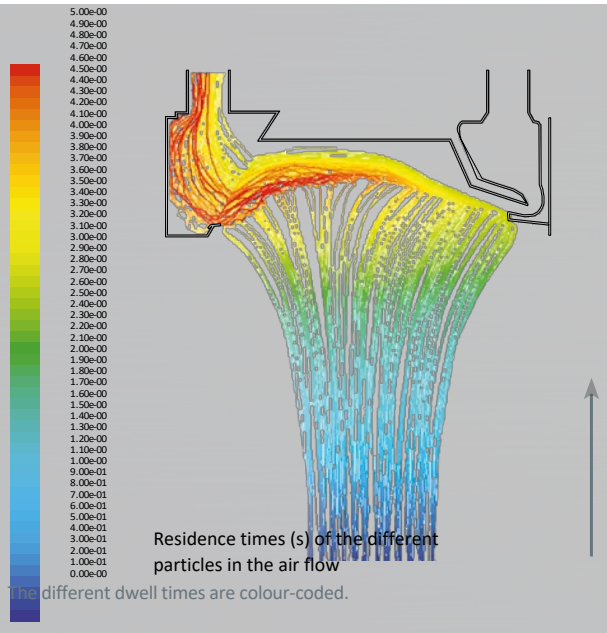


Flow behaviour of particles of different sizes (kg/s) The different particle sizes are colour-coded.

The interaction between the shape and surface of the X-CYCLONE® profiles and the condensed air or aerosol flow plays a special role and ensures optimum separation of pollutant particles and oil droplets. Thanks to optimisation through CFD analysis, the fifth product generation with the globally patented X-CYCLONE® profiles with arrow geometry is now on the market.

The separation efficiency is up to 99.999%.

CF**D simulation** (CFD = Computational Fluid Dynamics) is used to design and optimise flow-conducting components.



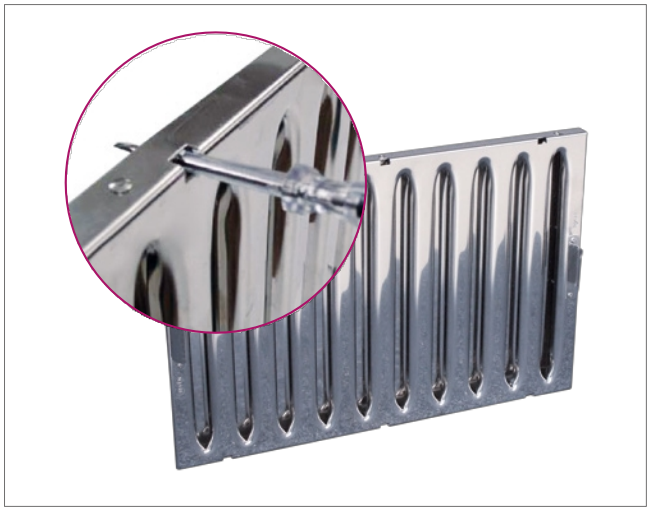
Residence times (s) of the different particles in the air flow
The different dwell times are colour-coded.

Our REVEN® induction system was also developed using CFD simulation. It drives the thermal air flow to the separators and at the same time ensures forced condensation.

Optimisation through flow tightness

Short-circuit flows eliminated

Even the best flow control cannot prevent the loss of separations caused by so-called bypass openings.
Punch holes or fitting inaccuracies between the frame and profiles can lead to short-circuit flows.

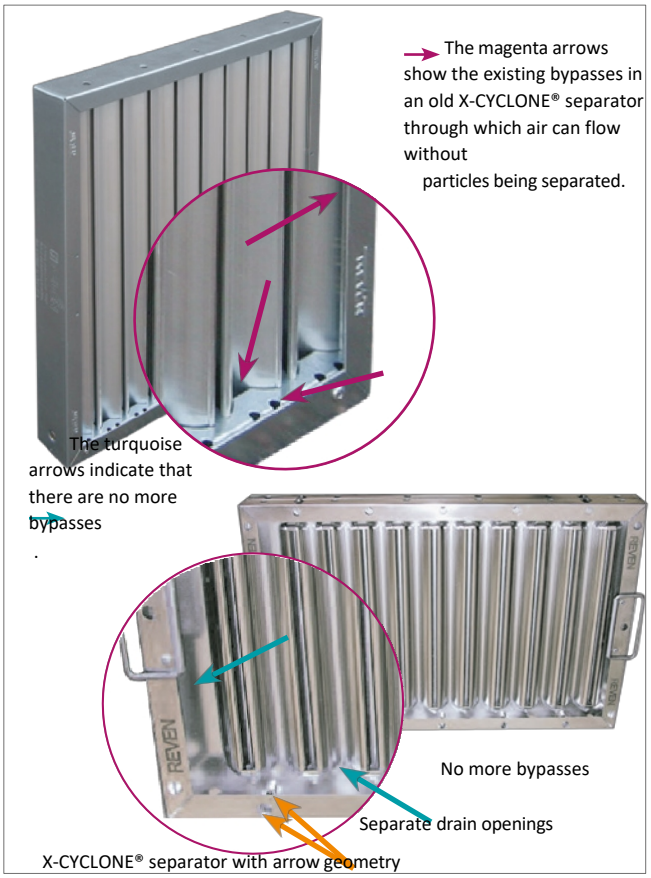


In this baffle plate separator, punch holes in the edge area cause short-circuiting of the air from the raw gas side (the outside of the separator facing the kitchen) to the clean gas side (the inside of the separator). This means that up to 10% of the air can flow through such bypass openings.

Bypass openings in a separator are defined as punched-out areas and fitting inaccuracies between profiles and frames that allow air flows to pass directly past the profiles without being separated **(short-circuit flows)**.

With REVEN, there are no short-circuit flows – i.e. 0 m³ /h.

With X-CYCLONE® separators, we are the first company in the history of kitchen ventilation to succeed in manufacturing a separator for kitchen hoods that has **ZERO** m³/h short-circuit flows in the edge and frame area!



The solution: We have created separate outlet openings; one on the raw gas side, where the separator is exposed to the flow, and one on the clean gas side. These openings are separate and not connected to each other. This means that there can no longer be any bypasses or short circuits!
Decades of continuous research and development have resulted in the fifth generation of X-CYCLONE® air cleaners being presented to the global public.

The separators in the air cleaners feature a new arrow geometry and a 20% improvement in separation efficiency.

Functionality scientifically proven

Particle measurement

Today's particle counters can analyse heavily polluted indoor air with the same accuracy that has been standard in clean rooms for decades.

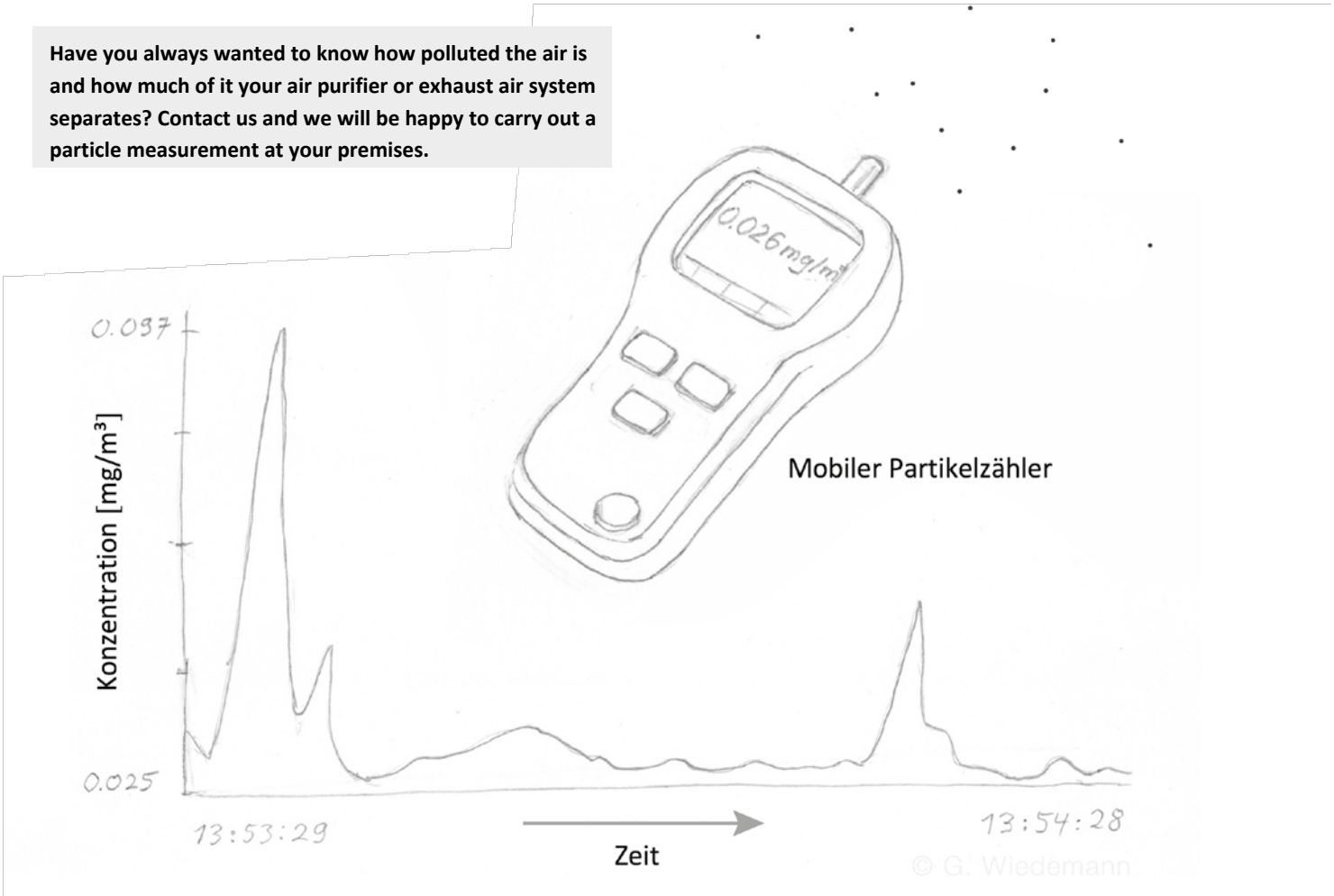
In order to test the proper functioning of a ventilation system, the efficiency of detection and extraction, and the separation and filtering of pollutants from the air flow, we use CFD analysis and, above all, particle measurement.

We do not make assumptions, but prove the functionality of our X-CYCLONE® systems in black and white.

The functionality of REVEN's X-CYCLONE® separators is scientifically proven.

fractions of individual particle sizes.

Have you always wanted to know how polluted the air is and how much of it your air purifier or exhaust air system separates? Contact us and we will be happy to carry out a particle measurement at your premises.



Separation efficiency

Depending on the cooking processes, a wide range of particle sizes occur in kitchens. For example, due to high temperatures and the use of oil, a smaller particle spectrum can be expected above tilting frying pans than above a cooking kettle. However, past experience has shown that approximately 80% of particles are in the size range of 0.05–10 µm. The aerosol concentration in kitchen air ranges from 10–100 mg/m³.

In the economic analysis, an average load of 60 mg of oil, grease and dirt per cubic metre of exhaust air is assumed.
These 60 mg of pollutants per cubic metre of exhaust air must be assigned to the individual particle sizes in order to determine the separation efficiency.

The mass fraction thus takes into account both the particle frequency and the mass of a single particle. It should be noted here that a particle measuring 10 µm has approximately 37,000 times the mass of a 0.3 µm particle.

Distribution of mass fractions in a kitchen

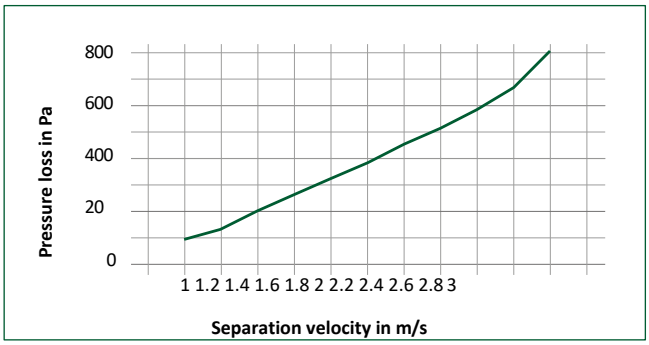
Particle size	Mass fractions in the air	
[µm]	[mg/m³]	
0.5	2.4	4
1.0	4.2	7
3.0	23.4	39
5.0	24.0	40
10.0	6.0	EVEN (assuming 10
Total:	**60 mg/m³**	

Typical distribution of mas
assumption of 60 mg) in kitchens

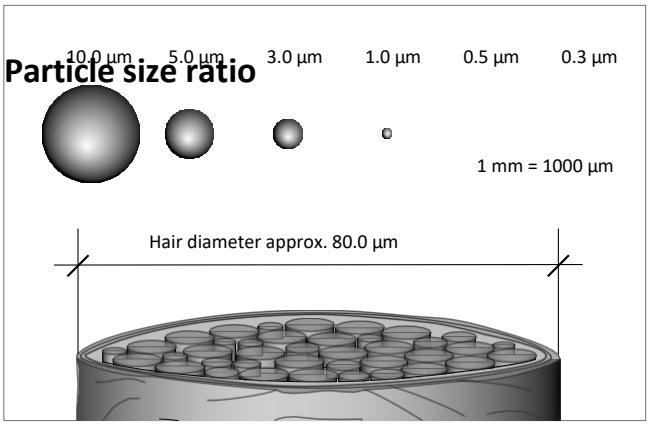
Separation speed & pressure loss

An important factor for the separation efficiency is the separation velocity and the associated pressure loss. This leads to better separation performance but also to increased noise emission.

Pressure loss



Particle size ratio



The higher the **separation rate**, the greater the pressure loss, the higher the separation, but also the higher the noise emission.

The **separation efficiency** is given as the percentage of the mass fraction of a particle size separated from 1 m² of air.

Fractional separation curves show the separation efficiency of the mass fractions of the individual particle sizes at different flow velocities.

up to 99.999% Separation efficiency

Fraction separation efficiency

To determine the percentage of mass fractions of the individual particle sizes present in the room air that are separated, particle measurements must be taken both before and after separation.

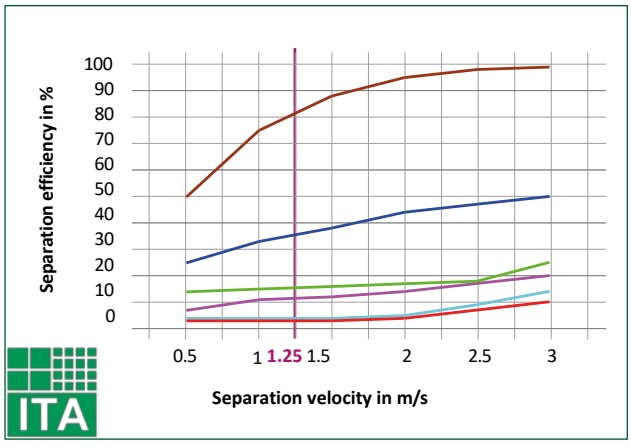
The improved separation performance achieved with X-CYCLONE® separators leads to a reduction in the load on the exhaust air duct (approx. 40% according to the example below). With an inflow velocity of 1.5 m/s, the separation performance is optimised even further.

Example of fraction separation efficiency through particle measurement

	Particle size [µm]	Mass fractions * [mg/m³]		Separation efficiency* General baffle plate separator [mg/m³]		Separation efficiency* X-CYCLONE® separator [mg/m³]	
before the use of a separator	0.5	2.4	After the use of a separator	0.1	3	0.2	8
	1.0	4.2		0.5	11	0.7	16
	3.0	23.4		3.7	16	8.9	38
	5.0	24.0		8.4	35	18.5	77
	10.0	6.0		4.9	81	5.8	96%
	Total:	**60 mg/m³**		**17.6 mg/m³**		**34.1 mg/m³**	

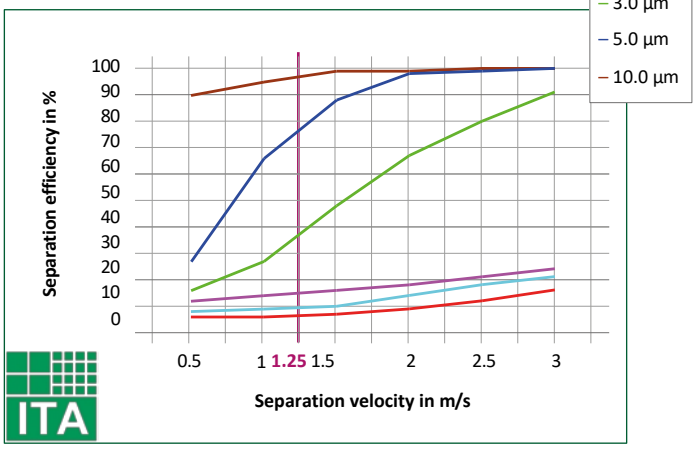
* The measurement was carried out by REVEN.
The separation efficiency of the various mass fractions can now be determined using the fraction separation curves, assuming an inflow velocity of **1.25 m/s** (~100 Pa pressure loss).

Fraction separation curves of a general baffle plate separator



The measurement was carried out by the Fraunhofer Institute for Toxicology and Aerosol Research. In addition, the particle size 0.8 µm is also taken into account in the graph.

Fraction separation curves of the X-CYCLONE® separator from REVEN



The measurement was carried out by the Fraunhofer Institute for Toxicology and Aerosol Research. In addition, particle sizes of 0.8 µm are also taken into account here.

The X-CYCLONE® separator clearly has the better separation efficiency of up to 99.999%.

X-CYCLONE® separators reduce exhaust air duct cleaning costs.

Flame arrestor
in accordance with DIN 18869-5 and DIN EN 162826

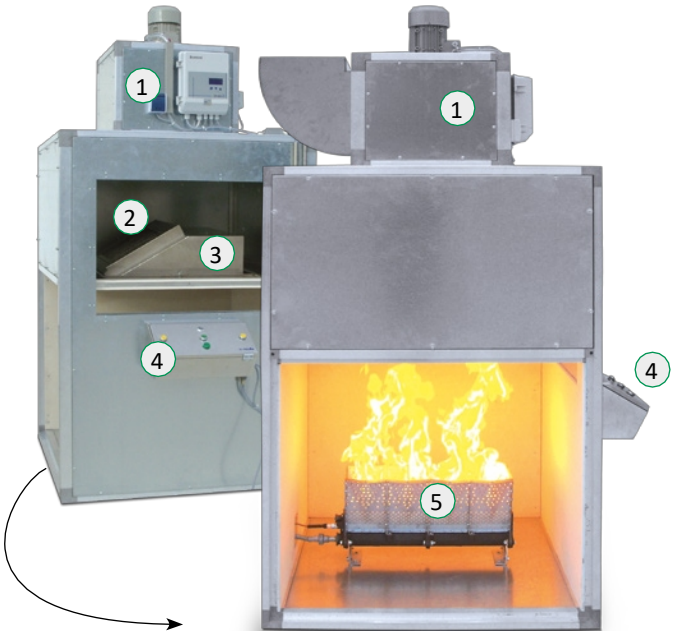
The first testing facility for flame spread resistance in accordance with DIN 18869-5 and DIN EN 16282-6, built by Rentschler REVEN in collaboration with TÜV SÜD Product Service GmbH.

During machining processes on machine tools and in food processing, high concentrations of highly flammable aerosols often need to be extracted and separated.

If these aerosols ignite in an exhaust air duct, the flames can spread through the exhaust air duct throughout the entire building and set entire building complexes on fire within minutes.

To prevent this, all our X-CYCLONE® separators are tested on our test benches for flame-through resistance in accordance with national and international standards.

All X-CYCLONE® separators are type A.
They are flame-proof and comply with DIN 18869-5 and DIN EN 16282-6.



The testing facility

1. Design with continuously adjustable fan
2. Removable X-CYCLONE® separator Collection
3. vessel for aerosolate
4. Switching point
5. Gas surface burner 600 x 200 mm

The test facility was equipped with an adjustment device that allows the air flow at the separator to be regulated between 70 m^3/h and 1,500 m^3/h.
Removable rear panels and a collection vessel for separated aerosol were provided for gravimetric measurement as part of the efficiency test.

A gas panel burner was installed for the flame propagation test. This had to cover an area 600 mm wide and 200 mm deep and ensure a flame height of 800 mm with a uniform flame pattern for one minute. The height from the upper edge of the gas surface burner to the lower edge of the separator was 500 mm. The gas surface burner was operated with propane.

Type A
flame-resistant

When REVEN decided to be the first and, to date (2009), only company to test its X-CYCLONE® separator in accordance with DIN 18869-5 (later also DIN EN 16282-6), we discovered that there was no suitable test bench anywhere in the world for testing aerosol separators in accordance with this standard.

We therefore worked with TÜV SÜD Product Service GmbH to set up a suitable test bench at REVEN that complies with the standards.

No flames appeared behind the separator during testing!
The entire test was recorded on video.

Our X-CYCLONE® separators meet all German and European requirements for flame resistance!

According to DIN 18869-5 point 8.2, **type A** separators must **not** allow **flame propagation**. Separators that allow flame propagation when tested according to 8.2 or separators that have not been tested according to 8.2 are **type B** separators.

Company, DIN or type A engraved on the frame of the separator confirm compliance with European standards

Explosion test passed

Even the positive behaviour of the oil mist separators in the event of explosions was proven and documented!

Explosion test

Permissible kitchen areas for

Type A

- Kitchen areas with thermal appliances (e.g. bakery kitchens, cook and chill)
- Front cooking area

Type B

- Kitchen areas for food serving
- Kitchen areas for food storage
- Scouring kitchen

Baffle plate separators belong to type B

Sound power and sound pressure levels

The perception of loudness

In life, we are constantly surrounded by noise. Whether we perceive noise as pleasant, even soothing, or disturbing is very individual. Humans have an amazing ability when it comes to perceiving volume or sound levels (dB). No matter how high the sound level is, we perceive it as twice as loud when it increases by 10 dB and half as loud when we lower the sound level by 10 dB. However, with two sound sources of equal loudness – e.g. two motorcycles each producing 70 dB – the volume only increases by 3 dB (= 73 dB). A total of 10 motorcycles are needed to hear twice the volume (80 dB).

In short: doubling the number of sound sources does not mean doubling the volume.

This also applies to the use of X-CYCLONE® separators in extractor hoods and ventilation ceilings.

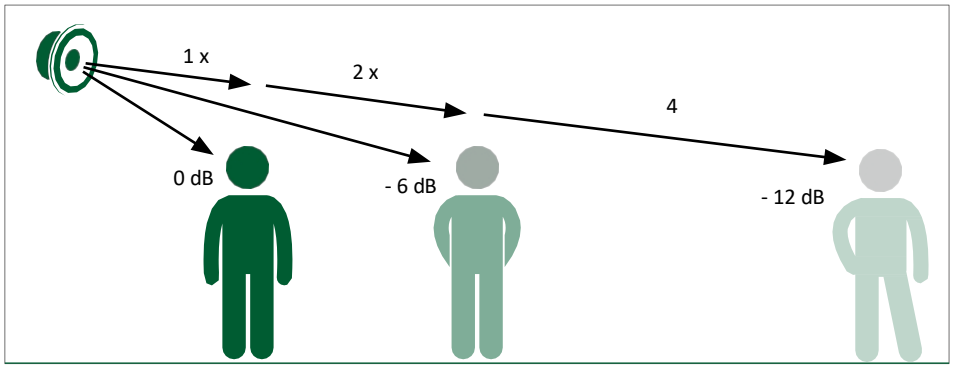
Fixed and variable volume levels

The first physical variable used to assess volume is the sound power level, which is measured directly at the noise source. It is always the same and is therefore a fixed variable. The second variable is the sound pressure level, which decreases the further away you are from the sound source. It also depends on other acoustic conditions in the room, such as the size of the room, whether the sound is absorbed, refracted or reflected by walls or shelves, and whether there are other sound sources in the room. A "mix" of different or reflected sound levels then merges into a diffuse sound field.

When working, people often find a diffuse sound field more pleasant than direct sound in a free field.

It is not the sound power level directly at the device (separator) that determines the volume, but rather the distance from which it is heard.

Quick formula for calculating the sound pressure level



The quick formula applies to a sound source with spherical radiation in a free field.

For a sound source with spherical radiation, the following applies: Doubling the distance between the sound source and the measuring point reduces the sound level in the free field by 6 dB. Halving the distance leads to an increase of 6 dB.

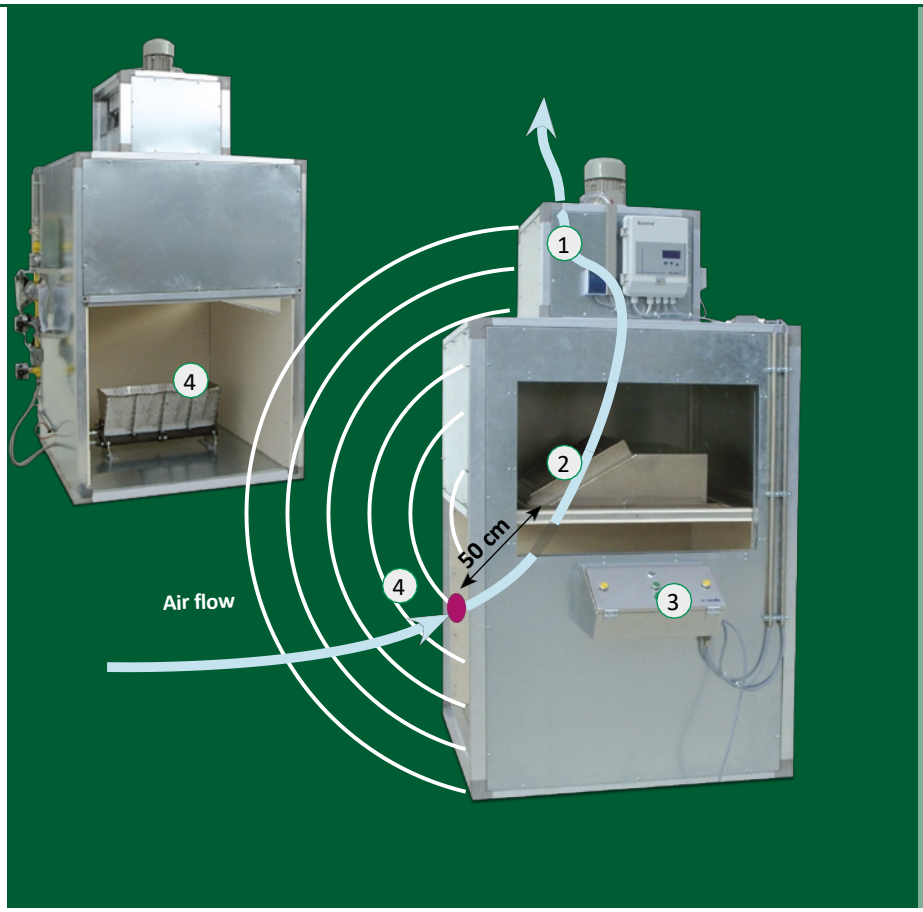
For line sound sources, the sound pressure level decreases by 3 dB when the distance doubles.

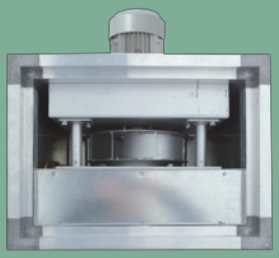
Source: Bavarian State Office for the Environment 2017

The **sound power level** (LWA) indicates how loud the sound emission (sound level) is directly and objectively at the noise source.

The **sound level** is expressed in decibels (dB) and indicates the deflection (ratio between the lowest and highest levels of a pressure wave).

Sound power level measurement





1 Housing with fan

2 X-CYCLONE® separator

3 Operation

4 Sound power level measurement point

Sound measurement with separator

In order to obtain objective measurement results, we commissioned DTM GmbH & Co. KG to carry out sound power measurements on our test bench.
Two X-CYCLONE® separators of different sizes with different air volume flows were measured.

Comparative measurement without separator

Comparative measurements without separators were carried out with the same volume flows in the intake cross-section. The measured values were more than 10 dB below the measurements with separators. The acoustic influence of the fan on the sound measurement is therefore negligible.

X-CYCLONE® separators comply with DIN EN 16282 with regard to sound pressure level.

Measurement data

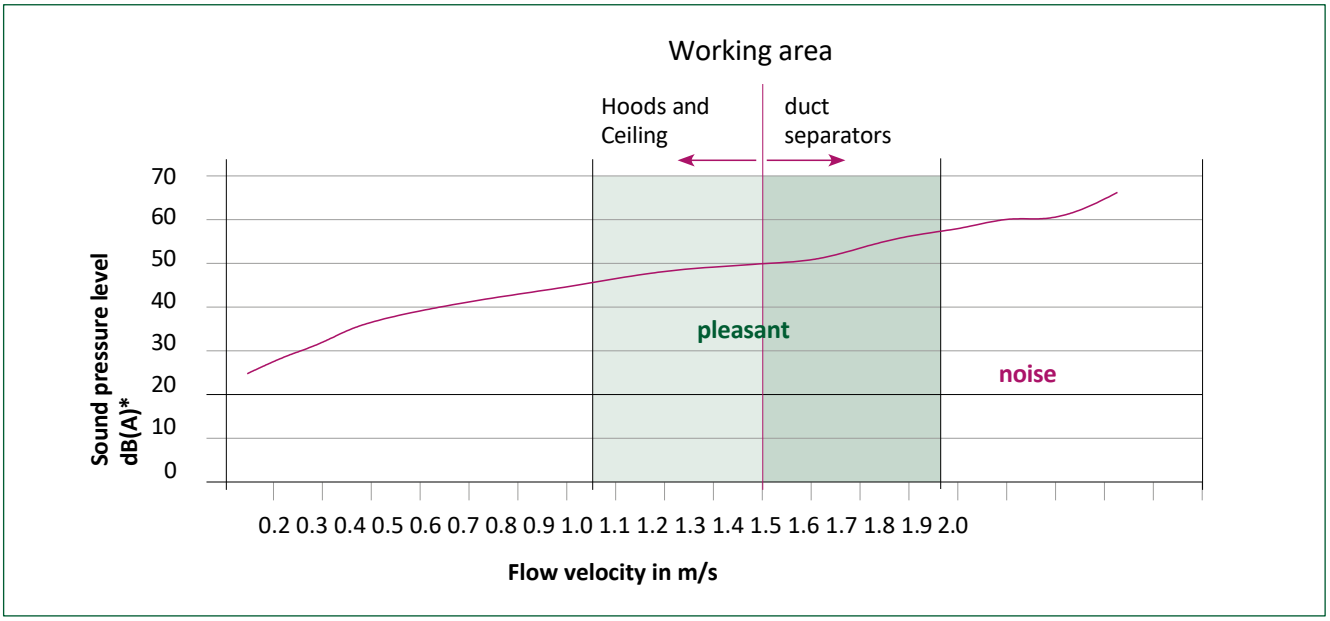
Date of measurement: 14 September 2021
Ambient temperature: approx. 14 °Celsius Air pressure: 998 mbar
Correction factor C: 0.0 dB
Test bench: TÜV-approved measuring stand
Measuring instruments: Brüel & Kjaer

The sound power was determined in accordance with ISO 9614 using sound intensity measurements.

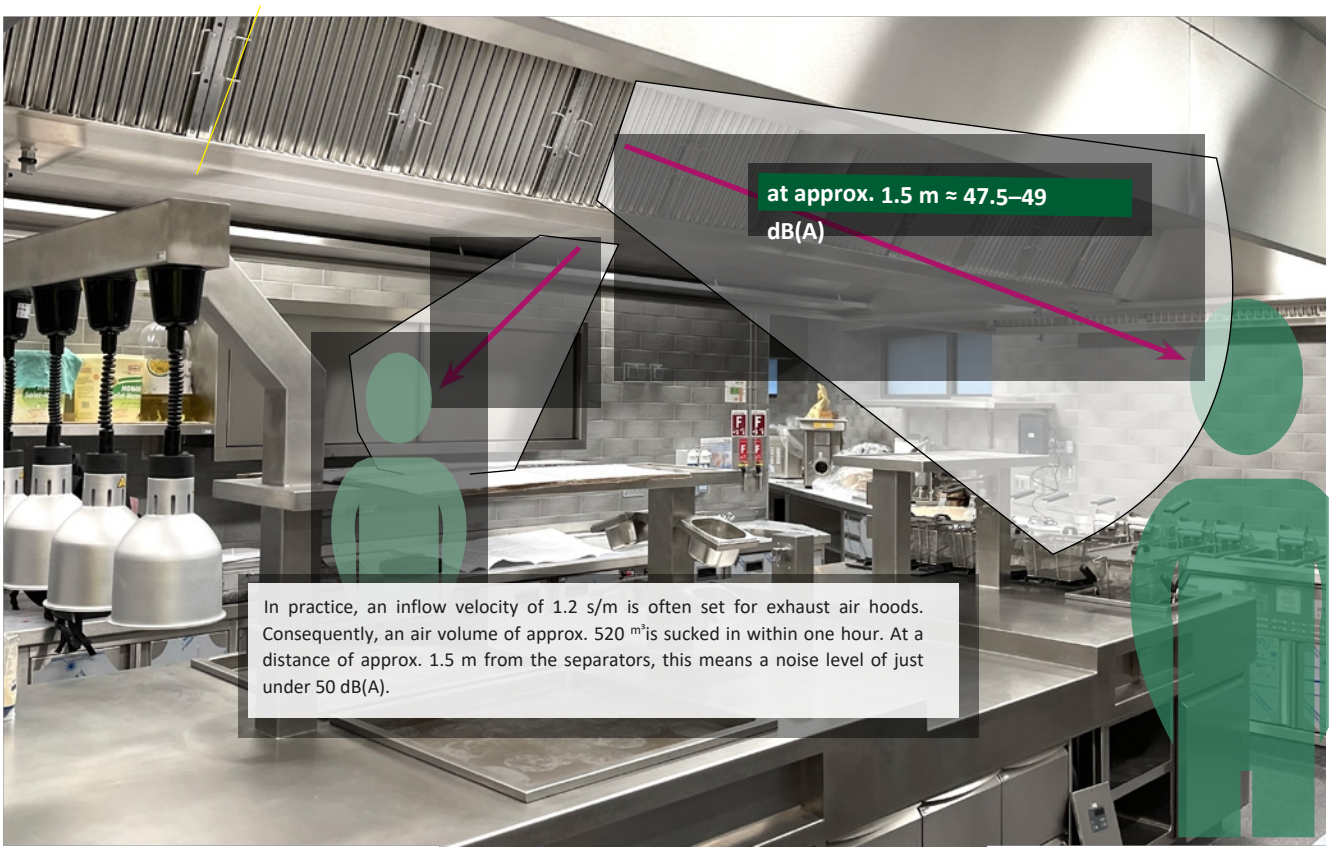
1 Air volume flows were measured using a
3 speed-controlled fan.
between 400 and 1000 m³/h. The
4 measurement was taken in the cross-section of the intake opening, at a distance of 50 cm
from the lower edge of the separator.

Sound pressure level in practice

Noise generation / flow velocity



* Measured at a distance of one metre from the kitchen hood separator (440 x 400 mm)



Example of sound pressure level at typical flow velocity in exhaust hoods

Noise emission from REVEN industrial air cleaners

In order to reduce noise emissions in production halls, we equip our oil mist separators with silencer attachments as standard.

Please refer to the technical data for the respective air cleaners in the REVEN catalogue for sound level specifications.

➜ Download the REVEN catalogue:
https://www.reven.de/loesungen/verarbeitende-industrie/oelnebelabscheider/

Sound pressure level comparison

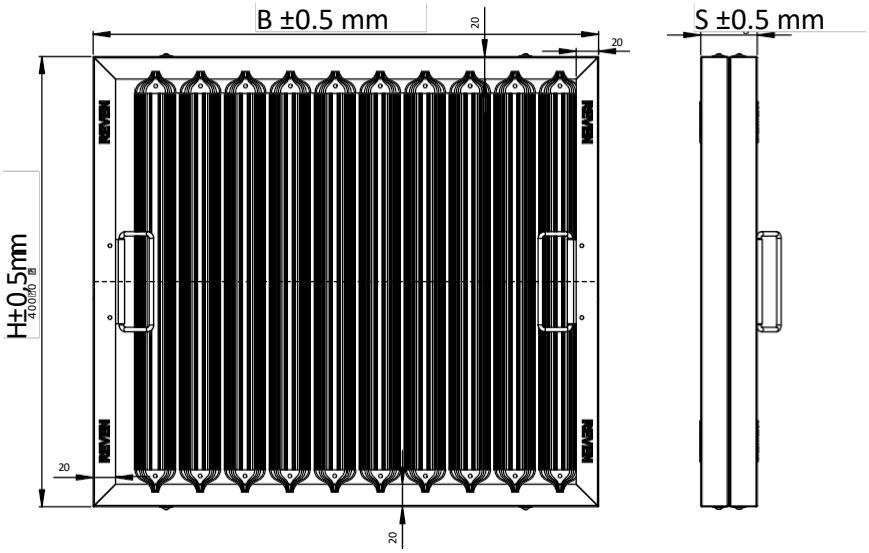
Different sound sources

140 dB(A)	Jet aircraft
130 dB(A)	Pain threshold
120 dB(A)	Thunderstorm
110 dB(A)	Hammer drill, drum kit
100 dB(A)	Train, boom box
90 dB(A)	Lawnmower
80 dB(A)	Car, piano playing
70 dB(A)	Hair dryer, kettle, vacuum cleaner
60 dB(A)	Normal conversation, office
50 dB(A)	Quiet conversation, refrigerator
40 dB(A)	Whisper
30 dB(A)	Bedroom, whisper quiet
20 dB(A)	Mosquito
10 dB(A)	Breathing, rustling leaves
0 dB(A)	Hearing threshold

Example of an industrial hall with many different sound sources. REVEN compact systems are supplied with silencer attachments.

Technical data

Lifetime warrant



The engraving on the side of the separator you can see which standards the separator complies with.

Dimensions

Width B [mm]	Height H [mm]	Thickness S [mm]
610	610	50
500	500	50
450	400	50
450	300	50
450	250	50
410	310	50
330	330	50

Special sizes available on request!
Special sizes have a delivery time of approx. 4 weeks!

Each X-CYCLONE® separator consists of two complete profile levels, which can be easily pulled apart after loosening the clamps.

Air volume calculation

Calculating the air volume for kitchen ventilation (quick formula)

The volume of air flowing through the separator is calculated based on the surface area of the X-CYCLONE® separator. The frame is deducted from the total area.

Example: Hood separator 450 x 400 mm (W x H), deduction of the edge area. Area exposed to air flow: (450 - 80 mm) x (400 - 60 mm) = 0.12 m2

This results in the following air volume per hour:
Flow velocity (0.4 m/s) x flow area (0.12 m²) x 3600 seconds = air volume (173 m³/h)

Flow velocity [m/s]	Exhaust air volume [m³/h]	Pressure loss [Pa]	Separation efficiency* [%]
0.4	173	25	50
0.8	345	80	78
1.2	520	140	88
1.6	690	200	98

* based on a particle spectrum of 3 to 10 µm

For optimum separation, flow velocities above 1.0 m/s should be aimed for. However, it is essential to take noise levels into account (see page 18)!

The air volume that an exhaust hood or ventilation ceiling module can handle therefore depends on the number and size of the X-CYCLONE® separators installed. Try out our configurator:
If you change the length of the collection systems and ventilation ceilings, you will see information on the maximum air volume.

➜ https://bim.reven.de/

Calculating the air volume for industrial air cleaners

There is no rule of thumb for calculating the air volume for industrial air cleaners. First of all, it must be clarified which air cleaner is suitable for which production processes and which additional filter stages are used in the air cleaner.
Information about our oil mist separators, smoke filters and duct installation systems, as well as air volume design, can be found in our catalogue.

➜ Download the REVEN catalogue:

https://www.reven.de/loesungen/verarbeitende-industrie/oelnebelabscheider/

Cleaning and maintenance

Cleaning in industrial washing machines

Our X-CYCLONE® separators are completely maintenance-free and self-cleaning. However, if grease or other substances accumulate on the profiles over time, the separators can be easily removed from the air cleaners and cleaned either with a high-pressure cleaner or in industrial washing machines.
To make cleaning even more efficient, the X-CYCLONE® separator can be easily halved into two plate levels.

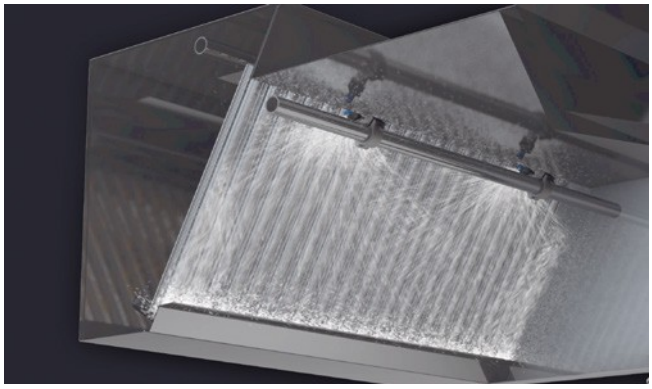
Removal of the X-CYCLONE® separators from an exhaust air hood.

Insertion of a clean X-CYCLONE® separator into an oil mist separator

The REVEX® spray system

The REVEX® system must be integrated when separating dry and sticky fine dust or when dealing with contamination from grease deposits. The REVEX® system is a patented spray technology that has two functions:

A) It is used for automatic cleaning and, if desired, also for disinfecting the X-CYCLONE® separators.



REVEX® system integrated into kitchen hoods or ventilation ceilings

B) It cleans the air in a similar way to an air scrubber in the chemical industry. The permanent REVEX® air scrubbing function washes out the smallest aerosols and harmful gases from the air flow.

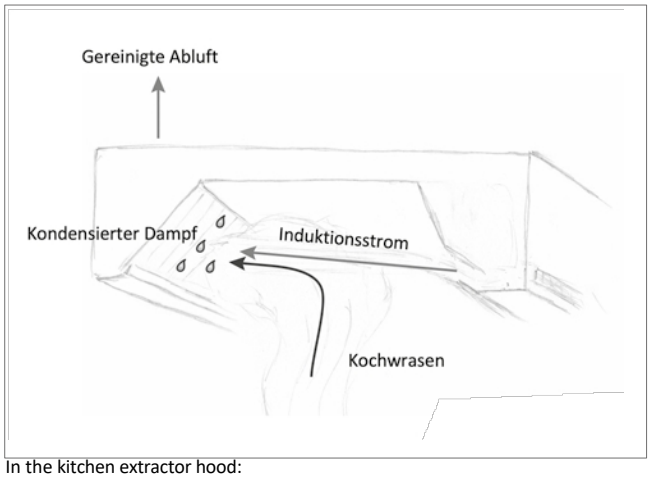
Compact X-CYCLONE® air purifier from the CR-XSC series with integrated REVEX® system for automatic cleaning and continuous air scrubbing.

➜ More information on "REVEX® flushing technology":
https://www.reven.de/technologien/desinfektion-reinigung/

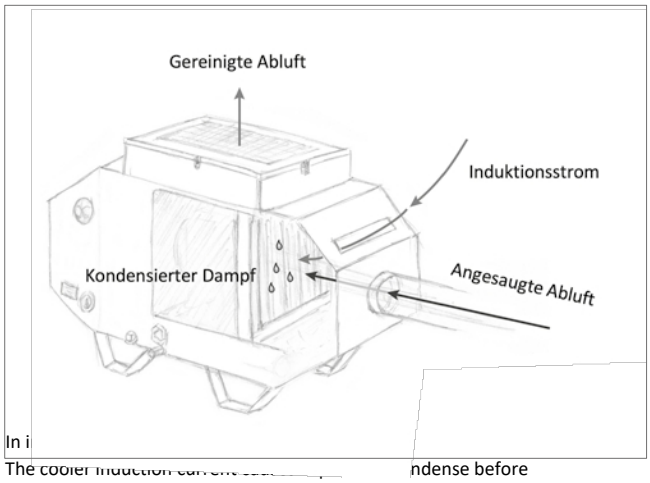
Supporting separation

Forced condensation

The patented REVEN® induction system captures all exhaust air and directs it through the separators. This prevents pollutants from entering the ambient air. The cooler induction flow forces gaseous molecules to condense and be expelled.



In the kitchen extractor hood:
The cooler induction current causes vapours to condense and be separated on their way to the exhaust air duct.



In i ndense before the X-CYCLONE® separator and be separated.

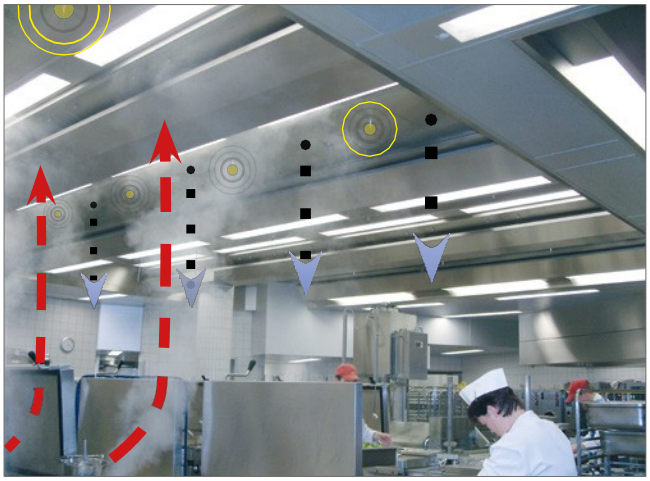
➜ More information about the "REVEN® induction system":
https://www.reven.de/technologien/erfassung/

➜ More information about the "RSC and XSC":
https://www.reven.de/technologien/regelung-steuerung/

RSC control system for kitchen ventilation

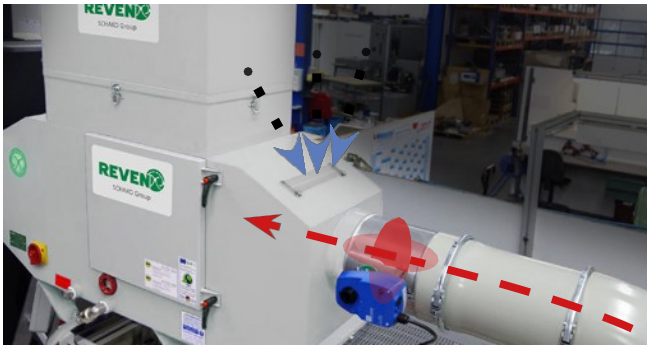
The RSC (REVEN® Speed Control) temperature and humidity sensors are designed for kitchen conditions and detect cooking activity. The RSC control system continuously increases or decreases the supply and exhaust air flow as required and complies with Standard 4.0.

In addition to energy savings of up to 50%, this has other advantages such as a reduction in noise levels. The flow velocity in the exhaust air system and thus also the noise level is only increased when necessary. Otherwise, the exhaust air systems operate on demand or at the lowest suction level, i.e. correspondingly quietly.



XSC control system for oil mist separators

In accordance with Industry Standard 4.0, the XSC system (X-CYCLONE® Speed Control) for air volume control with frequency converter and status display is installed as standard in all compact devices of type C-XSC, CE-XSC and CR-XSC.



Safety instructions

WARNING

The following safety instructions and warnings apply to the use of X-CYCLONE® separators in our industrial air cleaners:

Use of the devices in potentially explosive atmospheres

The separators are supplied without explosion protection. This means that no vapours, gases or mists may be extracted that are explosive or could form ***explosive media*** in the device.

Extraction of media with a low flash point

Due to the increasing use of liquids with a lower flash point in modern machine tools, ***the risk of fire and deflagration during material processing is increasing in general.*** In case of doubt, contact specialist companies for fire protection advice and fire protection systems.

CAUTION:

Never open the maintenance door while the device is running. Never switch on the device when the maintenance door is open.

In both cases, there is a risk of accident!

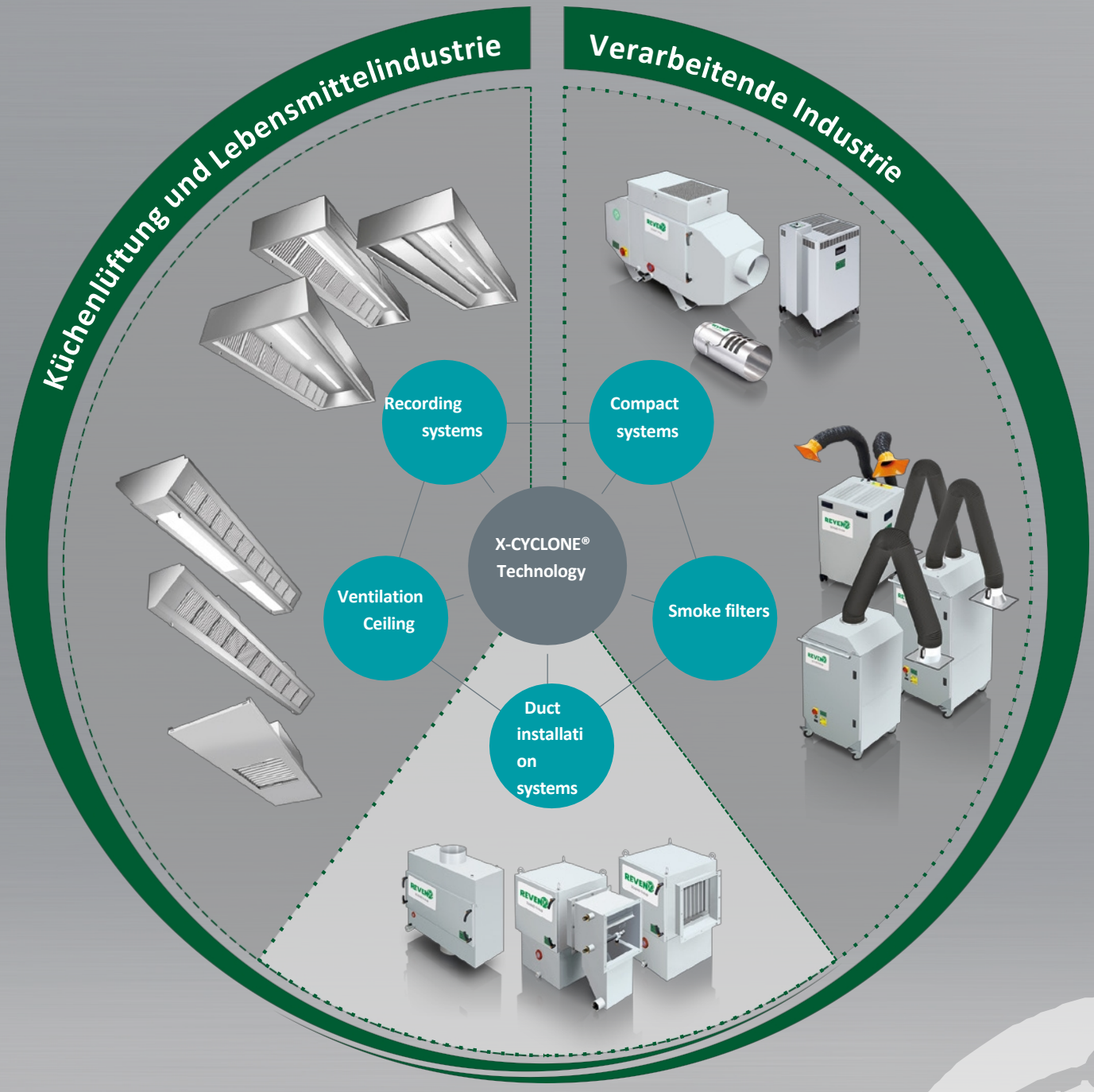
Clean air recirculation is not permitted when handling particularly carcinogenic hazardous substances in accordance with § 15a of the GefStoffV (German Hazardous Substances Ordinance)! These are:

- 6-amino-2-ethoxynaphthalene
- 4-aminobiphenyl and its salts
- Asbestos
- Benzidine and its salts
- Bis(chloromethyl) ether
- Cadmium chloride (in respirable form)
- Chloromethyl methyl ether
- Dimethylcarbamoyl chloride
- Hexamethylphosphoric acid triamide
- 2-Naphthylamine and its salts
- 4-nitrodiphenyl
- 1,3-propanesultone
- N-nitrosamine compounds
- Tetranitromethane
- 1,2,3-trichloropropane

In these cases, the X-CYCLONE® devices must must be operated in exhaust air mode, i.e. the purified air must not be recirculated into areas where people are present!

Use of separators in our products

Rentschler REVEN offers a wide range of products (over 1,000 variants); in addition to standard products, customised solutions are also available.



References

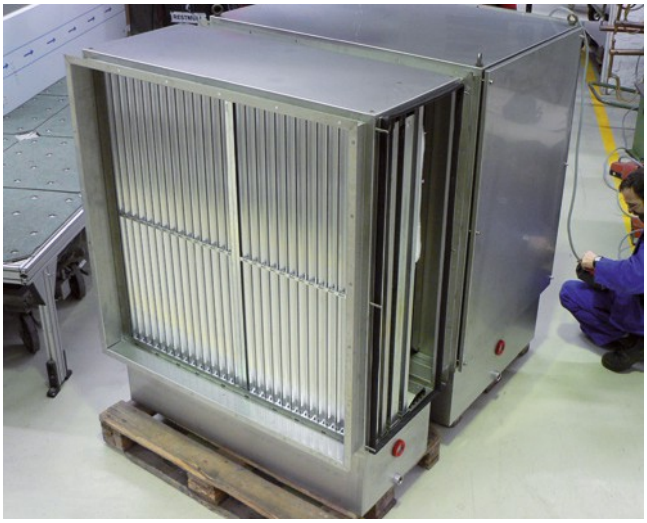
REVEN ventilation ceiling

REVEN kitchen hood with REVEN® induction technology

➜ Further reference images for REVEN kitchen ventilation: https://www.flickr.com/photos/123764546@N07/sets/72157644256607512

Examples of industrial air cleaners: X-CYCLONE® C (compact air cleaner with additional particulate filter attachment), X-CYCLONE® CE (electrostatic air cleaner), X-CYCLONE® RJ (small compact air cleaner)

Installation of a REVEN duct separator in the food industry



Area consisting of four X-CYCLONE® separators in an exhaust air duct cleaner

➜ Further reference images of industrial air cleaners: https://www.flickr.com/photos/123764546@N07/sets/72157644256598122

The Podcast

Get your copy

Misconceptions
in ventilation technology and air pollution control

on the topics:

- Extraction
- Filtering and separation
- Vapours and odours
- Virus
- Visualising air currents
- Measuring air pollution
- ect.

More information in the blog at www.reven.de