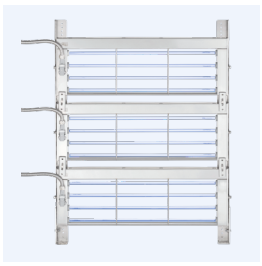
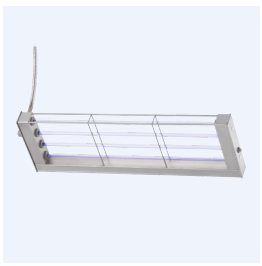
oxytec

# **Innovative air and water cleaning systems |** Stainless steel and aluminium processing

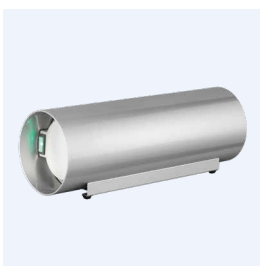




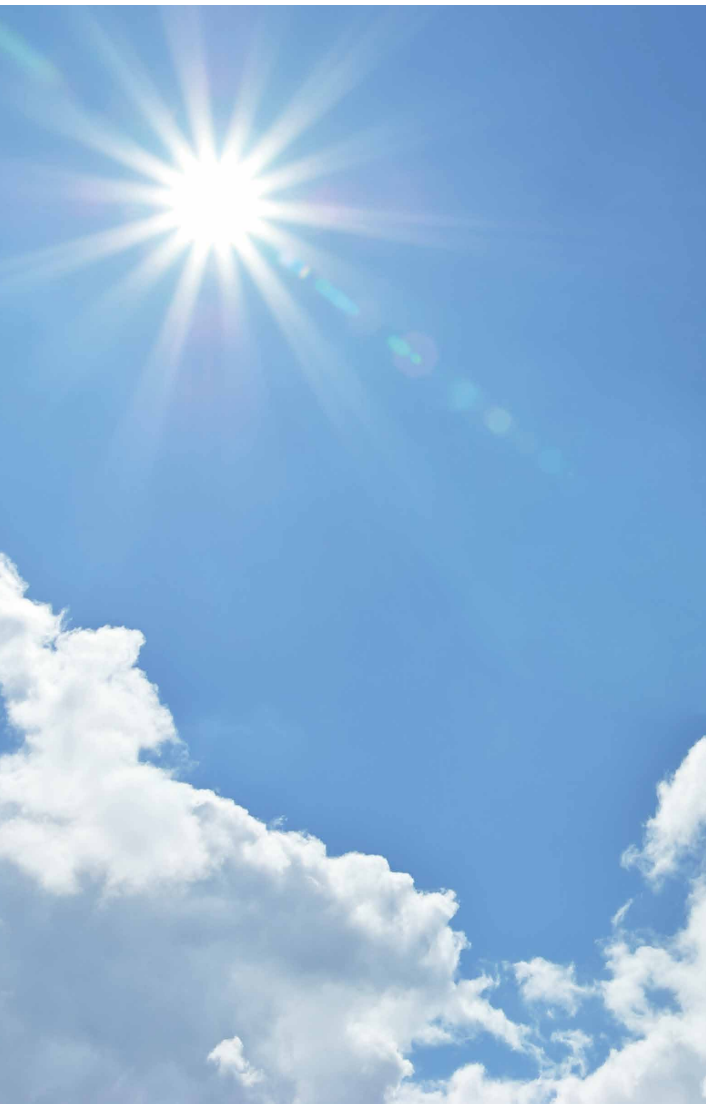







# We are breaking new ground!



In the field of **air purification, disinfection and water treatment based on UV-C/ozone and plasma technology,** we set new impulses since 2004.

We develop and distribute systems worldwide for air and surface disinfection as well as exhaust air purification in industry and medical technology. We design and manufacture exhaust air solutions for gastronomic and private applications – room air purifiers round off the product portfolio.

Our technologies are scientifically sound and are regularly tested by specialist institutes such as the Fraunhofer Institute for Building Physics (IBP), the TÜV, Müller BBM and other institutes. In the past few years, we have been able to develop products and devices for countless industrial companies, commercial kitchens, cruise ships and private households.

**In essence, oxytec has specialised in the following areas:**

- **Industrial exhaust air purification**
- **Disinfection of circulating air flows in evaporators air coolers, air handling systems and surface systems and surface disinfection systems**
- **Kitchen ventilation technology and exhaust air purification**
- **Room air cleaners and KWL systems**
- **Plasma filters for private extractor systems**
- **Extractor hoods and trough ventilators with plasma systems for private applications**
- **Stainless steel constructions and outdoor kitchens made of stainless steel**

# Innovative ventilation concepts, environmental protection, energy efficiency and sterilization

With foresight and sound experience in the automotive industry, plant engineering and in strategy and restructuring consulting, Dipl.-Ing. Anja Toussaint and Dr. Christian Haverkamp founded oxytec ag in 2004 in Zurich.

The aim was to develop innovative ventilation concepts, as both recognised the potential of alternative technologies for exhaust air purification and the germ removal from supply air and recirculation systems.

The guiding principle of energy efficiency, combined $CO_2$ savings and the associated replacement of fossil replacement of fossil fuels and the pursuit of new paths in the field of filter technology for air flows, drove both.

The world has changed since 2004: Today $CO_2$ emission-reduced exhaust air systems have long been state of the art. The topic of disinfecting air and surfaces is no longer exclusively relevant to the food industry and has penetrated into the areas of public and private areas.

We too are constantly developing our product range and now offer a correspondingly range of extract air, supply air and recirculation systems for industrial systems for industry, commerce and the private sector.

Our goal is to continue to find the optimal solution for our customers and to adapt our products to the requirements of the market. Quality, cost consciousness, energy efficiency and environmental protection are the focus of our daily activities.

# **oxytec group of companies–** fully on course for growth

**We promote innovation and development.** The market is changing and so are the technical challenges. Based on their experience and legal requirements, our application engineers are constantly developing our products or finding new solutions.

We build on **long-standing customer relationships** and continue to grow together with every project and every application. Our employees develop and strengthen these relationships with their know-how and their interest in innovative products.

**That is why we focus on cooperation:** in all processes, the cooperation with our customers is in the foreground in all processes, in order to bring the products even closer to customer benefits, needs and market requirements.

## We continue to grow

| | |
|---|---|
| 2004 | Foundation of oxytec AG in Zurich |
| 2006 | Implementation of various major projects in shipbuilding |
| 2009 | Foundation of oxytec GmbH in Hamburg |
| 2012 | Market launch of UV-C/wash systems for cruise ship galleys |
| 2015 | Founding of oxytec s.r.o. in Prague and an independent production site in Chrudim/CZ |
| 2016 | Start of production of plasma systems and exhaust air scrubbers |
| 2017 | Introduction of plasma room air cleaners for medical and private applications |
| 2018 | Start of production of plasma hoods for gastronomic applications |
| 2020 | Start of the production (Chrudim) of plasma systems for extractor hoods and trough ventilators for private households |
| 2020 | Certification of the UV-C and plasma-based air handling units by the Fraunhofer Institute for Building Physics – seal “virus-free” |
| 2021 | Foundation of stainlesstec GmbH in Hildesheim to secure the value chain for stainless steel and aluminium components, start of production of outdoor kitchens for gastronomy and private use |

# This is what we stand for

oxytec

**oxytec AG, oxytec GmbH and oxytec s.r.o.**

Development and production of exhaust air, supply air and recirculating air and water treatment systems based on UV-C/ozone, plasma and scrubber technology – since 2004.

oxytec offers everything from one source: Technology, planning, consulting, production, assembly (turnkey) and service.

stainlesstec

**stainlesstec GmbH**

**Stainless steel and aluminium processing and production of outdoor kitchens for gastronomy and private use**

Stainless steel and aluminium are the key materials of stainlesstec. The production potential and know-how in pure white production is unparalleled and is demonstrated by the high customer base from the automotive and pharmaceutical industries.

stainlesstec stands for highest quality and reliability. In doing so, stainlesstec accompanies the customer from the initial product idea to the start of production. Tailor-made to the customer's wishes and supplies – even beyond the product range of the oxytec group – other customers in the field of sheet metal.

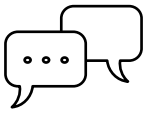
# Everything from one competent source

## Technology

The UV-C/ozone and NT plasma purification processes (low-temperature plasma) are stand alone as successful technologies in the various markets, industries and applications that we serve. The successful expertise of our technologies in industry and gastronomy can be easily transferred to other applications. We see this as a great advantage and gain the highest satisfaction among our customers.

## Dimensioning

For the industrial and commercial sector, we design systems according to various requirements with regard to germs and exhaust air type, (e.g. odour, carbon (total C), formaldehyde, $H_2S$, VOCs and fats). We offer odour guarantees on the basis of official olfactometric measurements and thus achieve the possibility of industrial and gastronomic settlement even with the strictest official requirements. Here too expertise can be transferred to the private sector.



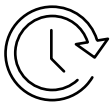
## Consulting

In addition to the dimensioning oxytec provides technical advice, provides test facilities, organises visits to reference customers and offers presentations to authorities or customers. Our consulting expertise focuses on:

- Industry, commercial and hospitality
- OEM
- Kitchen trades

## Planning

From the kitchen ventilation module for the private kitchen up to the exhaust air treatment of an industrial fryer or a drying of sewage sludge – every topic and every product is dimensioned and designed for the specific application parameters and is tailored to the customer's requirements. If desired, we also develop turnkey solutions for projects planned by us.



## Automation

We programme various control and automation systems for the most diverse applications. We use the most common components or rather according to the requirements of our customers.

## Hygiene management

We support companies in the establishment of air hygiene management systems, especially in the food industry and catering, e.g. according to the HACCP concept. If desired we also undertake the cleaning of grease ducts in trade, industry and the gastronomy.

## Service

In addition to installation, we offer regular inspection and maintenance as well as the cleaning of supply and exhaust air ducts. Our service technicians speak German, English, French and Czech and are available both on land and on cruise ships worldwide.

# **From development to service:**
# Place your trust in us

**Research and development**

We work closely with leading German and Swiss institutes and universities. This enables us to provide a close-knit interlocking of research, technology, production and application. The knowledge gained from this can be included directly into our products.

**Planning and consulting**

With great professional competence and efficient solutions, we stand for high-quality and technically products, complemented by competent on-site advice.

We deal intensively with the needs of our customers and offer flexible and, above all, scalable solutions.

Our technical advisors and field service offer comprehensive advice, both in the form of presence at events or by accompanying them on customer visits, and find the optimal and precise solution – whether for industry and commerce, OEM or the kitchen trade.

**Operation and maintenance**

In this area too, our qualified personnel are at your side. We implement your requirements quickly and cost-efficiently. This also includes a telephone hotline available 24/7.

# Environment and sustainability

In all areas of private life, each and every one of us can do something to conserve resources, to make life more sustainable and thus contribute to environmental protection.

Whether in the industrial, commercial or private sector – we contribute to increasing the focus on the protection of our environment. Our systems and appliances are energy-efficient and thus reduce $CO_2$ emissions – e.g. through the replacement of thermal incineration in the food industry.

For example, we help to make food more durable with systems for the disinfection/sterilisation of air and surfaces, in a resource-saving way without the use of water and thus also without chemicals.

With our private applications we improve indoor air (e.g. KWL systems) or reduce odours, germs and viruses and thus provide sustainable and efficient indoor air systems with the lowest operating costs – without the use of expensive Hepa filters that have to be replaced regularly.

# Highly efficient and energy-saving

## Extensive expertise in all product categories

We develop and distribute air and water treatment systems for industry, commerce and private households on the basis of our various technologies. The product categories can be defined as follows:

Air aftertreatment
**Kitchens & Restaurants**

- Kitchen ventilation systems based on UV-C/ozone, plasma and scrubber technology for commercial kitchens and for front-cooking applications

Exhaust air purification and energy recovery
**Industry & Trade**

- Exhaust air purification for sewage plants, sewage sludge drying, waste collection foundries, biogas plants, clamping frames, etc. as well as exhaust air purification solutions for facility management.

Clean indoor air
**At home**

- Plasma filters for domestic extractors and trough ventilators
- Extractor hoods and trough ventilators with integrated plasma technology
- Room air cleaners for private and commercial purposes (e.g. medical practices, schools etc.).

Exhaust air purification and disinfection
**Food manufacturer**

- Exhaust air purification of hot, greasy air from frying lines and deep-fat fryers, smokehouse and slaughtering plants
- Sterilisation systems for cold rooms, enclosure air coolers, evaporators and RLT systems
- Surface disinfection with UV-C or UV-C/ozone systems

Disinfection and indoor air technology
**Modern building & building services**

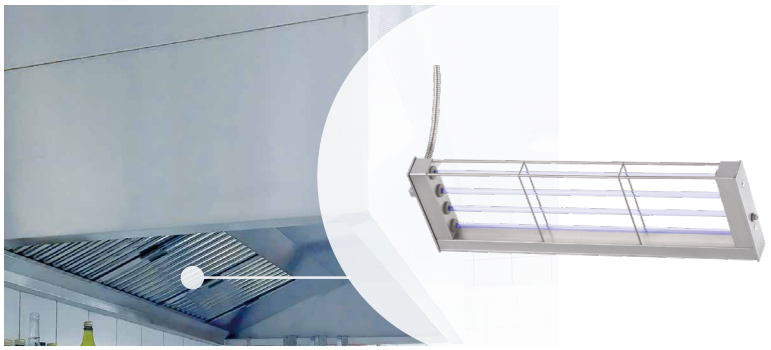
- Disinfection systems for air handling units/monoblocks for industry, commerce and private use
- KWL systems for low-energy houses

**Precision in stainless steel – stainlesstec**

- Stainless steel and aluminium processing
- Ready-assembled assemblies and system components
- Special constructions
- Stainless steel outdoor kitchens
- Extractor hoods and ventilating ceilings

# Air after-treatment **kitchens and restaurants**

Free choice of location for gastronomy due to grease- and odour-free kitchen exhaust air

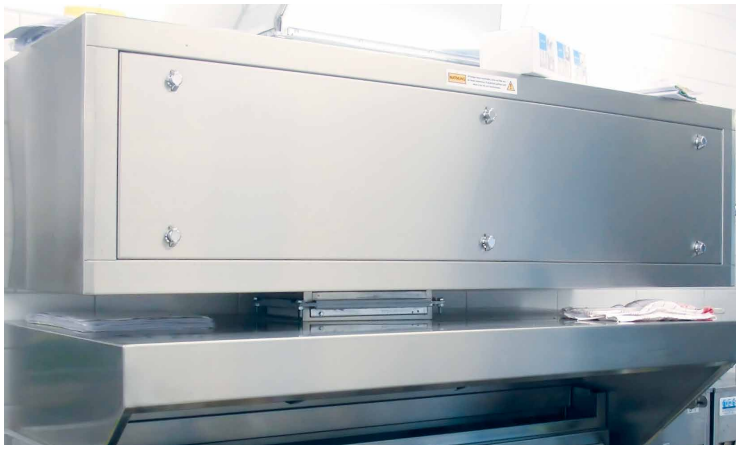



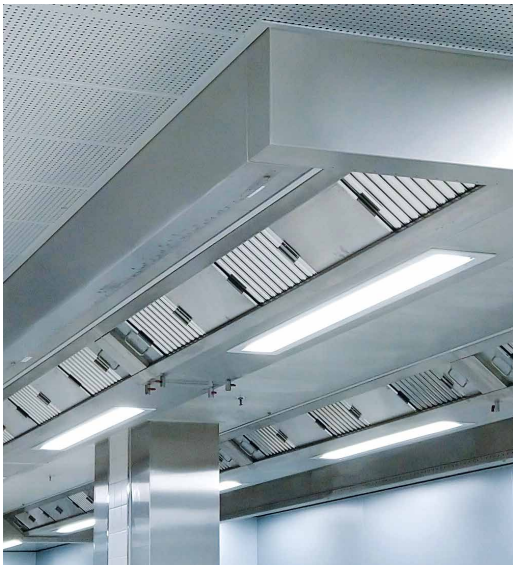
**Selection of references in the Kitchen exhaust air collection area**

- Charité, Berlin
- Reichstag building, Berlin
- Alexa, Berlin
- Hamburg Airport
- Green Papaya, Hamburg
- Trade Fair Centre, Munich
- OEZ, Munich
- Bakery Ihle, Munich
- German Federal Bank, FFM
- Commerzbank, Frankfurt
- IBC, Frankfurt
- Vapiano, Cologne
- Museum, Wuppertal
- Venue of the SC Freiburg e.V.
- Scharffs Schlossweinstube in Heidelberg Castle

# Highly efficient kitchen exhaust air collection

Kitchen ventilation hoods, ventilated ceilings and front cooking systems





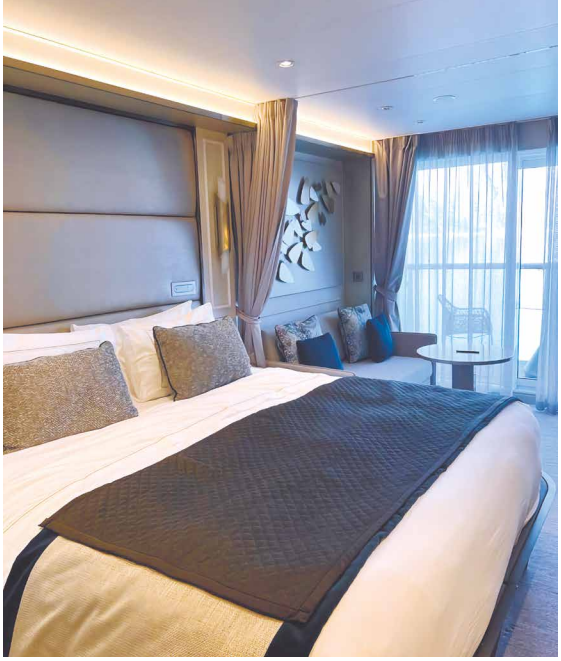
**Selection of references in the Kitchen exhaust air collection area**

- L'Osteria, Sylt
- Edel & Scharf, Kühlungsborn
- Columbus, Bremerhaven
- Europahotel, Kühlungsborn
- Dörpshus, Lohe
- Insel e.V., Rügen
- Sylt Express
- John's Burger, Hamburg

# Air management on **passenger ships**

Ships are a shelter against moisture, wind, cold and heat and therefore need closed air management systems. The corona-virus pandemic has made us realise how quickly infection can occur in such systems. But there are many more problem areas that call for solutions from oxytec:

Cruise ships and mega yachts in particular require oxytec's specialized expertise to ensure the health of passengers and crews and to meet the comfort requirements of passen-gers in the premium segment.



**Healthy breathing air and hygiene**

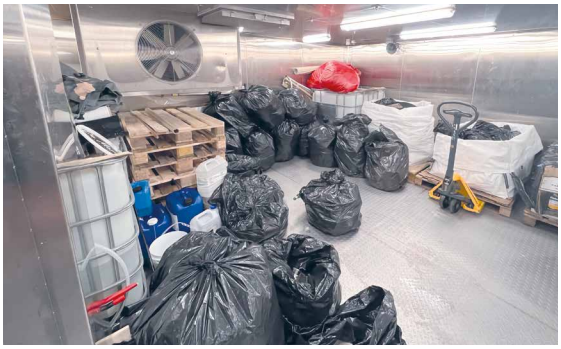
Reducing the risk of infection in common rooms:

- Keeping air ducts clean and sanitising them using UV ozone and NT plasma technology
- Ensuring germ-free cabin air via the disinfection of fan coils and air handling units
- Cabins for allergy sufferers individually cleaned with air purification devices with NT plasma technology

**Kitchen exhaust air: cleaning and fire protection**

Neutralisation of grease and odours with particularly compact hoods for the limited space available on board:

- Minimisation of the high air volume required for the kitchens through galley demand ventilation
- Extending the shelf life of food through UV and NT plasma sterilisation of the air in the storage rooms



**Odour control**

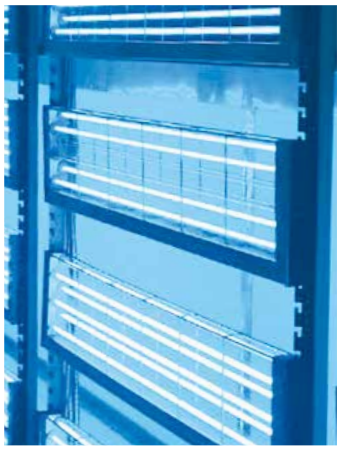
- Elimination of odours from waste rooms with UV and NT plasma technology
- Elimination of odours from wastewater treatment using UV-C or NT plasma technology

**Pure water**

- Disinfection of drinking water with UV water
- Purification of pool water with UV and ozone

# Exhaust air purification and disinfection **in the food industry**

Energy-efficient according to TA Luft | Germ reduction and protection against Covid-19




**Exhaust air from frying and roasting lines, smoking and roasting processes**

- Fish finger production
- French fries production
- Chips production
- Baking cheese production
- Room air from frying line
- Smoking exhaust air
- Coffee roasting
- Nut roasting

# Exhaust air purification and energy recovery **in the industrial sector**

Energy-efficient and cost-conscious with UV/ozone, plasma and scrubber systems

**Exhaust air from chemical and solvent processes, e.g. exhaust air from**

- Tenter frames in the textile industry
- Foundries
- Heparin production
- Glycol production

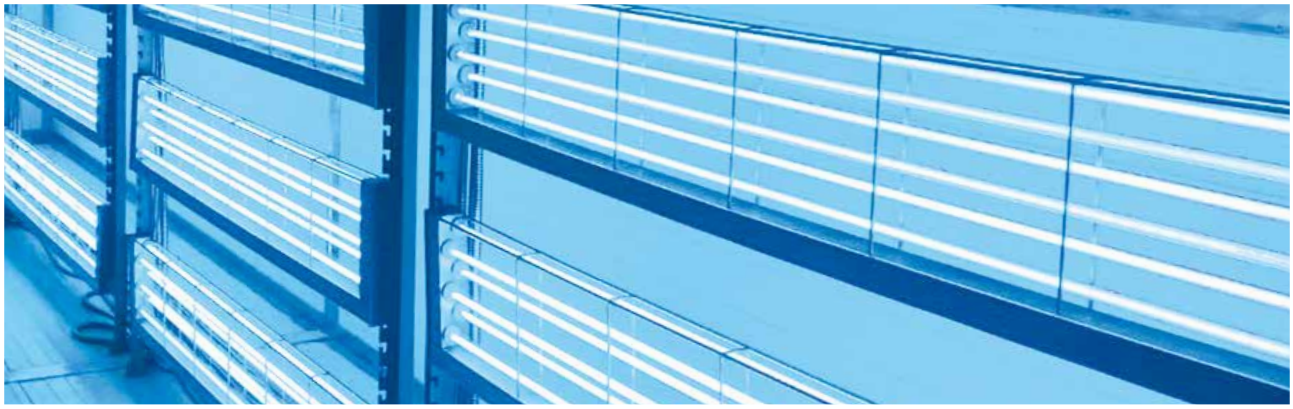
**Exhaust air**

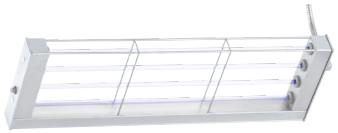
- Pet-Food
- Tripe
- Sewage treatment plants
- Biogas plants

# Sterilisation for ventilation and air conditioning

## Germ-free with UV-C and protection against Covid-19

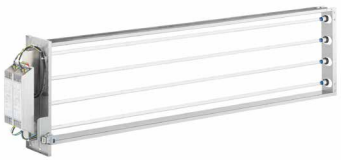
Easy and quick to install UV-C systems for new equipment and retrofitting including connection to the existing building management system



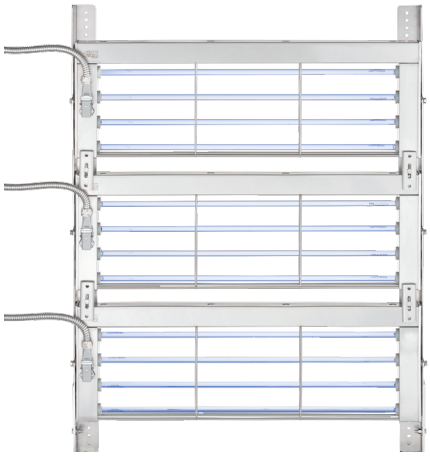


UV IB

UV Box



Channelframe



# **Pure drinking and process water** is a question of responsibility

Service life extension and hygiene are a question of sustainability

**Water is indispensable**

The challenges in the field of water sterilisation nowadays are, with the state of the art technology to produce aseptic water for injections, clear drinking water from seawater, clear filtration of fruit juices, emulsified palm oil from washing water to be separated, or the emulsion splitting of oil in water-emulsions in the metal industry, or the separation of blood from slaughterhouse waste water. In industry, waste water accumulates after production that can be treated. Processes such as UV water disinfection, ultrafiltration, ozone water disinfection, magnetic separation and ozone flotation can be used. In many areas of industry, water is used as an additive in process lines, for example in the beverage industry or in the pharmaceutical industry. This water must comply with the respective hygiene regulations and must be free of germs. For this purpose, oxytec offers UV lamps as a solution to render the bacteria, viruses or spores in the water ineffective.

**Safe with UV disinfection**

Certified UV-C systems for water disinfection and UV disinfection systems up to 60 °C.

Drinking water is becoming more and more valuable all over the world. Not everywhere we know and have safe, clean water. There are many arguments in favour of disinfecting water without the use of chemical substances. Drinking water must not contain any pathogens. And when we at oxytec talk about disinfection, we mean a reduction of pathogenic germs by 99.999 % and have designed the plants accordingly. The certified devices are particularly suitable for water purification and the disinfection of drinking

water and are approved and biodosimetrically tested in accordance with ÖVGW, DVGW and SVGW.

**Efficient and thorough with ozone** for the cleaning of surfaces, but also for the treatment of industrial washing and defrosting water, water ozonation systems can be used to destroy existing microorganisms by up to 99 %. When the ozone treated water comes into contact with the surfaces to be disinfected, it transfers its third atom to this material. Bacteria, viruses or other contaminants are oxidised or burnt. The application of water ozone disinfection, the only by-product is oxygen, which is released into the atmosphere. The use of ozone-disinfection has no influence on the taste, colour or smell of the food. Ozone cleans much faster and more efficiently than chlorine.

**Service life extension with magnetic separation** through separation of finest metal particles from O/W emulsions and pressureless cooling water purification without chemicals. For the separation of the metallic particles, a process was developed based on magnetic separation with high-performance magnets. This process can be used continuously in the bypass and in the full flow to efficiently remove the solids content and that of the magnetic fine particles from the emulsion with minimum oil discharge.

# **More topical and relevant than ever:** Air pollution through microorganisms, odours & Co.

The air is not only enriched with oxygen, nitrogen and other gases, at the latest since **the Covid-19 pandemic** aerosols is well known. In contrast to gas molecules, aerosol particles are solid or liquid particles in the air, and their size ranges from one nanometre to several micrometres. These diverse numerous ultrafine particles, nanoparticles (fine dust and man-made particles) and microorganisms (viruses, bacteria, spores and pollen) pollute daily life by harming health and well-being. Everywhere, where people are present and work, where food is produced, processed or prepared, organic pollutants are also produced in the air, which often turn into unpleasant odours.

**With our room air cleaners,** the air is not only free of odours, pollutants and allergens, but also from **viruses** and **bacteria** of all kinds.

Nowadays, special attention is paid to the protection against corona infections. Our devices inactivate corona viruses that are transmitted via aerosols in the air.

This was tested by the **Fraunhofer Institute for Building Physics** under real-room conditions with surrogate viruses and confirmed as highly efficient (up to 99 % inactivation).
The tested units bear the **Fraunhofer seal "virus-free".**

Our indoor air purifiers improve our quality of life through a clean, pleasant indoor climate without odours. This promotes concentration during the day and at night it ensures a restful and peaceful sleep. Our plasma and UV-C units are ready to plug in. They work very quiet, energy-efficient and can be integrated into any room thanks to their simple design.

# Clean indoor air

## Fraunhofer certified and eligible for funding

To be seen in the picture: Cleanair Sky

oxytec

Tested safety
Freshair cleans 99 % of the air

VIRUS-FREE

Fraunhofer certifies Freshair
Freshair UHS-65/2020

www.oxytec.com

Freshair

UV-C 500

**A small selection of references**

- HAWK University of Applied Science and Art, Göttingen
- Educational Academy of the University Medical School, Göttingen
- University Medicine Göttingen UMG, Göttingen
- NW-FVA Forest Research Institute, Göttingen
- City of Göttingen
- Adelebsen district, Adelebsen
- Primary school, Adelebsen
- Alpla GmbH, Markdorf
- Sports club, Nordenham
- City of Dassel, Dassel
- Myplace Selfstorage GmbH
- Hotel Steigenberger Graf Zeppelin, Stuttgart

Cleanair

Cleanair KWL

# Precision in stainless steel and aluminium

stainlesstec performance in stainless steel

**stainlesstec GmbH** is characterised by uncompromising quality in the processing of stainless steel and aluminium and responds to customer requirements with a high degree of flexibility. Fast and accurate implementation is guaranteed. The satisfaction of our customers is the highest premise and therefore, in all areas, from consulting to after-sales support, qualified, experienced and committed employees do a great job.

stainlesstec offers:
**Stainless steel and aluminium parts,** components and systems in highest precision and cleanest processing. It does not matter how complex and challenging the constructions and shapes are.

**Stainless steel and aluminium cladding** and customised industrial solutions of the highest level of quality.

**For the air purification systems of the oxytec group,** stainlesstec manufactures pre-assembled assemblies and system components. Within the framework of the entire value chain, a positive influence can thus be exerted on quality and delivery reliability – to the benefit of our customers.

stainlesstec works with all modern production methods of sheet processing:

- Laser
- Welding
- Grinding
- Assembly
- Rolling
- Edging
- Bending
- Deburring

Melitta®
Kemper
DACOS
METTLER TOLEDO
CHRIST
BUCO
Nordson
JENSEN

# Research activities with competent partners secure technological lead

After solid, liquid and gaseous, plasma is the fourth state of matter.

**oxytec** is the innovation leader in the field of development of innovative plasma sources and modules. The plasma department within the oxytec group concentrates on research and development in the field of plasma technology, electrode development, electrode and application development. It offers numerous solutions for different air purification applications.

Research results show that a low temperature volume plasma can be used to significantly kill bacteria, fungi and viruses and remove odours. The efficiency depends on the structure and the plasma parameters used.

Based on the newly developed plasma source oxytec has developed universal circulating air modules for private applications that can be used independently of the hood or the hob extractor fan selected for almost all appliances from a wide range of cooker hood manufacturers.

We offer this plasma technology not only to the industry and well-known manufacturers of extractor hoods, but also to other users in the room air purification. Applications include, for example:

- Kitchen trade
- Aircraft, underground and railway ventilation systems
- Low-energy houses

A lot of time is currently being invested in the research and new plasma ceiling units. With these devices used in recirculation mode up to 99.9 % of viruses and bacteria are filtered out of the air and inactivated. This has been confirmed by various institutes, including the Fraunhofer Institute for Building Physics.

Together with our partners from the various universities, we are continuing to work on the potential of laser and plasma technology in the fields of surface technology, material processing, radiation sources, fluid processing and plasma medicine.

# **Plasma exhaust air gas cleaning**
at the touch of a button

**The purification of industrial waste gases is necessary for an environment worth living in. Without it, the world would be back to the 19th century: Smog in urban centres, poisoned waters, dying forests. Many industrial pollutant gases are still burnt with natural gas and thus purified before being released into the environment. However, this causes climate-damaging $CO_2$ emissions. A plasma purification system developed at OST will change this: It is powered by electricity and was recently successfully tested for the first time in a battery recycling factory.**

In many industries, odour-intensive or harmful exhaust gases in large quantities. In paint shops, coffee roasting plants, distilleries, waste incineration plants, commercial kitchens and in many factories with chemical processes. What until the 20th century caused smog-polluted cities and toxic water is a thing of the past today thanks to clean air laws.

**Most industries today rely on fossil fuels for exhaust gas purification:** In order to eliminate the pollutants in the exhaust gases, the exhaust gases are cleaned of solid particles using filter systems, for example, and pretreated so that they can be burnt with natural gas in post-combustion plants. What remains is water and $CO_2$, both of which are then released into the environment. **The advancing climate change is leading to a rethink, so that the associated climate-damaging $CO_2$ emissions from the fuel natural gas is no longer desirable.**

In the search for new solutions, oxytec AG, which specialises in air and water purification, has developed a plasma-based purification system together with the Institute for Environmental and Process Engineering (UMTEC) at OST. Instead of the usual energy-intensive combustion at 850 to 950 degrees Celsius, the exhaust gases are channelled through a "cold plasma". Only two things are needed for this: air and electricity. "Our plasma prototype can clean various exhaust gas test mixtures in the laboratory at the touch of a button – the advantage here is that no preheating is required and only a small amount of waste heat is generated," explains materials scientist Dr Bastian Welte.

In the summer, the prototype from the laboratory was integrated into the test operation of a battery recycling plant operated by Primobius GmbH (a member of the SMS Group), which in turn manufactures plants for the German automotive industry. After several months of operation with waste gases from battery recycling, UMTEC project manager Prof Dr André Heel draws a thoroughly positive conclusion: "We were able to show that our system can be integrated into the existing infrastructure and can deliver the expected cleaning performance. If the system is scaled up, cleaning volumes of up to one hundred thousand cubic metres and more of waste gas cleaning per hour are also possible on an industrial scale."

**Full power at the touch of a button**

A major advantage of plasma cleaning compared to fossil fuel incineration plants is simple operation. Because the plasma in the reactor can be generated directly with electricity, the full cleaning power is generated at the touch of a button. Warm-up times or complex systems for recuperating waste heat are not necessary. "This is important because many companies have no use for the waste heat or are even connected to a district heating network, which means that such systems cause undesirable complexity and costs," says Welte. The logistics and transport infrastructure for fossil fuels are also eliminated. The UMTEC researchers are therefore confident that they have made an important contribution to industrial waste gas purification. **"Our plasma-reactive cleaning system makes exhaust gas cleaning less complex and at the same time more environmentally friendly, and it also fits in perfectly with the current electrification and thus defossilisation of processes," says Heel.**

Following the successful test operation, oxytec AG together with UMTEC will continue work on the commercialisation and greater market penetration of the system. The demand in the industry is there. "Innovative technology and a great team lead to an excellent result", says Horst Krenn, Managing Director of Primobius GmbH.

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