

-----  
Rentschler Reven GmbH  
-----

Ludwigstrasse 16 - 18  
74372 Sersheim, Germany  
-----

Tel.: +49 (0)7042 373-0  
Fax: +49 (-20)7042 373-20  
-----

www.reven.de  
-----



## Innovation Award 2013 of the State Baden-Württemberg

For the development of the new X-CYCLONE® air cleaning technology, the first price was awarded to the company Rentschler Reven GmbH by the Regional Council of Stuttgart on 21 November 2013 in Ludwigsburg Palace.

### innovation award



Since 1985, the Dr.-Rudolf-Eberle price has been awarded every year to domestic companies in industry, trade and the technology service sector for the development of new products, processes or technology services or the application of modern technologies in their products, production or services. The award officially recognises the outstanding efforts of medium-sized companies to develop and apply new technologies.

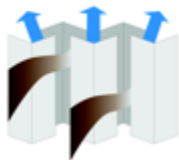
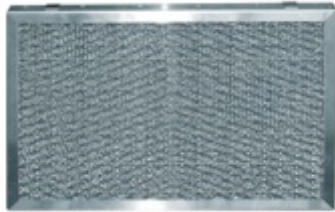
## Rentschler Reven GmbH

### X-CYCLONE® air cleaning technology

On the basis of decades of experience in the field of air cleaning, Rentschler Reven has developed the mechanical X-CYCLONE® separating system. The innovative technology is protected by international patent rights and was presented to the public worldwide in 2012. PM10 air pollutants such as oils, emulsions, steam, process waste gas and fine dust are separated from the air to the highest possible extent. The system works purely mechanically without auxiliary energy and does not require disposable products that have to be replaced at regular intervals. Therefore, the operating and maintenance costs are considerably lower than for conventional air cleaners! The X-CYCLONE® system is excellently suited for separating air-borne pollutants of all kinds, such as aerosols, mist, vapour, steam and fine dusts that are released during manufacturing or finishing processes in the food processing or manufacturing industry. Typical areas of application of our air cleaners are finishing, manufacturing, food processing and commercial food preparation. Over the decades, the ongoing development and optimisation of the X-CYCLONE® technology, which is the heart piece of all REVEN® air cleaners, has resulted in highly efficient, energy-saving equipment with a sustainable air cleaning concept. Thanks to these efforts, Rentschler Reven managed to win renowned customers in the food processing industry and other completely new sectors, such as air cleaning on drilling rigs for the oil and gas industry. REVEN® air cleaners are also established in the purification of extracted air in milk processing companies. In addition to this, the X-CYCLONE® technology is increasingly being implemented for separating cooling lubricants on machine tools. With machines equipped with our air cleaning equipment being exported worldwide, REVEN® air cleaners are distributed across the globe.

### The starting situation

For many years, air cleaners for purifying process exhaust air have been available in a diverse range of designs. They are used in all kinds of exhaust systems, from large plants for process exhaust extraction and cleaning in steel works to extractor equipment in hotel kitchens or small mechanical processing companies. The air cleaners available on the market up to now have all used either disposable filters made of paper or fibreglass, metal mesh or high-voltage filters. All these systems incur high operating and maintenance costs, as the filters have to be replaced at regular intervals. Moreover, the conduction of the airflow inside these systems has not been analysed and optimised up to now.



Conventional filter elements with an undefined, turbulent airflow through the filter element



The X-CYCLONE® technology with an analysed airflow based on scientifically sound methods

Conventional exhaust air cleaners often comprise a combination of several filter elements, such as baffle plates, metal mesh and glass fibre mats, which produce a turbulent airflow with very high air resistance. Due to this, the equipment has very high power consumption.

## The innovation

When we started developing the X-CYCLONE® technology, there were very few reliable studies delivering sound findings on the flow behaviour of air and pollutants passing through a filter element. At that time, there were hardly any scientific studies and research results that we could use. An additional challenge in the initial phase of our research and development work was the lack of suitable measuring equipment to determine the efficiency of filter elements handling industrial process exhaust air. Therefore, our first step was to find suitable equipment and optimise its analysis methods. This involved costs of about a million euros, an enormous amount for a medium-sized enterprise. These investments were indispensable, however, because airflows are complex and cannot be mapped analytically. The only way to examine and understand these flows and gain useful knowledge for the improvement of processes and products is to simulate them with computational fluid dynamics (CFD). The CFD-based development tools allowed us to transform a metal baffle plate with an undefined airflow into an X-CYCLONE® element with a known and defined

airflow. Our flow optimisation has succeeded in causing the airflow to rotate strongly as it passes through the X-CYCLONE® filter element. This flow behaviour reliably separates PM10 particles from the exhaust airflow with a high degree of efficiency. At the same time, we managed to keep power consumption low and dispense with disposable filter media. Our aerodynamic laboratory is equipped with sophisticated particle measuring equipment, which we have improved and optimised in cooperation with our partners from the science sector. With the help of scattered-light spectrometer systems, our company was the first to succeed in exactly and reliably measuring particle concentrations and sizes in highly contaminated exhaust airflows and accurately recording the separating efficiency.

In the meantime, the findings and expertise of this pilot work and basic research have attracted interest all around the world, resulting in the company Rentschler Reven GmbH being invited by the Shanghai Academy of Environmental Sciences (SAES) in spring 2013 to present and explain X-CYCLONE® technology and the research results and patents involved to the SAES institute. Subsequently, the SAES decided to use X-CYCLONE® air cleaners for the reduction of air pollution in Shanghai for the first time.



X-CYCLONE® air cleaner in a German gear production factory in Baden-Württemberg

## The company

The history of Rentschler Reven began as early as in 1905, when Gustav Rentschler, the great-grandfather of the present CEO Sven Rentschler, had the company *Gustav Rentschler Flaschnerei und Apparatebau* registered in the guild roll of the Swabian town of Sersheim. Even during the foundation phase, the company started constructing extraction apparatuses and systems for production facilities and workshops. The family-owned company has remained loyal to this field of activity ever since, specialising in industrial air cleaning over the decades. Our knowledge in the field of air cleaning has grown continuously over generations since then and is unique today. Numerous internationally protected patents, brand names, design protection rights and technologies bear witness to more than a hundred years of company history and progress. Our central factory in the heart of Baden-Württemberg serves our customers all over the world. We ensure perfect customer care with an international network of authorised REVEN® dealers and service points and a homepage offering information and documentation in nine different languages. Our production site is located in Sersheim in Baden-Württemberg, approximately 30 km north of Stuttgart. We produce all of our air cleaners at this company site. In

our automated and computer-controlled production, we process exclusively rustproof stainless steel and aluminium sheets. Our production processes and materials guarantee reproducible quality and fully corrosion-proof products, which come with a lifetime warranty. Automated processing machines and a high-rise warehouse ensure very short delivery periods, because we keep 80 % of our air cleaner product range in stock!