



Dürr - Clean Technology Systems

Case Study Exhaust Air Purification: Collaborative Partnership as Key to Success

Tailored Service Ensures High Availability and Lower Costs

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Exhaust Air Purification: Collaborative Partnership as Key to Success

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Looking back on over 10 years, the collaborative partnership between Orafol Europe GmbH and the service area of the Dürr Clean Technology Systems (CTS) division has reached a particularly high level of commitment and engagement. While the foil specialist continues to grow as it develops new, innovative products and installs additional production lines to boost capacity, Dürr looks after the air purification systems by providing a comprehensive range of services that extends throughout their operative lifecycle. The global market leader of highly efficient air purification systems has many years of experience dealing with different processes and helping customers, and offers proactive service solutions, including for complex “production and exhaust air portfolios”.

Orafol Europe GmbH is a high-growth global player for self-adhesive graphical products, adhesive tape systems, and reflective materials. Maintaining four successful product divisions – Graphic, Reflective Solutions, Energy Solutions, and Adhesive Tape Systems – the innovative company employs 1,750 members of staff in over 100 countries, with a total of 14 production facilities operated on five continents. Most of the production occurs at the company’s headquarter location in Oranienburg near Berlin, which has been continuously expanded since 1995 and is currently being fitted

with additional production lines and air purification systems to match. The keys to success for Orafol's corporate culture are performance-oriented, forward-looking products, ongoing investment, efficiency, and reliability.

Air Purification Grows with Production Capacity

The critical steps in the production process for foil are various screen-printing processes and coatings involving adhesive and UV protective layers in particular. Solvents such as toluene, heptane, ethylacetate, and benzene are used primarily for printing and coating as well as for cleaning production equipment and must be reliably extracted from the exhaust air.



*Figure 1: Energy-efficient **Ecopure®** RTO air purification plant with optimized efficiency*

Dürr is currently installing another Regenerative Thermal Oxidizer (**Ecopure®** RTO) system for several new foil coating lines that improves efficiency by an additional 10 percent, thanks to the use of optimized ceramic honeycomb structures (see Figure 1).

Orafol not only insists on the best possible efficiency for new systems, but also for existing ones. For this reason existing units are systematically analyzed for areas in which energy consumption can be reduced, efficiency increased and control software optimized together with Dürr (see Table 1). Any necessary improvements are then implemented accordingly. The **Ecopure®** RTO systems from Dürr can be upgraded to the latest technical standard relatively quickly and easily thanks to their modular design.

Heat exchanger modification	<ul style="list-style-type: none"> • Higher levels of operating efficiency and better economy • Reduced energy consumption • Lower pressure loss
Burner optimization	<ul style="list-style-type: none"> • Reduced gas consumption • Longer service life • Better distribution of temperature in the combustion chamber
Controller adaptation	<ul style="list-style-type: none"> • System does not need to be converted • Safety-relevant adaptations • Quick and cost-effective process changes

Table 1: Selected starting points for optimizing existing air purification systems

Proactive Services Across the Entire Lifecycle

Not only has the scope of services provided by Dürr grown over the years, but the quality the company offers has as well. After the first **Ecopure®** RTOs were delivered the service features consisted only of single units, such as maintenance. Since that time Dürr has evolved to become a tailored, integrated system-service, with a service concept that is second to none. This system includes complete diagnostic system that shows the current conditions and the possibility for remote diagnostics.

Dürr employs a flexible, interdisciplinary team of specialists to assist Orafol. By working hand in hand with the experts at the customer, they analyze weak points so that targeted solutions can be developed. Flexible in this context means that the make-up and size of the team, which primarily comprises process, control, and automation technology specialists, can vary depending on the task at hand.

“The key to success is to offer the level of service expertise required while at the same time maintaining a trustworthy professional relationship. With this balance, we not only know exactly what Orafol needs to complete the task at hand, but can also assist our partner on a very personalized level by offering best-practice solutions that have worked with other customers”, explains Dürr Key Account Manager Hans Kuttler.

Dürr services can be grouped as follows:

Assessment and Engineering: Assessments involve analyzing all areas required to ensure optimal air purification separately, and as a whole for new plants as well as for existing production lines that have been rebuilt and/or converted. When the results have been documented in transparent fashion and specific customer requirements have been defined, the planning and implementation phases are initiated.

Startup and Production Monitoring: The Dürr service team assists in the installation of new plants as well as making adaptations and adjustments during production operation. Changes in production conditions therefore necessitate corresponding adaptations to the air purification systems as pollutant and concentration levels shift. This is achieved either by reprogramming the control system or converting the air purification systems altogether. Making pinpoint adjustments to the control system to compensate for fluctuating accumulation of solvents, for example, can be enough to substantially reduce the energy required for air purification and are relatively quick and inexpensive to carry out.



Figure 2: An *Ecopure*® RTO plant from Dürr is being erected.

An example of this is a recently installed washing facility for a screen and doctor blade cleaning system. The cleansing agent used is ethylacetate, which is very explosive in high concentrations. To rule out any risks or hazards, a sophisticated safety concept was devised, whereby pollutants in the exhaust air stream are diluted by way of interconnected electrical components to ensure that the explosion limit is undershot by a safe margin.

The exhaust air stream for an additional, new coating line doubled as a result, thereby greatly exceeding the capacity of the existing air purification system. The cost-effective solution envisaged by Dürr involved installing a new, larger-capacity **Ecopure®** RTO and relocating the previous one to another line (see Figure 2).

Inspections, Maintenance, and Optimization: Orafol and Dürr utilize regular inspection intervals not only to investigate and quantify the current operational state and determine when wear parts need to be replaced as they also provide the perfect opportunity to identify potential areas where improvements can be made to energy efficiency, availability, and safety, for example. Since the service team in the Dürr Clean Technology Systems division is pretty diversified and comprises highly qualified employees, challenging conversions can also normally be carried out in record time with only minimal impact on production operation (see Figure 3).



Figure 3: The Dürr service team discusses how new plants can be integrated and existing ones adapted without impacting production operation any more than necessary.

Dürr also offers troubleshooting support with its 24-hour technical hotline staff, that remotely access control systems and visualize all plants so that the cause of the problem can be quickly determined and rectified on site. This is further facilitated by a requirements-based spare parts management program that includes customized OEM or emergency service packages.

Impressive Results with Availability in Excess of 99 Percent and Energy Consumption Down by 18 Percent

The Technical Director at Orafol and his team are more than satisfied with the on-going improvements made to Dürr's service offering (see Figure 4). The Dürr tailor-made service program not only undershoots critical emissions limits, but also increased the operational availability of our air purification systems to over 99 percent in the last few years, thanks in part to the 24-hour technical hotline. Energy consumption was likewise reduced by approximately 18 percent as a direct result of ongoing improvements made to the air purification systems. These systems can then be operated for longer periods of time, which in turn lowers the total cost of investment – an aspect that cannot be overlooked as air purification itself does not actively contribute to production output, but only adds to the list of operating expenses.

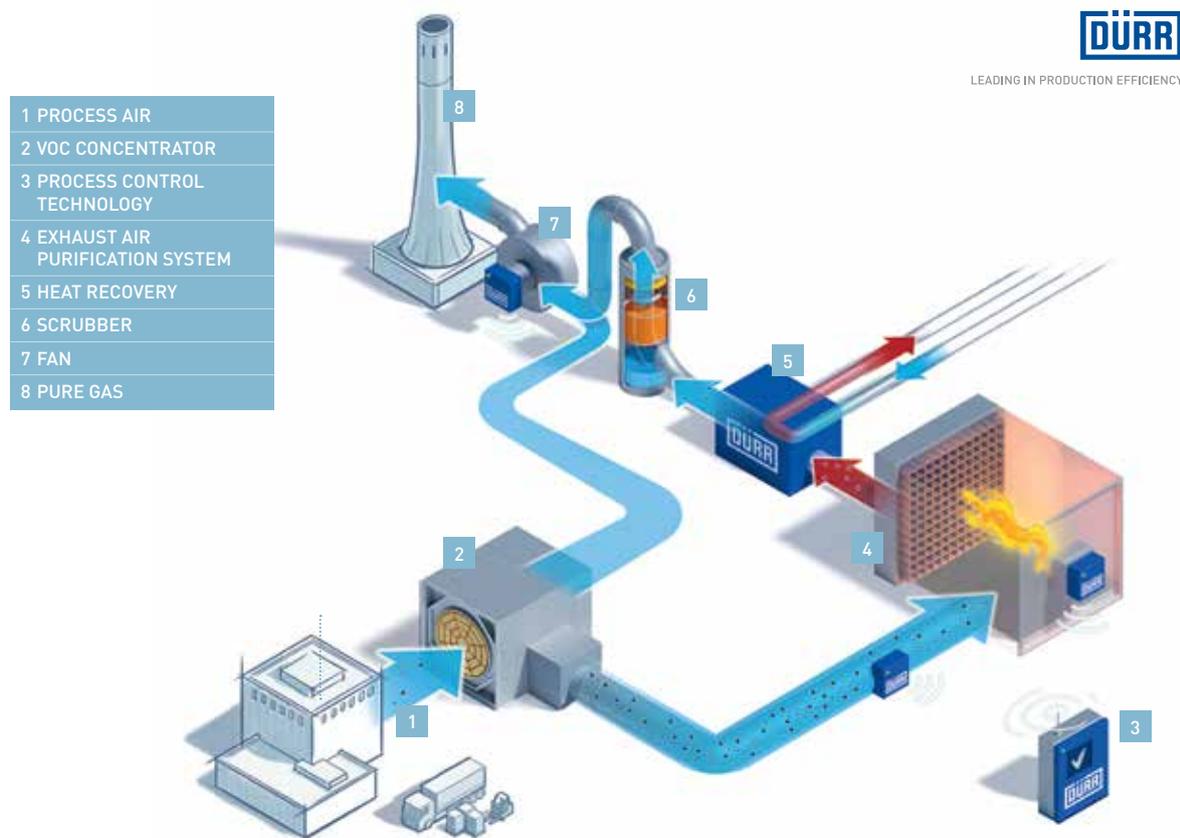


Figure 4: Dürr offers proactive, tailor-made services that extend throughout the entire lifecycle of the air purification system.

As an industry leader, Dürr supplies highly efficient air purification systems incorporating the latest, state-of-the-art technology that cover a wide range of sectors, pollutant types, and concentrations. To ensure economical operation, the systems not only need to be tailored to the customer's specific requirements, but also require competent, reliable servicing. Dürr offers a portfolio of base services such as maintenance, servicing, and expedited troubleshooting, which are augmented by optimization programs, extensive training for the customer's employees, and dedicated contacts who can make the seemingly impossible possible when an emergency situation arises.



Figure 5: The service portfolio of the Dürr Clean Technology Systems division

The CTS division offers a comprehensive service package for **Ecopure®** systems from Dürr used to purify process air and dispose of residual fluids as well as for third-party systems that customers can tailor to meet their specific needs. This package includes services that range from commissioning, consulting, and training, to expedited spare parts and repair service, through to preventive maintenance (see Figure 5).

Interview with Marcel Janßen, Technical Director at Orafol Europe GmbH in Oranienburg.

How important is efficient air purification in your company?

Social responsibility forms a widely practiced component of Orafol's corporate philosophy, which is why we go far beyond legal requirements when it comes to environmental protection. Our specially designed environmental management system in line with ISO 14001 requirements works not only to minimize emissions at the highest level of energy efficiency possible, but also to build and establish closed, or reused raw material, energy, and resource cycles. We want to maintain an air purification network that can reduce emissions by up to 99.8 percent while offering maximum reliability and low operating costs – an objective that not only targets our locations in Germany, but also in other countries that have less stringent environmental standards such as in the USA.

What are the benefits of preventive service?

Production reliability enjoys the highest priority. Since production equipment needs to be stopped and shut down when the air purification system at the other end fails, the latter must offer maximum availability for as long as possible. This is especially important to us as a single air purification system can be used to treat the exhaust produced by up to five production lines. The high level of availability is attained by way of a clever reliability concept devised for the Dürr air purification systems, expedited troubleshooting when required, and preventive maintenance and retrofit upgrades. Highly efficient recovery systems further lower our energy costs while improving cost operation.

What makes the services offered by Dürr different from those of other Providers?

In addition to the comprehensive, expedited and dependable after-sales service program maintained by highly qualified employees, we particularly value the range of pre-engineering services offered by Dürr. As our teams frequently engage in open and honest cross-communication, we are not offering out-of-the-box-solutions, but work together to develop customized approaches that meet the applications. The experience we have gained thus far shows that this forward-looking course of action ultimately leads to the lowest overall costs incurred.

The Dürr Group is one of the world's leading mechanical and plant engineering firms with extensive automation expertise. Products, systems and services offered by the Group enable highly efficient manufacturing processes in different industries. Dürr supplies sectors like the automotive industry, the mechanical engineering, chemical and pharmaceutical industries, and the woodworking industry. The company has 86 business locations in 28 countries. The Group generated sales of € 3.57 billion in 2016. Dürr has around 14,500 employees and operates in the market with five divisions:

- **Paint and Final Assembly Systems:** paint shops and final assembly systems for the automotive industry
- **Application Technology:** robot technologies for the automated application of paint, sealants and adhesives
- **Clean Technology Systems:** exhaust-air purification systems and energy efficiency technology
- **Measuring and Process Systems:** balancing equipment as well as assembly, testing and filling technology
- **Woodworking Machinery and Systems:** machinery and equipment for the woodworking indust