

A fresh approach to tunnel air-filtration and safety

Ever-larger tunnel projects are being realized worldwide to protect people and the environment, subsequently leading to an increased demand for filter systems to clean the air. Austria's Aigner Tunnel Technology has been developing the requisite filters and safety equipment since 1990. The Austrian company's big breakthrough came with its ECCO filter concept, patented in 2000. A further development, the ECCOEP, was installed in the Mont Blanc Tunnel in 2010.

Aigner offers a range of services, encompassing design, development, installation and maintenance all from one source. The company works in close collaboration with the Technical University of Graz in Austria as well as other renowned research institutes. Close-knit organization ensures quick decision making with cost-effective performance for individual solutions.

"Filter systems for tunnels are subject to their own very specific requirements," says Heinz Aigner, managing director. "Our systems are optimized continuously to meet the latest economic criteria."

Experience counts

Since 2004, Aigner has equipped filters to many new tunnel filter systems installed in Europe.

One key project is the famous Mont Blanc Tunnel, an 11.6km-long tunnel linking Italy and France. Designed as a single-tube tunnel for bi-directional traffic, the tunnels sees traffic volumes totaling around 1.8 million vehicles a year. Leaving aside the beneficial results of building the new Mont Blanc Tunnel, the steadily deteriorating air quality was



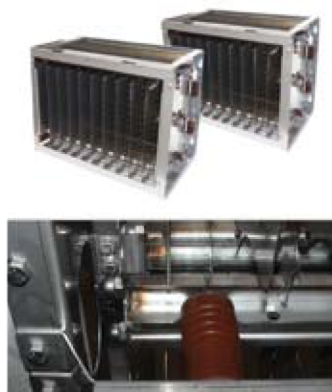
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(Left) The famous Mont Blanc Tunnel (Below) Aigner's tunnel filtration helps keep motorists safe during their journey through the tunnel

Need to know?

A range of filters for removal of particulate matter and gases as well as safety products for road tunnels

- > The high efficiency of ECCO makes it possible to reduce particulate matter load and to intercept carcinogenic diesel soot particles
- > The ECCO filter system can be used in any tunnel project, whether a new construction or refitting during renovation
- > The four-stage filter process of the ECCOEP results in 98% efficiency for particle sizes from 0.1- 20µm
- > FIRECURTAINS safety product aids visibility and promotes safer emergency operations



becoming an unacceptable side-effect for residents in the nearby town of Chamonix. The tunnel operators decided to integrate an air-filtration system into the existing tunnel.

The Mont Blanc Tunnel company had good reason to select Aigner's ECCOEP system. This latest generation of filter technology is space-saving and makes for minimal pressure loss and low energy consumption. A four-stage filter process, meanwhile, results in highly efficient particulate separation,



even of ultra-fine diesel soot particles. The degree of efficiency for all particulates lies at over 90%.

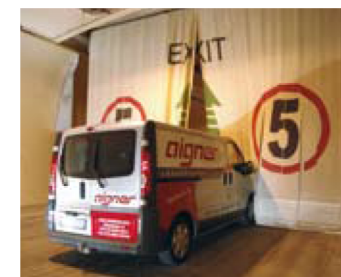
Aigner took a leading role in the project in terms of design and installation of the filter system, including all additional technical equipment, with the filters adapted to fit an existing ventilation system. This was also the reason for the two-part solution using ECCOEP, to guarantee the highest degree of efficiency despite the limited space available. Interested in the

potential, a delegation of South Korean tunnel construction technicians has recently seen for themselves how this works.

In case of a fire

A tunnel fire poses a high risk for tunnel users, although it's not the fire itself that presents the biggest threat but the smoke generated, which causes people to panic. For this reason, smoke must be efficiently extracted at the right place and as quickly as possible. The FIRECURTAINS developed by Aigner promote sufficient visibility in such cases so that people are able to orientate themselves in the event of a fire. It's a double-pronged approach: on the one hand, the danger of suffocation is prevented by controlled smoke extraction; on the other, clearly visible signs in the form of exit arrows on the curtains instruct drivers to drive slowly through and leave the tunnel. Such a system was installed for the first time in the Roppen Tunnel in Austria in 2009.

A further pioneering idea from Aigner is the



Fire curtains promote visibility and instruct drivers how to behave safely

ECCONoxCAT gas filter system. This system – featuring activated carbon and special catalytic properties – filters a large proportion of the nitrogen dioxide out of the air and has been in use – without requiring maintenance – since 2007 in the Calle 30 tunnel in Madrid. ○



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