

INDUSTRY: Filter Production

CHALLENGE: Paper Dust, which is not only a Nuisance but also very flammable

SOLUTION: PowerCore® Dust Collector with PowerCore® Filter Packs



PowerCore® dust collectors at AFSI, Czech Republic

AFSI established PowerCore®

Innovative dust collection technology for filter production

At their Czech plant the company AFSI produces oil and hydraulic filters for construction equipment and engines. During the initial process steps of the filter production, paper dust becomes airborne, which is not only a nuisance, but also very flammable. To reduce the air pollution, AFSI has purchased two PowerCore® dust collectors manufactured by Donaldson. These filter systems deliver a long service life along with a minimal maintenance requirement.

Highly efficient dust collection technology is required in the filter production, as the example of the European manufacturing facility of AFSI (Advanced Filtration Systems Incorporated) shows. The company with its headquarters in Champaign, Illinois (USA) manufactures oil filters for internal combustion engines and hydraulic filters for construction equipment.

Construction of a modern filter production facility

In 2007 the first European plant of the company was constructed in the Czech Republic, which today employs around 200 people. Since then, the company operates in a "division of labour": The engine and hydraulic filters for North and South America are produced in Champaign, USA. The plant in Havran, Czech Republic, is responsible for the markets in Europe, Asia and Africa. As engines and with them the filters often operate under extreme operating conditions, a high performance and a long service life are demanded even at high loads.

High dust loads during production

The filter production process in Havran starts with the mechanical cutting and pleating of special filter paper. Then, the pre-manufactured filter inserts are formed into cartridges and are



Up to 50% smaller than traditional baghouses

Donaldson CPC dust collectors with PowerCore® technology are up to 50% smaller than conventional dust collectors



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connected to the metal filter housing. Especially during the cutting process of the paper large quantities of paper dust develop, which must be extracted reliably for several reasons. First: The personnel must not be exposed to dust. Second: The filter itself must be free of particles, as impurities would enter the oil circuit. Third: Paper dust - like any organic dust - is flammable, when a certain mixing ratio is present in the air.

In search for the best dust collection system

High expertise must be assumed when selecting a dust collection technology – as AFSI is professional in this field. The requirements, which were specified by the responsible team at AFSI, were a most compact design, long service life of the filters, a high level of energy efficiency, easy service and the suitability to be used in areas with dust explosion hazard.

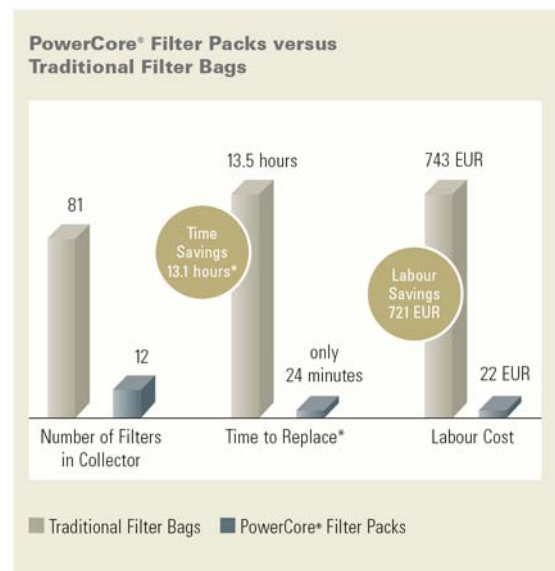
Premiere of a new technology

Precisely at that time Donaldson presented the newly developed PowerCore® technology. Dust collectors, which are equipped with this filter technology can be designed up to 50 % smaller compared to conventional systems.

A practical example: For a dust collection unit, which previously had to be equipped with 81 bag filters of each 2.40 m in length, now only 12 PowerCore® filter packs are required. At the same time, the maintenance of the filter system is simplified: While previously 10 minutes had to be applied for replacing a traditional bag filter, the time for replacing a PowerCore® filter pack is reduced to 2 minutes.

High performance, long service life

Crucial is that these benefits are not at the expense of efficiency and filter life – the opposite is the case. Independent tests verified that PowerCore® filter packs reduce emissions by up to 78 % when compared to standard polyester filter bags



* Savings are based on one changeout. Calculations assume bags and PowerCore filter packs show equal life time; one person replacing one traditional filter bag in 10 minutes; one person changing PowerCore in only 2 minutes; labour rates equal 55 EUR/h.



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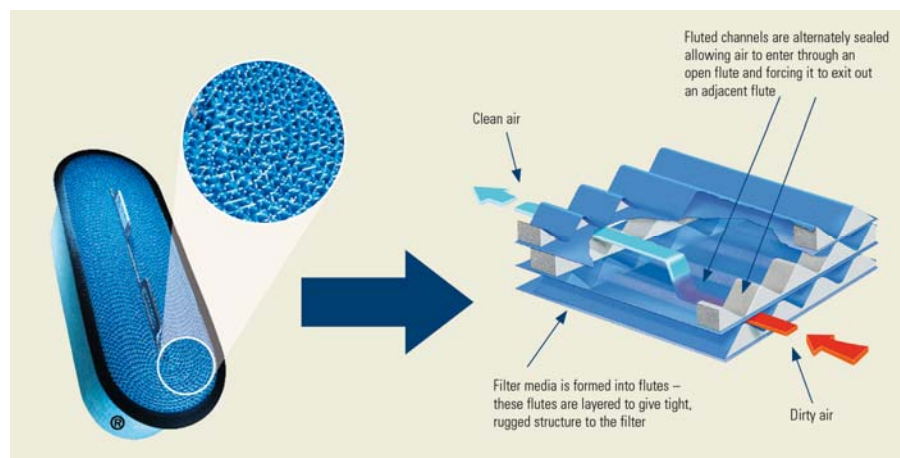
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Two essential factors have led to this performance increase: First, Donaldson uses the highly effective and proprietary Ultra-Web® nanofibre filter medium for PowerCore® filter packs, which collects a higher dust load on the surface of the media flutes as would be possible with conventional fabric filters with a depth loading of 540 g/m². The result: The filters can be cleaned off with low energy input - a proprietary pulse cleaning system was specifically developed for this purpose. In addition, less material is deposited in the depth of the filter media, which increases the service life of the filter packs. Second, the media flutes of the filter packs result in an optimum air flow.



Decision for innovative technology

These features of the new technology convinced AFSI. Milos Ruzicka, Engineering Manager: "The benefits were so obvious that we decided for this solution very quickly."

For each of the two production lines a PowerCore® system was projected together with Donaldson engineers for a throughput of 4,500 and 7,000 m³/h. Both systems are equipped with IPC(ΔP) controller in dust-Ex version, an additional filling level control in the hopper and an additional fan at the top of the housing. Of course, the ATEX-compliant version is applied, which is approved for the dust-Ex zone 21 in accordance with EC Directive 94/9/EC.

The right decision

The decision for the new technology was absolutely correct for AFSI. Karel Dosek responsible for the operation of the dust collection system at AFSI: "The production area is free of paper dust. All limit values are met reliably and the system requires only a minimum of maintenance."

Meanwhile, the PowerCore® technology has not only been proven at AFSI, but has been applied successfully in numerous companies in various industries - e.g. in the cement, bulk, plastics and wood industries. The operational cost saving and energy efficient dust collectors are available for volume flows up to 34,000 m³/h.



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