Stefaan Kennis
Donaldson Europe B.V.B.A.
Leuven/Belgium
www.donaldson.com

Following studies in engineering, majoring in materials science and production technology, Mr Kennis began his professional career with an automotive supplier. In 1997 he joined Donaldson, then Torit, working in industrial filtration as a production engineer, engineering manager and product line manager. Today as Product Strategy Manager Industrial Air Filtration, he is responsible for the strategic orientation of the product portfolio in this business division.

Compact performance

New dust collection technology proves its performance in difficult application

Summary: Plugging and clogging is a common problem when dust collection units are employed in the production process of mineral wool insulation materials. The fibres tend to entangle and bridge, and when coming out of the melting-oven virtually glue together. The Dutch Isover plant in Etten-Leur solved this problem by installing a new PowerCore® dust collection unit.

1 Introduction

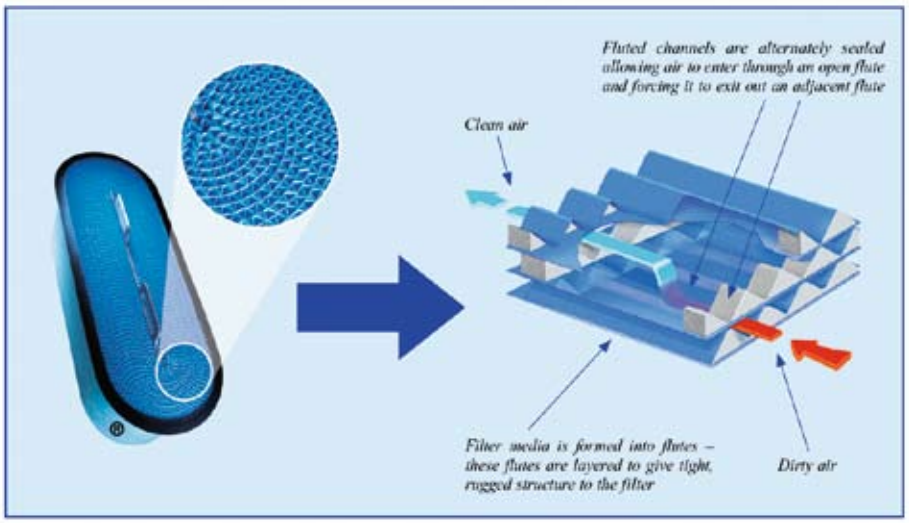
Insulation of buildings is a major topic with regards to energy-savings: With a state-of the art insulation, the owner of an existing building can save up to 90 % of energy, as the yearly European contest "Isover Energy Efficiency Awards" regularly demonstrates. By doing so, house owners will not only save remarkable amounts of money but also contribute to the reduction of carbon emissions and the protection of the environment.

2 From glass to fibre

The manufacturers of insulation materials benefit from this trend. One main manufacturer in this field is Isover, a company within the Saint-Gobain Group. The well-known brand name is derived from the French words "isolation" (insulation) and "verre" (glass), giving a hint to the main component of the insulation material: Glass or other mineral raw materials like sand or volcanic rock are processed to thin, long fibres which – together with additives – are melted in an oven. The result is a mineral wool mat with a soft, airy structure.

When asked why this material is perfect for insulation even many physicists will hesitate. The answer: the best natural insulator on earth is dry immobile air. Glass wool with its entangled, porous structure perfectly traps the air, making it one of the best, and not to forget incombustible, insulating materials.

PowerCore® dust collection unit with a capacity of 20 000 m³/h at the Isover plant

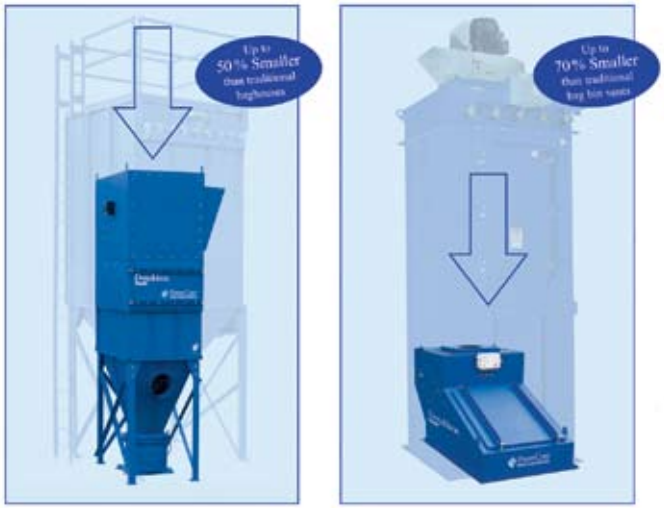


1 Design and function of the innovative PowerCore® filter packs

3 Great performance on the smallest footprint

In the dust collectors, the fibres tend to entangle and nest on themselves, often causing a bridge between filter bags that plugs airflow and in the worst case clogs the whole filter.

When the Dutch Isover plant in Etten-Leur needed to replace an existing tubular baghouse, they hoped for improvement by installing a dust collector with higher capacity. The Donaldson engineers visited the factory, examined the application and came up with a different proposal. To that time, the company was just preparing



2 Donaldson units using PowerCore® technology are up to 70 % smaller in comparison to conventional dust collectors

3 Convincing in practical application: modular design, easy accessibility and filter pack changeout from the clean air side

the introduction of the new PowerCore® dust collection technology which promised better results in this critical area of application.

Walter Hompes, Area Sales Manager, Donaldson Nederland, B.V.: "The key to the high performance of the PowerCore® units are the filter packs, combining our patented Ultra-Web® medium with a rugged fluted-media configuration (Fig. 1). The medium allows a higher dust load to be collected on the surface of the media flutes. This high performance enables a downsizing of the whole unit." In practice, a stand-alone PowerCore® dust collector of the CPC range will be up to 50 % smaller than conventional baghouses, a CPV (bin vent) unit is even up to 70 % smaller (Fig. 2).

4 400 hour-test was completely satisfying

These advantages of the PowerCore® technology sounded promising and Isover agreed to test the new technology before the official European market launch. The unit was installed, and after 400 hours proved to be the perfect solution: The filter did not clog or plug one single time, the pressure drop stabilized at a steady 25 mm wg resp. 250 Pa and impressed with the cleanliness of the clean air side of the filter chamber.

The PowerCore® unit proved that it is able to meet the challenges of the fluffy, agglomerative glass wool trim pieces. Consequently Isover ordered a unit with a capacity of 20 000 m³/h which was installed in one of the production lines. Walter Hompes: "We delivered one of the first PowerCore® systems in Europe to Isover. The unit (Fig. 3) was adapted to the individual requirements in one single detail. We added a sophisticated dust disposal system which prevented bridging in the dust hopper, to-gether with a pneumatic conveying system."

This unit now runs since six months and the engineers at Isover are satisfied with the results (Fig. 4 and Fig. 5). Project Engineer René van Gurp: "There is no significant increase in pressure drop. So we expect the filter packs to reach more than the expected lifetime of one year. Not once we had a downtime due to a plugged filter at that production line."

5 The key: Patented pulse-cleaning

Two of the main reasons for the smooth operation of PowerCore® under these critical circumstances are the optimized airflow and the patented pulse-cleaning system. Walter Hompes: "Bridging happens in baghouses because the pulse-cleaning knocks accumulated dust down the length of the filter, and often it accumulates in the lower interstitial spaces. On material like glass wool that tends to stick to itself, the accumulation builds eventually into a bridge that blocks airflow." The PowerCore® units were engineered with computer-modeled fluid flow analysis to manage the incoming dirty air and the velocities directed into

4 Simple filter changeout reduces maintenance costs

5 The dirty air side of the PowerCore® unit. Bridging between the filters and resultant plugging are successfully avoided

the filter pack, avoiding bridging problems between the filter packs. Even the hot glass fibres that virtually glue together are efficiently prevented to build agglomerations. And the pulse pattern of the Compact Oblique Pulse Cleaning System covers the entire media pack and pulses the dust out of the fluted channels. Bridging, and therefore plugging, is successfully avoided (Fig. 6)."

All in all, Isover has made the right choice in selecting the new filter technology. The company will surely consider using a PowerCore® unit when one of the other production lines requires a new dust collection system.