Proven fabric filter technology in revolutionary design
Innovative DuoClean™ solutions at lower CAPEX

DuoClean™ filter technology delivers

- Dual-flow gas approach
- Long filter bag technology
- Compact design
- Outstanding performance

FLSmidth is continuously developing filter solutions that offer a technological edge and reduce operating costs. Thanks to its long-established experience with controlling emissions, FLSmidth’s state-of-the-art fabric filter solutions ensure high performance and meet even the strictest emission requirements, as reflected by the more than 4,000 outstanding FLSmidth fabric filter installations around the world.

Advanced gas and dust distribution
The DuoClean™ filter is a well-proven design and a technology that has been installed at more than 50 plants worldwide. The technology is characterised by a dual-flow gas approach from the bottom of the bags as well as from the side to ensure a low uniform velocity over the entire bag filtration area, making it possible to use longer bags and reducing the filter footprint. To ensure an even distribution of gas to the hoppers and on the bags, individually designed gas distribution screens are used for each filter application.

New octagonal shape for DuoClean technology
FLSmidth has developed two new, revolutionary DuoClean filter types – the DuoClean DC2 and the DuoClean DC8. With an innovative octagonal shape resulting in a compact, modular filter design, the new filters provide the powerful emission-reduction capabilities that plants need, at reduced CAPEX. This design is unique with regards to manufacturability and constructability, minimising delivery time and costs.

Extensive R&D work
Substantial R&D efforts have been invested to ensure optimal control of gas distribution and the ideal dual-flow split. To develop new filter types, FLSmidth uses computational fluid dynamics (CFD). For the new DuoClean DC2 and DC8 filters, the CFD results demonstrate a well-distributed gas flow with significant dust being pre-separated to the hopper. This ensures uniform gas speed to the bags, reduces compressed air usage and increases the lifetime of the bags, leading to lower OPEX.

Self-reinforcing shape and cost-effective construction
The new modular design and octagonal shape of the filter enables the use of simple reinforcement profiles and reduces the number of different components. Eight identical panels are assembled in an octagon, which has clear stress and strain advantages thanks to its near round shape.
The optimised casing and hoppers reduce the weight and complexity of steel construction, making the fabrication and workshop assembly cost-effective.

**Optimised transportation**
The steel parts for filters are often fabricated far away from a plant, requiring container transport over sea. The new DuoClean filters’ octagonal shape casing and the width of the eight side-panels and hole-plate elements fit into a standard container. The containers are packed with a focus on utilising the entire space, reducing the number of containers required and minimising transportation costs.

**Easy assembly and quality assurance**
Filter components are typically assembled at a dedicated area close to the plant, and construction is completed on-site while the filter is installed in its final position with a high degree of pre-assembly. This reduces the need for scaffolding and crane capacity and means that construction can be done quickly, in a safe environment, and at reduced cost.

In addition, as the prefabricated parts are standardised, the risk of errors is reduced and quality assurance is trouble-free.

**Low operational costs**
FLSmidth’s DuoClean filters ensure an outstanding performance at a low operational cost. Thanks to the unique gas distribution and pre-separation of dust, the pulse jet cleaning system operates with a minimal number of cleaning cycles, resulting in low compressed air consumption, less wear of the bags and an increased bag lifetime.

The low pressure cleaning system (cleaning pressure ≤ 2.0 bar), developed with extensive R&D, is also available to ensure efficient cleaning and reduced stress of the long bags. This means that the traditional high-pressure compressor (6-7 bar) can be replaced with a root blower, saving investment and operational costs.
DuoClean DC2 filter: Small footprint, big impact

Benefits of the DuoClean DC2 filter

- Uses long bags reducing footprint and CAPEX
- Unique gas distribution system reduces OPEX
- Easily transported to site in containers
- Fast and easy to construct, reducing costs
- Light in weight, reducing CAPEX
- Casing design reduces steelwork by up to 15%

Large capacity
DuoClean DC2 filter

The goal of developing the DuoClean DC2 filter was to optimise the entire supply chain by reducing costs and minimising environmental impact by considering the design, production, manufacturing, packing, shipping, installation and commissioning.

FLSmidth’s extensive R&D work has resulted in the most innovative process filter available on the market for medium to large gas flows.

The DC2 filter consists of multiple octagonal modules that are connected as one, compact filter, with a small footprint. The DC2 handles gas flows from 150,000 to 1,900,000 Am³/h, making it ideal for large mill and process applications. It is suitable for bag lengths of 6-10 metres and includes the unique gas distribution screens, ensuring an even distribution of gas. The DuoClean DC2 comes with top access or weather enclosure design.

These 8 steps illustrate a DuoClean DC2 filter taking shape. Construction and installation can be as quick as just four weeks. The components arrive on-site in containers. You only need a crane for the final moving of the pre-installed components to the final filter location; otherwise all construction is done at ground level.
The DuoClean DC2 filter matched the needs of the Lafarge Medgidia plant in Romania, who trusted FLSmidth to select the best filter for their processes.

Lafarge appreciated that this new DuoClean filter design was from FLSmidth, part of a larger group with expert knowledge in cement production. Additional key points for selecting FLSmidth as supplier was the proven long-bag technology and the FLSmidth R&D Centre testing filter capabilities using CFD. The small footprint was also a decisive factor for Lafarge's Medgidia plant, as the space for the filter installation was very narrow.

"FLSmidth is a well-known supplier in the cement industry. When we selected the DuoClean DC2 filter we knew that we could expect high quality, a high-performing installation and professional service during the project execution."

Mr. Emmanuel Ollivier, Project Manager, Lafarge Cement Technical Center, Lyon (FR)

**Kiln/raw mill**
- Bag length: 9m
- Media type: ePTFE/Woven glass
- Gas flow: 690,000 Am³/h
- Temperature: 130-240 °C
- Emission guarantee: 10 mg/Nm³

**Performance test results:**
- Emission: 2.25 mg/Nm³, dry @10% O₂

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FLSmidth supplied the Lafarge Rezina plant in Moldova with the same type of filter as the Lafarge plant in Romania. The customer therefore benefits from stocking the same type of spare parts, and maintenance is also facilitated. In Moldova, the DC2 filter was installed quickly because a large amount of assembly was done in advance. Filter components were also pre-installed, minimising the downtime for installation. Filter start-up went very smoothly and performance has exceeded expectations.

**Kiln/raw mill**
- Bag length: 9m
- Media type: ePTFE/Woven Glass
- Gas flow: 630,000 Am³/h
- Temperature: 100-250 °C
- Emission guarantee: 10 mg/Nm³

**Performance test results:**
- Emission: 1.24 mg/Nm³, dry @10% O₂

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At the Askale Gusmushane plant in Turkey, the DC2 filter has been selected due to its compact design and optimised performance handling large gas flows. FLSmidth has a long-established relationship with Askale Gumushane, which includes several filter installations for the main process filters at the plant. The customer has been pleased with FLSmidth's service and technology and looks forward to a swift installation.

**Cement mill**
- Bag length: 10m
- Media type: PAN
- Gas flow: 850,000 Am³/h
- Temperature: 95 °C
- Emission guarantee: 10 mg/Nm³
**DuoClean DC8 – the ultimate compact filter**

**Benefits of the DuoClean DC8 filter**
- Low weight compared to other small process filters
- Small footprint – a one-compartment filter for small gas flows
- Standard modules that are simple to manufacture
- Uses standard parts making it easy to design and assemble at site

**Matching smaller needs**
The DuoClean DC8 filter is a one-compartment filter in an octagonal shape that is suitable for gas capacities from 45,000 up to 150,000 Am³/h. The bags can be from 6 to 10 metres long. It is ideal for, but not limited to, smaller mill and process applications where the capacity of a filter with multiple compartments is too large.

The octagonal shape of the DC8 saves up to 40% on weight compared to a normal square filter.

The DuoClean DC8 filter offers excellent pre-separation ability and gas distribution with a low uniform velocity over the entire bag filtration area.

Different types of filter tops are available for the DuoClean DC8 filter: top access, weather enclosure (for weather protection) or a walk-in plenum.
**DuoClean DC8 achievements in Egypt**

In 2010, FLSmidth installed four DC8 filters at the BMIC plant in Egypt for the cement mill and the cement separator. Both applications have gas flows below 150,000 Am³/h and do not require online maintenance, therefore the DC8 filter was the best choice. The main achievements include:

- Weight reduction of more than 30% compared to alternative designs
- Easy and fast to construct on-site – just 3-4 weeks
- Pressure drop and emission targets have all been successfully met

Most of the pre-assembly for the two DC8 filters took place in the nearby workshop, reducing erection costs.

Today, the BMIC plant benefits from the advantages of high-performing fabric filters, which have a small footprint and compact design.

**Cement mill**

Bag length: 6m  
Media type: Polyester  
Gas flow: 72,000 Am³/h  
Temperature: 140 °C  
Emission guarantee: 20 mg/Nm³

**Cement separator**

Bag length: 6m  
Media type: Polyester  
Gas flow: 78,500 Am³/h  
Temperature: 140 °C  
Emission guarantee: 20 mg/Nm³

**Modular design valued in Oman**

In 2013, FLSmidth supplied a DuoClean DC8 fabric filter for the lime kiln at the Cameuse Lime plant in Oman.

“We placed our order with FLSmidth after carefully considering the advantages of having a small footprint, less total structure weight, and the single compartment solution. Because of the modular design, where all the side walls are completely identical, transportation to our plant is straightforward and the octagonal shape provides very good stress and strain advantages.”

*Mr. Benoit Bolly, Europe Technical Purchaser, Cameuse Coordination Center, Belgium*

**Lime kiln**

Bag length: 6m  
Media type: PTFE/Woven glass  
Gas flow: 69,660 Am³/h  
Temperature: 90 °C  
Emission guarantee: 10 mg/Nm³

**Contact FLSmidth today**

Discover the concrete savings and powerful emission reduction capabilities that the DuoClean DC2 or DC8 fabric filter can deliver to your plant. The filters offer advantages across the full supply chain – from design and manufacturing, transport and construction, to efficient filter operation and extended filter bag lifetime.

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