



CASE STUDY

viledon®

POTENTIAL ENERGY SAVINGS IN A CEMENT PLANT

Application

In cement plants with an annual production output of 5 million tons, there may easily be 1 million m³ of exhaust air per hour. The filter systems are usually fitted with bag filters, whose total filtering area comes to approx. 20,000 m². This means filtration constitutes a significant cost factor for a cement plant.

Starting situation

In a cement plant (capacity 6 million tons p.a.), the energy consumption in a cement mill was compared before and after a bag filter substitution. 330 needlefelt bags were replaced by Viledon® NEXX filter bags. The volume flow required is 45,000 m³/h.

The Viledon® solution

Viledon® NEXX filter bags are the next generation of surface filters with superlative advantages compared to conventional filters made of needlefelt. The lightweight NEXX media performs better and lasts significantly longer, which coupled with its low emissions, equates to a truly cost-effective alternative to traditional cement plant dust control. Because only Viledon® NEXX features the unique Evolon® technology. With NEXX bags in operation, the pressure drop in this system was downsized by 200 Pa, while simultaneously extending the filtration cycles and reducing the cleaning pressure (4 bar).

Result

Thanks to optimized filtration performance, the power consumption at the fan was reduced by almost € 4,400. Trouble-free cleaning of the NEXX microfilament medium not only saves on compressed-air consumption, but also prolongs the useful lifetime of the filter bags. Total cost savings thus add up to around € 6,100 a year.



Viledon® NEXX filter bags

Example: savings of around € 6,100 a year with Viledon®

CONVENTIONAL NEEDLEFELT BAGS	VILEDON® SYSTEM	
330 needlefelt bags, 560 g/m ² Ø 160 x 3,400 mm Volume flow: 45,000 m ³ /h	330 Viledon® NEXX filter bags, Ø 160 x 3,400 mm Volume flow: 45,000 m ³ /h	6,100 € / year cost savings with Viledon® Nexx
Power consumption 327,500 kWh / year	Power consumption 298,250 kWh / year	
Electricity costs* (327,500 kWh x 0.15 € / kWh) 49,125 €	Electricity costs* (298,250 kWh x 0.15 € / kWh) 44,738 €	4,387 € / year cost savings with Viledon® Nexx
Cleaning costs Cleaning pressure: 6 bar 1,109 € / year	Cleaning costs Cleaning pressure: 4 bar 396 € / year	713 € / year cost savings with Viledon® Nexx
Filter replacement costs 3,000 €	Filter replacement costs 2,000 €	1,000 € / year cost savings with Viledon® Nexx

* Electricity costs, industrial (0.15 € / kWh) Source: Confederation of the Energy and Water Industries, Status 2016

REDUCING EMISSIONS IN A CEMENT PLANT



Starting situation

In the 1950s, the dust emissions from cement production operations in Western Europe were approximately 3.5 kg per ton of cement. For a cement plant with a production output of 1 million tons, this means emissions of 3,500 tons a year. Nowadays, the plants are larger, and typical emissions for a 1.4-million-ton plant will be about 250 tons a year.

Technology

With the technologies currently available, emissions of under 20 mg/m³ are possible, and in modern plants of under 5 mg/m³. Meanwhile, the particle sizes are also taken into due account, since the very fine sizes, especially, are respirable.

In regard to the filter media involved, a distinction can now be made between four generations:

- 1st Generation**
simple fabric and needlefelt
- 2nd Generation**
optimized polymer media and glass-fiber media
- 3rd Generation**
membrane media
- 4th Generation**
composite materials (such as Viledon® NEXX)

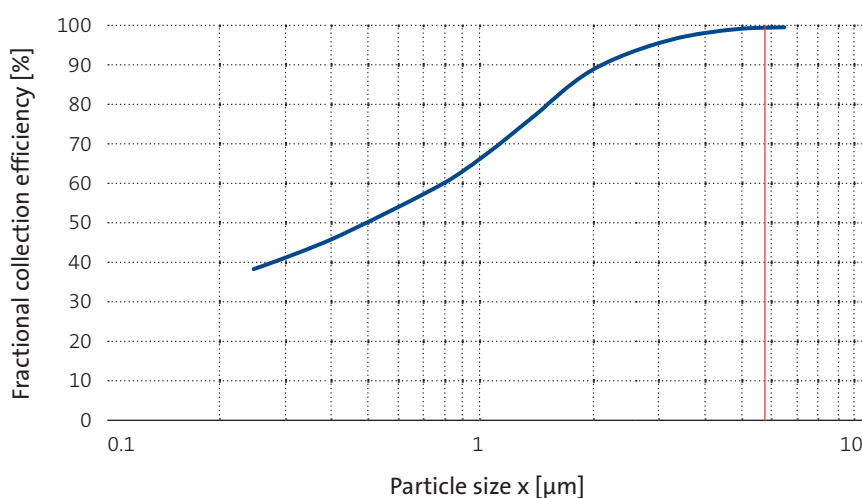
The Viledon® solution

The lightweight Viledon® NEXX composite materials constitute the fourth generation of surface filters, and offer superlative advantages compared to needlefelts with support fabrics and high weights per unit area. NEXX media made from the unique Evolon® material are stable and tough, are less mechanically stressed, last significantly longer, downsize the user's energy costs, and are resource-economical to produce. They achieve low emissions, enabling the clean-gas values to be sustainably reduced to less than 1 mg/m³. The initial collection efficiency for particles 5 µm in size is already at 99.99%.

Result

Besides compliance with environmental standards, the customer is now already meeting the upcoming fractional collection efficiency requirements (PM₁₀, PM₅, PM_{2.5} fine-dust loading). At the same time, valuable material is also recovered, and can then be re-used. Referenced to a cement mill with an exhaust air volume flow of 45,000 m³/h, instead of 2 tons emissions are now only max. 400 kg of cement a year.

Fractional collection efficiency NEXX filter medium without dust loading



— Viledon® Nexx

Air-to-cloth ratio
(ACR) = 1.1 m³/(m² × min)

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