viledon®

Freudenberg Filtration Technologies
Air Pollution Control
Sub-Saharan Africa




FREUDENBERG
FILTRATION TECHNOLOGIES

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Viledon® filter solutions

For customised dust removal concepts

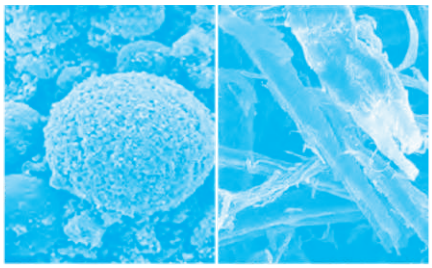
Technology Leader in Dust Extraction

In many industrial processes dust is generated. An example of this is the dust from smelter furnaces, material handling powders in foundries in the mining, steel and pharmaceutical industries, including welding fumes.

Depending on the material and the process, the concentration and the particle size and chemical composition of the dust can vary substantially. In addition the toxicity of the dust can differ. All this coupled by the temperature of the air extracted must be taken into account when selecting a suitable filtration system.

When dust is generated in industrial processes, it must be extracted at the source, as this dust is not only harmful to humans, but can damage machinery as it will penetrate into the motor, seals and bearings. As a result this will affect the process and the quality of the product. In many cases the dust particles have a monetary value and by recovering the dust, this can be processed again. It is also imperative that dust generated in industrial processes is not released into the atmosphere. Not only is this against the law, but is harmful to the environment. Therefore the importance of a reliable dust extraction and collection system cannot be underestimated.

This system would extract dust from the point of origin as well as that of airborne dust, then through a filtration process would separate the dust from the air. The air that is released is clean and the dust would either be recovered from self-cleaning cartridge filters or filter bags. This process is done through a reverse pulse filter system where automatic periodic pulsing releases the dust from the filters into a material handling system.



Not all dusts are alike:
SEM images reveal the differences.

Freudenberg is your one-stop shop in emission control systems. With years of experience in design to installation and commissioning of tailor made dust removal units, coupled with the technology of the Viledon® cartridge filter, the company is well equipped to undertake turnkey projects or retrofitting of existing systems.

Projects Management

The Freudenberg Projects department has a team of dedicated and experienced personnel. This, together with Freudenberg accredited installation crew and sub-contractors, are capable of any installation function be it mechanical, civil or electrical. This experience and partnerships enables this department to manage projects within stipulated timeframe.

CUSTOM-MADE EMISSION CONTROL UNITS

Freudenberg has a long track record as a manufacturer of dust extraction and dust control systems:

- Individual design and component selection to meet your requirements
- Fabrication, installation and commissioning
- Turn-key project management
- Supply of replacement cartridges and spare parts.

◦ Industries Serviced:

- Steel & Smelters
- Foundries
- Pharmaceutical
- Air Separation
- Chemical
- Pulp & Paper
- Petro Chemical
- Ceramic
- Medical
- Automotive
- F&B
- Power Generation
- Metal & Fabrication
- Mining
- Aviation
- Ship-Building
- Off-Shore

◦ Sectors in Industries Serviced:

- Paint Plants
- Manganese
- Arsenic
- Gold
- Diamonds
- Platinum
- Chrome
- Copper
- Cement
- Cobalt
- Fertilizer
- Zinc Oxide

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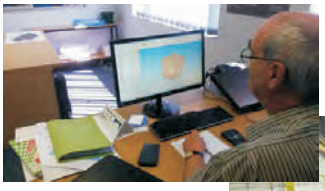
System Design , Manufacture, Delivery, Installation, Commissioning, Projects Management & Maintenance capabilities

System Design

The Freudenberg design and drawing office, makes use of 3D CAD software to generate state of the art models and fabrication drawings. With combined experience in excess of 175 years, Freudenberg is capable of designing and developing customized filtration solutions with world class precision.

Each system is designed and developed to suit individual customer requirements, site layout and production and factory circumstances.



Delivery

Transport to sites within South Africa, Namibia and Botswana is delivered by using:

- Freightliner Cat 515 horse with a specialized 15m long low bed trailer
- MAN ridged truck with 6m long draw-bar trailer
- Isuzu 5 Ton truck
- Isuzu 2 Ton truck

Maintenance

The in-house Freudenberg Service and Maintenance team will ensure optimal operation of all filtration systems to ensure that the customer receives the best possible service life from the installed filters and filter system as a whole.

Customer specific agreements and contracts ensure the best suitable, long term solution for each individual site and sytem.

Manufacture

Freudenberg builds on the longstanding relationship forged over the last 16 years with the country's leader in sheet metal manufacture.

Their experience in then industryn since 1971 is your guarantee of a world-class finished product, with the Freudenberg backing and assurance.

Manufacturing & Fabrication floor area of 350spm, 2 Fabrication bays of 40m long x 7m wide serviced with 5 ton overhead cranes with 6m hook height.

Epoxy powder coating facility with a floor area of 1000m² serviced with 5 ton overhead cranes with 6m hook height.

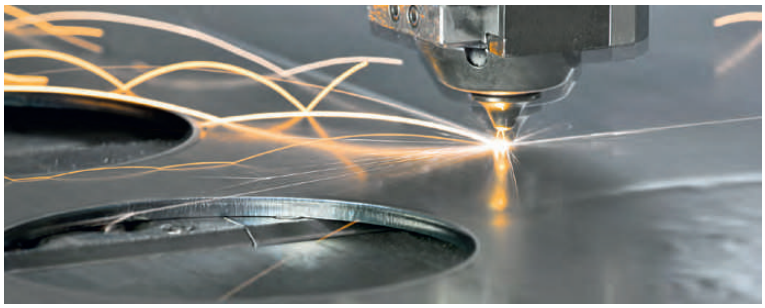
Making use of the latest state of the art 3D CAD software and the use of:

- 2 x CNC Turret Punch Presses,
- 2 x Laser Cutters, one of 6kW with 4.2m x 2.2m bed, the other of Fiber Optic CNC,
- CNC Press Brakes and CNC Band Saws,

Resulting in the best quality of cutting and bending.

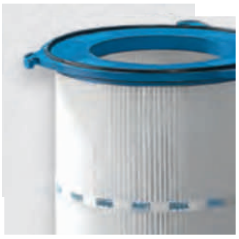
Viledon® filter cartridges
High performance. Long lifetimes.

In terms of shape, installation height, nominal diameter and pleat geometry, we match our Viledon® filter cartridges to your own particular requirements, to ensure you get precisely the solution you need.



Twist & Fix filter cartridges

High performance for any difficult dust removal job. A perfect fit and maximized protection for the filter medium, thanks to a centering collar. Patented spacer ribs on both sides ensure correct installation and an optimum seal against the system's raw-gas compartment. Fitted with a foamed-in seal on each side, Twist & Fix cartridges can be installed on both the raw and clean gas sides. They are available in all the geometries and versions customarily demanded by the market.



Snap & Fix filter cartridges

Bag filter or cartridge filter systems optimally equipped

This series of models snaps neatly into place and provides a perfect axial seal, without needing any additional aids such as metal sleeves or spring washers. Easy installation, requiring no tools, on the clean-gas side, without any elaborate screw-in procedures – just apply a bit of pressure and the patented snap hooks will engage.

PJR pulse-jet reflector

The application

Pulse-jet reflectors are available as an accessory and are the perfect match for filter cartridges. They improve air pressure behavior during the filtration operation by optimizing the intake of secondary air.

When using Viledon® filter cartridges and other commercially available filter cartridges with nominal diameters of 145, 155, 218, 324 and 327mm, these pressure surge reflectors can be easily attached with snap hook technology.

New: PJR327 now available for DIN cartridges.
Easy installation – simply insert them into the cartridge – Click & Fix.

DIN Standard filter cartridges

The market's customary dust removal systems are validated in the field

Maximised extraction performance coupled with low filter resistance, thanks to optimally combined selection of the appropriate filter material and pleat geometry. The synthetic filter material used has been IFA-tested (German Institute for Occupational Safety), and exhibits significantly more consistent qualitative excellence than conventional spunbonded nonwoven media. Residual dust content levels are complied with even when subjected to alternating loads during compressed air cleaning.

sinTexx Plus filter cartridges

High efficiency against smoke and fine dusts

Developed specifically for removing dust from fine smoke in welding, cutting and coating processes. The corrugated polyester medium with its nanofiber lining, offers numerous advantages compared to conventional, corrugated polyester material and to ePTFE membranes: higher collection efficiency right from the start, lower flow resistance, and elimination of initial precoating, which avoids the possibility of mistakes in handling. Available in all the usual Viledon® cartridge geometries.

energy efficiency
performance

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Viledon® filter bags

The right solution for each and every requirement

Viledon® filter bags are available in a multitude of sizes, lengths, models, and in different top and bottom section variants. Whatever the consistency of the dust involved, whether it's sticky or oily, then they can be pre-coated with appropriate efficacy. Whatever requirements you may have, we find the right filter concept for you.

Fiber Bags

Functionality validated many times over in the woodworking industry

In operation, these filter bags achieve high collection efficiency coupled with a low pressure drop, particularly when extracting fibrous dusts. They reach significantly lengthier useful lifetimes than conventional needlefelts, and possess very high abrasion-resistance. Using recycled polyester means enhanced economy with valuable resources.

NEXX Bags with Evolon technology

The next generation of surface filters

Definite advantages over conventional filters with needlefelt whereby dusts can be quickly and easily removed from the microfiber layer. Thanks to optimized filtration performance, there are savings in compressed air for cleaning and power consumption at the fan. Moreover: low emissions (sustained clean-gas values < 1 mg/m³) and 50 % less resources during production – for the same or even higher filtration performance.

Hi-NEXX Bags

The solution for maximized filtration performance

Hi-NEXX is a design enhancement of the Viledon® NEXX bags. An optimized production process, with even finer fibers on the filter's upstream side, ensures improved filter efficiency coupled with an extended lifetime. Clean-gas concentrations of < 1 mg/m³ can be maintained without any problems.

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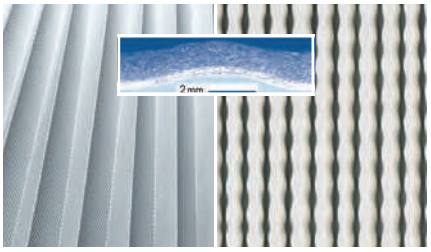
Filter Media & Accessories

The perfect compliment



Filter media for all applications

To ensure an affordably customised solution for your dust removal job, our product range includes high-performance filter media with unique characteristics created using patented production processes. Exclusive use of thermally bonded polyester and polypropylene nonwovens, produced with many different processes (staple-fiber, wet-laid and spun-bonded nonwovens), enables them to be responsively matched to ultra-stringent technical requirements.

Sinus-shaped corrugated filter media

Pleatable polyester filter media with a sinus-shaped cross-section and microfibers. Savings of up to 35% in energy costs are possible during operation. Why? Because the pleat corrugation significantly downsizes the pressure drop, and the material concerned, thanks to full-area thermal bonding, exhibiting a considerably smoother surface than linearly embossed spunbonded nonwovens. An advantage with beneficial effects on the cleaning behavior, which extends the useful lifetime and reduces the maintenance costs involved. The patented pleat stabilization feature is preserved even under the alternating loads of the filtration and cleaning phases. There is increase air flow rate through the filters since filter cartridges with sinus-shaped effective filtering area.

sinTexx Plus filter media

Viledon® sinTexx Plus media are a design enhancement of the corrugated Viledon® Sinus filter media, field validated by many years of actual operation, and now combined with an optimized surface coating made of nanofibers. Viledon® sinTexx Plus filter media outperform the media used previously with a higher collection efficiency right from the start, and substancially lower flow resistance, resulting in reduced power and compressed-air consumption and extended lifetimes for the filter cartridges.

Antistatic filter media

Various polyester or polypropylene nonwovens, finished with a patented raster print on both sides, applied by carbon suspension. The filter media provide high operational dependability without restricting the filter's performance. The antistatic effect is preserved even when arresting abrasive dusts or after being washed in accordance with the relevant instructions. DEKRA test reports confirming electrical surface and volume resistance of < 10^8 omh are on file.

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Some Success Stories

Smelter
Cartridge Filter Vacuum

Copper Smelter
High Temperature Bag
Filter Houses

Chemical Production
Cartridge Filter System

Gold Smelter
High Temperature Bag
Filter House

Glass Fiber Production
High Temperature
Bag Filter House

Foundry
Cartridge Filter System

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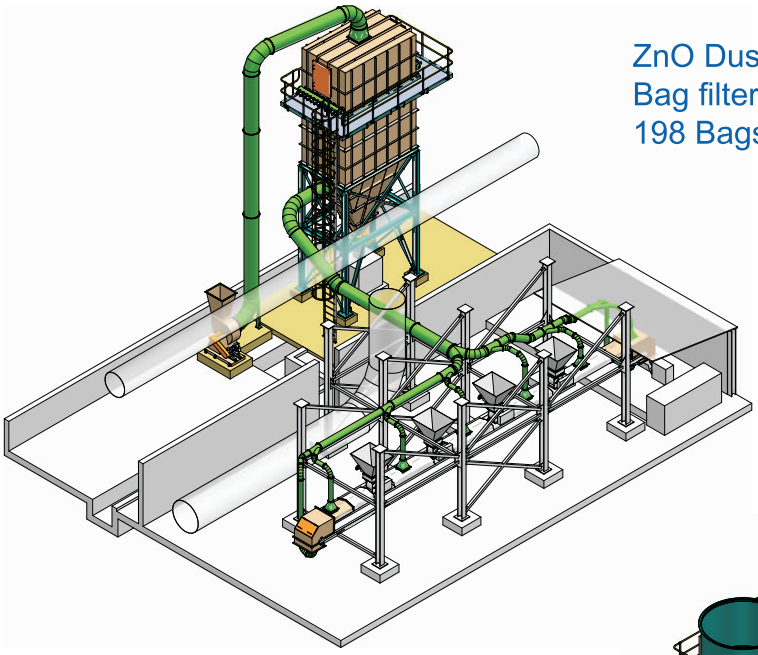
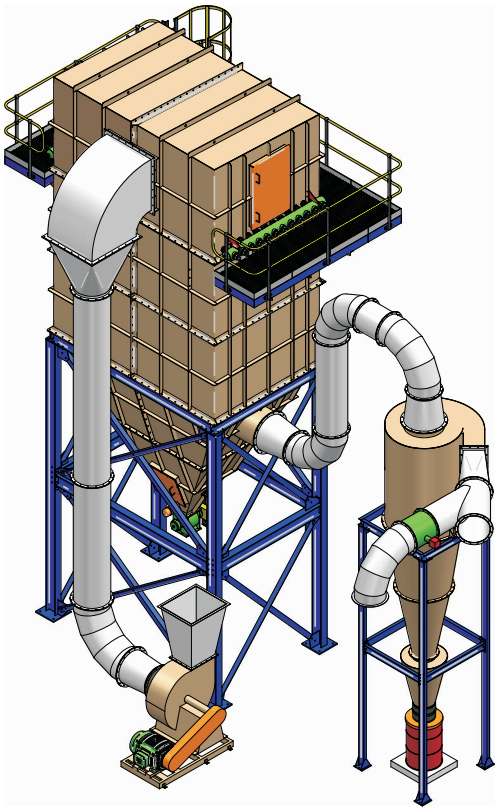
System Design & 3D Modeling



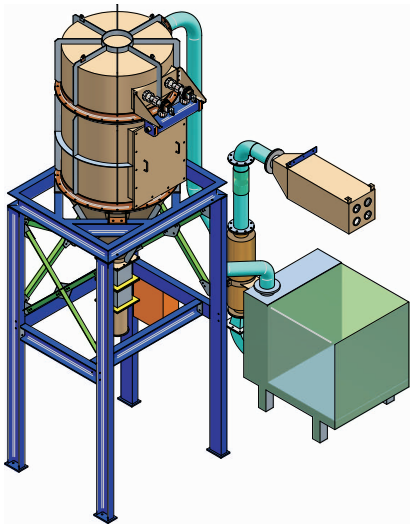
ZnO Dust extraction
Bag filter system
198 Bags

High Temperature
Bag Filter Unit
3600 Bags



Bag Filter unit &
Cyclone
216 Bags

Vacuum unit
6 Cartridge
Filters



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CASE STUDY

Potential energy savings in a cement plant

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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. 20,000m². 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 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.

Viledon®'s solution

Viledon® NEXX filter bags are the next generation of surface filters with excellent advantages compared to conventional filters made of needlefelt. The light weight 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 Evolong® technology.

With NEXX bags in operation, the pressure drop in this system was downsized by 200 P.a, while simultaneously extending the filtration cycles and reducing the cleaning pressure (4 bar).

Result

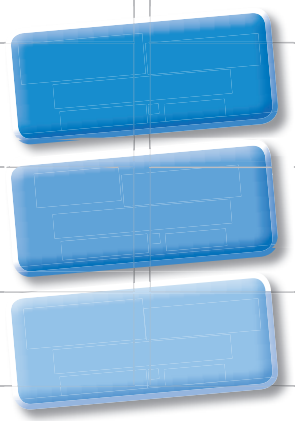
Thanks to optimized filtration performance, the power consumption at the fan was reduced by almost € 3, 000. Trouble-free cleaning of the NEXX micro-filament material not only saves on compressed air consumption, but also prolongs the useful lifetime of the filter bags. Total cost savings thus add up to around € 4, 400 a year.

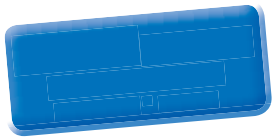
energy efficiency performance

BLUEcoMPETENCE Alliance Member
Partner of the Engineering Industry Sustainability Initiative

Example: savings of around 4,400 a year with Viledon® (approx. 10 / m³ / a)

330 needlefelt bags, 560 g/m² Ø 160 x 3,400 mm Volume flow: 45,000 m³ / h	*330 Viledon® NEXX filter bags, 240 g / m², Ø 160 x 3,400mm Volume flow: 45,000 m³ / h*
Conventional needlefelt bags	**Viledon® system**
Power consumption 327,500 kWh / year	Power consumption 298,250 kWh / year
Electricity costs* (327,500 kWh x 0.10 € / kWh) 32,750 €	Electricity costs* (298,250 kWh x 0.10 € / kWh) 29,825 €
Cleaning costs Cleaning pressure: 6 bar 739 € / year	Cleaning costs Cleaning pressure: 4 bar 264 € / year
Filter replacement costs 3,000 €	Filter replacement costs 2,000 €





The potential savings may differ widely from case to case, and need to be checked for each specific instance.

We'll be pleased to advise you!

* *Electricity costs, industrial (0.10 € / kWh) Source: Confederation of the Energy and Water Industries, Status2011*

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CASE STUDY

Reducing emissions in a cement plant

NEXX

Starting situation

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

Technology

With the technologies currently available, emissions of under 20mg/m^3 are possible, and in modern plants of under 5 mg/m^3. Meanwhile, the particle sizes are also taken into account, because very fine sizes are inhaled particles.

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

1st generation
simple fabric and needlefelt

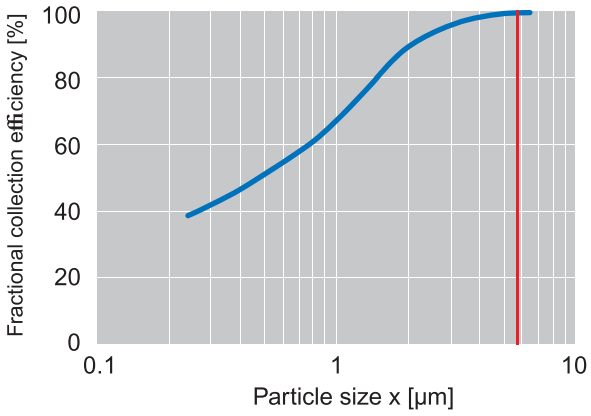
2nd generation
optimized polymer media and glass-fiber media

3rd generation
membrane media

4th generation
composite materials
(such as Viledon® NEXX)

Fractional collection efficiency
NEXX filter medium without dust loading

Air-to-cloth ratio (ACR) = 1.1 m^3/(m^{2}xmin)
NEXX



Viledon®'s solution

The lightweight Viledon® NEXX composite materials constitute the fourth generation of surface filters, and offer unparalleled advantages compared to needlefelts with support fabrics and high weights per unit area. NEXX media are made from the unique Evolong® materials are stable and tough, 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 substantially 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, PM2.5 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 m^3/h, instead of 2 tons emmisions, there are now only a max. 400 kg of cement a year.

Notes:

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