

## Viledon® sinTexx Plus – The new milestone in Air Pollution Control

Welding, cutting, grinding, polishing and coating of metals and surfaces are an integral part of the production process across many industrial sectors involving metallic and synthetic material manufacturing. Emissions generated from these processes need to be collected at source in order to protect the immediate workforce from potentially hazardous substances as well as maintain defined environmental particulate emission limits.

In addition to optimised particulate collection efficiency and workplace safety, the ability of the dust & fume collector to operate with the greatest energy efficiency is also a critical factor in today's economic climate.

For many years filter cartridges manufactured from the Freudenberg Filtration Technologie's Viledon® Sinus media have been proven to offer outstanding particulate collection and de-dusting performance in applications such as welding, thermal cutting and surface coating applications.

Historically this type of polyester media cartridge has required pre-coating using a specially designed 'one time coat pre-coat' powder prior to the media initially seeing any contact with particulate. Following the documented safe pre-coating procedure, results in permanent fiber and filter surface protection.

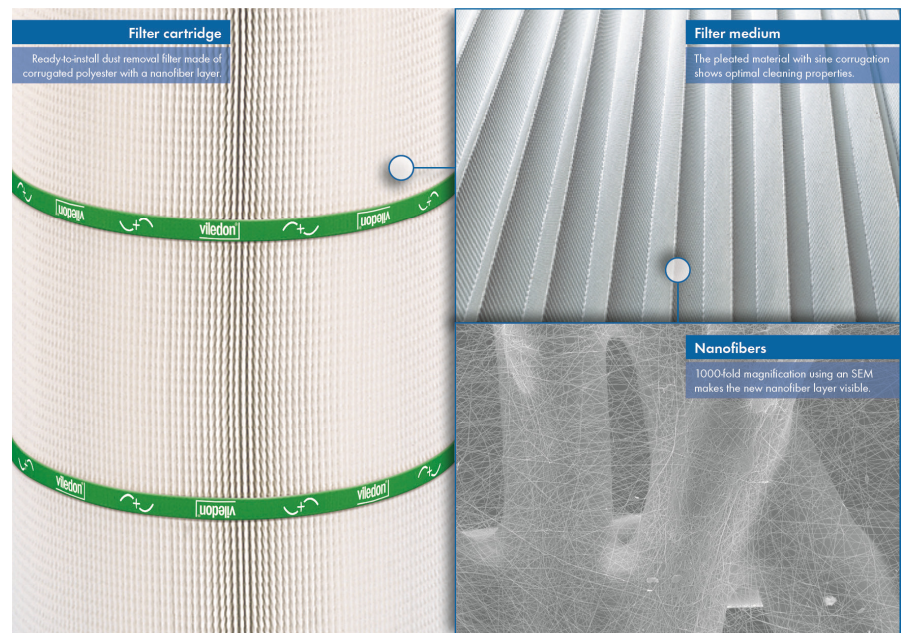
This additional protection is particularly effective with fine and sticky, types of dust by ensuring that the filter material pores and surfaces are not irreversibly blinded.

In practice the initial pre-coating procedure is often completely forgotten or ends up being incorrectly applied as far as Viledon's written procedures are concerned. When the dust fraction has a 90 % of its particle size smaller than 1 µm, a rapid increase in unstable pressure drop will result. Additional consequences are reduced system design flow rates, elevated emissions and ineffective collection of the workplace emission. In order to get over this situation, the fan speed, motor drive or the size of the actual fan can be increased resulting in greater energy consumption than the original system design allowed for. Premature filter failure, higher maintenance costs and increased compressed air consumption also need to be factored in to the new operational cost.

Difficult dusts are sometimes tackled using filter cartridges equipped with ePTFE membranes. These membranes do not need to undergo an initial pre-coat application to work effectively, however ePTFE membranes have a high initial cost and low operating pressure drops are not guaranteed.

Freudenberg Filtration Technologies has sought to address the operational issues of fine difficult dust and fume types by developing a totally new filter media that has the following properties:

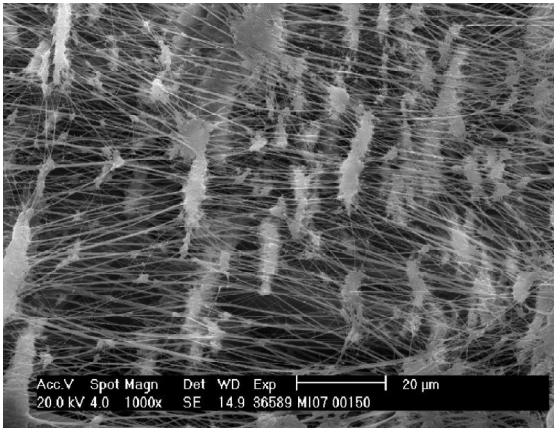
- High particle collection efficiency for small dust and fume particles ensuring both workplace exposure and environmental emissions limits are met.
- That high initial filter efficiency is available from the first moment the filter surface see's dust. All virgin dust removal filter media have a reduced filtering efficiency until 'Seasoned' which may mean the filters are working below specification until 'normal operation' is achieved.
- Significantly lower operational pressure drop. Lower pressure drop filter cartridges will result in energy cost savings, reduced compressed air consumption, longer filter life time, lower maintenance costs and reduced production downtimes.
- Initial Pre-coating elimination, thereby making the dust collector commissioning easier and site friendly.



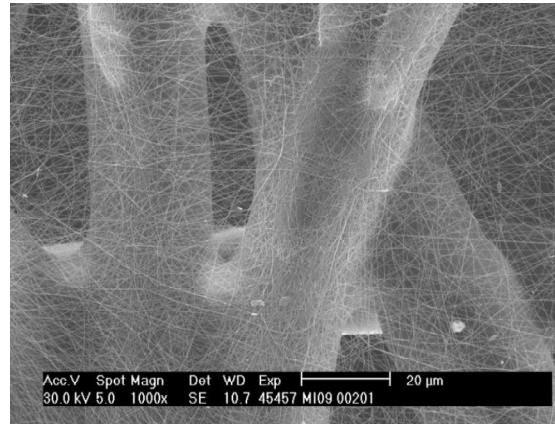
- e) Having all the operational advantages of the well-proven Viledon® Sinus corrugated polyester filter material, with the optimized surface coating comprising real nano fibers.

The tried and tested expensive ePTFE membranes are produced using a special plastic film lamination procedure resulting in pores with small diameters with an elongated orientation. Although the small pores provide efficient particle retention there are areas within the membrane structure which are now impermeable to air and hence a reduced filter area results.

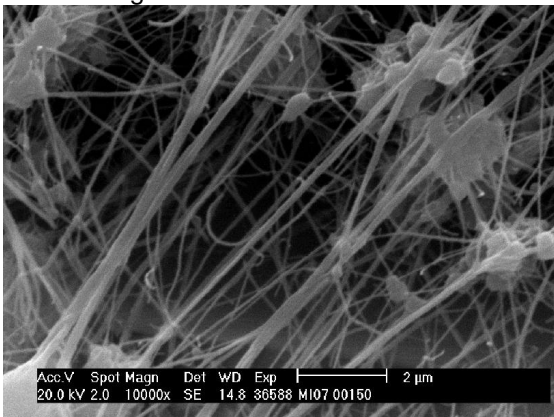
Picture 1 shows a Scanning Electron Micrograph (SEM) of an ePTFE membrane surface in 1000 times magnification. Compared to this Picture 2 shows a SEM of Freudenberg Filtration Technologies new filter material **Viledon® sinTexx Plus** at the same scale.



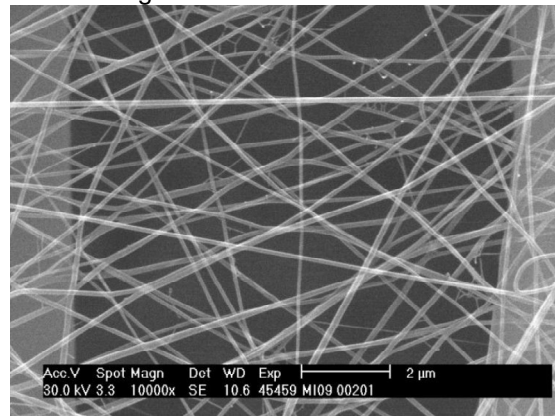
Pic. 1: ePTFE membrane at 1.000 times Magnification



Pic. 2: Viledon® sinTexx Plus at 1.000 times magnification



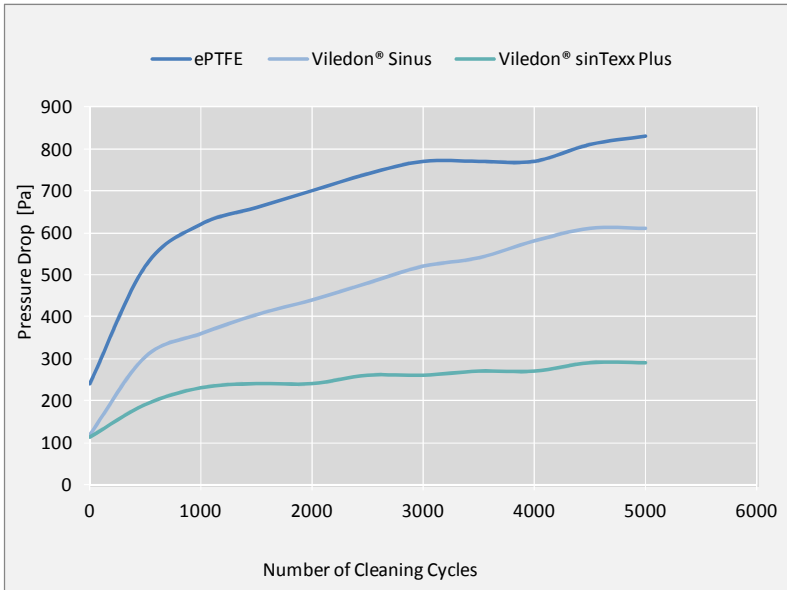
Pic. 3: ePTFE membrane at 10.000 times Magnification



Pic. 4: Viledon® sinTexx Plus at 10.000 times magnification

Picture 3 and 4 show SEM pictures at 10.000 times magnification. It is obvious that **Viledon® sinTexx Plus** shows a homogeneous pore structure with largest possible and permeable filter area. There are no non-permeable regions as ePTFE membranes show.

Laboratory experiments and field test were carried out with the purpose of directly comparing ePTFE membranes and Freudenberg Filtration Technologies proven Viledon® Sinus and the new **Viledon® sinTexx Plus** medias. Filter cartridges with the same geometry, Ø324 mm, length 600 mm and 10 m<sup>2</sup> filter area with identical pleat geometries were tested in extreme filtration conditions with the same parameters. Picture 5 shows the filtration test results at a face velocity of 0,5 m<sup>3</sup>/m<sup>2</sup>/min, raw gas dust concentration 2.000 mg/m<sup>3</sup> (limestone fine fraction) and cleaning cycle time of 5 s. Compared to ePTFE membranes **Viledon® sinTexx Plus** shows the same very low clean gas concentration from the very beginning but a significant lower operating pressure drop.



Pic. 5: Pressure drop development in filtration operation under extreme conditions

**Viledon® sinTexx Plus** shows a significantly better filtration and cleaning performance compared with Viledon® Sinus and ePTFE membranes. The overall pressure drop is much lower and ends up at appr. 40 % of PTFE membrane's pressure drop values. The use of **Viledon® sinTexx Plus** yields a potentially substantial energy cost savings. The consequences of these results mean that the filter unit designer can achieve significant cost savings by applying smaller kW motors, cheaper fans or smaller footprint filter units with reduced total volume.

Several field tests in various applications have proven that the new **Viledon® sinTexx Plus** based on a corrugated substrate is a milestone in the containment of difficult to handle particles such as ultra fine dust and fume.

Successful field applications include a flame spraying application formally equipped with pre-coated Viledon® Sinus cartridges. The metallic spray consisted of zinc and tin mixtures (ratios 90/10 and 50/50) where after only a few weeks of operation, pressure drops above 3.500 Pa were exhibited. The filter unit was re-equipped with the new **Viledon® sinTexx Plus** filter cartridges, and even without any pre-coating the filter cartridges have continued to operate for more than 28 months at pressure drops around 2.000 Pa.

In addition to the long filter lifetime there is an additional cost saving effect due to improved energy efficiency. Based on the real operating conditions, a cost calculation of the flame spraying dust collector equipped with 12 x 20 m<sup>2</sup> filter area cartridges at a flow rate of 10.000 m<sup>3</sup>/h, reduced energy costs by 4.300 €/year.

Freudenberg Filtration Technologies offers a new filter material **Viledon® sinTexx Plus** available in all standard filter cartridge geometries for fine and difficult to handle dusts. This new innovation in dust control technology really does provide long lifecycles, excellent filtration efficiency and energy efficient operation with low operating costs.

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