

THE WORLD LEADER IN CLEAN AIR SOLUTIONS

Nelior® Filtration Technology

Improved ePTFE Technology for
Pharmaceutical and BioSafety Cabinet Applications

TECHNOTE

Nelior® Filtration Technology - Latest Advancement in High-End Air Filtration

Unmatched by any other air filtration media, Nelior Filtration Technology is based on a patent-pending membrane air filtration medium. With a unique set of performance characteristics, the technology is an excellent solution to the challenges seen in the pharmaceutical and biotech industries. Nelior Technology is polymer-based which allows for a thinner, more durable filter media than ultrafine microglass media. The results are reduced operational risk and lower energy consumption.



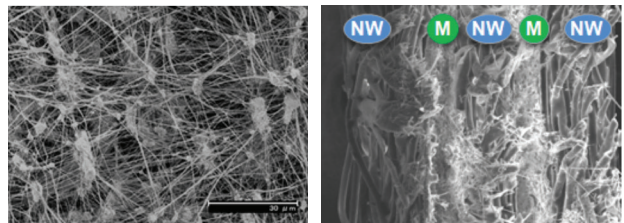
VITCAcel® mini-pleat HEPA filter with Nelior® membrane media.

HEPA Filter Integrity Testing

The purpose of installed HEPA filter integrity testing, also called in-situ testing, is to confirm a flawless performance during normal operation. With AAF's new Nelior Filtration Technology, filters can now be scan tested with the industry standard photometer at the standard aerosol concentrations set forward, as well as the low-aerosol concentration, Discrete Particle Counter (DPC) method.

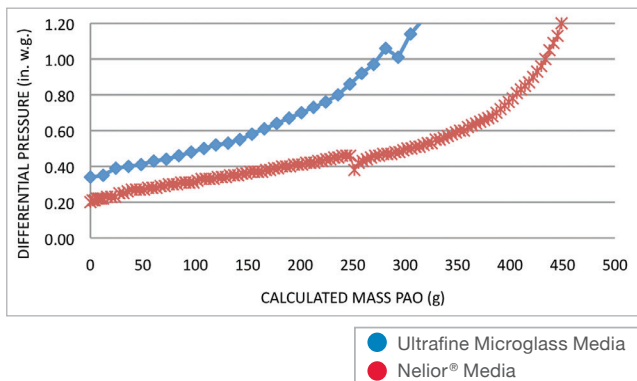
The Nelior membrane has larger fibrils and increased void volume to allow for particles and testing aerosols to collect on the membrane without blinding air pathways. To maintain the filter's high efficiency rating while increasing the void volume, the Nelior membrane media thickness is five times greater than traditional ePTFE membranes. Additionally, Nelior media uses two ePTFE membranes.

Nelior® Media



SEM Image of Surface View (x5000) SEM Image of Edge View (x1000)

M Membrane **NW** Nonwoven



BETTER AIR IS OUR BUSINESS®

Nelior® Filtration Technology

Reduce Operational Risk

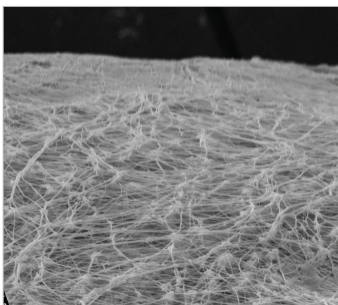
The pharmaceutical industry estimates that 77% of production downtime can be attributed to failures of equipment and environmental problems. This downtime can be attributed to HEPA filters failing. Traditional HEPA filters typically fail due to some form of contact combined with the poor mechanical strength of the filter. The actions required when these failures occur include repairing/replacing the HEPA filter, certifying the repair or new installation, investigating potentially contaminated product, and filing FDA paperwork.

Improved Durability

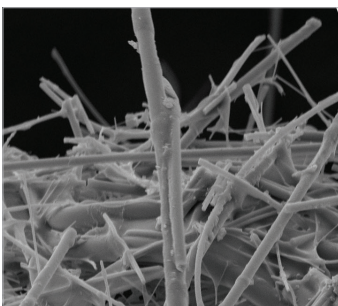
Independent tests have shown that AAF HEPA filters with Nelior membrane media have superior mechanical strength over traditional ultrafine microglass media.

The superior mechanical strength is demonstrated by a high tensile strength, burst pressure, and abrasion resistance. Nelior membrane media retains its integrity with a high resistance to any potential damage, such as mishaps in handling or installation. This means that the risk of filter media failure is minimized and that fiber shedding, which could cause contamination when entering the airstream, is eliminated.

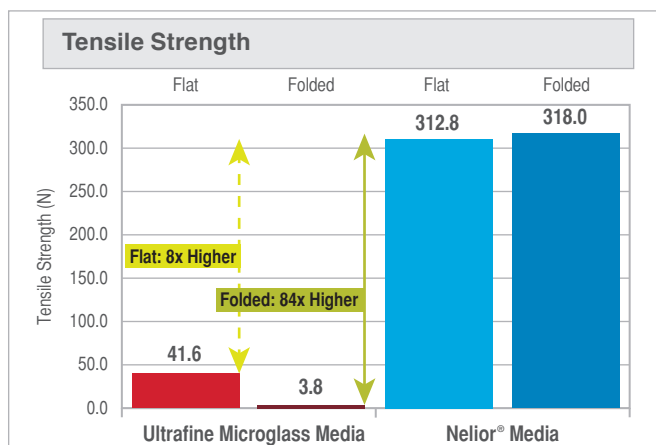
As a result, there is a decreased probability of contaminants entering cleanroom environments. Protection of sterile products and cleanroom personnel is optimized. Critical applications are given the possibility to improve their quality risk management systems for a consistent supply of quality products and a reduction of failure costs.



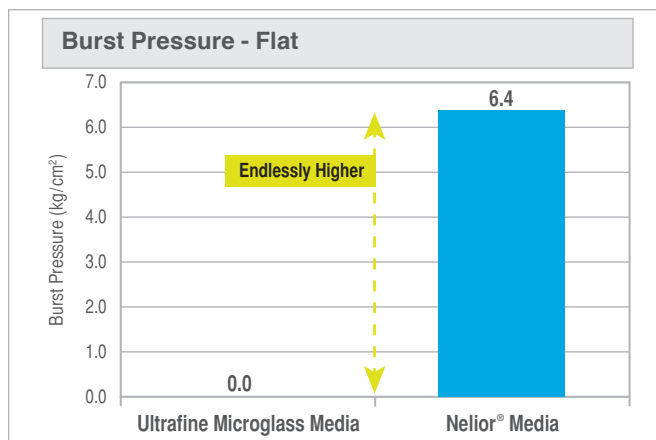
Resilient Nelior® media at fold tip @ 10,000x magnification.



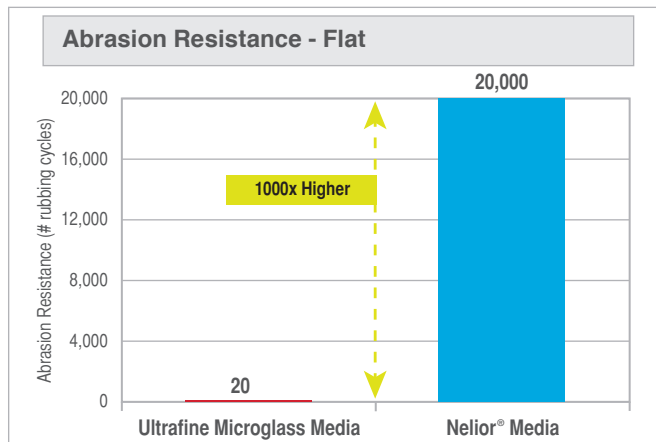
Fractured ultrafine microglass media fibers at fold tip @ 10,000x magnification.



Results based on Test Standard DIN EN 29073-3.



Results based on Test Standard DIN EN 13938-2.



Results based on Test Standard DIN EN 12947-2.

Nelior® Filtration Technology

Improved Chemical Properties

High Corrosion Resistance

Nelior membrane media is proven to be resistant in highly corrosive environments and will withstand attacks from common sterilizing chemicals such as hydrogen peroxide, formaldehyde, and chlorine dioxide. Both components of the Nelior membrane media, the membrane and non woven layers are stable against exposure at the prescribed time and concentration for the above disinfectant agents.

Superior Water Resistance

Based on AAF's test lab results, Nelior membrane media provides superior water resistance in comparison with ultrafine microglass media.

Negligible Off-Gassing

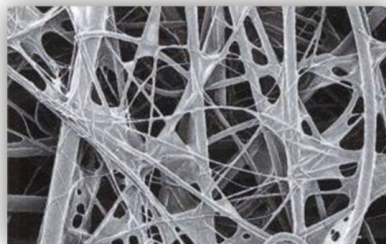
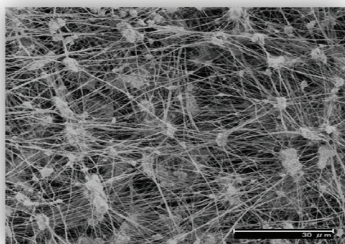
Nelior membrane media has near zero off-gassing of chemical components resulting in the highest quality clean air available.



Nelior® Media

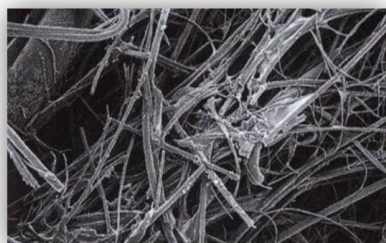
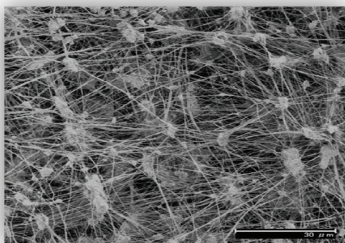
**Ultrafine
Microglass Media**

BEFORE



AFTER

Damage after use of Hydrogen Peroxide (H₂O₂) for cleanroom sterilization.



SEM photos at 5,000x magnification.

Nelior® Filtration Technology

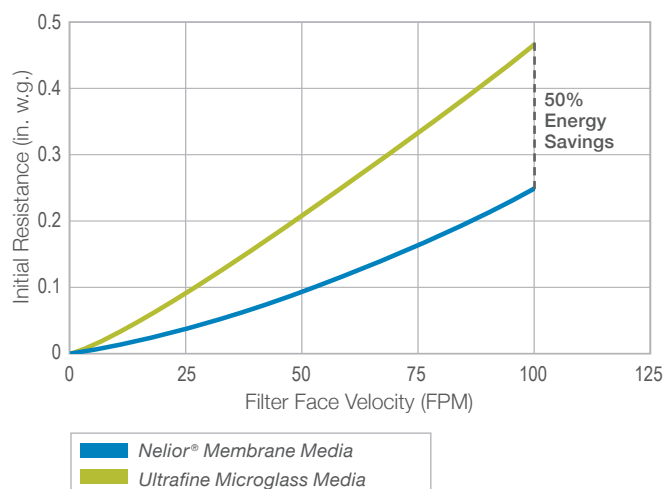
Lower Energy Consumption

Estimates show that up to 50% of a facilities energy consumption is used on heating, cooling, and air handling. With increasing utility prices and peak power billing plans, lowering energy consumption is a key initiative.

HEPA filters with Nelior membrane media feature a lower pressure drop than traditional ultrafine microglass media, up to 50% lower depending on the exact conditions. At the same time, the overall filtration efficiency for Nelior membrane media has proven to be higher than for ultrafine microglass media. The lower pressure drop and improved efficiency are achieved from an evenly distributed layer of fibers with very fine nanometer-scale diameters. Air molecules can efficiently pass through the fibers and airborne particles can be captured more easily. The result: air quality is optimized and energy costs are substantially reduced.

Performance Data

Initial Resistance vs. Filter Face Velocity



99.99% HEPA Filter, 50mm Packs

Availability

Nelior Filtration Technology is available in various styles of filters, including gel seal or gasket seal and plenum style of terminal module style.

Energy Savings Calculation

Average Pressure Drop

Nelior media	0.25 in. w.g. (62 Pa)
Ultrafine microglass media	0.47 in. w.g. (117 Pa)

Airflow Rate

100 FPM – 0.5 m/sec

Annual Energy Consumption

Nelior media	285 kWh
Ultrafine microglass media	535 kWh
Δ Savings	250 kWh

Annual Savings

250 kWh = **\$20.00** / filter

Based on a national average of **\$0.08** kWh.



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AAF has a policy of continuous product research and improvement and reserves the right to change design and specifications without notice.

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