



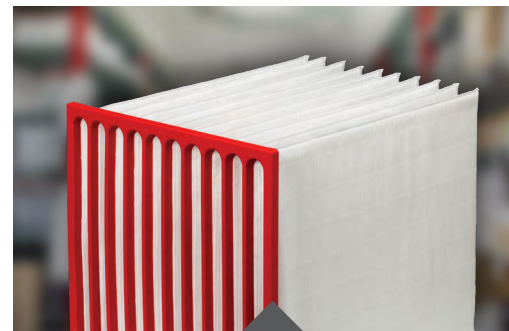
Product Quick Reference Guide



Technical Guidance



Solutions



Products

Bringing clean air to life.™

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Classifying Air Filters

Measuring Real Life – ISO 16890 replaces EN779:2012

ISO International Standards Organization issues a new standard for filter testing and rating

 <p>ISO coarse</p>	 <p>ISO ePM₁₀</p>	 <p>ISO ePM_{2,5}</p>	 <p>ISO ePM₁</p>
<p>ISO coarse – filters allocated to this range capture less than 50% of PM10 particles.</p>	<p>PM10 – Refers to the particle size fraction in the range from 0,3 µm up to 10 µm.</p>	<p>PM2,5 – Refers to the particle size fraction in the range from 0,3 µm up to 2,5 µm.</p>	<p>PM1 – Refers to the particle size fraction in the range from 0,3 µm up to 1 µm.</p>

The precise definition of PM10, PM2,5 and PM1 is quite complex and not simple to measure. Public authorities, like the US EPA or the German Federal Environmental Agency (Umweltbundesamt), increasingly use in their publications the simpler denotation of PM10 as being the particle size fraction less or equal to 10 µm. Since this deviation to the above-mentioned complex "official" definition does not have a significant impact on a filter elements particle removal efficiency, the ISO 16890 documents refer to this simplified definition of PM10, PM2,5 and PM1.

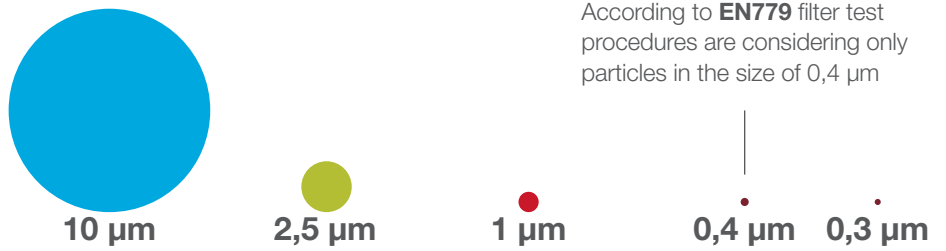
More Than Logic— ISO 16890 Measures Reality!

The world's leading health-related organizations consider PM10, PM2,5 and PM1 fine dust fractions as the most important and dangerous for humans. Their official documentation to the public always refers to these PM levels.

It is more than logic that filter test methods and classifications follow this approach to demonstrate filtration performance towards the most harmful fine dusts.

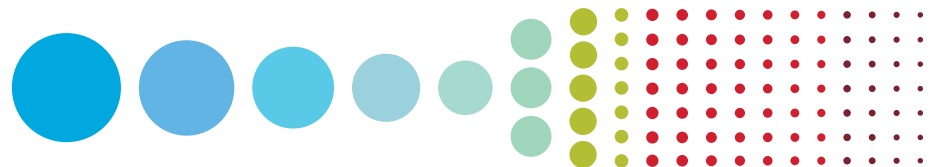


The Main Difference Between EN779 and the ISO 16890



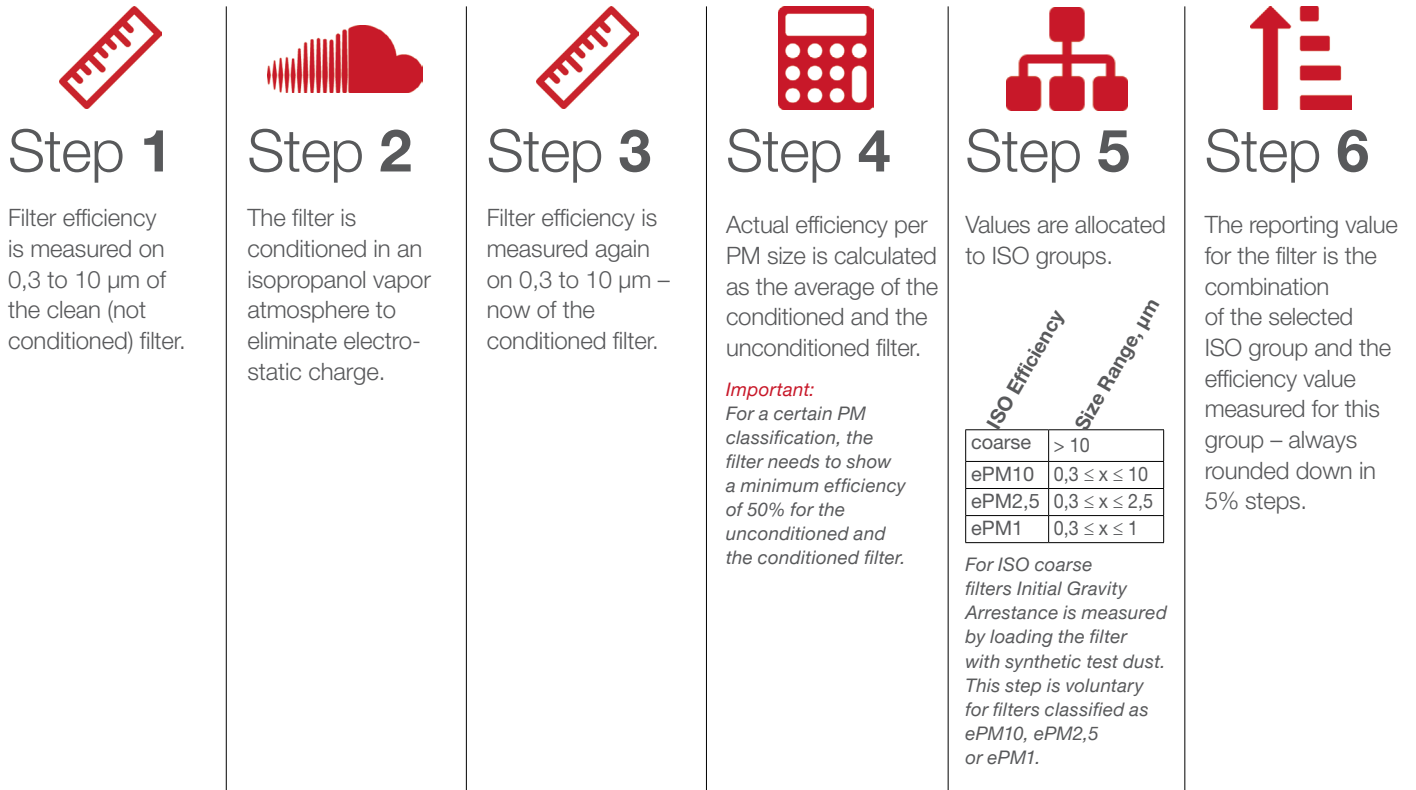
Due to their Harmfulness, Permanence, and Frequency, Particles Smaller or Equal to 1µm Need the Most Attention!

The lighter and smaller a particle is, the longer it stays in the air.



Particles smaller than **1 micron** contribute only a few % to the mass, at the same time contributing to **over 90% of the numbers**.

ISO 16890 Testing and Classification Procedure



Example:

A filter shows the following average efficiency values:

Efficiency class	Value
ISO ePM ₁₀	89%
ISO ePM _{2,5}	63%
ISO ePM ₁	49%

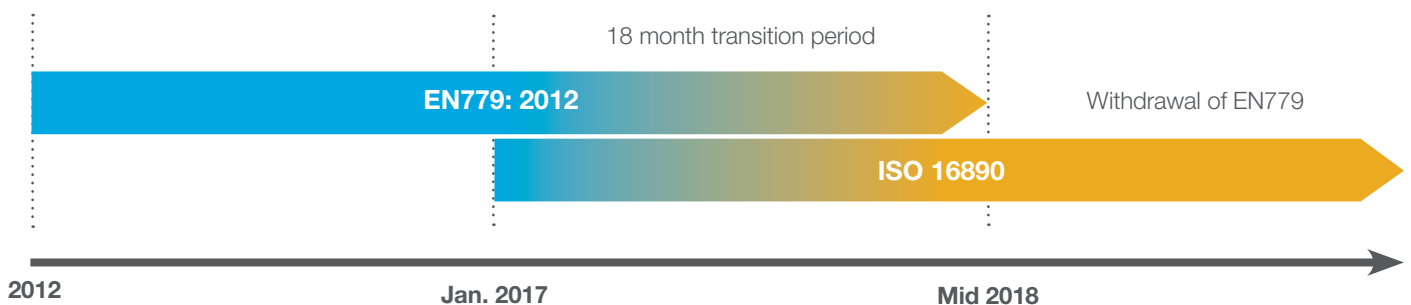
- Minimum efficiency of 50% is achieved for ISO ePM₁₀ and ISO ePM_{2,5} – but only 49% for ISO ePM₁, which is not fulfilled.
- Possible ISO groups are therefore ISO ePM_{2,5} and ISO ePM₁₀.
- If, for example, ISO ePM_{2,5} group is selected, value of 63% is rounded down to 60%.

As a result, the filter is classified as:

Classification
ISO ePM_{2,5} 60%

Meaning this filter is able to capture 60% of the particles smaller or equal to 2,5 micron!

ISO 16890 Timeline



Classifying Air Filters

EN1822:2009

To ensure the highest levels of air purity, pharmaceutical processes need to rely on high efficiency particulate air filters as terminal filter. These air filters are subject to classification according to the European EN1822:2009 standard.

EN1822:2009 distinguishes between eight filter classes, which are distributed over three filter groups; EPA, HEPA and ULPA.

EN1822:2009 filter groups	
Group E:	EPA (Efficient Particulate Air filter)
Group H:	HEPA (High Efficiency Particulate Air filter)
Group U:	ULPA (Ultra Low Penetration Air filter)

Air filter classification according to EN1822:2009				
Filter class	Integral Value		Local Value	
	Efficiency %	Penetration %	Efficiency %	Penetration %
E10	≥ 85	≤ 15	–	–
E11	≥ 95	≤ 5	–	–
E12	≥ 99,5	≤ 0,5	–	–
H13	≥ 99,95	≤ 0,05	≥ 99,75	≤ 0,25
H14	≥ 99,995	≤ 0,005	≥ 99,975	≤ 0,025
U15	≥ 99,9995	≤ 0,0005	≥ 99,9975	≤ 0,0025
U16	≥ 99,99995	≤ 0,00005	≥ 99,99975	≤ 0,00025
U17	≥ 99,999995	≤ 0,000005	≥ 99,9999	≤ 0,0001

Testing Capabilities of AAF

All HEPA and ULPA filters produced by AAF are tested in an ISO 7 cleanroom environment with full compliance to the EN1822:2009 standard. In a modern EN1822 test rig, each air filter is individually tested before shipment to the customer.

HEPA and ULPA filters are leak tested by using a DEHS aerosol. The test results are documented in a test report that is supplied with each individual HEPA or ULPA filter. It gives full information about the tested air filter, test parameters (airflow, test method and aerosol) and the test results according to EN1822:2009. Air filter labels include the identification of the air filter type, a serial number for full traceability, the test standard used, the filter class according to EN1822:2009 and the nominal airflow rate at which the air filter has been classified.

Strict quality procedures ensure that all HEPA and ULPA filters leaving the AAF factory are leak-free, perform according to applicable standards and are consistent with the individual customer requirements.

EN1822:2009 establishes a procedure for determining the filtration performance according to the efficiency of MPPS (Most Penetrating Particle Size) particles. It provides a standardized classification of these air filters on the basis of their integral value (for EPA) or their integral value and local value (for HEPA and ULPA).

EN1822-3:2009 governs the determination of the efficiency of a flat sheet of media for a range of particle sizes at nominal velocity. From the generated efficiency versus particle size curve, the MPPS is established. The MPPS differs per media type and air velocity applied. In EN1822-4:2009, the individual testing of filter elements of groups H and U is described for absence of leaks at their nominal airflow rate (leaks are specified as maximum allowable local penetration at the MPPS and must not exceed 5 times the overall penetration). Filter elements of group H are leak tested using an aerosol probe or alternatively a visual oil thread leak test method. Filter elements belonging to group U are leak tested using an MPPS scanning method with a particle counter probe. How to measure the overall efficiency of a filter element at its nominal airflow rate, using the MPPS test aerosol, is defined in EN1822-5:2009. For air filters of groups H and U, this has to be done on each individual filter element.



Air Filter Classification According to IEST-RP-CC001

Table 3: Recommended Test and Minimum Rating for Filters Types A Through K.

Filter Type	Penetration Test		Last (Scan) Test ¹			Minimum Efficiency Rating	Designated Leak Penetration
	Method	Aerosol	Method	Aerosol	Comments		
HEPA (type A)	MIL-STD-282	Thermal DOP	None	None		99.97%	n/a
HEPA (type B)	MIL-STD-282	Thermal DOP	None	None	Two-flow leak test	99.97%	n/a
HEPA (type C) ¹	MIL-STD-282	Thermal DOP	Photometer	Polydisperse DOP/PAO		99.99%	0.010%
HEPA (type D) ¹	MIL-STD-282	Thermal DOP	Photometer	Polydisperse DOP/PAO		99.999%	0.0050%
HEPA (type E) ¹	MIL-STD-282	Thermal DOP	None	None	Two-flow	99.97%	n/a
HEPA (type F) ¹	IEST-RP-CC007	Open	Particle Counter	Open		99.9995% at 0.1-0.2 or 0.2-0.3 µm	0.00250%
HEPA (type G) ¹	IEST-RP-CC007 ²	Open	Particle Counter	Open		99.9999% at 0.1-0.2 or 0.2-0.3 µm	0.0010%
HEPA (type H) ¹	IEST-RP-CC007	Open	None	None		99.97% at 0.1-0.2 or 0.2-0.3 µm	n/a
HEPA (type I) ¹	IEST-RP-CC007	Open	None	Open	Two-flow leak test	99.97% at 0.1-0.2 or 0.2-0.3 µm	n/a
HEPA (type J) ¹	IEST-RP-CC007	Open	Particle Counter or Photometer	Polydisperse DOP/PAO		99.99% at 0.1-0.2 or 0.2-0.3 µm	0.010%
HEPA (type K) ¹	IEST-RP-CC007	Open	Particle Counter Photometer	Polydisperse DOP/PAO		99.995% at 0.1-0.2 or 0.2-0.3 µm	0.0080%

¹Either of the two scan test methods or an alternative method may be used for filter types C, D, F, and agreed. Designated leak details for these filter types are given in IEST-RP-CC034.

²Filter medium tested at most-penetrating particle size (MPPS) prior to filter assembly. All filters are leak-tested but in some instances may not be tested for overall penetration. The MPPS for testing this filter type is determined from the media according to IEST-RP-CC021.

Testing Capabilities of AAF

All HEPA and ULPA filters produced by AAF are built in an ISO 7 cleanroom environment and tested in an ISO 4 cleanroom with full compliance to IEST standards. In a modern test rig, each air filter is individually tested by well-trained AAF personnel before shipment to the customer.

HEPA and ULPA filters are leak tested using a challenge aerosol. The test results are documented in a test report for each individual HEPA or ULPA filter. This report gives full information about the tested air filter, test parameters (airflow, test method and aerosol), and the test results according to IEST-RP-CC001, and are available for every filter when requested. Air filter labels include the identification of the air filter type, a serial number for full traceability, the test standard used, the filter class, and the nominal airflow rate at which the air filter has been classified.

Strict quality procedures ensure that all HEPA and ULPA filters leaving the AAF factory are leak-free, perform according to applicable standards, and are consistent with the individual customer requirements.

Filters that meet the requirements of IEST-RP-CC001 are suitable for use in clean air devices and cleanrooms that fall within the scope of ISO 14644, and for use in supply air and contaminated exhaust systems that require extremely high filter efficiency (99,97% or higher) for submicrometer (µm) particles. IEST-RP-CC001 describes 11 levels of filter performance and six grades of filter construction. The level of performance and grade of construction required should be specified. The filter efficiency required should also be specified if it is not covered by the performance level specified in this RP (Table 3).



Next-Generation Monitoring and Management Tool

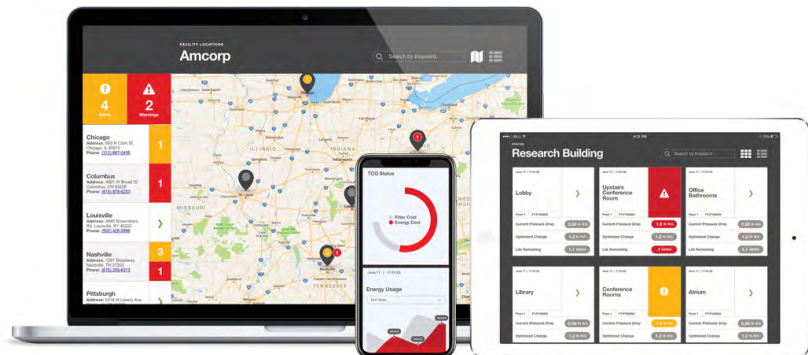
- First IoT (Internet of Things) patented technology platform to demonstrate effectiveness of building's filtration system by monitoring particulate levels
- Monitors pressure drop to determine filter change-out point that offers the best value and energy efficiency
- Battery-powered sensors measure particulate concentration in both unfiltered air and indoor air, and communicate values to a mobile/tablet/computer app
- Sensors send alert to app when particulate levels are at an unacceptable concentration level, so that IAQ issues can be resolved quickly
- App can be customized with user defined alerts
- Lobby kiosks display both indoor and outdoor air particulate levels for building occupants
- App immediately alerts facility managers that particulate levels are at an unacceptable concentration, enabling them to resolve issues quickly
- Cross platform capability – PC, tablet, or smartphone

Sensor360 - Enables You to Understand and Plan Air Filter Performance and Maintenance in Entirely New Way

Poor Indoor Air Quality (IAQ) ranks as one of the top five environmental risks to public health. The Sensor360 tool helps facility managers solve this problem by monitoring their building's indoor air, offering instantaneous monitoring of a filter system's performance and automatically tracking pressure drop and PM1, PM 2.5, and PM10 particulate levels.



This device gives the user the ability to resolve potential indoor air quality issues before they negatively affect building occupants. Building occupants will also have clarity regarding the quality of air that they are breathing. With Sensor360, the user can optimize preventive maintenance scheduling, decrease deferred maintenance, save money, reduce risk, and gain time. No other tool in the current marketplace gives this level of clarity and specificity regarding filter performance and IAQ.

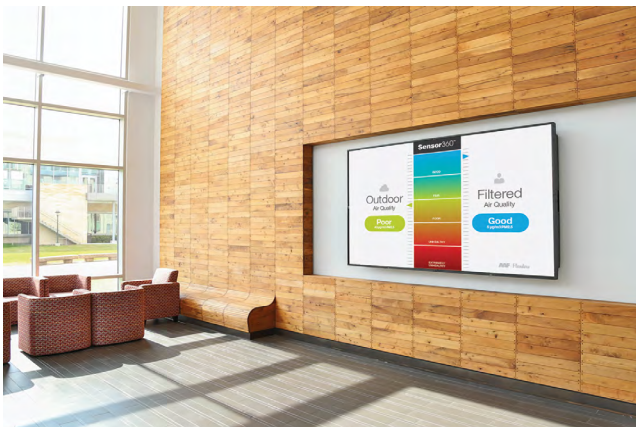


Contact your AAF International Sales Representative for more information.

A Path to Optimizing Your Clean Air Spending

Executives and Facility Management teams need the support of a trusted advisor who can perform Air Filtration Audits and Diagnostics, to ensure that the most optimal effective solution is selected and installed in their air filtration systems. A thorough air filter audit of your HVAC Systems is the first step, in order to provide you with professional guidance and analysis for cost savings and risk reduction. By conducting this audit, we will be able to understand your current state and then utilize TCO Diagnostic and Sensor360 to identify how you can perform even better.

Our locally optimized filtration analysis will provide the highest level of air filtration solutions, while minimizing your total life cycle costs. We do this by taking a true consultative and technical approach to understanding your complete air filtration needs, application, and business goals, to optimize your performance and lower your total cost of ownership.



A Long History of Technical Knowledge

Only AAF International has a long history with deep, technical knowledge and archives to bring the experience, expertise, and reliable data to the customer. Our mission is to help you protect your environment, reduce your business risk, and optimize your clean air related spending. We will always strive to invest our time and expertise to help you improve your business, not just to sell you a product.



AAF International operates its Clean Air Innovation & Research Center (Clean AIR Center) near its World Headquarters in Louisville, Kentucky.



Extensive studies show:

- **88%** of facility managers say that **deferred maintenance is an issue**
- **€5 million** – annual facility **cost of deferred maintenance**
- **HVAC** - the system **most affected by deferred maintenance**
- Approximately **50% of a building's energy consumption** goes to the heating, cooling, and moving of air
- Up to **37% more energy is consumed** by AHUs with **dirty coils** vs. clean coils
- 56% of commercial maintenance teams actually admit that their **IAQ maintenance is not carried out per IAQ guidelines**
- Facilities with poor IAQ can expect an overall **daily productivity drop** of around 9% with individual losses **up to 33%**

The High Cost of Deferred Maintenance

Today's competitive business landscape is becoming increasingly complex and competitive, which means everyone must do "more with less." Unfortunately, this culture is wreaking havoc on facilities in the form of deferred maintenance. By reacting to issues, rather than preventing them, even the smallest delays can add up to exorbitant costs due to:

- Equipment failure
- Safety risks and insurance claims
- Facility disrepair
- Energy overspending

HVAC—The System Most Affected by Deferred Maintenance

When HVAC systems are not maintained on time or as planned, they do not perform as they should, costing you time and money. Energy costs are up to 81% higher in facilities with deferred maintenance. 71% of this increase is HVAC related. With half of a facility's energy costs attributed to heating, cooling, and moving air, proper filter maintenance is essential to keeping HVAC systems operating effectively and efficiently. The proper selection of air filters is critical to a system's performance and can extend the life of components, decrease energy spend, and reduce labor costs.

Optimize Preventative Maintenance Schedules & Total Cost of Ownership

Filters play an important role in reducing your deferred maintenance backlog, so having an optimized program for filter maintenance and replacement is vital to a facility's operations. TCO Diagnostic® is an HVAC filtration system analysis program that helps reduce deferred maintenance backlogs and decrease reactive time by analyzing each facility's HVAC data, optimizing preventative maintenance schedules, and extending changeout cycles at the lowest total cost of ownership.

This tool provides a complete optimization of your filtration system to determine the most effective and efficient filter selection based on your facility's needs, saving you time and money while reducing risk.





Pads and Rolls

Roll-O-Mat®

Roll filter media on core with high tensile strength for optimal performance throughout the lifetime

Recommended application:

For use in AAF's Roll-O-Matic® automatic roll filter system as pre-filtration under demanding conditions

Configuration and performance:

- ISO 16890: n/a
- Filter class EN779: G3
- Media: fibreglass
- Provided with: bacteriostatic treatment
- Temperature limit: 80 °C



AmerTex

Efficient filter media with an optimized blend of synthetic fibres, available as pad or roll

Recommended application:

Filtration for protection of air ducts and fans in paint spray booths or for central air handling systems

Configuration and performance:

- ISO 16890: coarse 35%, 40%, 45%, 50%
- Filter class EN779: G2 - M5
- Media: synthetic
- Available as: F- and R-series
- Temperature limit: 100 °C



AmerGlas® PaintStop

Filter media of fibreglass in an optimized structure for long life, ensures reduced emissions and is available as pad or roll

Recommended application:

Filtration for protection of air ducts, fans and engines in paint shops

Configuration and performance:

- Filter class EN779: n/a
- Media: fibreglass
- Available as: Yellow and Green
- Temperature limit: 80 (Yellow) - 150 °C (Green)



Panel Filters

AmerGlas® Box

Lightweight panel filter made of fibre-glass in an intricate structure for optimized dust holding capacity

Recommended application:

Pre-filtration in central air handling, air conditioning and ventilation systems for regular and demanding use

Configuration and performance:

- ISO 16890: Coarse 35%
- Filter class EN779: G2
- Media: fibreglass
- Frame material: metal / cardboard / plastic
- Temperature limit: 75 °C



MetaNet

Permanent washable metal filter with media of multiple layered knitted steel wire and a high dust holding capacity

Recommended application:

Pre- or final filtration in demanding air handling, air conditioning and ventilation systems for collecting grease and oil mist

Configuration and performance:

- ISO 16890: coarse 35%
- Filter class EN779: G2
- Media: galvanized steel, stainless steel, aluminium steel
- Filter frame: galvanized steel
- Temperature limit: 65 (treated) - 500 °C (untreated)



Chevronet

Lightweight panel filter made of synthetic media in an optimized composition for uniform filtration performance

Recommended application:

Pre- or final filtration in central air handling, air conditioning and ventilation systems

Configuration and performance:

- ISO 16890: coarse 65%
- Filter class EN779: G4
- Media: synthetic
- Filter frame: galvanized steel
- Temperature limit: 100 °C



Red Pleat Panel Filters

RedPleat® / RedPleat® Ultra

Panel filter with a self-supporting media pack, consistent pleat spacing and excellent stiffness and durability

Recommended application:

Pre-filtration in central air handling, air conditioning and ventilation systems under humid and turbulent conditions

Configuration and performance:

- ISO 16890: Coarse 70%
- Filter class EN779: G4
- Media: synthetic
- Filter frame: metal / cardboard / plastic
- Optional: gasket and wire mesh at air leaving side
- Optional: bacteriostatic treatment (Ultra)
- Temperature limit: 65 °C



RedPleat® ePM10 70%

Panel filter with folded media pack made of fibreglass with supporting mesh grille for increased stability

Recommended application:

Pre-filtration in central air handling, air conditioning and ventilation systems

Configuration and performance:

- ISO 16890: ePM10
- Filter class EN779: M5
- Media: Glass
- Filter frame: metal / cardboard / plastic
- Optional: Gasket and wire mesh at air leaving side
- Temperature limit: 65 °C



RedPleat® Carb

Lightweight panel filter with a self-supporting media pack consisting of a combination of synthetic media and activated carbon

Recommended application:

Pre-filtration in central air handling, air conditioning and ventilation systems for removal of gaseous contaminants

Configuration and performance:

- ISO 16890: Coarse 65%
- Filter class EN779/EN1822: n/a
- Media: synthetic with activated carbon
- Filter frame: cardboard
- Temperature limit: 40 °C



RedPleat® HT

Silicone-free high temperature panel filter with folded fibreglass media pack, laminated with a mesh grille for enhanced stability

Recommended application:

Final filtration of high temperature processes in the automotive industry

Configuration and performance:

- ISO 16890: Coarse 90%
- Filter class EN779: G4
- Media: glass
- Filter frame: metal
- Optional: gasket
- Temperature limit: 260 °C.



Pocket Filters

DriPak® SX

Pocket filter made from synthetic material in a new tapered design with reduced pressure drop and reliable filtration performance

Recommended application:

Pre- or final filtration in central air handling, air conditioning and ventilation systems

Configuration and performance:

- ISO 16890: ePM 1, ePM2,5 and ePM10
- Filter class EN779: M5 - F7
- Media: synthetic
- Optional: bacteriostatic treatment
- Filter frame: galvanized steel, plastic and polyurethane
- Optional: neoprene (flat gasket)
- Temperature limit: 70 °C



DriPak® GX

Pocket filter made of fibreglass in a tapered design for very low pressure drop and high filtration efficiency

Recommended application:

Pre- or final filtration in central air handling, air conditioning and ventilation systems, pre-filtration for cleanrooms

Configuration and performance:

- ISO 16890: ePM 1, ePM2,5 and ePM10
- Filter class EN779: M5 - F9
- Media: fibreglass
- Filter frame: polystyrene plastic or galvanized steel
- Optional: neoprene (flat gasket)
- Temperature limit: 70 °C



DriPak® NX / NX+

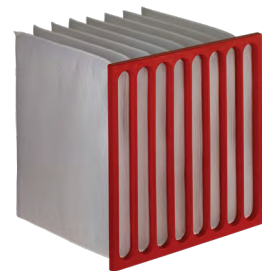
Highly efficient synthetic pocket filter in a new tapered AAF design, with extremely low pressure drop and long service life

Recommended application:

Pre- or final filtration in central air handling, air conditioning and ventilation systems, pre-filtration for cleanrooms

Configuration and performance:

- ISO 16890: ePM1
- Filter class EN779: F9
- Media: highly efficient synthetic
- Filter frame: injection moulded polyurethane, galvanized steel or beechwood
- Optional: neoprene (flat gasket)
- Temperature limit: 70 °C



DriPak® KX

Pocket filter made of uncharged synthetic media with self-rigid properties with high dust holding capacity and long service life

Recommended application:

Pre- or final filtration in automotive paint booths, healthcare facilities, commercial buildings, and industrial applications

Configuration and performance:

- ISO 16890: Coarse 80% and ePM10
- Filter class EN779: M5, M6
- Media: synthetic
- Filter frame: injection moulded polyurethane
- Temperature limit: 70 °C



DriPak GC

Pocket filter made of microglass media with self-rigid properties removes both particles and gases

Recommended application:

Pre- or final filtration in properties in environments with heavy traffic flows, hospitals, schools, day care centres

Configuration and performance:

- ISO 16890: ePM1
- Filter class EN779: F7
- Media: microglass with activated carbon granules
- Filter frame: galvanized steel
- Temperature limit: 50 °C



Pocket Filters





Compact Filters

VariCel®

Highly efficient compact filter with a deep-pleat media pack, supported by aluminium separators in a robust construction

Recommended application:

Pre- or final filtration in central air handling systems and industrial installations under demanding conditions

Configuration and performance:

- ISO 16890: ePM1 and ePM10
- Filter class EN779: M6 - F8
- Media: fibreglass
- Filter frame: galvanized steel and extruded aluminium
- Optional: dry seal gasket
- Temperature limit: 70 (with gasket)
- 150 °C (without gasket)



VariCel® EcoPak

Very compact filter with uniform media pack for high filtration efficiency of fine dust in lightweight and fully combustible frame

Recommended application:

Pre- or final filtration in central air handling systems and industrial installations with limited space

Configuration and performance:

- ISO 16890: ePM 1 and ePM 10
- Filter class EN779: M6 - F9
- Media: fibreglass
- Optional: bacteriostatic treatment
- Filter frame: HIPS
- Optional: dry seal gasket
- Temperature limit: 70 °C



VariCel® M-Pak

Lightweight and space-saving compact filter with extended filtration surface in non-corrosive and fully combustible frame

Recommended application:

Pre-filtration in central air handling systems and industrial installations under turbulent conditions

Configuration and performance:

- ISO 16890: ePM 1 and ePM 10
- Filter class EN779: M6 - F9
- Media: fibreglass
- Optional: bacteriostatic treatment
- Filter frame: HIPS
- Optional: dry seal gasket
- Temperature limit: 70 °C



VariPak

Mini-pleat filter with ultrafine fibreglass media pack, low pressure drop and available with various configuration options

Recommended application:

Pre- or final filtration in central air handling systems, pre-filtration for cleanrooms

Configuration and performance:

- ISO 16890: ePM 1 and ePM 10
- Filter class EN779: M6 - F9
- Media: fibreglass
- Filter frame: anodized extruded aluminium or MDF
- Optional: dry seal or gel seal gasket
- Temperature limit: 70 °C



VariCel® V XLE

Air filter with high capacity in a robust V-shaped configuration with a lightweight and fully combustible plastic construction

Recommended application:

Designed to provide excellent performance combined with high energy savings, in either industrial or commercial HVAC installations

Configuration and performance:

- ISO 16890: ePM1
- Filter class EN779: F7 - F9
- Media: fibreglass
- Filter frame: combination of HIPS and ABS
- Optional: Polyurethane foamed endless
- Temperature limit: 70 °C



VariCel® V XL

Air filter with high capacity in a robust V-shaped configuration with a lightweight and fully combustible plastic construction

Recommended application:

Pre- or final filtration in central air handling systems and demanding industrial installations, pre-filtration for cleanrooms

Configuration and performance:

- ISO 16890: ePM1 and ePM10
- Filter class EN779: M6 - F9
- Media: fibreglass
- Filter frame: combination of HIPS and ABS
- Optional: dry seal gasket / reverse airflow
- Temperature limit: 70 °C



VariCel® Aero V (H)XL

High efficiency compact for high filtration efficiency of fine dust in lightweight and fully combustible frame

Recommended application:

Final filtration in central air handling systems wherever highest possible efficiency on (bio)aerosols is needed

Configuration and performance:

- ISO 16890: ePM 1 95%
- Media: fibreglass
- Filter frame: plastic
- Optional: polyurethane foamed endless gasket
- Temperature limit: 70 °C



BioCel® V (H)XLA

High efficiency filter with class-leading protection for your herd. With vertical pleats, plastic mesh grid and a durable moisture-resistant construction.

Recommended application:

Final filtration for challenges presented by farm pests.

Configuration and performance:

- ISO 16890: n.a.
- Media: fibreglass
- Filter frame: plastic
- Optional: foam gasket
- Temperature limit: 70 °C



EPA/HEPA/ULPA Filters

BioCel®

Highly efficient filter with a deep-pleat media pack, supported by aluminium separators in a robust construction

Recommended application:

Final filtration in central air handling systems and industrial installations under turbulent conditions, pre-filtration for cleanrooms

Configuration and performance:

- Filter class EN1822: E10
- Media: fibreglass
- Filter frame: galvanized steel and extruded aluminium
- Gasket: dry seal
- Temperature limit: 70 (with gasket) - 120 °C (without gasket)



BioCel® II

Mini-pleat filter with lightweight frame and low pressure drop for easy installation and reduced energy consumption

Recommended application:

Final filtration in central air handling systems and industrial installations under turbulent conditions, pre-filtration for cleanrooms

Configuration and performance:

- Filter class EN1822: E11
- Media: fibreglass
- Filter frame: anodized extruded aluminium
- Gasket: dry seal, gel seal or knife edge
- Temperature limit: 70 °C



BioCel® III

Highly efficient filter in a V-shaped configuration with optimized media packs of fibreglass, suitable for high airflow rates

Recommended application:

Pre- or final filtration in high airflow air handling systems, pre-filtration for cleanrooms

Configuration and performance:

- Filter class EN1822: E11
- Media: fibreglass
- Filter frame: galvanized steel
- Gasket: dry seal
- Temperature limit: 70 °C



BioCel® VXL

Air filter with high capacity in a robust V-shaped configuration and a lightweight and fully combustible plastic construction

Recommended application:

Pre- or final filtration in central air handling systems and demanding industrial installations, pre-filtration for cleanrooms

Configuration and performance:

- Filter class EN1822: E10 - E12
- Media: fibreglass
- Filter frame: combination of HIPS and ABS
- Gasket: dry seal
- Temperature limit: 70 °C



BioPak®

Mini-pleat filter with ultrafine fibreglass media pack and low pressure drop, available in different frame executions

Recommended application:

Pre- or final filtration in central air handling systems, pre-filtration for cleanrooms

Configuration and performance:

- Filter class EN1822: E11
- Media: fibreglass
- Filter frame: anodized extruded aluminium or MDF
- Gasket: dry seal
- Temperature limit: 70 °C



AstroCel® I

Efficient HEPA filter with high capacity and deep-pleat media pack, supported by aluminium separators

Recommended application:

Final filtration in central air handling systems and industrial installations

Configuration and performance:

- Filter class EN1822: E12 - H14
- Media: fibreglass
- Filter frame: anodized extruded aluminium, steel or MDF
- Gasket: dry seal
- Temperature limit: 70 (std. gasket) - 120 (without gasket) - 260 °C (silicone gasket)



AstroCel® II

High quality and space-saving mini-pleat filter, individually tested for guaranteed filtration performance

Recommended application:

Final filtration for cleanrooms and turbulent or laminar airflow systems

Configuration and performance:

- Filter class EN1822: H14 - U17
- Media: fibreglass
- Filter frame: anodized extruded aluminium
- Also available: TM Hood (terminal module)
- Gasket: dry seal, gel seal or knife edge
- Temperature limit: 70 °C



AstroCel® III

Highly efficient filter in a V-shaped configuration with optimized media packs of fibreglass, suitable for high airflow rates

Recommended application:

Final filtration in central air handling systems and industrial installations, areas in which hazardous materials are being handled

Configuration and performance:

- Filter class EN1822: E12 - H14
- Media: fibreglass
- Filter frame: steel
- Gasket: dry seal or gel seal
- Temperature limit: 70 (regular version) - 120 °C (nuclear grade)



AstroCel® VXL

Air filter with high capacity in a robust V-shaped configuration with a lightweight and fully combustible plastic construction

Recommended application:

Final filtration in central air handling systems and industrial installations, pre-filtration for cleanrooms

Configuration and performance:

- Filter class EN1822: E10 - E12
- Media: fibreglass
- Filter frame: combination of HIPS and ABS
- Gasket: dry seal
- Temperature limit: 70 °C



AstroPak®

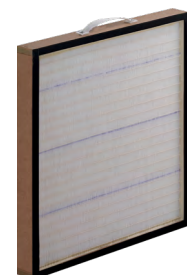
Mini-pleat filter with ultrafine fibreglass media pack and low pressure drop, available in different frame executions

Recommended application:

Final filtration in central air handling systems and industrial installations, pre-filtration for cleanrooms

Configuration and performance:

- Filter class EN1822: H13 - H14
- Media: fibreglass
- Filter frame: anodized extruded aluminium or MDF
- Gasket: dry seal or gel seal
- Temperature limit: 70 °C



MEGAcel®

Energy efficient mini-pleat filter with a sturdy aluminium frame, boron-free media pack and outgassing-free separator

Recommended application:

Final filtration for sensitive microelectronic cleanrooms and laminar airflow systems

Configuration and performance:

- Filter class EN1822: U16
- Media: ePTFE membrane
- Filter frame: anodized extruded aluminium
- Also available: TM Hood (terminal module)
- Gasket: dry seal, gel seal or knife edge
- Temperature limit: 70 °C



MEGAcel® I

High-efficiency HEPA filter with a deep-pleat media pack, supported by aluminium separators, and a very low pressure drop

Recommended application:

Final filtration in industrial installations and cleanroom environments

Configuration and performance:

- Filter class EN1822: H13 - H14
- Media: ePTFE membrane
- Frame: galvanized or stainless steel
- Gasket: dry seal
- Temperature limit: 70 °C



MEGAcel® II

High quality and durable mini-pleat filter with a high efficiency and a very low pressure drop characteristic

Recommended application:

Final filtration for cleanrooms with turbulent or laminar airflow systems

Configuration and performance:

- Filter class EN1822: H14 - U16
- Media: ePTFE membrane
- Filter frame: anodized extruded aluminium
- Also available: TM Hood (terminal module)
- Gasket: dry seal, gel seal or knife edge
- Temperature limit: 70 °C



MEGAcel® III

Highly efficient filter in a V-shaped configuration for handling high airflow rates at an extremely low pressure drop

Recommended application:

Final filtration in central air handling systems and industrial installations, areas in which hazardous materials are being handled

Configuration and performance:

- Filter class EN1822: H13 - H14
- Media: ePTFE membrane
- Filter frame: galvanized steel or ABS
- Gasket: dry seal
- Temperature limit: 70 °C



High Temperature Filters

VariCel® HT

Silicone-free high efficiency compact filter with a deep-pleat media pack in a frame construction of aluminized steel

Recommended application:

Pre- or final filtration for drying ovens in the automotive industry

Configuration and performance:

- ISO 16890: ePM 1 and ePM10
- Filter class EN779: M6 - F8
- Media: fibreglass
- Filter frame: aluminized steel and extruded aluminium
- Optional: glass rope gasket
- Temperature limit: 385 °C



VariCel® II HT

Silicone-free mini-pleat filter with fibreglass media in a robust aluminium frame and faceguards on both sides

Recommended application:

Final filtration for drying ovens in the automotive industry

Configuration and performance:

- ISO 16890: n/a
- Filter class EN779: M6, F8
- Media: fibreglass
- Filter frame: anodized extruded aluminium
- Gasket: glass rope
- Temperature limit: 385 °C (480 °C 1h peak)



VariCel® V HT

Silicone-free air filter in a V-shaped configuration with a sturdy construction of aluminized steel for high integrity

Recommended application:

Final filtration for recirculation systems of drying ovens under turbulent conditions in the automotive industry

Configuration and performance:

- ISO 16890: n/a
- Filter class EN779: M6 - F7
- Media: fibreglass
- Filter frame: aluminized steel and extruded aluminium
- Gasket: glass rope
- Temperature limit: 385 °C (480 °C 1h peak)



VariCel® XL HT

Silicone-free high temperature compact filter with a deep-pleat media pack in an aluminized steel frame construction and low pressure drop

Recommended application:

Final filtration for drying ovens in the automotive industry

Configuration and performance:

- ISO 16890: ePM 1 and ePM10
- Filter class EN779: M6 - F8
- Media: fibreglass
- Filter frame: aluminized steel and extruded aluminium
- Optional: glass rope gasket
- Temperature limit: 385 °C (480 °C 1h peak)



BioCel® HT

Highly efficient compact filter with a deep-pleat media pack in a silicone-free aluminized steel frame construction

Recommended application:

Final filtration for drying ovens in the automotive industry

Configuration and performance:

- Filter class EN1822: E10
- Media: fibreglass
- Filter frame: aluminized steel and extruded aluminium
- Gasket: glass rope
- Temperature limit: 260 °C (480 °C 1h peak)



BioCel® V HT

Silicone-free air filter in a V-shaped configuration with a sturdy construction of aluminized steel for high integrity

Recommended application:

Final filtration for recirculation systems of drying ovens under turbulent conditions in the automotive industry

Configuration and performance:

- Filter class EN1822: E10
- Media: fibreglass
- Filter frame: aluminized steel and extruded aluminium
- Gasket: glass rope
- Temperature limit: 385 °C (480 °C 1h peak)



AstroCel® I HTP

Silicone-free HEPA filter with superior durability, highly reliable operation and performance in compliance with FDA / GMP guidelines

Recommended application:

Filtration under high-temperature for dry heat sterilization and the removal of pyrogens in the pharmaceutical industry

Configuration and performance:

- Efficiency: $\geq 99,99\%$ at $0,3 \mu\text{m}$, $\geq 99,95\%$ at MPPS
- Media: fibreglass
- Filter frame: stainless steel
- Gasket: fibreglass
- Temperature limit: 350 °C (400 °C 1h peak)



Gas-Phase Filters

VariSorb® XL / VariSorb® XL SAAFCity

Fully incinerable combination filter for particulate and molecular filtration with a wide range of chemical media options

Recommended application:

Pre-filtration in central air handling, air conditioning and ventilation systems for removal of gaseous contaminants

Configuration and performance:

- ISO 16890: ePM2,5
- Filter class EN779: M5 (SAAFCity)
- Media: synthetic with activated carbon
- Filter frame: combination of HIPS and ABS
- Relative humidity: 10 - 95%
- Temperature limit: 55 °C



SAAF™ Canister

Molecular filtration system consisting of cylindrical cartridges with a choice of various chemical media, mounted in a galvanized frame

Recommended application:

Pre-filtration in central air handling and ventilation systems for removal of gaseous contaminants

Configuration and performance:

- ISO 16890: n/a
- Filter class EN779/EN1822: n/a
- Media: activated carbon, activated alumina, blends
- Cartridge: HIPS, galvanized or stainless steel
- Frame: galvanized sheet metal
- Relative humidity: 10 - 95%
- Temperature limit: 55 °C



SAAF™ Cassette

Patented gas-phase filtration system with multiple cassettes in a V-shaped construction, pre-filled with chemical media

Recommended application:

Pre-filtration in central air handling and ventilation systems for removal of gaseous contaminants

Configuration and performance:

- ISO 16890: n/a
- Filter class EN779/EN1822: n/a
- Media: activated carbon, activated alumina, blends
- Cassette: HIPS, stainless or epoxy-coated steel
- Relative humidity: 10 - 95%
- Temperature limit: 55 °C



SAAF™ Media

Highly efficient filtration for removal of unwanted gaseous pollutants with a wide choice of media options and combinations

Recommended application:

Pre-filtration in central air handling systems for removal of gaseous contaminants

Configuration and performance:

- ISO 16890: n/a
- Filter class EN779/EN1822: n/a
- Media: activated carbon
- Optional: various additives to improve specific adsorption properties
- Relative humidity: 10 - 95%
- Temperature limit: 55 °C





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