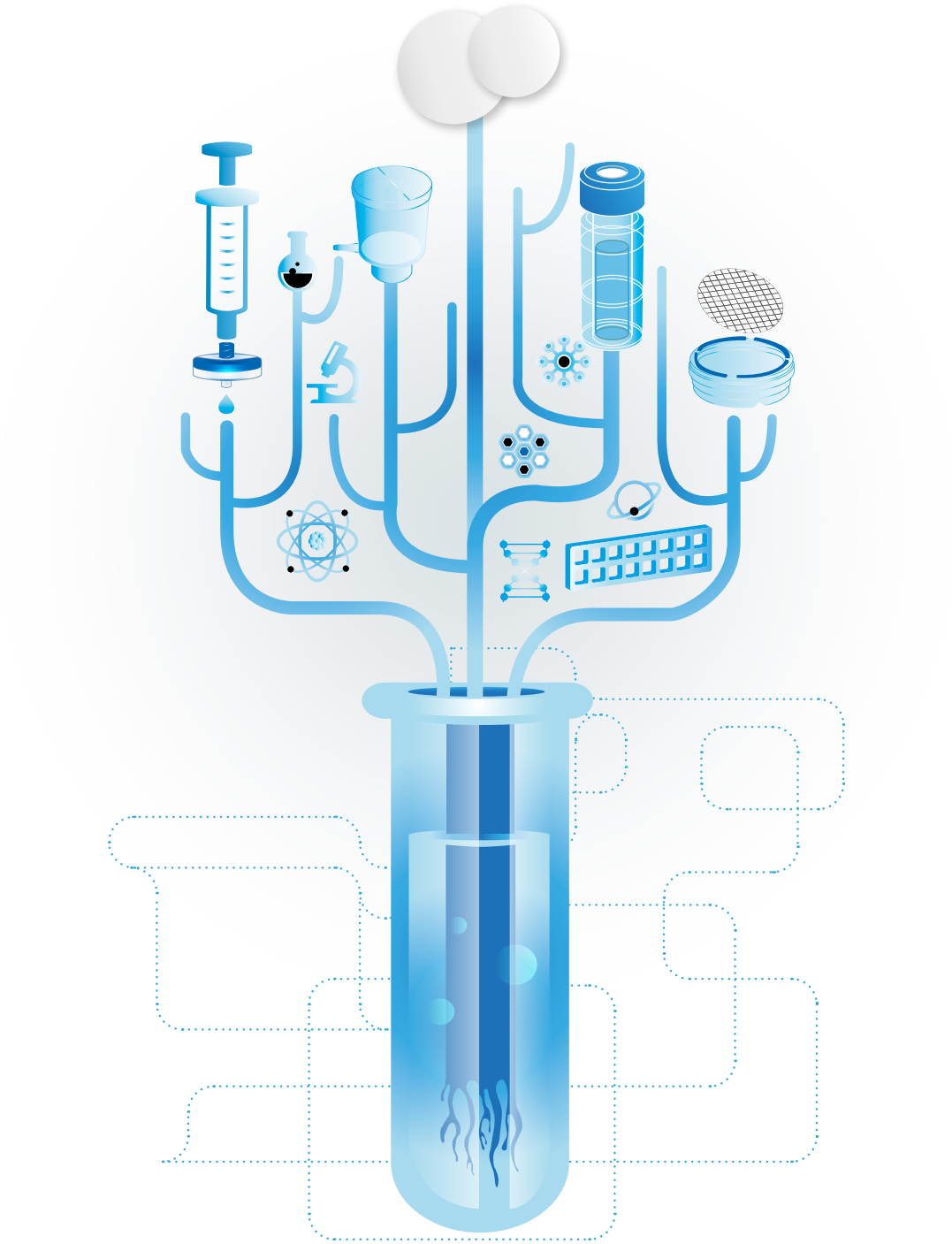
FILTER TECHNOLOGY

ENVIRONMENTAL MONITORING



FILTER TECHNOLOGY

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Environmental Monitoring

GVS Filter Technology is a fully integrated producer and supplier of membrane based solutions for the environmental monitoring community.

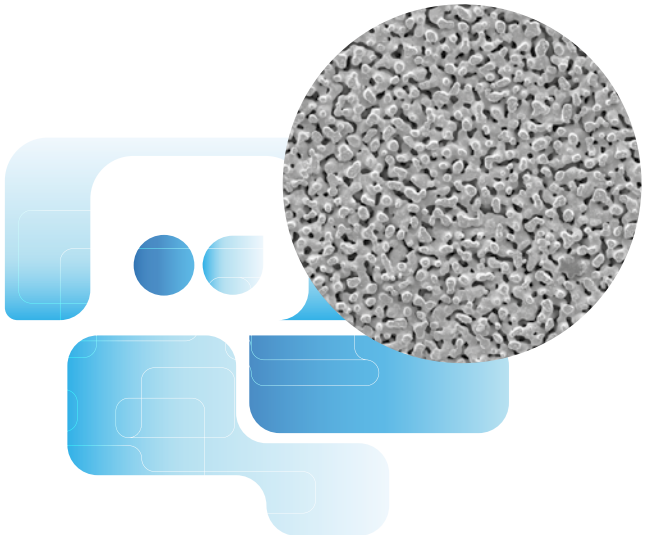
Poor Air and Water Quality around the world is a severe health risk for the population. Particulates impact the quality of the air we breathe, the water we drink and the space we live in everyday.

Standards and regulations for air and water particulate monitoring have been established by global environmental agencies to define, measure and mitigate issues. Regulations provide established methods for the analysis and definition of air and water quality. Global Standards have been established to define best practices for environmental monitoring using the most accurate procedures and test methods.

GVS supports the need for environmental monitoring and controls and offers a comprehensive suite of products developed for the air and water monitoring market. These include membranes and filters for air particulate monitoring, water quality, chemical, soil and asbestos analysis. GVS products are designed to be used in environmental testing and meet the Global Regulation Standards for air and water quality monitoring and analysis. All GVS membranes and filters are manufactured in ISO certified facilities to ensure reliable performance each and every time.

GVS products for environmental testing include applications and testing for:

- Environmental air monitoring
- Air pollution monitoring from stacks, flues and aerosols
- Industrial and home air monitoring
- Solutions for particulate matter testing
- Chemical analysis
- Asbestos analysis
- Oil monitoring
- Water testing
- Heavy metal testing
- Smoke number measurement
- Emission testing
- Gas monitoring
- Exhaust gas control
- Gravimetric analysis
- Preparation for qualitative analysis



Environmental monitoring

- Environmental monitoring describes the processes and activities that need to take place to characterize and monitor the quality of the environment.
- Environmental monitoring is used in the preparation of environmental impact assessments, as well as in many circumstances in which human activities carry a risk of harmful effects on the natural environment.
- All monitoring strategies and programes have reasons and justifications which are often designed to establish the current status of an environment or to establish trends in environmental parameters.
- In all cases the results of monitoring will be reviewed, analyzed statistically and published.
- Air pollutants are atmospheric substances which may potentially have a negative impact on the environment and organism health.
- With the evolution of new chemicals and industrial processes has come the introduction or elevation of pollutants in the atmosphere, as well as environmental research and regulations, increasing the demand for air quality monitoring

Besides gaseous pollutants, the atmosphere can also be polluted by particles. These particles (either in suspension, fluid or in solid state), have a divergent composition and size and are sometimes called aerosols. They are often catalogued as ‘floating dust’, but are best known as particulate matter (PM).

This floating dust is most often categorized based on their aerodynamic diameter. The aerodynamic diameter of a dust particle is the diameter of a sphere-shaped particle that shows the same behavior in the atmosphere as a dust particle (which does not necessarily have a sphere shape). In the framework of air quality problems, particulate matter is the most important.

Particulate matter such as PM10, PM2.5, PM1 and PM0.1 is defined as the fraction of particles with an aerodynamic diameter smaller than respectively 10, 2.5, 1 and 0.1 µm (for your information: 1 µm = 1 millionth of a meter or 1 thousandth of a millimeter). In comparison, the average diameter of a human hair equals 50-70 µm (see figure below)

Membranes Selection Guide

Ambient air monitoring methods for the analysis and definition of particulates and chemicals present in the air.

The tables below provide guidance in the selection of the appropriate filters for air monitoring and match relevant specifications to the regional regulatory body.

Country	Regulation
U.S.A.	EPA 40 CFR 50, 40 CFR 53 EPA 600/R-94-038b
EU	Directive 2015/1480/EC EN12341-2014 for PM2.5/ PM10
CHINA	GB 3095-2012 HJ 656-2013 for PM2.5 HJ618-2011 FOR PM2.5/PM10
BRAZIL	CONAMA Resolution 003/90
SOUTH KOREA	Clean Air Conservation Act
JAPAN	Fifth Basic Environment Plan
INDIA	Revised National Ambient Air Quality Standards
MEXICO	Air Quality Mexican Official Standards
AUSTRALIA	Air NEPM

* As of December 2018.
Verify for your specific local and country requirements.

Analysis	Recommended Membranes
PM 2.5 PARTICULATE	PM 2.5 PTFE
PM 10 PARTICULATE	QUARTZ FIBER GLASS FIBER PTFE MEMBRANE
PARTICULATE MONITORING	PM 2.5 PTFE GLASS FIBER QUARTZ FIBER SILVER MEMBRANE
ASBESTOS	POLYCARBONATE MCE SILVER MEMBRANE
HEAVY METAL	QUARTZ FIBER SILVER MEMBRANE
CHEMICAL ANALYSIS	QUARTZ FIBER GLASS FIBER PTFE MEMBRANE SILVER MEMBRANE

PM 2.5 PTFE Membrane

GVS Life Sciences PM 2.5 PTFE Membrane is a high-purity, thin membrane for PM 2.5 ambient air monitoring. Each membrane is sequentially numbered with a chemically resistant polypropylene support ring. The low tare mass allows for accurate gravimetric determinations. No glues or adhesives are used in making the membranes and its stable design eliminates curling, keeping the membrane flat allowing for robot use.

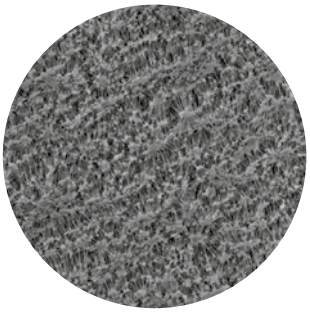
Product Characteristics

Filter thickness	30-40 µm
Filter diameter	46.2 mm
Filter pore size	2.0 µm
Support ring material	Polypropylene
Total support ring thickness	0.38 mm
Support ring width	3.68 mm
Particle retention (0.3µm)	99.7 %
Pressure drop (0.3µm) @16.67 l/min clean air	30 cm water
Alkalinity	<25 µeq/g of filter
Temperature weight loss stability	<20 µg
Drop test weight loss stability	<20 µg
Moisture weight gain stability	<10 µg

Ordering information

Product Code	Description	Pore Size (µm)	Quantity
759310	PM 2.5 PTFE Membrane Disk, EPA Conforming	2.0	50 /pk

Polytetrafluoroethylene (PTFE) Membrane



PTFE Sep
PTFE
Membrane

PTFE (fine powder resin) is expanded into a 3-dimensional web-like structure called PTFE which creates billions of microscopic pores. This structure utilizes the inherent hydrophobic (water-resistant) and non-stick nature of PTFE to allow removal of particulate captured on the membrane surface. This allows air to pass easily through the membrane while collecting particulate as small as 0.1 micron on its surface. GVS PTFE disc are membranes used for general applications in the environmental monitoring.

Product Characteristics

Pore Size (µm)	Bubble Point (EtOH) (kPa)	Flow Time (MeOH) (sec)	Thickness (µm)
0,22	107.9 -152.0	80 -140	100 -180
0,45	63.7-103.0	40 - 75	100 -180

Ordering information

	Dimensions Packaging	13 mm 100/pk	25 mm 100/pk	47 mm 100/pk
Pore sizes	0.22 µm	1215485	1215486	1215487
	0.45 µm	1215491	1215492	1215493
	0.5 µm			1215501

Glass Microfiber Filter

GVS Filter Technology offers a wide range of glass microfiber filters made of 100% borosilicate glass fibers without binders. The depth structure of the filter with its large surface area provides an outstanding impurity retention capacity combined with a low filter resistance. Glass fiber filters adsorb the finest particles down to 1 µm from liquids and < 1 µm in air and gases, as the electrostatic interaction between the glass fibers and gases is better than between glass fibers and liquids. Temperature resistant up to 500° C (with organic binders up to 180° C).

Glass Microfiber without Binder GF 1.6 µm

Features and Benefits

- Very small particles retention
- Resistance to aggressive substances
- Temperatures up to 500 °C
- Fine retention with fast flow
- -100% borosilicate glass fibers without binders

Product Characteristics

Basis Weight	52 g/m²
Thickness	260 µm
Retention range	1.6 µm
Binders	Binder-free
Retention DOP	99,998 %

Ordering information

Product Code	Diameter	Quantity
FP025DFAFAGLFC01	25 mm	100/pk
FP037DFAFAGLFC01	37 mm	100/pk
FP047DFAFAGLFC01	47 mm	100/pk
FP050DFAFAGLFC01	50 mm	100/pk
FP090DFAFAGLFC01	90 mm	100/pk
FP203RFAFAGLFC01	203 x 254 mm	100/pk

Glass Microfiber Filter with Binder (GB10)

Features and Benefits

- 100% borosilicate glass filbers with binders
- Organic binders added for increased strength
- Hydrophobic
- Can be used in place of GF10 glass microfiber filters
- Penetration <0.05% (0.3um at 15 cm/s)

Applications

- Air sampling to collect atmospheric particulates and aerosols
- Particle filtration of gases

Product Characteristics

Basis Weight	64 g/m²
Thickness	< 270 µm
Binders	With binders
Maximum Temperature	180°C

Ordering information

Product Code	Diameter	Quantity
FP025DAM64GLFC01	25 mm	100/pk
FP037DAM64GLFC01	37 mm	100/pk
FP047DAM64GLFC01	47 mm	100/pk
FP050DAM64GLFC01	50 mm	100/pk
FP090DDAM64GLFC01	90 mm	100/pk

Quartz Microfiber Filter

GVS Quartz microfiber filters are made with 100% pure quartz microfiber with zero binders. Exhibit greater chemical resistance at high temperatures than glass microfiber. Excellent choice for use in environments with extreme temperature up to 900°C and/or aggressive chemical exposure. Retention loading and air flow permeation similar to glass microfiber filters. Use wherever filters of the highest purity are needed.

Features and Benefits

- Excellent retention of very fine particles.
- Exceptional chemical and thermal resistance.
- Excellent weight and dimensional stability with lowest trace metal content.
- High Permeation enables large volume of air to pass through.
- Higher temperature stability than glass microfiber filters; up to 900°C.
- Excellent chemical stability with practically no filter-mass loss in the presence of acid gases (HCl, SO2, SO3, H2, SO4, NO and NO3).

Product Characteristics

Weight	85 g/m²
Thickness	440 µm
Retention DOP	99.998 %

Ordering information

Product Code	Diameter	Quantity
FP025D0QF1QUFC01	25 mm	100/pk
FP037D0QF1QUFC01	37 mm	100/pk
FP047D0QF1QUFC01	47 mm	100/pk
FP050D0QF1QUFC01	50 mm	100/pk
FP090D0QF1QUFC01	90 mm	100/pk
FP203R0QF1QUFC01	203 x 254 mm	100/pk

Silver Membrane

Silver membranes are composed entirely of 99.97% pure metallic silver. They provide excellent chemical resistance and high temperature characteristics. Orientation of the membrane can be important. There is a distinct difference in surface characteristics with one side appearing shinier than the other. Use the Shinier side upstream for scanning electron microscopy. For all other applications and analytical work use the duller side upstream.

Features and Benefits

- 99.97% pure silver
- High temperature resistance
- High chemical resistance
- Hydrophilic
- Economical - can be cleaned and reused
- Autoclavable

Applications

- Airborne asbestos fibers by X-Ray diffraction
- Dissolved Organic Carbons (DOC)
- Analysis of airborne silica in foundries, glass plants, quarries, mines, ceramic manufacturing
- Coke oven emissions analysis
- Carbon and carbon black
- Coal tar pitch volatiles
- Fly Ash - high temperature
- Bromine and Chlorine analysis

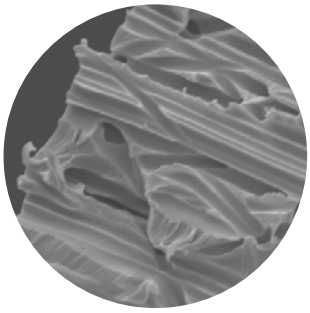
Product Characteristics

Retention Range	0.22 to 5 µm available
Maximum Temperature	204 °C
Thickness	50 µm

Ordering information

Dimensions Packaging	25 mm 50/pk	37 mm 25/pk	47 mm 25/pk
Pore sizes			
0.45 µm	1145335	1145341	1145347
0.8 µm	1145334	-	1145346

Polycarbonate Track Etched (PCTE) Membrane



PORETICS
PCTE Membrane

Features and Benefits

- Smooth, thin, glass-like surface is suitable for optical analysis applications
- PVP treated for hydrophilic wetting.
- Resists chemical staining to ease microscopy visualization

Polycarbonate Track Etched (PCTE) Membrane is recommended for TEM and SEM microscopic testing for Asbestos Monitoring. GVS Polycarbonate Track Etched (PCTE) Membrane is made from a thin polycarbonate film with precisely defined pores. The proprietary manufacturing process provides increased control over pore size and density for absolute size separation. This unique process ensures the physical properties of each membrane precisely fit specification.

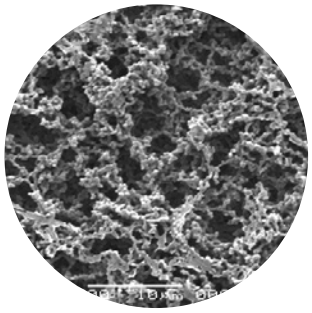
Product Characteristics

Thickness	8 - 11 µm
Optical Properties	Semi-translucent
Maximum Operating Temperature	284°F (140°C)
Residual Ash Weight Average	0.92 µg/cm^2
Sterilization	Gamma Irradiation or Ethylene Oxide (EtO)
Autoclavable	Yes
Wetting Characteristics	Hydrophilic

PCTE Hydrophilic Membrane - Disks
Ordering information

Pore sizes Dimensions Packaging	25 mm 100/pk	37 mm 100/pk	47 mm 100/pk
0.2 µm	1215611		1215612
0.4 µm	1215614	1215615	1215617
0.8 µm	1215622	1215623	1215624
1 µm	1215627	1221302	1215628

Mixed Cellulose Esters (MCE) Membrane



MICRON
NC (MCE) Membrane Sep

Features and Benefits

- High loading capacity and flow rate
- Hydrophilic wetting
- Unsupported

Recommended for PCM and TEM microscopic testing for Asbestos Monitoring.
GVS Mixed Cellulose Esters (MCE) Membrane provides high flow rate and fast filtration with uniform pore structure for consistent flow and high throughput.

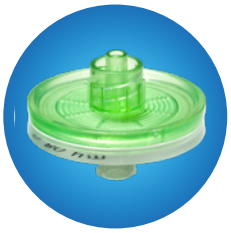
Product Characteristics

Sterilization	Gamma Irradiation or Ethylene Oxide (EtO)
USP Class VI testing	Passed
Thickness	100 - 190 µm
Sealing Compatibility	Ultrasonic, Heat, Radio Frequency and Insert Molding
Pore Size Range	0.22 to 0.8 µm

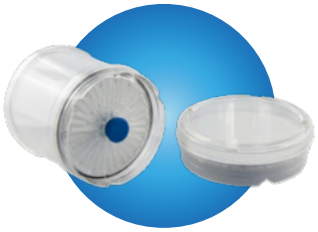
Ordering information

Pore sizes	Dimensions Packaging	25 mm 100/pk	37 mm 100/pk	47 mm 100/pk	90 mm 25/pk
	Color	**white**	**white**	**white**	**white**
	0.22 µm	1214898		1214909	1214941
	0.45 µm	1215263	1215272	1215281	1215305
	0.8 µm	1215425	1215426	1215428	1215431

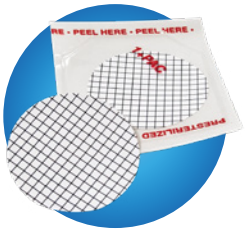
Life Sciences products and capabilities



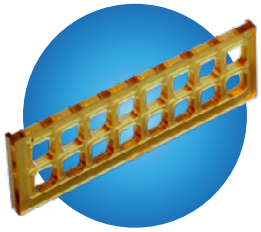
- MICROFILTRATION PRODUCTS: Syringe Filters, Vent Filters, Capsule Filters, Centrifugal Filters, Bottle Top, Filter Holders for Membranes, Filter Funnels



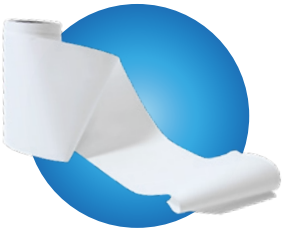
- MICROBIOLOGY: Microbiological Monitors, Analytical Monitors, Nutrient Liquid Media, Swab Kits, Dilution Bottles, Sterile Membranes



- FILTRATION MEMBRANES: Discs, Sheets and Roll, available in a wide range of media: CA, NC, NY, PES, PP, PTFE, RC, PE, Hydrophobic and Hydrophilic PVDF, PCTE, PETE, Silver, Drain Discs, Filter Papers,Glass Fiber/Quartz



- FAST® PROTEIN MICROARRAY



- MEMBRANES in ROLL STOCKS

- CUSTOMIZED DEVICES AND COMPONENTS

- TRANSFER (blotting) MEMBRANES for nucleic acid and protein analysis

For more information on the lifesciences product collection please visit www.gvs.com

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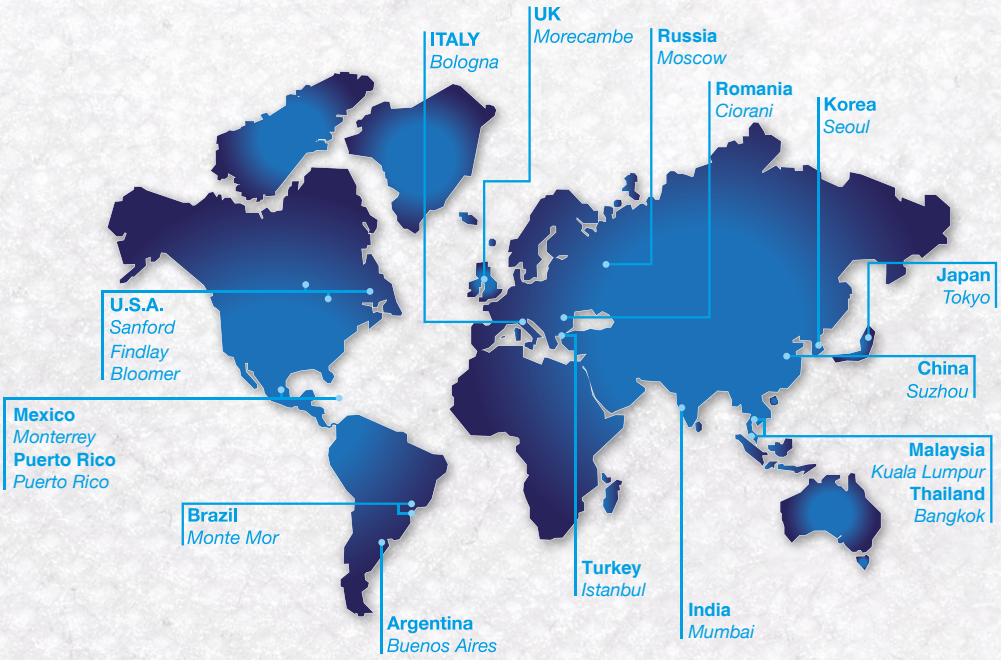
FILTER TECHNOLOGY

WORLDWIDE

DISTRIBUTION CENTERS



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