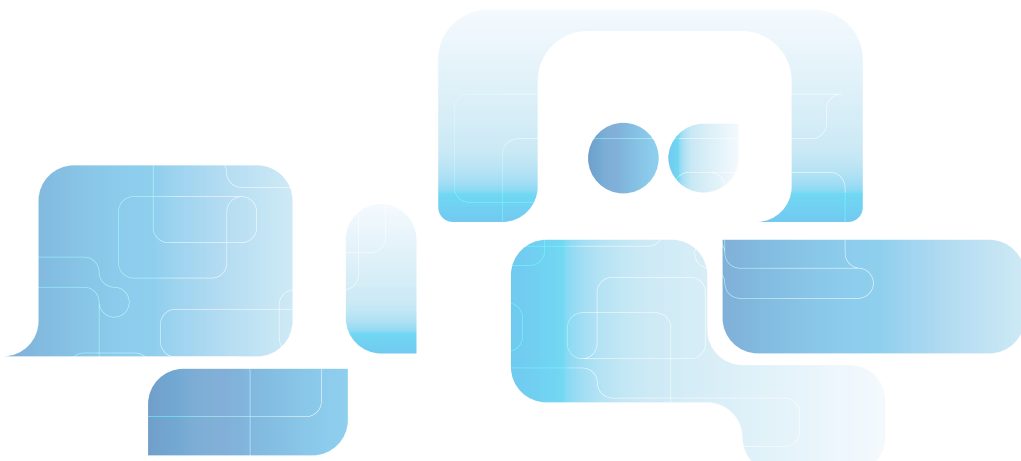
FILTER TECHNOLOGY

LIFE SCIENCES
PRODUCT COLLECTION

MZ ANALYSENTECHNIK

AUTHORIZED DISTRIBUTOR
MZ-Analysentechnik GmbH, Barcelona-Allee 17 • D-55129 Mainz
Tel +49 6131 880 96-0, Fax +49 6131 880 96-20
e-mail: info@mz-at.de, www.mz-at.de



GVS

GVS

With over 40 years of experience GVS Group is one of the world's leading manufacturers of membranes and microfiltration devices, with applications in the laboratory, medical and pharmaceutical markets, food & beverage and automotive.

GVS Filter Technology offers a full line of laboratory filtration and analysis products, providing an incomparable experience for the customer in the analytical, chemistry and life science laboratories.
GVS Group is a global supplier of membrane-based solutions for life science research. We offer a full line of research tools for filtration, protein and nucleic acid blotting and transfer.

GVS complete range:

- 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
- FILTRATION MEMBRANES: Discs, Sheets and Roll, available in a wide range of media: CA, NC, NY, PES, PP, PTFE, RC, PE, Hydrophobic and Hidrophilic PVDF, PCTE, PETE, Silver, Drain Discs, Filter Papers,Glass Fiber/Binder
- TRANSFER (blotting) MEMBRANES for nucleic acid and protein analysis
- FAST® PROTEIN MICROARRAY
- MEMBRANES in ROLL STOCKS
- CUSTOMIZED DEVICES AND COMPONENTS

OEM Manufacturing

Our expertise and capabilities combine to provide custom solutions for Life Sciences applications, from project / product development to large scale manufacturing.

International expansion

GVS Group's presence in major markets across the world has led to the opening of 15 manufacturing plants located in Italy, UK, Brazil, USA, China and Romania, as well as offices in Italy, Germany, UK, USA, Brazil, Argentina, China, Japan, Korea, India, Russia and Turkey.

Sophisticated industrial technology

GVS's highly innovative technical capabilities include filter material development, hydrophobic and hydrophilic technology, activated carbon filtration, filter surface coating technology.
Production technologies include: Multi-cavity insert and over-molding, pleating, potting and low compression injection, high-speed automatic assembly, ultrasonic, heat and radio-frequency welding, laser cutting and welding and All in-Mold technology, a revolutionary manufacturing technology combining injection molding and robotic assembly all within the molding tool. The most critical products are manufactured in a clean-room environment.

Commitment to Quality

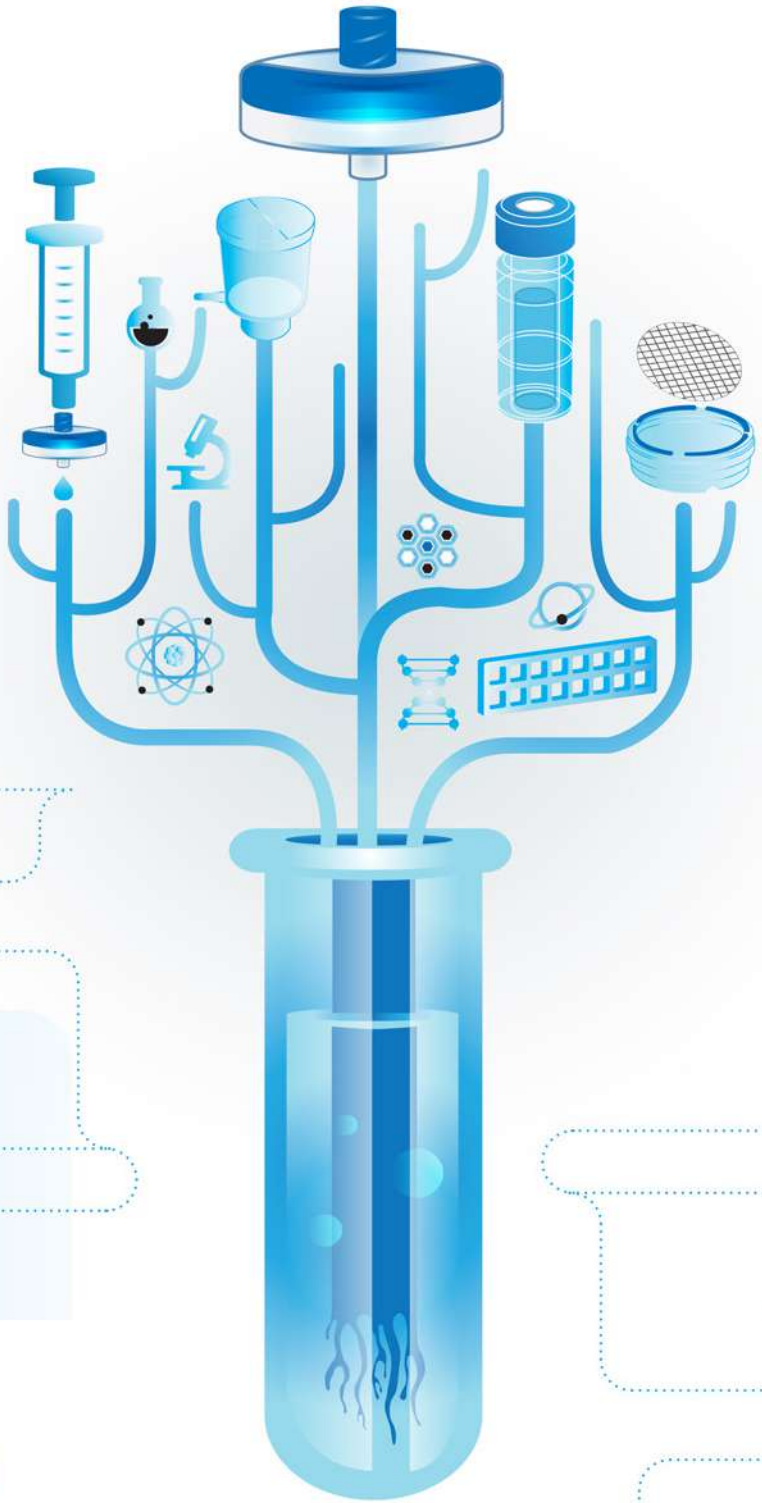
GVS has obtained ISO 9001 certification, and our Medical Division has qualified for ISO 13485 certification, plus several of our medical devices have been qualified for CE marking. All the plants are UNI EN ISO 14001:2004 certified for its Environmental Management System (EMS), marking a milestone in GVS ongoing commitment to reduce its environmental footprint.

Continuing Improvement thanks to our R&D Department

A great part of the know-how incorporated in GVS's products comes from our Research Labs, which ensures that the company's various divisions have access to innovative R&D. With its pioneering tools and facilities and highly sophisticated analytic techniques, the GVS Labs also works in close conjunction with a large number of hospital's labs and academic bodies of international acclaim, in Italy, in the US and wherever GVS operates. Without it, the group's strongly innovation-oriented policy and commitment to growth would be much less effective.

FILTER TECHNOLOGY

MICROFILTRATION



MICROFILTRATION

GVS offers a comprehensive line of devices used in chemistry and biology laboratories for filtration: Syringe Filters, Syringeless Filter Vials, Capsule Filters, Centrifugal Filters and Bottle Top Filters as well as a complete offering of accessory devices

Syringe Filters

GVS syringe filter devices are designed to provide fast and efficient filtration.
These syringe filters are suitable for numerous applications in pharmaceutical, environmental, biotechnology, food/beverage, and agricultural testing laboratories. Available in 13 different membrane types, two housing materials and up to ten pore sizes.

- Polypropylene or Acrylic housing
- Multifunctional connectors - equipped with luer-lock or luer-slip female connections
- Sterile or non-sterile options
- Available in bulk-packages or individual blisters
- Customized product and packaging on request

Syringeless Filter Vial – SEPARA

Filtering with a plunger in the vial is a rapid single step, reducing sample loss. After filtration, the sample is ready for use in auto-sampling. The pre-slit cap ensures easy and clean transfer of sample. The most useful device for single filtration… Easy to press, fast and simple to use GVS provides a wide range of membrane that help the end users to make their analysis easier and faster. Available in 5 different membranes types, and two pore sizes, polypropylene body with PTFE and silicone septa.

Vent Filter

GVS Vent Filters are available with different connectors and are individually packaged either sterile or non-sterile. These devices are available with PTFE membranes, Polypropylene housing and 0.20um or 0.45um pore size. GVS Vent filters are suitable for several applications:

- Sterile venting of filling vessels and fermentation carboys, including culture vessels and CO2 incubators
- Venting of holding tanks for sterile, distilled water and liquid culture media
- Autoclave venting
- In-line sterilization of and particulate removal from air and gases, such as sterilization of air for small fermenters

MICROFILTRATION

Calyx Capsule Filters

GVS capsules are disposable filtration units designed for the removal of particles or bacteria from aqueous or solvent solutions and gas streams. They are ready to use, eliminating the need to disassemble, clean and reassemble filter housings.
GVS capsules contain no glue or surfactants and feature serial layer filter design for increased throughput and extended life. Two upstream vents are included to facilitate venting in any position. 100% of our capsules containing membrane media are preflushed to reduce extractables.
GVS Polypropylene capsules are food compliant (FDA/EU), pass class VI toxicology testing and are integrity tested prior to shipment.
Capsule filters are available in sterile and non-sterile versions.
Calyx Capsules are available in small, medium or large with Polypropylene, PES, Nylon 66, or PTFE membrane and a Polypropylene or Polyester housing. Pore sizes range from 0.1 to 25 µm.

Centrifuge Filters

GVS centrifuge filters, Centrex, enables the end users to do a larger sample preparation, with a considerable reduction of contamination risk. Thanks to the GVS knowledge in filtration, the Centrex user avoids cross contamination during sample preparation or filtration.

Bottle-top Filters - ZapCap

GVS ZapCap, is the device for the filtration of samples, for cell culture media and HPLC solutions.
GVS offers a comprehensive line of Bottle-top Filters:
ZapCap-S - Filtration of cell culture media
Cellulose acetate membrane filters (CA) with extremely low protein binding for cell culture media and other aqueous solutions
Sterile filtration of solutions that cannot be autoclaved
ZapCap-S Plus - Sterile filtration and clarification of difficult-to-filter aqueous solutions
ZapCap-CR - Filtration of HPLC solutions

Extractor - Ethidium bromide (EtBr)

One-step filtration Polypropylene funnel device for the rapid removal of ethidium bromide from gel-staining solutions.
This disposable unit contains an activated carbon matrix, which removes > 99% of ethidium bromide from electrophoretic buffer quickly and easily. Each device can decontaminate up to 10 litres of gel-staining solution. After filtration, the decontaminated solution can be safely poured down the laboratory drain.
The extractor funnel device fits most standard laboratory flasks and bottles (neck size 33 to 45 mm), and the unit includes a cap for storage between uses. the polypropylene housing is chemically resistant to organics. also included in the package are glass fiber prefilters, which remove gel pieces and other debris to avoid premature clogging of the carbon filter.

Filter Holders for Membranes

To insure precise filtration, GVS offers a selection of filtration holders and apparatus that are designed to work with GVS membranes and are built to exacting standards. In most applications, the filter holder is just as important as the filter for accurate results every time. Filter holders are available for a wide variety of applications including air analysis, chemotaxis, tissue culturing and general aqueous and solvent filtration.

Syringe Filters

GVS offers a complete range of syringe filter connectors designed for an efficient filtration and easily handling. GVS can also provide different combinations to meet your needs.

Abluo and Cameo ensures fast and efficient filtration of your samples.

ABLUO

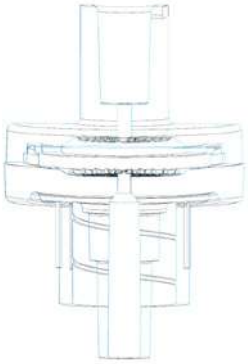
The Abluo Series is available in 13 mm and 33 mm sterile and non sterile with wide variety of membranes. Abluo is made with ultrasonic weld with two adaptor combinations available: FLL / MLL and FLL / MLS. The housing material can be acrylic or polypropylene to adapt your samples.

cameo

The Cameo series is available in 17 mm and 33 mm (Cameo Plus) non sterile. Cameo filters are designed with Polypropylene housing and overmolded ring.
Cameo filters are available with the adaptor combination of FLL/MLS.

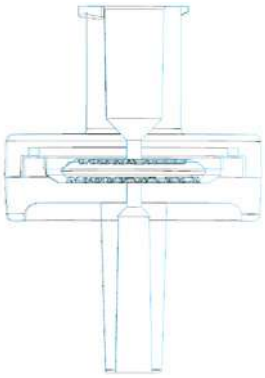
13mm Abluo CA

Ultrasonically welded



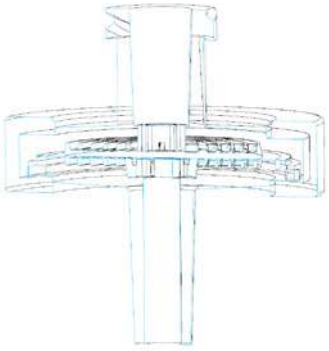
13mm Abluo RC

Ultrasonically welded



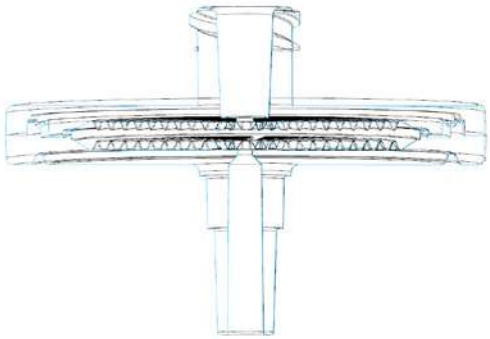
17mm Cameo

Overmolded



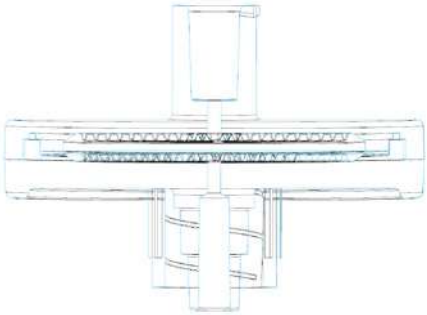
33mm Cameo Plus

Overmolded



33mm Abluo

Ultrasonically welded



Legend

Inlet Connector Female Luer Lock (FLL) (ISO 80369-7)
Outlet Connector, Male Luer Slip (MLS) or Male Luer Lock (MLL) (ISO 80369-7)

13 mm ABLUO Syringe Filters

Characteristics

Membrane Materials: Cellulose Acetate, Nitrocellulose (MCE), Nylon 66, PE, PES, PTFE, PVDF, Regenerated Cellulose
Membrane Diameter: 13 mm
Effective Filtration Area: 0.76 cm²
Housing Diameter: 18 mm
Housing Materials: Acrylic, Polypropylene, Ultrasonically welded
Inlet / Outlet: FLL / MLL-MLS
Holdup Volume: <50 microliter
Maximum Operating Temperature:
PP Abluo - 90°C / 194°F, Acrylic Abluo 50°C / 122°F
Maximum Operating Pressure: 80 psi
Sterile: No

Typical Applications

- Filtration of Aqueous, Organic and Alcohol Solutions
- Analytical Sample Preparation
- IC Chromatography
- Fuel Hydraulic Fluids and Machined Parts
- Clarification
- Protein Chemistry
- Cell Culture

Ordering information

Membrane Material	Pore Size (µm)	End Fitting	Housing Material	Color	Product Code
					Packaging 500/pk
Cellulose Acetate (CA)	0.22	FLL/MLL	Acrylic	Blue	FJ13ANCCA002DD01
Cellulose Acetate (CA)	0.45	FLL/MLL	Acrylic	Yellow	FJ13ANCCA004FD01
Cellulose Acetate (CA)	0.80	FLL/MLL	Acrylic	Green	FJ13ANCCA008ED01
Cellulose Acetate (CA)	1.20	FLL/MLL	Acrylic	Red	FJ13ANCCA012CD01
Cellulose Acetate (CA)	5.00	FLL/MLL	Acrylic	Brown	FJ13ANCCA050PD01
Nylon 66 (NY)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPNY002AD01
Nylon 66 (NY)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPNY004AD01
Nylon 66 (NY)	5.0	FLL/MLL	Acrylic	Transparent	FJ13ANCNY050AD01
Mixed Cellulose Esters (MCE)	0.22	FLL/MLS	Acrylic	Transparent	FJ13BNCNC002AD01
Mixed Cellulose Esters (MCE)	0.45	FLL/MLS	Acrylic	Transparent	FJ13BNCNC004AD01
Polyethersulfone (PES)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPS002AD01
Polyethersulfone (PES)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPPS004AD01
Polytetrafluoroethylene Hydrophilic (PTFE HP)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPH002AD01
Polytetrafluoroethylene Hydrophilic (PTFE HP)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPPH004AD01
Polyethylene (PE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPE002AD01
Polyethylene (PE)	0.50	FLL/MLS	Polypropylene	Transparent	FJ13BNPPE005AD01
Regenerated Cellulose (RC)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPRC002AD01
Regenerated Cellulose (RC)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPRC004AD01
Polyvinylidene Fluoride (PVDF)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPV002AD01
Polyvinylidene Fluoride (PVDF)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPPV004AD01
Polytetrafluoroethylene (PTFE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPT002AD01
Polytetrafluoroethylene (PTFE)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPPT004AD01

17 mm CAMEO Syringe Filters

Characteristics

Membrane Materials: Cellulose Acetate, Nylon 66, PES, Polypropylene, PTFE, PVDF, Glass Fiber/Nylon, Glass Fiber/PP, Glass Fiber/PTFE
Membrane Diameter: 17 mm
Effective Filtration Area: 1.4 cm^2
Housing Diameter: 22 mm
Housing Material: Polypropylene Overmolded
Inlet / Outlet: FLL-MLS
Holdup Volume: <40 microliter
Maximum Operating Temperature: 82°C / 180°F
Maximum Operating Pressure: 80 psi
Sterile: No

Typical Applications

- Analytical Sample Preparation
- Dissolution testing
- Content uniformity
- Environmental samples
- Composite assays
- Food analysis
- Biofuel analysis

Ordering information

Membrane Material	Pore Size (µm)	End Fitting	Housing Material	Color	Product Code			
					Packaging 50/pk	Packaging 200/pk	Packaging 500/pk	Packaging 1000/pk
Cellulose Acetate (CA)	0.22	FLL/MLS	Polypropylene	Transparent	1225617	1225618	1225619	1233871
Cellulose Acetate (CA)	0.45	FLL/MLS	Polypropylene	Transparent	1225620	1225622	1225623	1233882
Nylon 66 (NY)	0.22	FLL/MLS	Polypropylene	Transparent	1224746	1224747	1224748	1229460
Nylon 66 (NY)	0.45	FLL/MLS	Polypropylene	Transparent	1224753	1224754	1224755	1229462
Nylon 66 (NY)	1.20	FLL/MLS	Polypropylene	Transparent	1224760	1224761		
Nylon 66 (NY)	5.00	FLL/MLS	Polypropylene	Transparent	1224763	1224764	1224765	1229464
Polyethersulfone (PES)	0.22	FLL/MLS	Polypropylene	Transparent	1233547			1233544
Polyethersulfone (PES)	0.45	FLL/MLS	Polypropylene	Transparent	1233548			1233545
Polypropylene (PP)	0.22	FLL/MLS	Polypropylene	Transparent	1224808	1224809	1224810	1229452
Polypropylene (PP)	0.45	FLL/MLS	Polypropylene	Transparent	1224811	1224812	1224813	1229454
Polytetrafluoroethylene (PTFE)	0.22	FLL/MLS	Polypropylene	Transparent	1224780	1224781	1224782	1229447
Polytetrafluoroethylene (PTFE)	0.45	FLL/MLS	Polypropylene	Transparent	1224787	1224788	1224789	1229449
Polyvinylidene Fluoride (PVDF)	0.22	FLL/MLS	Polypropylene	Transparent				3049952
Polyvinylidene Fluoride (PVDF)	0.45	FLL/MLS	Polypropylene	Transparent	3023135			3023187
Glass Fiber/Nylon (GF/NY)	0.22	FLL/MLS	Polypropylene	Transparent	1224766	1224767	1224768	
Glass Fiber/Nylon (GF/NY)	0.45	FLL/MLS	Polypropylene	Transparent	1224773	1224774	1224775	1229479
Glass Fiber/Polypropylene (GF/PP)	0.22	FLL/MLS	Polypropylene	Transparent	1224814	1224815		1229473
Glass Fiber/Polypropylene (GF/PP)	0.45	FLL/MLS	Polypropylene	Transparent	1224817	1224818		
Glass Fiber/PTFE	0.22	FLL/MLS	Polypropylene	Transparent	1224794	1224795	1224796	1229469
Glass Fiber/PTFE	0.45	FLL/MLS	Polypropylene	Transparent	1224801	1224802	1224803	1229471

33 mm ABLUO Syringe Filters

Characteristics

Membrane Materials: Cellulose Acetate, Glass Fiber, Nitrocellulose (MCE), Nylon 66, PES, Polyethylene, PTFE, PVDF, Regenerated Cellulose
Housing Diameter: 33 mm
Membrane Diameter: 25 mm
Effective Filtration Area: 4.6 cm²
Housing Materials: Acrylic, Polypropylene Ultrasonically welded
Inlet / Outlet: FLL / MLL-MLS
Holdup Volume: <100 microliter
Maximum Operating Temperature:
PP Abluo - 90°C / 194°F, Acrylic Abluo 50°C / 122°F
Maximum Operating Pressure: 80 psi
Sterile: No

Typical Applications

- Analytical sample preparation
- Biological fluids
- Buffer solutions
- Sterile filtering of tissue culture media
- Protein aqueous solutions
- Biofuel analysis
- HPLC sample preparation
- Pesticide testing
- Cannabis potency testing
- Neutraceutical sample preparation

Ordering information

Membrane Material	Pore Size (µm)	End Fitting	Housing Material	Color	Product Code
					Packaging 500/pk
Cellulose Acetate (CA)	0.22	FLL/MLL	Acrylic	Blue	FJ25ANCCA002DD01
Cellulose Acetate (CA)	0.45	FLL/MLL	Acrylic	Yellow	FJ25ANCCA004FD01
Cellulose Acetate (CA)	0.80	FLL/MLL	Acrylic	Green	FJ25ANCCA008ED01
Cellulose Acetate (CA)	1.20	FLL/MLL	Acrylic	Red	FJ25ANCCA012CD01
Cellulose Acetate (CA)	5.00	FLL/MLL	Acrylic	Brown	FJ25ANCCA050PD01
Nylon 66 (NY)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPNY002AD01
Nylon 66 (NY)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPNY004AD01
Polyethersulfone (PES)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPS002AD01
Polyethersulfone (PES)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPPS004AD01
Mixed Cellulose Esters (MCE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPNC002AD01
Mixed Cellulose Esters (MCE)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPNC004AD01
Regenerated Cellulose (RC)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPRC002AD01
Regenerated Cellulose (RC)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPRC004AD01
Polyvinylidene Fluoride (PVDF)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPV002AD01
Polyvinylidene Fluoride (PVDF)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPPV004AD01
Polytetrafluoroethylene (PTFE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPT002AD01
Polytetrafluoroethylene (PTFE)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPPT004AD01
Polytetrafluoroethylene Hydrophilic (PTFE HP)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPH002AD01
Polytetrafluoroethylene Hydrophilic (PTFE HP)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPPH004AD01
Polyethylene (PE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPE002AD01
Polyethylene (PE)	0.50	FLL/MLS	Polypropylene	Transparent	FJ25BNPPE005AD01
Glass Fiber (GF)	0.70	FLL/MLS	Polypropylene	Transparent	FJ25BNPGF007AD01
Glass Fiber (GF)	1.00	FLL/MLS	Polypropylene	Transparent	FJ25BNPGF010AD01
Glass Fiber (GF)	1.20	FLL/MLS	Polypropylene	Transparent	FJ25BNPGF012AD01
Glass Fiber (GF)	3.10	FLL/MLS	Polypropylene	Transparent	FJ25BNPGF031AD01

33 mm CAMEO PLUS Syringe Filters

Characteristics

Membrane Material: Cellulose Acetate, Glass Fiber, Nylon 66, PES, Polypropylene, PTFE, PVDF, Glass Fiber/CA, Glass Fiber/NY66, Glass Fiber/PE, Glass Fiber/PP, Glass Fiber/PTFE.
Housing Diameter: 33 mm
Membrane Diameter: 30 mm
Effective Filtration Area: 4.8 cm^2
Housing Material: Polypropylene Overmolded
Inlet / Outlet: FLL-MLS
Holdup Volume: <100 microliter
Maximum Operating Temperature: 82°C / 180°F
Maximum Operating Pressure: 80 psi
Sterile: No

Typical Applications

- Analytical sample preparation
- Dissolution testing
- Content uniformity
- Environmental samples
- Composite assays
- Food analysis
- Biofuel analysis

Ordering information

Membrane Material	Pore Size (µm)	End Fitting	Housing Material	Color	Product Code			
					Packaging 50/pk	Packaging 200/pk	Packaging 500/pk	Packaging 1000/pk
Cellulose Acetate (CA)	0.22	FLL/MLS	Polypropylene	Transparent	1213641	1213192	1214014	1229443
Cellulose Acetate (CA)	0.45	FLL/MLS	Polypropylene	Transparent	1214778	1214932	1214966	1229444
Cellulose Acetate (CA)	0.80	FLL/MLS	Polypropylene	Transparent	1226939	1226941	1226940	1229445
Glass Fiber (GF)	1.00	FLL/MLS	Polypropylene	Transparent	1227204		1227205	1229451
Glass Fiber (GF)	0.70	FLL/MLS	Polypropylene	Transparent	1227207			1227208
Nylon 66 (NY)	0.10	FLL/MLS	Polypropylene	Transparent	1224100	1224101	1224103	
Nylon 66 (NY)	0.22	FLL/MLS	Polypropylene	Transparent	1224104	1224105	1224106	1229461
Nylon 66 (NY)	0.45	FLL/MLS	Polypropylene	Transparent	1224112	1224113	1224114	1226917
Nylon 66 (NY)	1.20	FLL/MLS	Polypropylene	Transparent	1224119	1224120	1224121	1229463
Nylon 66 (NY)	5.00	FLL/MLS	Polypropylene	Transparent	1224124	1224125	1224126	1229465
Polyethersulfone (PES)	0.22	FLL/MLS	Polypropylene	Transparent	1233549			1233541
Polyethersulfone (PES)	0.45	FLL/MLS	Polypropylene	Transparent	1233550		1233551	1233543
Polypropylene (PP)	0.22	FLL/MLS	Polypropylene	Transparent	1224172	1224173	1224174	
Polypropylene (PP)	0.45	FLL/MLS	Polypropylene	Transparent	1224310	1224311	1224312	1229458
Polytetrafluoroethylene (PTFE)	0.22	FLL/MLS	Polypropylene	Transparent	1224143	1224144	1224145	1229448
Polytetrafluoroethylene (PTFE)	0.45	FLL/MLS	Polypropylene	Transparent	1224150	1224151	1237721	1229450
Polyvinylidene Fluoride (PVDF)	0.22	FLL/MLS	Polypropylene	Transparent	3038551			3038552
Polyvinylidene Fluoride (PVDF)	0.45	FLL/MLS	Polypropylene	Transparent	3020528		3020351	3023084
Glass Fiber/Cellulose Acetate	0.22	FLL/MLS	Polypropylene	Transparent	1226942		1226943	1229466
Glass Fiber/Cellulose Acetate	0.45	FLL/MLS	Polypropylene	Transparent	1226945		1226946	1229467
Glass Fiber/Cellulose Acetate	0.80	FLL/MLS	Polypropylene	Transparent			1226950	
Glass Fiber/Nylon 66	0.10	FLL/MLS	Polypropylene	Transparent				1229480
Glass Fiber/Nylon 66	0.22	FLL/MLS	Polypropylene	Transparent	1224127	1224128	1224129	1229478
Glass Fiber/Nylon 66	0.45	FLL/MLS	Polypropylene	Transparent	1224135	1224136	1224137	1226916
Glass Fiber/Polyethersulfone	0.45	FLL/MLS	Polypropylene	Transparent	3050121		3050122	
Glass Fiber/Polypropylene	0.22	FLL/MLS	Polypropylene	Transparent	1224175	1224176	1224177	
Glass Fiber/Polypropylene	0.45	FLL/MLS	Polypropylene	Transparent	1224313	1224314	1224315	
Glass Fiber/PTFE	0.22	FLL/MLS	Polypropylene	Transparent	1224157	1224158	1224159	
Glass Fiber/PTFE	0.45	FLL/MLS	Polypropylene	Transparent	1224164	1224165	1224166	1229472

13 mm STERILE ABLUO Syringe Filters

Characteristics

Membrane Materials: Cellulose Acetate, PES, PVDF
Housing Diameter: 18 mm
Membrane Diameter: 13 mm
Effective Filtration Area: 0.76 cm²
Housing Material: Acrylic Ultrasonically welded
Inlet / Outlet: FLL / MLL-MLS
Holdup Volume: <50 microliter
Maximum Operating Temperature: 50°C / 122°F
Maximum Operating Pressure: 80 psi
Sterile: Yes

Typical Applications

- Filtration of Aqueous Solutions
- Analytical Sample Preparation
- IC Chromatography
- Sterile Filtration and Clarification
- Protein Chemistry
- Cell Culture
- Clarification

Ordering information

Membrane Material	Pore Size (µm)	End Fitting	Housing Material	Color	Product Code
					Packaging 50/pk
Cellulose Acetate (CA)	0.22	FLL/MLL	Acrylic	Blue	FJ13ASCCA002DL01
Cellulose Acetate (CA)	0.45	FLL/MLL	Acrylic	Yellow	FJ13ASCCA004FL01
Cellulose Acetate (CA)	0.80	FLL/MLL	Acrylic	Green	FJ13ASCCA008EL01
Cellulose Acetate (CA)	1.20	FLL/MLL	Acrylic	Red	FJ13ASCCA012CL01
Cellulose Acetate (CA)	5.00	FLL/MLL	Acrylic	Brown	FJ13ASCCA050PL01
Polyethersulfone (PES)	0.22	FLL/MLS	Acrylic	Transparent	FJ13BSCPS002AL01
Polyethersulfone (PES)	0.45	FLL/MLS	Acrylic	Transparent	FJ13BSCPS004AL01
Polyvinylidene Fluoride (PVDF)	0.22	FLL/MLS	Acrylic	Transparent	FJ13BSCPV002AL01
Polyvinylidene Fluoride (PVDF)	0.45	FLL/MLS	Acrylic	Transparent	FJ13BSCPV004AL01

33 mm STERILE ABLUO Syringe Filters

Characteristics

Membrane Materials: Cellulose Acetate, Nylon, PES, PVDF, Nitrocellulose (MCE).
Housing Diameter: 33 mm
Membrane Diameter: 25 mm
Housing Material: Acrylic Ultrasonically welded
Effective Filtration Area: 4.6 cm²
Inlet / Outlet: FLL / MLL-MLS
Holdup Volume: <100 microliter
Maximum Operating Temperature: 50°C / 122°F
Maximum Operating Pressure: 80 psi
Sterile: Yes

Typical Applications

- Filtration of Aqueous and Alcohol Solutions
- Sterile Filtration and Clarification
- Cell Culture
- Protein Chemistry
- Filtration of Aqueous and Organic Solutions

Ordering information

Membrane Material	Pore Size (µm)	End Fitting	Housing Material	Color	Product Code
					Packaging 50/pk
Cellulose Acetate (CA)	0.22	FLL/MLS	Acrylic	Transparent	FJ25BSCCA002AL01
Cellulose Acetate (CA)	0.45	FLL/MLS	Acrylic	Transparent	FJ25BSCCA004AL01
Cellulose Acetate (CA)	0.80	FLL/MLS	Acrylic	Transparent	FJ25BSCCA008AL01
Cellulose Acetate (CA)	0.22	FLL/MLL	Acrylic	Blue	FJ25ASCCA002DL01
Cellulose Acetate (CA)	0.45	FLL/MLL	Acrylic	Yellow	FJ25ASCCA004FL01
Cellulose Acetate (CA)	0.80	FLL/MLL	Acrylic	Green	FJ25ASCCA008EL01
Cellulose Acetate (CA)	1.20	FLL/MLL	Acrylic	Red	FJ25ASCCA012CL01
Cellulose Acetate (CA)	5.00	FLL/MLL	Acrylic	Brown	FJ25ASCCA050PL01
Mixed Cellulose Esters (MCE)	0.22	FLL/MLS	Acrylic	Transparent	FJ25BSCNC002AL01
Mixed Cellulose Esters (MCE)	0.45	FLL/MLS	Acrylic	Transparent	FJ25BSCNC004AL01
Nylon 66 (NY)	0.10	FLL/MLS	Acrylic	Transparent	FJ25BSCNY001AL01
Nylon 66 (NY)	0.22	FLL/MLS	Acrylic	Transparent	FJ25BSCNY002AL01
Nylon 66 (NY)	0.45	FLL/MLS	Acrylic	Transparent	FJ25BSCNY004AL01
Nylon 66 (NY)	1.20	FLL/MLS	Acrylic	Transparent	FJ25BSCNY012AL01
Nylon 66 (NY)	5.00	FLL/MLS	Acrylic	Transparent	FJ25BSCNY050AL01
Polyethersulfone (PES)	0.80	FLL/MLS	Acrylic	Transparent	FJ25BSCPS008AL01
Polyethersulfone (PES)	0.22	FLL/MLS	Acrylic	Transparent	FJ25BSCPS002AL01
Polyethersulfone (PES)	0.45	FLL/MLS	Acrylic	Transparent	FJ25BSCPS004AL01
Polyvinylidene Fluoride (PVDF)	0.22	FLL/MLS	Acrylic	Transparent	FJ25BSCPV002AL01
Polyvinylidene Fluoride (PVDF)	0.45	FLL/MLS	Acrylic	Transparent	FJ25BSCPV004AL01

50 mm Vent Filter

Characteristics

Membrane: hydrophobic PTFE reinforced with polypropylene
Porosities: 0.45 µm or 0.20 µm
Housing: Polypropylene Ultrasonically welded
Connectors: 6 mm ($^1/_4$ in) to 12 mm ($^1/_2$ in) stepped barb
Filter Area: 19.6 cm^2
Air Flow Rate: 32 L/min at 1 bar (0.45 µm), 27 L/min at 1 bar (0.20 µm)
Housing Diameter: 63 mm
Housing Length: 53 mm
Maximum Pressure: 3.5 bar (approx. 50 psi)
Sterilization: Autoclave at 121°C or ETO

Typical Applications

- Sterile venting of filling vessels and carboys
- Autoclave venting
- Low volume sterile filtration of non-aqueous fluids
- In-line sterilization of and particulate removal from air and gases

Vent Filter - Non Sterile
Ordering information

Membrane Material	Pore Size (µm)	End Fitting	Housing Material	Color	Product Code
					Packaging 100/pk
PTFE	0.20	Barb Connectors	Polypropylene	Transparent	VF50ANPPT002AC01
PTFE	0.45	Barb Connectors	Polypropylene	Transparent	VF50ANPPT004AC01

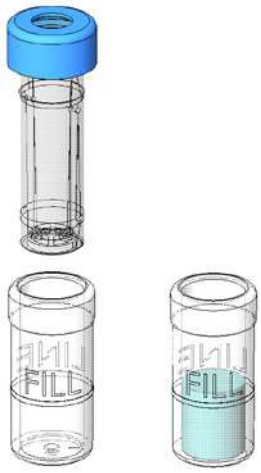
Vent Filter - Sterile
Ordering information

Membrane Material	Pore Size (µm)	End Fitting	Housing Material	Color	Product Code
					Packaging 10/pk
PTFE	0.20	Barb Connectors	Polypropylene	Transparent	VF50ASPPT002AX01
PTFE	0.45	Barb Connectors	Polypropylene	Transparent	VF50ASPPT004AX01

Syringeless Filters - SEPARA®

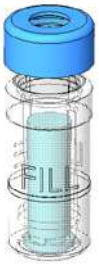
Save time and money in sample preparation process with SEPARA® syringeless filters. The single step filtering process is efficient, simple to use, easy to press and fast.

SEPARA Syringeless filter is one step sample preparation device and integrates a device auto-sampler, filtration membrane, plug and cap/septa. The device consists of two parts: an internal vial with a membrane chamber and an external vial to be filled with filtrate. The internal vial has a sealed membrane and a cap with a pre-cut septa.
The liquid is placed in the external vial and dispensed by pressing the internal vial. This pushes the liquid through the membrane. The sample is then filtered and the SEPARA is ready to be loaded in the auto-sampler.



Sample filling

Press down to filter sample



Filtered sample ready for analysis

Features & Benefits

- Rapid sample preparation
- Single step process, filtering with a plunger in the vial
- Sample ready to use after filtration
- Pre-slitted cap ensures easy and clean sample transfer
- Replace syringe, syringe filter, glass vial and cap, reducing waste
- Increase sample integrity with all-in vial and filter
- Compatible with any auto-sampler that takes a standard (12mm x 32mm profile)
- Compatible with multi-compressors

Characteristics

Dimensions: 12 mm diameter x 32 mm height
Materials: Polypropylene, with PTFE and silicone septa
Fill Line Volume: 480 microliter
Filtering Capacity: 450 microliter
Dead Volume: 30 microliter
Compression Force: 8 psi (0.6 bar)
Maximum operating temperature: 120°F (50°C)

Ordering information

Membrane Material	Pore Size (µm)	Color	Product Code 100/pk
Polytetrafluoroethylene (PTFE)	0.20	Pink	MV32ANPPT002TC01
Polytetrafluoroethylene (PTFE)	0.45	Red	MV32ANPPT004CC01
Regenerated Cellulose (RC)	0.20	Gray	MV32ANPRC002GC01
Regenerated Cellulose (RC)	0.45	Black	MV32ANPRC004LC01
Nylon 66 (NY)	0.20	Light Blue	MV32ANPNY002BC01
Nylon 66 (NY)	0.45	Blue	MV32ANPNY004UC01
Polyvinylidene Fluoride (PVDF)	0.20	Yellow	MV32ANPPV002FC01
Polyvinylidene Fluoride (PVDF)	0.45	Orange	MV32ANPPV004IC01
Polyethersulfone (PES)	0.20	Light Green	MV32ANPPS002EC01
Polyethersulfone (PES)	0.45	Dark Green	MV32ANPPS004WC01

Calyx

GVS capsules are disposable filtration units designed for the removal of particles or bacteria from aqueous or solvent solutions and gas streams. They are ready to use, eliminating the need to disassemble, clean and reassemble filter housings. GVS capsules contain no glue or surfactants and feature serial layer filter design for increased throughput and extended life. Two upstream vents are included to facilitate venting in any position. All capsules containing membrane media are preflushed with purified water to reduce extractables. GVS capsules made with Polypropylene housings are food compliant (FDA/EU), as restrictions may apply depending on final application, it is end user's responsibility to determine full compliance. All capsules pass class VI toxicology testing and are integrity tested prior to shipment. Capsule filters are available in sterile and non-sterile versions.
The capsules are available with the following connections: 3/8 inch hose barb, 1/4 to 1/2 inch stepped hose barb, 1/4 inch NPTM, 1/2 inch NPTM, and 1.5 inch sanitary flange.

Available filter medias: PES, Polypropylene, Nylon 66, PTFE
Available housing material: Polypropylene, Polyester
Cage and Core: Polypropylene
Endcaps: Polypropylene, polyester
Media Support: Polypropylene, polyester
All units are packaged in low particulate plastic bags and individual boxes.
Sterile units are shrink wrapped and include a sterility indicator.

Dimensions

Diameter: 3.5" (9 cm)		
Capsule Size	Nominal Effective Filtration Area	Total Length Connector end-to-end[1]
Small	0.8 ft^2 (748 cm^2)	3.5 - 4.7" (9 - 13 cm)
Medium	3.0 ft^2 (2806 cm^2)	7.6 - 8.8" (19 - 23 cm)
Large	5.9 ft^2 (5500 cm^2)	11.5 - 12.7" (29 - 33 cm)

[1]Varies with connection style

Operational Limits

Maximum Operational Pressure	80psi (5.5 bar) @ 70°F (21°C) in Liquid 50psi (3.8 bar) @ 70°F (21°C) in Gas
Maximum Differential Pressure	60psi (4.1 bar) @70°F (21°C)
Maximum Operating Temperature	110°F (43°C) @ ≤ 30 psi (2.1 bar) Operating Pressure
Autoclavable, PP Housing	110°F (121°C), 15psi, 30 minutes, up to 5 cycles

Media selection Guide

Polypropylene Hydrophobic Media: For Pure Chemical Fitration of Etchants, Photoresists, Developers, Solvents, Acids, Bases, and Fine Chemicals. Also for Vent/Process Air Filtration.

Teflon (PTFE) Hydrophobic Media: For Chemical and Vent Filtration, Acids, Base and Oxidant Filtration, Bulk Chemical, Electronics Grade Chemical Filtration, Sterile Venting, Process Air and Gas Filtration.

Polyethersulfone (PES) Hydrophilic Media: For Low Protein Binding and Broad Chemical Compatibility. ideal for Filtration of Acids, Bases, Oxidants, Serums, Solvents, Fine chemicals, Plating Solutions, Beverages, Electronics, Biologics, Lacquers, Parts Cleaning, Tissue Culture Media, Pharmaceutical Intermediates, Fine Inks and Dyes, Point of Use filtration for Process Water.

Nylon 66 Hydrophilic Media: Double Layer Media with a larger micron prefilter and second final filtration layer. For Beverages, Cosmetics, Electronics, Fine and Bulk Chemicals, Pharmaceuticals. Solvents, Fine chemicals, Ink Jets, Process Water, Parts Cleaning, Electronics, Biologics, Dyes, Lacquers. Avoid Acidic Solutions.

PP and PTFE media available in Polypropylene housings. Polypropylene housings may be repeatedly autoclaved for up to 5 cycles.

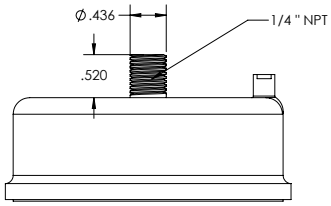
Nylon and PES media available in Polyester Housings. PES media also available in a PP housing by request.

Standard available combinations are shown in the tables below. Contact your local GVS sales representative for alternate solutions.

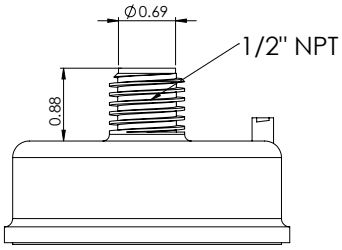
Adaptors Selection Guide

Unit of measure: inch

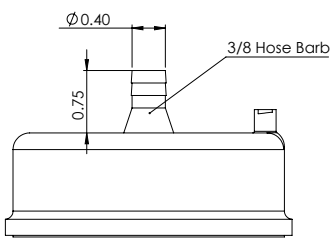
¼ in NPT male (R)



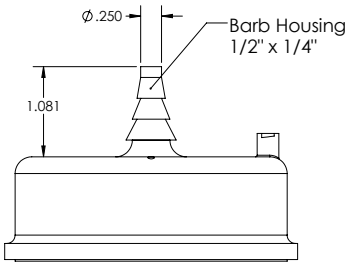
½ in NPT male (W)



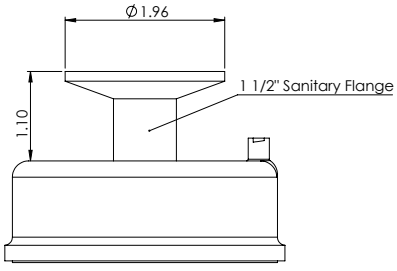
3/8 in hose barb (M)



¼ - ½ in stepped hose barb (L)



1.5 in sanitary flange (Y)



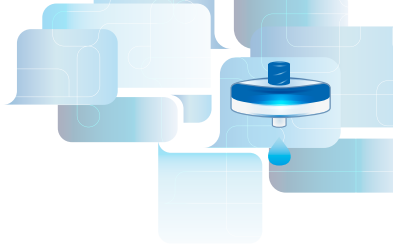
Polypropylene Filter Media - Hydrophobic - Polypropylene housing: Ordering information

Pore Size µm	Filtration area ft² (cm²)	Length in (cm)	Adaptors: L=¼ - ½ in stepped hose barb; M= 3/8 in hose barb; R=¼in NPT male; Y=1.5 in sanitary flange; W=½ in NPT male				
			LL	MM	RR	WW	YY
0.22	0.8 (748)	3.5 (9)			1213584 1213941*		
		4.0 (10)	1212949	1213578			
		4.3 (11)				1212929	
		4.7 (12)					1212971
0.22	3.0 (2808)	8.4 (21)				1213057	
0.22	5.9 (5500)	11.5 (29)			1213089		
		12.3 (31)				1213893** 1213090	
		12.7 (32)					1213091
0.45	0.8 (748)	3.5 (9)			1213596		
		4.0 (10)	1212950	1213591			
		4.3 (11)				1212930	
		4.7 (12)					1212972
1.2	0.8 (748)	3.5 (9)			1213611		
		4.0 (10)	1212951				
		4.3 (11)				1212932	
1.2	5.9 (5500)	11.5 (29)			1213100		
		12.3 (31)				1213101	
5.0	0.8 (748)	3.5 (9)			1213620		
		4.0 (10)	1212953	1213619			
		4.7 (12)					1212975
		8.8 (22)					1213080
		12.7 (32)					1213113
10.0	0.8 (748)	3.5 (9)			1213622		
		4.0 (10)		1213621			
10.0	3.0 (2808)	8.1 (20)		1213081			
25.0	0.8 (748)	3.5 (9)			1213617		
25.0	3.0 (2808)	7.6 (20)			1220684		
25.0	5.9 (5500)	12.3 (31)				1215179	

*sterile product
** PP Membrane

PTFE Capsule Filters - Hydrophobic - Polypropylene housing: Ordering information

Pore Size µm	Filtration area ft² (cm²)	Length in (cm)	Adaptors: L=¼ - ½ in stepped hose barb; M= 3/8 in hose barb; R=¼ in NPT male; Y=1.5 in sanitary flange; W=½ in NPT male			
			MM	RR	WW	YY
0.1	0.8 (748)	3.5 (9)		1213160		
0.2	0.8 (748)	3.5 (9)		1213158		
		4.0 (10)	1213155			
		4.3 (11)			1212937	
		4.7 (12)				1212978
0.2	5.9 (5500)	11.5 (29)		1212987		
0.4	0.8 (748)	3.5 (9)		1213161		
0.4	5.9 (5500)	11.5 (29)		1212992		



Nylon 66 Filter Media - Polyester housing: Ordering information

Pore Size µm	Filtration area ft² (cm²)	Length in (cm)	Adaptors: L=¼ - ½ in stepped hose barb; M= 3/8 in hose barb; R=¼in NPT male; Y=1.5 in sanitary flange; W=½ in NPT male				
			LL	MM	RR	WW	YY
0.1	0.8 (748)	3.5 (9)			1213540 1213671		
		4.0 (10)	1212939	1213529			
0.1	3.0 (2080)	8.8 (22)					1221768
0.1	5.9 (5500)	11.5 (29)			1212899		
0.2	0.8 (748)	3.5 (9)			1213561		
		4.0 (10)		1213550 1213757* 1214448*			
0.2	5.9 (5500)	11.5 (29)			1212905		
0.4	0.8 (748)	3.5 (9)			1213577		
		4.0 (10)		1214457			
0.4	5.9 (5500)	11.5 (29)			1212910		
		12.0 (30)		1212908			
		12.3 (31)				1212911	

*sterile product

PES Polyethersulfone Filter Media - Polyester housing: Ordering information

Pore Size µm	Filtration area ft² (cm²)	Length in (cm)	Adaptors: L=¼ - ½ in stepped hose barb; M= 3/8 in hose barb; R=¼in NPT male; Y=1.5 in sanitary flange; W=½ in NPT male				
			LL	MM	RR	WW	YY
0.1	0.8 (748)	3.5 (9)			1222323		
0.2	0.8 (748)	3.5 (9)			1213608 1214001*		
		4.0 (10)	1214225*				
		4.3 (11)				1225346	
		4.7 (12)					1213956
0.2	3.0 (2808)	4.0 (10)	1214436*				
		8.4 (21)				1215154 1223845*	
		8.8 (22)					1222327
0.45	0.8 (748)	3.5 (9)			1213610		
		4.0 (10)	1214227*				
0.45	3.0 (2808)	8.1 (20)	1222432*				
0.45		8.8 (22)					1215030

Pore Size µm	Filtration area ft² (cm²)	Length in (cm)	Adaptors: L=¼ - ½ in stepped hose barb; M= 3/8 in hose barb; R=¼in NPT male; Y=1.5 in sanitary flange; W=½ in NPT male	
			RM	WM
0.2	0.8 (748)	4.0 (10)	1223129**	
	3.0 (2808)	8.2 (21)		1235556***

* sterile product
** PE Housing
*** PP Housing

Centrifuge Filters - Centrex™

GVS centrifuge filters, Centrex, has various type of membranes and make able the end users to do a larger sample preparation, with a considerable reduction of contamination risk. Thanks to the GVS knowledge in filtration, using Centrex you can reduce the risk of cross contamination.

Characteristics

- Centrifugal filter units with various types of membrane filter
- Rapid and simple preparation of a large number of samples
- Ideal for automated systems and high-speed batch filtration with robots
- Considerably reduced contamination risk when working with radioactive biologically hazardous material
- Cross contamination avoided
- Receiver Tubes 1.5 or 5 mL
- Housing Material Polypropylene

Typical Applications

- 0.45 µm cellulose acetate membrane for the rapid elution of agarose gels
- Nylon 66 and cellulose acetate membranes for the removal of particles and microorganisms from HPLC samples
- Sample preparation for quality control
- Cellulose acetate and nitrocellulose membrane for rapid clearing and filtration of aqueous solutions

Ordering information

Membrane	Pore Size (µm)	Color	1.5 mL Sterile	1.5 mL non-Sterile	5 mL Sterile	5 mL non-Sterile
			50/pk	250/pk	50/pk	250/pk
Nylon 66	0.2	Brown	10467003		10467015	10467010
Nylon 66	0.45	Tan	10467007	10467002	10467021	10467012
Cellulose Acetate	0.2	Blue	10467004	10467009	10467013	
Cellulose Acetate	0.45	White	10467006	10467011	10467017	
Cellulose Acetate	0.8	Green	10467008			
Nitrocellulose	0.2	Pink	10467001			
Nitrocellulose	0.45	Rust	10467005		10467019	

Bottle-top Filters - ZapCap™

GVS Bottle-top Filters is ideal solution for the filtration of cell culture media and HPLC media solution. ZapCap is a complete 500 mL filtration unit to connect with receiver bottles. ZapCap are equipped with side tubing nozzle (bottle-top). This ready to use filter is available with prefilter too. The connection seals fit on any standard bottle 33 to 45 mm and the membrane diameter is 76 mm with an effective area of filtration of 39.2 cm^2. Can be used up to 50ºC.

ZapCap™ Selection Guide

- ZapCap-S with included package of 12 glass fiber prefilter for high flow rates
- ZapCap-S Plus with a glass fiber prefilter for very high flow rates already inserted into the housing.
- ZapCap-CR, the chemical-resistant bottle-top filter

Typical Applications

ZapCap-S - Filtration of cell culture media

- Cellulose acetate membrane filters (CA) with extremely low protein binding for cell culture media and other aqueous solutions. Sterile filtration of solutions that cannot be autoclaved

ZapCap-S Plus - Sterile filtration and clarification of difficult-to-filter aqueous solutions

ZapCap-CR - Filtration of HPLC solutions

- Polyamide Nylon 66 membrane filters (NY) for the retention of particles ≥ 0.2 µm in HPLC/FPLC solutions when the column packing is ≤ 10 µm
- PTFE membrane filters for the retention of particles ≥ 0.45 µm in organic solutions; strong acids or aldehydes

Ordering information

Membrane Material	Pore Size (µm)	Housing Material	Description	Quantity	Product Code
Cellulose Acetate	0.2	Polystyrene	ZapCap-S / Sterile	12/pk	10443401
Cellulose Acetate	0.45	Polystyrene	ZapCap-S / Sterile	12/pk	10443411
Cellulose Acetate with glass fiber prefilter	0.2	Polystyrene	ZapCap-S PLUS / Sterile	12/pk	10443430
Cellulose Acetate with glass fiber prefilter	0.45	Polystyrene	ZapCap-S PLUS / Sterile	12/pk	10443435
Nylon 66	0.2	Polypropylene	ZapCap-CR / Non Sterile	12/pk	10443421
Nylon 66	0.45	Polypropylene	ZapCap-CR / Non Sterile	12/pk	10443423
PTFE	0.45	Polypropylene	ZapCap-CR / Non Sterile	12/pk	10443425

Extractor

Extractor - Ethidium bromide (EtBr) waste reduction system

One-step filtration polypropylene funnel device for the rapid removal of ethidium bromide from gel-staining solutions. This disposable unit contains an activated carbon matrix, which removes > 99% of ethidium bromide from electrophoretic buffer quickly and easily. Each device can decontaminate up to 10 litres of gel-staining solution. After filtration, the decontaminated solution can be safely poured down the laboratory drain. The extractor funnel device fits most standard laboratory flasks and bottles (neck size 33 to 45 mm), and the unit includes a cap for storage between uses. The polypropylene housing is chemically resistant to organics. Also included in the package are glass fiber prefilters, which remove gel pieces and other debris to avoid premature clogging of the carbon filter.

Ordering information

Product Code	Quantity	Description
10448030	2/pk	Ethidium Bromide Extractor Waste System, Polypropylene
10448031	6/pk	Ethidium Bromide Extractor Waste System, Polypropylene

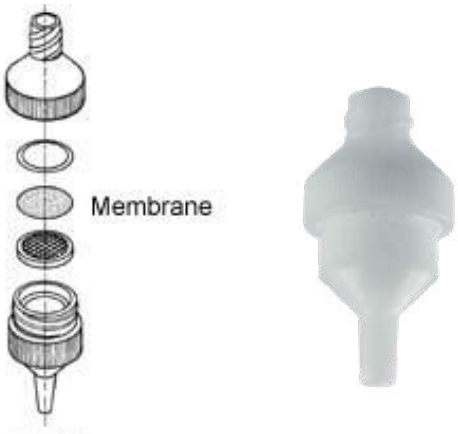
Filter Holders for Membranes

GVS offers a selection of filtration holders and apparatus that are designed to ensure precise filtration work with GVS membranes. In most applications, the filter holder is just as important as the filter for accurate results every time. Filter holders are available for a wide variety of applications including air analysis, chemotaxis, tissue culturing and general aqueous and solvent filtration.
Available products are: 13, 25, and 47 mm Filter Holder, and 47 mm Gravi-Seal.

Product Selection Guide: Filter Holders

Specifications	13 mm	25 mm	47 mm
Materials	Celcon (acetal copolymer)	Polypropylene - body & support	Polypropylene - body & support
O-rings	PTFE	Silicone	Silicone
Filter Size	13 mm	25 mm	47 mm
Prefilter Cap size	10 mm	21 mm	42 mm
Filtration Area	0.8 cm^2	3.5 cm^2	13.5 cm^2
Diameter	16 mm (0.6 in)	30 mm (1.2 in)	65.0 mm (2.6 in)
Height	35 mm (1.4 in)	30 mm (1.2 in)	50 mm (2.0 in)
Maximum Liquid Temperature	80°C (176°F)	80°C (176°F)	80°C (176°F)
Differential Pressure	2.8 bar (40 psi)	2.9 bar (42 psi)	4.9 bar (71 psi)
Autoclaving	15 minutes at 121°C (250°F) and 15 psi	20 minutes at 121°C (250°F) and 15 psi	20 minutes at 121°C (250°F) and 15 psi
Connections, Inlet	Female Luer Lock	Female Luer Lock	1/4 inch NPTM, Female Luer Slip
Connections, Outlet	Male Luer Slip	Male Luer Slip	1/4 inch NPTM, Female Luer Slip

13 mm Filter Holder, Swinney



The GVS Swinney 13 mm filter holder is optimized for small volume (1-5 mL) particulate removal from fluids dispensed with a syringe. The holder is resistant to alcohols, esters, ethers, glycols, aromatic hydrocarbons, halogenated hydrocarbons, ketones, oils, photoresists and many other chemicals. Although suitable for most weak acids and bases, we recommend that you test for compatibility with acids.

Features & Benefits

- High resistant organic components
- No need for specific tools
- Quick efficient assembly

Typical Applications

- Biofluids
- Ophthalmics
- Gas chromatography samples
- Lubricants

Ordering information

Product Code	Quantity	Description
1220950	5/pk	Filter Holder, Swinney, 13 mm diameter

25 mm Filter Holder, Polypropylene

The GVS polypropylene 25 mm filter holders are very useful for ultra cleaning and sterilizing small volumes of liquids from a syringe. Due to the polypropylene construction, they can be used over a wide temperature range with excellent chemical compatibility. In the case of the syringe, the inlet cap locks into the base to prevent twisting damage to the membrane as the cap is tightened. Projection lugs on the base and the cap allow these units to be assembled and sealed quickly and efficiently.

Typically, the 25 mm is used to filter up to 50 mL of sample. With the syringe holder type, dual support screens prevent membrane rupture in case back pressure is applied.
It also allows for bi-directional sample flow. The polypropylene holder has a broad chemical compatibility range. It can withstand temperatures up to 121°C. and be autoclaved.

Features & Benefits

- Excellent chemical compatibility
- Quick, efficient assembly
- No need for special tools
- Excellent temperature and chemical resistance
- Several filter holders can be attached together for serial filtration

Typical Applications

- Point of use sampling
- Particulate removal
- Used in filtering chromatography solvents
- General filtration

Ordering information

Product Code	Quantity	Description
1214250	10/pk	Filter Holder Polypropylene: 25 mm diameter
1214526	10/pk	Filter Holder Polypropylene Support Screen: 25 mm

47 mm Filter Holder, Polypropylene

The GVS polypropylene 47 mm filter holder is designed especially for ultra cleaning and sterilizing liquids under positive pressure. In addition this holder can be used for aseptic sampling of liquids or gases at point-of-use or when samples must be collected and processed on-site.
The polypropylene material allows these holders to be used over a wide temperature range with excellent chemical compatibility. Sealing is achieved by simple hand tightening of the locking ring. The 47 mm In-Line holder has dual support screens, which allow for flow in either direction. The inlet cap design and exterior locking ring allow the unit to be assembled quickly and efficiently without tearing the membrane. 3 O-rings help to prevent leaks with all membranes. The 47 mm can filter up to 1 liter depending upon the viscosity of the sample. The polypropylene holder can withstand temperatures up to 121°C and be autoclaved.

Features & Benefits

- Easy to use - unique lock ring design assures proper sealing without damage to the membrane
- Easy to clean
- Conforms with EPA Method 1311 for Toxicity Characteristic Leaching Procedure, 40 CFR, Part 261, 1991 Hazardous Waste Compliance Guide

Typical Applications

- Point of use sampling
- Particulate removal
- Used in filtering chromatography solvents
- General filtration

Ordering information

Product Code	Quantity	Description
1262579	1/pk	Filter Holder Polypropylene: 47 mm
1214260	10/pk	Filter Holder Polypropylene: 47 mm

47 mm Filter Holder - Gravi-Seal™

The GVS polysulfone 47 mm autoclavable filter holder combines a number of key features and benefits, making it a tremendous value. To begin with, the funnel has only two pieces. There are no clamps or locking devices to manipulate. A unique gravity sealing design allows for one-handed operation with no danger of filter by-pass or sample leakage when using depth filters. And it is stable and very solid with no costly replacement parts. It all adds up to the easiest and most cost-efficient analytical funnel available. GVS analytical funnels are available in polysulfone for aqueous samples. The polysulfone unit is autoclavable and chemically resistant for cell culture and microbiological applications. There are graduations up to 350 mL with 50 mL intervals. The No. 8 stopper mounts in a standard 1-liter filtering flask for individual tests or in three- and six-place stainless steel manifolds for multiple tests to run concurrently.

Features & Benefits

- Durable - break resistant, no extra parts to break or wear out
- Uses a 47 mm depth filter disc
- One-handed operation
- Only two parts
- No clamps, wheel locks, or magnets to wear out
- Solid, stable and easy to use

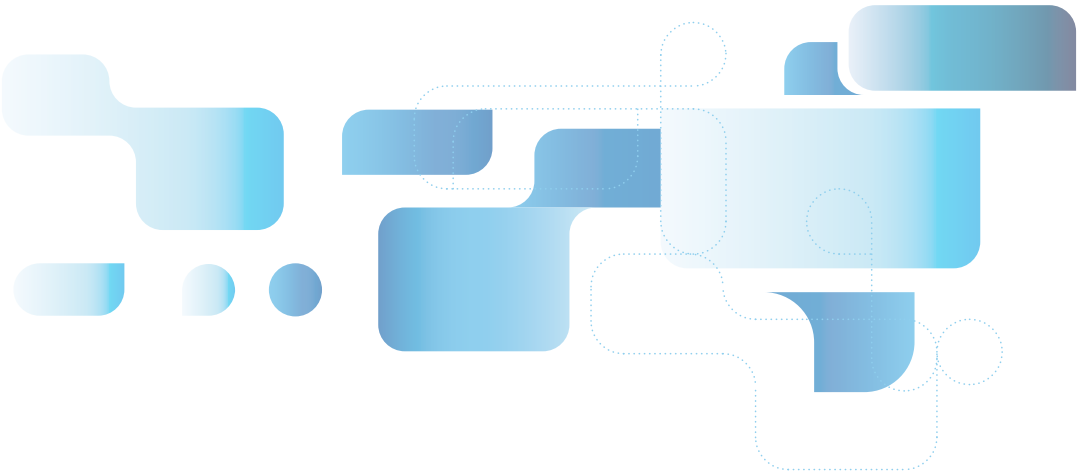
Typical Applications

- Filtering liquids for sterility
- Particle removal
- General filtration
- Autoclavable

Ordering information

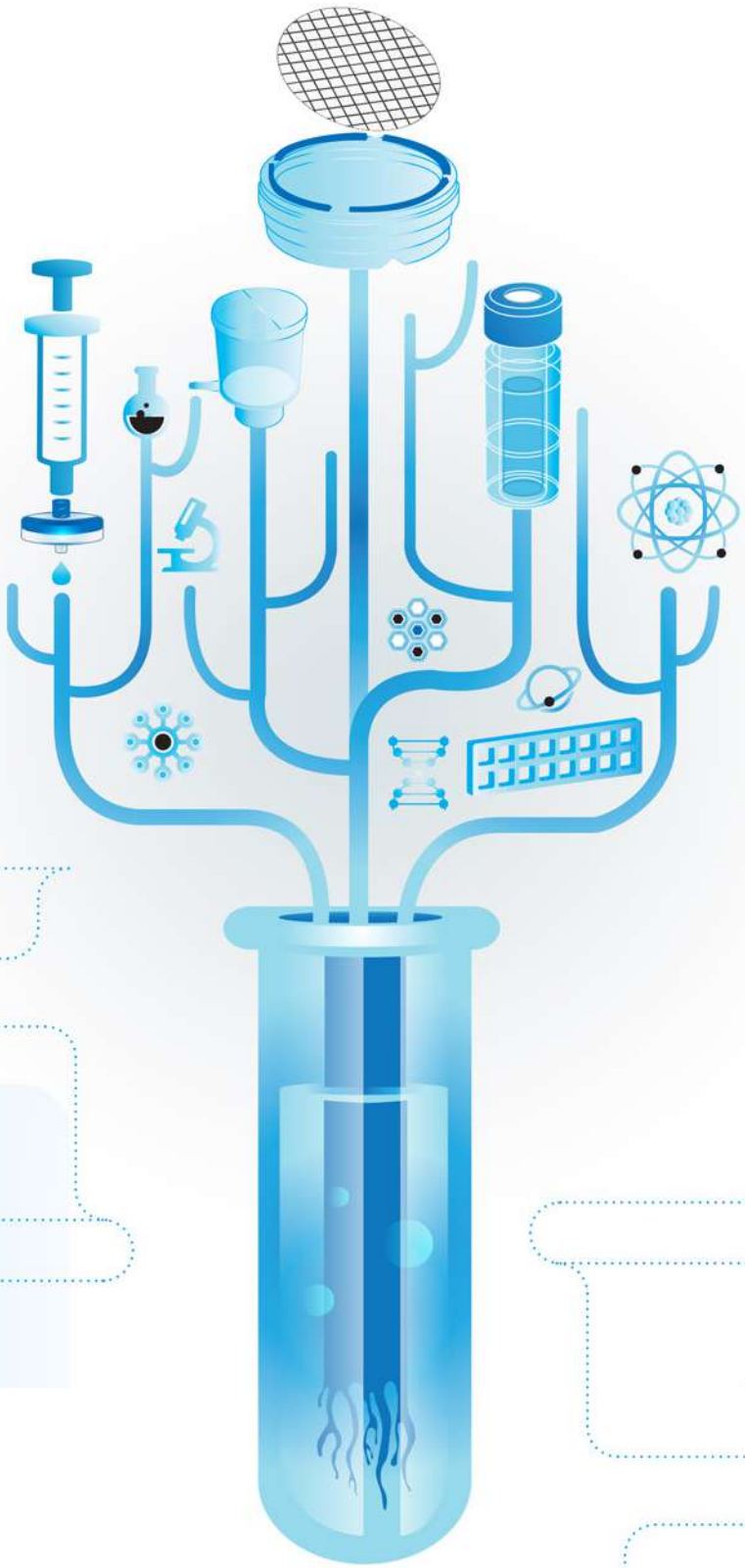
Product Code	Description	Quantity
1213865	Gravi-Seal PS Analytical Filter Holder (complete unit): 47 mm	1/pk
1214124	Gravi-Seal PS Analytical Filter Holder (complete unit): 47 mm	3/pk
1213883	Gravi-Seal PS Analytical Filter Holder, Base Only	1/pk
1213882	Gravi-Seal PS Analytical Filter Holder, Funnel Only	1/pk

Gravi-Seal can be used with GVS Manifold, (see page 29).



FILTER TECHNOLOGY

MICROBIOLOGY



Microbiological Monitors & Analytical Funnels

GVS microbiological monitors and analytical funnels provide a complete system solution for liquid sample preparation. Each single-use, pre-sterilized filtering unit consists of a measured filter funnel, base, pad, membrane, removable lid and plug. This all-in-one system easily converts from the 100 mL filtration unit to a petri dish, which can be labeled and incubated for culturing. The GVS funnels meet the standard method requirements for a disposable device.
Each sterile monitor includes a NC membrane fixed and welded to the dish.
Each sterile analytical funnel includes a removable NC membrane.

Features & Benefits:

- Rapid testing: With no need to sterilize funnels or filter base between samples, testing time can be reduced by up to 70%
- No flaming required: Combined filtration unit minimizes the risk of cross-contamination
- All-in-one system: Filtration unit easily converts to a Petri dish, which can be labeled and incubated for culturing
- Reduced contamination: Single-use materials virtually eliminate cross-contamination between funnel and membrane
- Reproducible results: All-in-one filtration unit reduces the chance of external error
- Easy handling: Ready-to-use, pre-sterilized monitors are simple to use

Typical Applications:

Microbiological analysis of:

- Potable water
- Beer and wine
- Waste water
- Dairy products
- Soft drinks
- Fruit Juices
- Fermented products

Microbiological Monitors

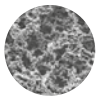
Microbiological Monitors (100 mL) are single use, pre-sterilized filtering units with welded fixed membranes and culturing devices.
With 47 mm or 56 mm Sterile Nitrocellulose Membranes for faster flow rates.

Product Code		Description	Quantity
47 mm	56 mm		
10497511	10497603	Monitor, Nitrocellulose, 0.2 µm, sterile, white/black grid	50/pk
10497500	10497600	Monitor, Nitrocellulose, 0.45 µm, sterile, white/black grid	50/pk
10497501	n/a	Monitor, Nitrocellulose, 0.45 µm, sterile, white/black grid, individually packaged	50/pk
10497502	10497601	Monitor, Nitrocellulose 0.45 µm, sterile, black/white grid	50/pk
10497503	10497602	Monitor, Nitrocellulose, 0.8 µm, sterile black/white grid	50/pk

Analytical Funnel

The Analytical Funnel (100 mL) is a single use, 47 mm pre-sterilized filtering units with removable sterile Nitrocellulose Membrane for use with liquid media agar plates and culturing devices.

Product Code	Description	Quantity
10497507	Funnel, Nitrocellulose, White/Black Grid Sterile 0.2 µm	50/pk
10497510	Funnel, Nitrocellulose, White/Black Grid Sterile 0.2 µm , individually packaged	50/pk
10497504	Funnel, Nitrocellulose, White/Black Grid Sterile 0.45 µm	50/pk
10497506	Funnel, Nitrocellulose, White/Black Grid Sterile 0.45 µm, individually packaged	50/pk
10497508	Funnel, Nitrocellulose, Black/White Grid Sterile 0.45 µm	50/pk
10497509	Funnel, Nitrocellulose, Black/White Grid Sterile 0.45 µm, individually packaged	50/pk



GVS offers a complete range of Nitrocellulose (MCE) filtration membranes for microbiological analysis. Check page 39 - 40

Monitor and Analytical Funnel Manifold

Features & Benefits

- Easy to clean
- Easy to prevent biofilms
- Simple to use

Typical Applications

- Beer Bottled
- Water Cosmetics
- Pharmaceutical Products Analysis
- Bioburden Testing
- Water Monitoring

GVS offers stainless steel manifolds for microbial enumeration. The manifold is available in 3 and 6 positions. The filter manifolds have been designed specifically for microbiological applications. Filter holder supports accept No. 8 silicone perforated stopper. These devices fit with the microbiological monitors and analytical funnels. The surface is easy to clean, reducing potential for cross contamination during the analysis.

Ordering information

Product Code	Description	Quantity
10498763	3-place vacuum manifold	1/pk
10498764	6- place vacuum manifold	1/pk

Silicone Stopper 8

Product Characteristics

Size	8
Length	25 mm
Top diameter	43 mm
Bottom diameter	36 mm

Ordering information

Product Code	Description	Quantity
10498550	Silicone Stopper 8	1/pk

Nutrient Liquid Media

2 mL ampouled media

- Wide range of products satisfies even special customer requirements
- Optimal media stability, sterility, and reproducibility
- Less time-consuming, higher productivity
- Batch-specific quality certificate in each pack

Liquid Media

Ready-to-use media considerably reduces the preparation time in quality control laboratories and also effectively reduces the risks of cross contamination.
GVS is cooperating closely with quality assurance managers in the industry in the development of its own media and test kits. This intensive product development has produced a range of products that is being used to monitor production plants and conduct microbiological checks on raw materials through final product release in laboratories.

Typical Applications

Microbiological analysis of:

- Drinking water
- Surface water
- Recreational water
- Purified water
- Beverage distilled and non distilled

Features & Benefits

Liquid Media Descriptions

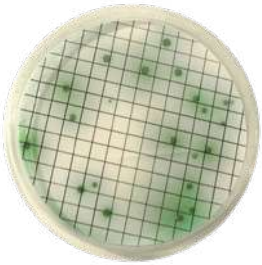
Brilliant Green Bile Broth 2%

Brilliant Green Bile Broth is used to detect coliforms in water, milk and other samples. BGBB contains two inhibitors of both gram-positive and selected gram-negative organisms, namely, oxgall and brilliant green dye. Fermentation is detected by gas production.

Brilliant Green Bile Broth

Cetrimide Broth

Cetrimide Broth is used for selective cultivation of Pseudomonas aeruginosa. Pseudomonas aeruginosa is characterized by the production of pyocyanin (a blue green, water soluble, non-fluorescent, phenazine pigment) which is stimulated by the inclusion of magnesium chloride and potassium sulfate in the broth. Cetrimide (N-cetyl-NNN-trimethylammonium bromide) is added to inhibit bacteria other than Pseudomonas aeruginosa. Its action as a quaternary ammonium cationic detergent causes nitrogen and phosphorous to be released from bacterial cells other than Pseudomonas aeruginosa.



Pseudomonas Media: Typical Growth of Pseudomonas aeroginosa ATCC 10145

EC Broth

EC (Escherichia coli) Broth is used to detect coliforms and E. coli. EC Broth contains casein peptone as a source of nutrients. Lactose provides the carbohydrate fermented by coliform bacteria and Escherichia coli. In addition, lactose-positive bacteria metabolize lactose with gas formation. Gram-positive bacteria are inhibited by the mixture of bile salts.

EC Broth with MUG

EC Broth with MUG is used to detect Escherichia coli in water, milk and food. The presence of fluorescence using a long-wave UV light source confirms the presence of Escherichia coli and no further confirmation is required. MUG detects anaerogenic strains, which may not be detected in the conventional procedure. Lactose is a source of energy. Casein peptone provides additional nutrients. The mixture of bile salts is inhibiting for gram-positive bacteria, particularly bacilli and fecal streptococci. The substrate 4-methylumbelliferyl-b-D-glucuronide is hydrolyzed by an enzyme, b-glucuronidase, possessed by most Escherichia coli and a few strains of Salmonella, Shigella and Yersinia, to produce a fluorescent end product, 4-methylumbelliferone.

EC-Broth: Vial Left: Control; Vial Right: Broth inoculated with Escherichia coli ATCC 25922

Enterococcus Broth

Enterococcus Broth is a modified version of the improved media described by Slanetz and Bartley with triphenyltetrazolium chloride (TTC). The membrane filtration method is simple to perform, does not require confirmation and permits a direct count of enterococci in 48 hours.

Heterotrophic Plate Count (HPC) Broth with or without TTC

HPC Broth and HPC Broth with TTC Heterotrophic Plate Count (HPC) Broth is used to determine live heterotrophs in drinking water and other media at incubation temperatures of 35°C. All bacteria grow on HPC with indicator media and produce a red color. This is a result of the precipitation of formazan following the reduction of 2,3,5- TTC by bacteria.

KF-Streptococcus Broth

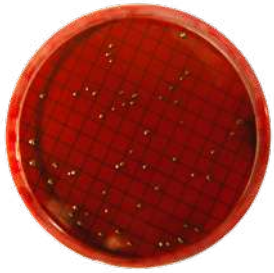
KF-Streptococcus Broth is selective for the determination of fecal streptococci in polluted surface waters. Maltose and lactose are fermentable carbohydrates, sodium azide is the selective agent and brom cresol purple is the indicator dye.

Mannitol Salt Broth

Mannitol Salt Broth is used to detect presumptive pathogenic Staphylococci. Because of the amount of peptones and beef extract, Mannitol Salt is a nutrient rich medium. Most bacteria (other than staphylococci) are inhibited by the high concentration of sodium chloride. Organisms capable of fermenting mannitol, e.g., Staphylococcus aureus, cause a pH change in the media. With phenol red as the pH indicator the colonies appear with a yellow coloration.

M-Endo Coliform Broth

M-endo Broth is used to detect coliform in water samples. M-Endo is a red colored media, which needs to be stored in the dark to prevent discoloration. Gram-positive bacteria are inhibited on this media by the deoxycholate and lauryl sulfate. The addition of ethanol increases the antibacterial nature of the formulation. Lactose fermenting organisms form aldehydes, which react with Schiff's reagent (basic fuchsin and sodium sulfite) to give red colored zones around the colonies. Coliform colonies are therefore red with a characteristic metallic sheen.



M-Endo Coliform Broth

M-FC Broth

M-FC (fecal coliform) Broth allows the development of fecal coliforms at elevated temperatures (44.5°C).

M-FC with Rosolic Acid

M-FC with Rosolic Acid acts and functions in the same way as M-FC Broth. Rosolic acid inhibits bacterial growth in general, except for fecal coliforms.

M-Green Yeast and Mold Broth and M-Green Yeast and Mold Agar

M-Green Yeast and Mold Broth is used to detect yeast and mold in beverages and food. M-Green Yeast and Mold Broth is an improved modification of the liquid media. The addition of bromocresol green, which diffuses into fungal colonies as an alkaline reaction, allows them to be easily identified. Metabolic by-products from the developing colonies diffuse into the surrounding medium, further reducing the pH which aids in the inhibition of bacterial growth, but also produces an acid reaction that causes residual bromocresol green to change to yellow.

M-Green Yeast and Mold Broth: Typical Growth of Candida Albicans ATCC10231 on a Black Membrane

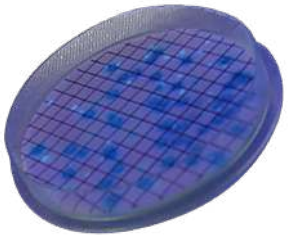
M-Green Select Broth

M-Green Select Broth was developed to improve efficiency of detection and enumeration of fungi in sugar based drinks using the membrane filtration method. This medium has a low pH, which inhibits bacterial growth. The addition of chloramphenicol further inhibits the growth of bacteria to allow for the development and enumeration of yeast and mold.

MICROBIOLOGY

MI Broth and MI Agar

MI Broth detects the presence of coliform bacteria by the production of b-galactosidase, which cleaves the substrate MUGal to produce 4-methylumbelliferone, which fluoresces on exposure to UV light. Non-coliforms do not produce this enzyme and therefore do not fluoresce on the medium. Escherichia coli is detected by the compound IBDG. The b-glucuronidase produced by Escherichia coli cleaves the substrate to produce a blue indigo color in the colonies. As Escherichia coli is also a total coliform, and also produces b-galactosidase, it will also fluoresce. The antibiotic cefsulodin is present to inhibit the growth of gram-positive bacteria and some non-coliform gram-negative bacteria that can cause false positive reactions.



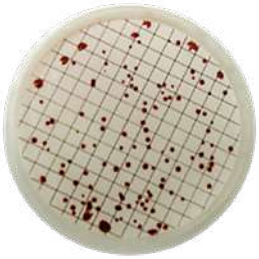
MI-Media: Pure Culture of Escherichia coli ATCC 25922 with UV Light

MRS Broth

MRS medium supports luxuriant growth of all lactobacilli, even the slow growing species.

M-TGE Total Count Media

All bacteria develop on TGE media and produce a range of different colored and sized colonies.



Total Count Media with Indicator. Escherichia Coli ATCC 25922 and Staphylococcus Aureus ATCC 25923 can be Easily Detected according to their Red to Pink Colonies

Orange Serum Media

Orange Serum Broth is used to detect aciduric microorganisms.Organisms known to grow in single strength and concentrated juices are lactic acid and acetic acid bacteria and yeast. Lactobacilli, Leuconostoc and yeast have all been identified as spoilage organisms by numerous authors. Orange serum at pH 5.4 to 5.6 has been reported to yield maximum counts of all types of spoilage organisms in mixed cultures and in single culture comparison tests.

PRY Broth

Preservative Resistant Yeast Broth is a low pH selective medium for the detection of spoilage microorganism in beverages and water.

Pseudomonas Broth

Pseudomonas aeruginosa is characterized by the production of pyocyanin (a blue green, water soluble, non-fluorescent, phenazine pigment) which is stimulated by the inclusion of magnesium chloride and potassium sulfate in the broth. Irgasan, an antimicrobial agent, selectively inhibits gram-positive and gram-negative bacteria other than pseudomonads. Glycerol both serves as an energy source and helps in the promotion of pyocyanin.

Total Count Media with TTC

All bacteria develop on Total Count Media with indicator and produce a red color as a result of the precipitation of formazan following the reduction of 2,3,5- TTC by bacteria.

Trypticase Soy Broth Double Strength (not Innoculated)

Trypticase Soy Broth – Single Strength

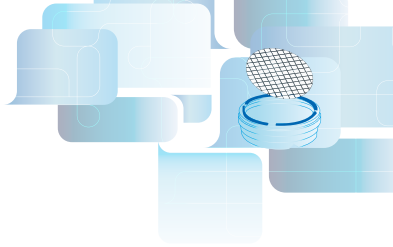
General purpose medium used in qualitative procedures for the cultivation of fastidious and non-fastidious microorganisms. Trypticase Soy Broth – Single Strength complies with the demands of the DIN Norm 10167 for the detection of Escherichia coli serotype 0157:H7 in foods and FDA-BAM for the isolation of enterohemorrhagic Escherichia coli (EHEC). In addition the media conforms to the formula of the US Pharmacopoeia.

Trypticase Soy Broth – Double Strength

TSB is a medium that will support the growth of a wide variety of microorganisms including aerobic, facultative, and anaerobic bacteria and fungi.

Wallerstein Nutrient Broth (WL) and WL Differential Broth (WLD)

WL Nutrient Broth is for the cultivation and enumeration of yeast and WL Differential Broth is for determination of bacterial count. Use of the medium at pH 5.5 and incubation at 25°C will give reliable counts for brewer's yeast. Adjustment of the pH to 6.5 and incubation at 30°C allows for the selective growth of baker's and distiller's yeast.



2 mL Ampoules
Ordering information

Product Code	Description	Packaging
10496146	Cetrimide Broth	50/pk
10496120	Enterococcus Broth	50/pk
10496164	Heterotrophic Plate Count (HPC) Broth with TTC	50/pk
10496151	HPC Broth	50/pk
10496125	KF-Streptococcus Broth	50/pk
10496121	Mannitol Salt Broth	50/pk
10496103	M-Endo Coliform Broth	50/pk
10496124	M-FC media	50/pk
10496114	M-FC Broth with rosolic acid	50/pk
10496116	M-Green Select Broth	50/pk
10496101	M-Green Yeast and Mold Broth	50/pk
10496192	MI-Broth Media	50/pk
10496112	MRS Broth	50/pk
10496102	M-TGE Broth	50/pk
10496104	Orange Serum Broth	50/pk
10496106	PRY Broth	50/pk
10496119	Pseudomonas Broth	50/pk
10496113	Total Count Broth with TTC	50/pk
10496108	Wallerstein Broth	50/pk
10496109	Wallerstein Differential Broth	50/pk

9 mL Vials
Ordering information

Product Code	Description	Packaging
10496710	Brilliant Green Bile Bottled Broth, with Durham tubes	20/pk
10496714	EC Bottled Broth, with Durham tubes	20/pk
10496709	EC with MUG, Bottled Broth	20/pk

Bottled Media
Ordering information

Product Code	Description	Packaging
10496851	MI Media, Bottled Broth, 50 mL,	1/pk
10496847	MI Media, Bottled Agar, 50 mL	1/pk
10496705	M-Green Yeast and Mold Bottled Agar, 100 mL	1/pk
10496707	Trypticase Soy Broth (TSB) Single strength, Bottled Broth, 100 mL	1/pk
10496708	Trypticase Soy Broth (TSB) Double strength, Bottled Broth, 100 mL	1/pk
10496744	ColiCheck with MUG, Presence-Absence (P-A) Test Kit with Sample Bottles	30/pk

SwabCheck™

swabcheck

The SwabCheck principle

The surface is wiped with a cellulose swab and any bacteria collected are transferred via the swab into a tube containing a special medium with an indicator dye, which is then incubated. A single bacterium is sufficient to cause a color change. This means that SwabCheck is about 1000 times more sensitive than the conventional ATP method. This accuracy is particularly important in the food industry. With this simple method, it is possible to identify microorganisms such as Listeria monocytogenes.

SwabCheck: how to use

Open the sterile pack, remove the swab and wipe it over an area of about 10 x 10 cm.Then twist off the cap of the medium tube and insert the swab so that the cap fits tightly. Label the sample tube and incubate at the appropriate temperature.

A change in color indicates the presence of the microorganism in question. The quicker the color change occurs, the higher the bioburden. If no color change has been observed after the maximum incubation period has elapsed, then the corresponding microorganism is not present. GVS offers SwabCheck in packs of 25 with a shelf-life of 12 months.

Features & Benefits:

- The right test for each type of contamination
- Qualitative and semi-quantitative hygiene control
- Sterile packed and ready-for-use
- Easy to handle
- Rapid results
- Long shelf-life

Neutralizing Buffer Swabs

Neutralizing buffer swabs are used in the monitoring of surfaces for total bacterial count. Neutralizing buffer inactivates the bactericidal and bacteriostatic effects of chlorine and quaternary ammonium detergents. Without exhibiting toxic effects on microorganisms. This permits the transfer of swabbed organisms to the laboratory without loss in viability. Neutralizing buffer is not designed to culture and enumerate microorganisms.

Total Count Swab Kit

Buffer Swabs

Buffer Swabs are used for the collection of surface contamination from flat or convoluted surfaces prior to transport to a laboratory for culture and enumeration. Buffer swabs contain no bacteriostatic or bactericidal compounds and cannot suppress the action of detergents.

Coliform SwabCheck

SwabCheck

SwabCheck is used as an indication of hygiene on contact surfaces. SwabCheck changes color from purple to yellow. The color change is based on acid reaction with the indicator. The more rapid the color change, the higher the level of bacteria in the sample. SwabCheck is useful in determining the sanitation levels of preparation surfaces, filling ports, and processing areas in beverage and food processing plants, dairies, restaurants, and healthcare facilities.

Coliform SwabCheck

Escherichia coli and coliforms are used traditionally as indicator organisms for fecal contamination in water and other environmental samples. Detection of these organisms usually points to poor hygiene at some stage in the production process or pollution of water at source. The presence of coliforms is indicated by a color change from brown to yellow. The more rapid the color change the higher the level of coliform bacteria.

Hygiene SwabCheck

Easy to use: The Hygiene SwabCheck shows an obvious color change from red to yellow. The time taken for this change is an indication of the level of contamination. This should be used in conjunction with known specification levels of your process/ product. Rapid screening hygiene test is a same day test that will detect gross bacterial and fungal contamination of work surfaces, equipment machinery or other sampling sites.

Listeria SwabCheck

Listeria Isolation SwabCheck is designed to be used alongside traditional selective methods to improve the quality system and minimize the risk of Listeria contamination. This simple to use diagnostic test can be applied anywhere in the environment and on foodstuffs where the presence of Listeria species would be critical.

Listeria sp and specifically Listeria monocytogenes are rapidly becoming the most important pathogen in the food industry; regulatory bodies from around the world are insisting that all food products are Listeria free. Listeria Isolation SwabCheck works on an enhanced Esculin media formulation. The hydrolysis of esculin gives a distinctive black/brown precipitate. Inhibitors and antibiotics are present in the media, which will inhibit the growth of non-Listeria species.

SwabCheck Escherichia coli

SwabCheck Escerichia coli is used for the detection of Escherichia coli on surfaces. The presence of fluorescence using a longwave UV light source confirms the presence of Escherichia coli and any further confirmation is not required. MUG detects anaerogenic strain that may not be detected in the conventional procedure. Lactose is a source of energy. Casein peptone provides additional nutrients. The mixture of bile salts is inhibiting for gram-positive bacteria, particularly bacilli and fecal streptococci. The substrate 4-methylumbelliferyl-b-D-glucuronide is hydrolyzed by an enzyme, b-glucuronidase, possessed by most Escherichia coli and a few strains of Salmonella, Shigella, and Yersinia, to produce a fluorescent end product, 4-methylumbelliferone. The presence of Escherichia coli is detected by the appearance of fluorescence throughout the tube.

Hygiene SwabCheck

Total Count Swab Kit

Total Count Swab Kit is used for the non-selective development and enumeration of all aerobic bacteria on surfaces in accordance with Hazard Analysis and Critical Control Points (HACCP). The kit includes the swabs and culture medium, packaged with a membrane device, providing a quantitative result. All bacteria develop on TGE media and produce a range of different colored and sized colonies. It is not possible using TGE to presumptively identify any bacteria. Identification can be undertaken using traditional microbiology techniques following initial colony identification.

Listeria SwabCheck

Yeast and Mold Swab Kit

Yeast and Mold Swab Kit is used for the enumeration of yeast and molds on surfaces in accordance with HACCP. The kit includes the swabs and culture medium, packaged with a membrane device, providing a quantitative result. M-Green yeast and mold is an improved modification of the liquid medium, and was developed to improve efficiency of detection and enumeration of fungi in sugar based drinks using the membrane filtration method. This medium has a low pH, which inhibits bacterial growth. The addition of bromocresol green, which diffuses into fungal colonies as an alkaline reaction, allows them to be easily identified. Metabolic by-products from the developing colonies diffuse into the surrounding medium, further reducing the pH that aids in the inhibition of bacterial growth, but also produces an acid reaction that causes residual bromocresol green to change to yellow. Green opaque colonies against a yellow background are indicative of the growth of yeasts. Mold colonies are green and filamentous.

Yeast and Mold Swab Kit

Polywipe Sponge

Polywipe Sponge is used for the recovery of microorganisms from a surface. Polywipe is a blue sponge that is premoistened with neutralizing buffer to neutralize the effects of surface disinfectants. The sponge material is selected to be free of the preservatives found in commercially available sponges, which can inhibit microorganism growth. Polywipe sponges are biocide free and tested for zero toxicity to microorganisms. Each sponge is individually wrapped in a peel pouch and gamma irradiated to ensure sterility.

Polywipe Sponge

Buffers Ordering information

Product Code	Description	Volume	Quantity
10498303	Neutralizing Buffer Swabs	4 mL	125/pk
10498304	Neutralizing Buffer Swabs	4 mL	500/pk
10498305	Buffer Swabs	4 mL	125/pk
10498306	Buffer Swabs	4 mL	500/pk

SwabCheck Ordering information

Product Code	Description	Volume	Quantity
10498404	SwabCheck	4 mL/tube	125/pk
10498402	SwabCheck Escherichia coli	4 mL/tube	125/pk
10498315	Total Count Swab Kit	2.8 mL/tube and membrane device	30/pk
10498316	Yeast and Mold Swab Kit	2.8 mL/tube and membrane device	30/pk
10498406	Coliform SwabCheck	Individually wrapped package	25/pk
10498407	Hygiene SwabCheck	Individually wrapped package	25/pk
10498408	Listeria SwabCheck	Individually wrapped package	25/pk
10498521	Polywipe Sponge	Individually wrapped pre-moistened sponge	50/pk

Dilution Bottles

Prefilled sterile dilution bottles are designed for sample dilution of water, dairy products, foods, and pharmaceuticals prior to microbiological testing. Final pH for all solutions is 7.2 pH ±0.2 pH at 25°C. They come in an easy open, flip-top, plastic container with a tamper-evident seal.

Butterfield's Phosphate Buffer contains monobasic potassium phosphate and is used extensively in the food, dairy, and pharmaceutical industries. Offered in 90 ml and 99 ml volumes for easy 1:10 and 1:100 dilutions. It is recommended as a general diluent in laboratory procedures by the Federal Drug Administrations and in the Bacteriological Analytical Manual. This product is prepared according to Standard Methods for the Examination fo Water and Wastewater for use in water testing.

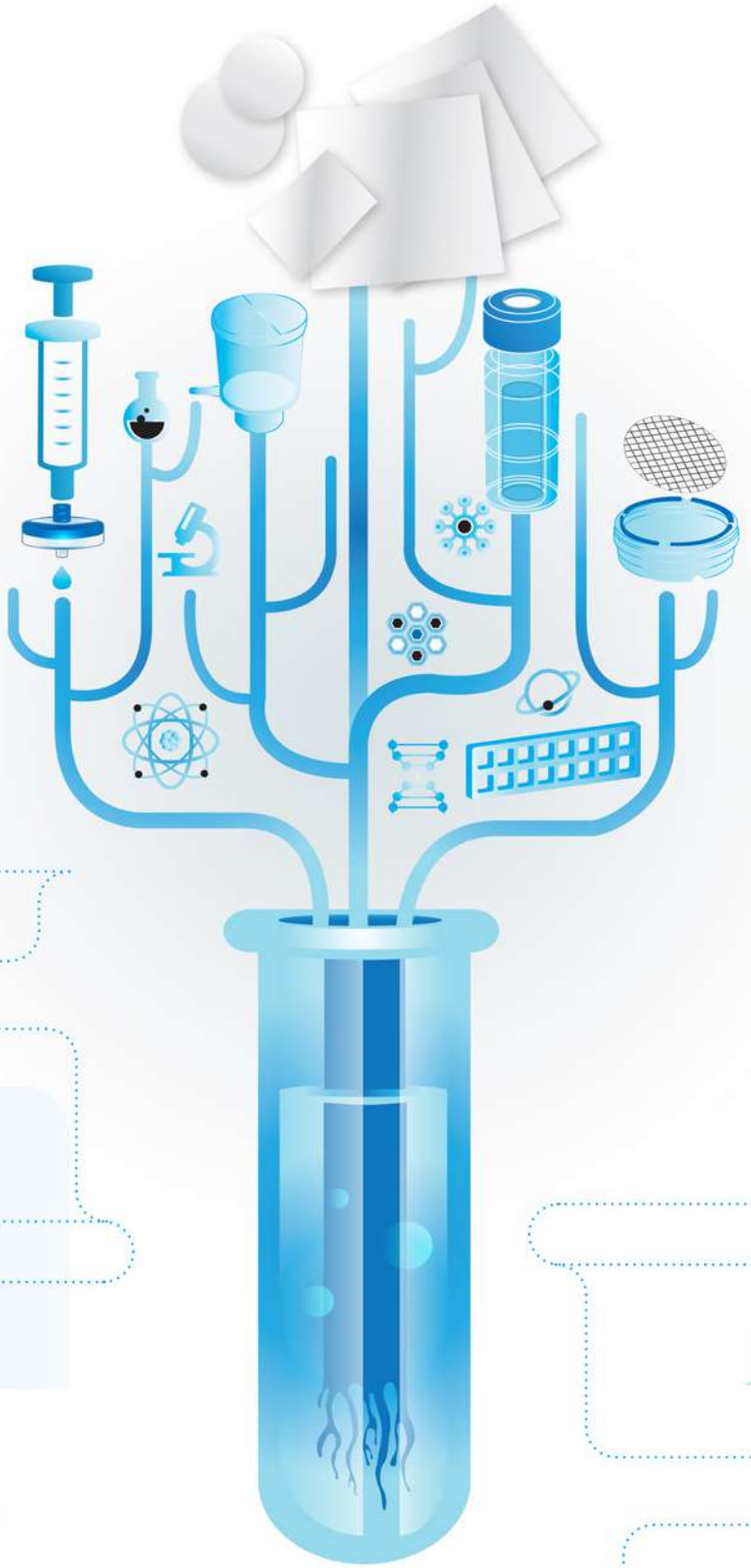
Phosphate Buffer with magnesium chloride is used as the diluents for the preparation of dilutions in plate counts in the dairy and food industries. It is recommended by APHA for the recovery of injured microorganisms from dairy and food samples. Contains deionized water, monopotassium phosphate, and magnesium chloride.

Ordering information

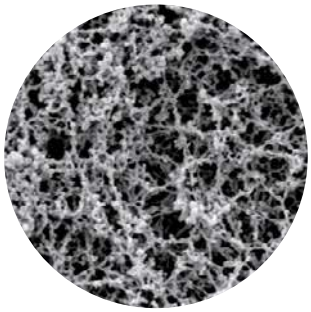
Product Code	Description	Volume	Quantity
10498503	Dilution Bottle, Butterfield's Buffer	99 mL	72/pk
10498504	Dilution Bottle, Butterfield's Buffer	90 mL	72/pk
10498505	Dilution Bottle, Phosphate Buffer Magnesium Chloride	99 mL	72/pk

FILTER TECHNOLOGY

DISC AND SHEET MEMBRANES



Cellulose Acetate (CA) Membrane



ACETATE
Cellulose Acetate Membrane Plus

GVS Cellulose Acetate (CA) Filtration Membrane is a supported, hydrophilic membrane that is naturally low binding. It is ideal for use in filtration applications where maximal recovery of protein is critical.

Exceptional Strength for Improved Performance

GVS CA Filtration membranes are composed of pure cellulose acetate that is internally supported by an inert polyester web. This web gives each membrane exceptional strength to prevent cracking, tearing, breaking and distortion when handled or creased. The resulting membrane has dimensional stability that can withstand autoclaving or steam sterilizing leaving the membrane unaffected in temperatures up to 135°C (274°F). The exceptional dimensional strength and low binding characteristics of GVS CA Filtration Membranes provides higher throughputs than competitive offerings and reduces the amount of filter changes needed during proteinaceous solution filtering. Its uniform pore size and consistent flow rates ensure reliable performance.

Features & Benefits

- Superior strength: Can withstand aggressive handling or be used with automated equipment without breaking or tearing
- Low extractables: Ensures tests will be clean with consistent results
- Hydrophilic: Wets out rapidly
- Lot-to-lot consistency: Quality checks ensure consistent flow and diffusion rates for dependable results every time
- Nonlysing of cells: Prevents contamination of critical solutions
- Can be autoclaved or steam sterilized

Typical Applications

- Protein and enzyme filtration
- Biological fluid sterilization
- Tissue culture media sterilization
- Cold sterilization

Product Characteristics

USP Class VI testing	Passed
Thickness	65 - 100 µm
Maximum Operating Temperature	274°F (135°C)
Sealing Compatibility	Ultrasonics, Heat, Radio Frequency and Insert Molding
Pore Size Range	0.22 to 5.0 µm

Performance

Pore Size (µm)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm² @ 10psi)	Bubble Point (psi)
0.22	70-155	250/20	10.26-22.72	50-72
0.45	20-49	250/20	32.46-79.53	30-45
0.65	15-40	250/20	39.77-106.04	18-32
0.8	13-36	250/20	44.18-122.36	14-28
1.2	40-248	500/5	51-318	11-22
5.0	23-59	500/5	216-553	6-16

Ordering information

Pore sizes	Dimensions Packaging	13 mm 100/pk	25 mm 100/pk	47 mm 100/pk	50 mm 100/pk	90 mm 25/pk	102 mm 25/pk	142 mm 25/pk	293 mm 25/pk	20x20 mm 5/pk	30 cmx 3m 1/pk
	0.22 µm	1212374	1213124	1213804	1221730	1214357		1215074	1215427		1224211
	0.45 µm	1215533	1215635	1215676	3052874	1212375	1221546	1212517	1212620		1240382
	0.65 µm		1212846	1212942		1213037				3061196	
	0.8 µm	1213305		1213358					1213316	3034974	3034975
	1.2 µm			1213805				1213958	1214038		3041202
	5.0 µm		1214370	1214411		1212648					3049247

Polyethersulfone (PES) Membrane

ULTRASep
Polyethersulfone
Membrane

GVS Polyethersulfone (PES) Filtration Membrane is hydrophilic and cast from pure polyethersulfone polymer. It is designed to remove particulates during general filtration and its low protein and drug binding characteristics make it ideally suited for use in life science applications.

Product Uniformity and High Sensitivity Maximize Performance

This strong, microporous film asymmetric membrane is constructed from a high-temperature polyethersulfone polymer that is acid and base resistant. Its strength and durability are advantageous during usage that involves aggressive handling or automated equipment. GVS PES Filtration Membrane is naturally hydrophilic without added wetting agents and has low extractables.

Due to its inherent uniform porosity and controlled pore size, GVS PES Filtration Membrane efficiently removes particulates from solutions during general filtration. Additionally, its low protein and drug binding characteristics maximize recovery of critical drugs used in I.V. therapy, chemotherapy and open-heart surgery.

Features & Benefits

- Hydrophilic: Eliminates the need for wetting agents that can potentially interfere with analyses
- Low extractables: Ensures test results will not be compromised by wetting agents or other extractables
- Low drug and protein binding: Maximizes recovery of critical drugs or proteins
- Wide range of pore sizes: Pore size range of 0.03 µm to 8.0 µm enables specific pore size selection for given applications
- Superior burst strength: Protects the integrity of the membrane under high pressure
- Lot-to-lot consistency: Quality checks, both down and across the membrane, ensure dependable results every time

Typical Applications

- Protein and enzyme filtration and sterilization
- Biological fluid filtration and sterilization
- Pharmaceutical sterilization
- Environmental water studies

Performance

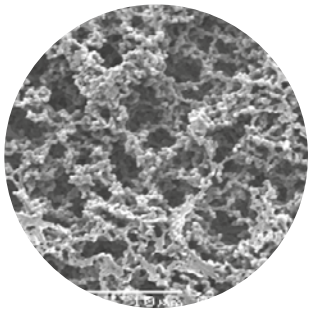
Pore Size (µm)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm² @ 10 psi)	Bubble Point (psi)
0.03	200-500	250/20	3.18-7.95	90-110
0.1	100-200	250/20	7.95-15.91	70-90
0.2	35-70	250/20	22.72-45.45	50-70
0.4	20-40	250/20	39.77-79.53	35-50
0.6	12-25	250/20	63.63-132.55	21-32
0.8	80-160	500/5	80-159	13-28
1.2	65-130	500/5	98-196	11-22

Ordering information

Pore sizes Dimensions Packaging	13 mm 100/pk	25 mm 100/pk	47 mm 100/pk	47 mm 200/pk	90 mm 25/pk	142 mm 25/pk	293 mm 25/pk	200x200 mm 5/pk	30 cmx3 m 1/pk
0.03 µm	3032875	3032876	3029505		3018505			1235748	3057106
0.1 µm			1214756		1222230			1225881	3026365
0.22 µm		1214193	1214465	1226158*	1214920	1214169	1214759	1223871	1226664
0.45 µm		1214532	1214475	1226159*	1215368	1214170	1214760	1225882	1226665
0.65 µm		1215238					1224490	1225883	1225985
0.8 µm		1214604	1214568		1214669	1214171		1225884	3037376
1.2 µm		1222267	1221008		1224492			1223340	1242278
5.0 µm			1215396		1224496			1236292	
8.0 µm								1225885	

*Sterile

Mixed Cellulose Esters (MCE) Membrane



MICRON
NC (MCE) Membrane Sep

GVS Mixed Cellulose Esters (MCE) Filtration Membrane is an unsupported, hydrophilic membrane. Its rapid flow rate and high throughput make it ideal for use in diagnostic kit manufacturing applications.

Characteristics

- High flow rate: fast filtration rates
- Uniform pore structure: consistent flow and diffusion rates
- Lot-to-lot consistency

Typical Applications

- Aqueous filtration
- Sterility testing
- Gravimetric analysis with ashing technique
- Microbiological and particulate analysis
- Black for food and beverage applications

Consistent Uniformity Improves Control and Performance

GVS MCE Filtration Membranes are composed of a mixture of inert cellulose nitrate and cellulose acetate polymers. The uniform microporous structure of these filters provides the fastest flow rates and highest throughputs available in a membrane filter. Because they are biologically inert, GVS MCE Filtration Membranes are ideal for a wide range of clarification, sterilization and analytical applications such as: microbiological analysis, clarification or sterilization of aqueous solutions, industrial hygiene applications, silt density index and particulate-matter analysis. For gravimetric analysis using ashing techniques, GVS MCE Membranes yield a residue or less than 0.045% of their initial weight. They are hydrophilic with a noncytotoxic wetting agent and yield extractable levels of less than 4% of their weight. These membranes are autoclavable at 121°C (250°F) for 20 minutes. Sterilized product lifetime is 24 months from sterilization date.

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	0.1 to 8.0 µm
BSA Protein Binding	Approx. 160 µg/cm^2 (depending on pore size)
Maximum Operating Temperature	356°F (180°C)

Performance

Pore Size (µm)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm^2 @ 10psi)	Bubble Point (psi)
0.1	198-263	250/20	6.05-8.03	80-110
0.22	60-136	250/20	11.70-26.51	52-65
0.45	23-46	250/20	34.58-69.16	30-42
0.65	13-35	250/20	45.45-122.36	25-42
0.8	5-18	250/20	88.37-318.13	11-19
1.2	30-80	500/5	159-424	9-18
5.0	13-36	500/5	353-979	6-15
8.0	3-25	500/5	509-4242	4-11

Mixed Cellulose Esters membrane - Sterile, white and black
Ordering information

	Individually Packaged Without Pad Gridded					Individually Packaged with Pad Gridded		
Dimensions Packaging	**47 mm 100/pk**	**47 mm 100/pk**	**47 mm 1000/pk**	**47 mm 1000/pk**	**50 mm 1000/pk**	**47 mm 100/pk**	**47 mm 100/pk**	**47 mm 1000/pk**
Color	**white**	**black**	**white**	**black**	**white**	**white**	**black**	**white**
Pore sizes 0.22 µm	1216720		1214396			1214872		
0.45 µm	1216721	1216719	1214923	1213643	1222980	1215237	1214866	
0.7 µm		1216718		1221948				1215409
0.8 µm	1216724	1216723		1215590		1225460		

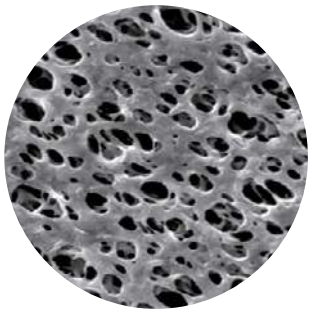
Cellulose Mixed Esters - Non sterile, white and black

Dimensions Packaging	**13 mm 100/pk**	**25 mm 100/pk**	**25 mm Gridded 100/pk**	**25 mm 100/pk**	**25 mm Gridded 100/pk**
Color	**white**	**white**	**white**	**black**	**black**
Pore sizes 0.1 µm		1214527			
0.22 µm	1214882	1214898			
0.45 µm	1215257	1215263			
0.65 µm		1215376			
0.8 µm	1215424	1215425	1215419	1215415	1215411
1.2 µm	1215438	1215440	1215435		
5.0 µm	1215448	1215450			
8.0 µm		1215455			

Dimensions Packaging	**47 mm 100/pk**	**47 mm Gridded 100/pk**	**47 mm 100/pk**	**47 mm Gridded 100/pk**	**90 mm 25/pk**
Color	**white**	**white**	**black**	**black**	**white**
Pore sizes 0.1 µm	1214533				
0.22 µm	1214909	1214839			1214941
0.45 µm	1215281	1215207		1214977	1215305
0.65 µm	1215380				
0.8 µm	1215428	1215421	1215416	1215412	1215431
1.2 µm	1215441	1215437			1215442
5.0 µm	1215451				1215452
8.0 µm	1215456			3053377	1215027

Dimensions Packaging	**142 mm 25/pk**	**293 mm 25/pk**	**20x20 cm 5/pk**	**20x20 cm 5/pk**
Color	**white**	**white**	**white**	**black**
Pore sizes 0.1 µm	1214554	1214565		
0.22 µm	1214950	1214959	1215464	
0.45 µm	1215316	1215323	1225781	3053082
0.65 µm				
0.8 µm	1215432	1215433	3050851	
5.0 µm	1215453			
8.0 µm	1221955			

Nylon 66 (NY) Membrane



MAGNA
Nylon Membrane

Features & Benefits

- Hydrophilic: Eliminates the need for wetting agents that can potentially interfere with biological processes
- Super strength: Eases handling when used with automated equipment
- Low extractables: Ensures tests will be clean and pure leading to more consistent results
- Lot-to-lot consistency: Quality checks ensure lot-to-lot consistency, both down and across the polyester web, for dependable results every time

Description and Use

GVS Nylon Filtration Membrane is a supported, naturally hydrophilic membrane designed to wet out evenly and retain its superior strength during use in general filtration or medical assays.

Typical Applications

- Sterilization and clarification of aqueous and organic solvent solutions
- HPLC sample preparation

Versatile Capabilities, Consistent Performance

GVS Nylon Filtration Membrane is internally supported with an inert polyester support web giving it added dimensional strength and stability that prevents cracking, tearing, curling and breaking. This added strength and durability is advantageous during usage that involves aggressive handling or automated equipment.

A naturally hydrophilic membrane, GVS Nylon Filtration Membrane does not require wetting agents that can interfere with biological processes.

Product Characteristics

Sterilization	Steam, Gamma Irradiation or Ethylene Oxide (EtO)
USP Class VI toxicity	Passed
Thickness	65 - 125 µm
Maximum Operating Temperature	356°F (180°C)
Sealing Compatibility	Ultrasonics, Heat, Radio Frequency and Insert Molding
Pore Size Range	0.1 to 5 µm

Performance

Pore Size (µm)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm² @ 10 psi)	Bubble Point (psi)
0.1	300-553	250/20	2.88-5.30	70-100
0.2	113-255	250/20	6.24-14.08	50-72
0.4	44-84	250/20	18.94-36.15	30-45
0.6	18-48	250/20	33.14-88.37	18-32
0.8	13-37	250/20	42.99-122.36	13-28
1.2	40-248	500/5	51-318	11-22
3.0	33-100	500/5	127-386	8-16
5.0	28-57	500/5	223-454	6-13

Nylon 66 (NY) Membrane, white

Ordering information

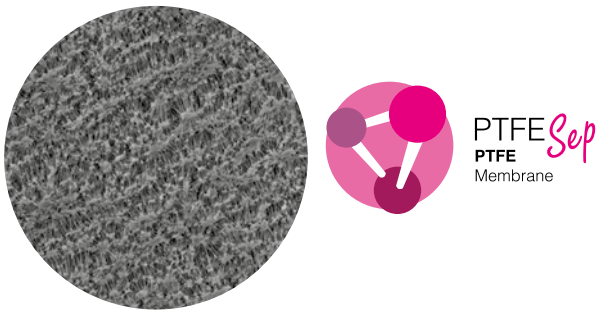
Pore sizes Dimensions Packaging	13 mm 100/pk	25 mm 100/pk	37 mm 100/pk	47 mm 100/pk	47 mm 1000/pk	47 mm Gridded 100/pk
0.1 µm	1213760	1213761		1213762	3026917*	
0.22 µm	1213766	1213768		1213769		
0.45 µm	1213774	1213775		1213776 1220671*		1213825 1213845
0.65 µm		1213782		1213783		
0.8 µm	1213788	1213789	1214881	1213790		3013826
1.2 µm	1213794	1213796	1230356	1213797		1214880
5.0 µm	1213810	1213811		1213812		3048260

*sterile

Pore sizes Dimensions Packaging	90 mm 25/pk	142 mm 25/pk	293 mm 25/pk	200x200 mm 5/pk	30 cm x3 m 1/pk
0.1 µm	1213763	1213764	1213765	1222859	1241477
0.22 µm	1213770	1213771	1213772	1222858	1224690
0.45 µm	1213778	1213779	1213780	1222857	1225982
0.65 µm	1213784	1213786		1222856	3052148
0.8 µm	1213791	1213792	1213793	1222855	
1.2 µm	1213798	1213799	1213800	1222854	1214956
5.0 µm	1213813	1213815	1213816	1222851	1221441

*sterile

Polytetrafluoroethylene (PTFE) Membrane



GVS Laminated PTFE filters are made of a polytetrafluoroethylene polymer (PTFE) laminated to a polypropylene support for improved durability and easy handling. These filters are chemically compatible with strong acids and most aggressive solvents such as alcohols.

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. PTFE membranes provide device manufacturers with a consistent, temperature and chemical compatible barrier to microbes and particulate matter. The optimal combination of air flow and water entry pressure adds value to most device designs.

Inherently hydrophobic, PTFE membranes will not absorb moisture from air or gases, making it ideal for venting applications, phase separations and aerosol samplings.

Laminated PTFE filters can be used to filter aqueous solutions when prewetted with methanol.

They are autoclavable up to 130°C (260°F).

Features & Benefits

- Naturally hydrophobic
- Compatible with strong acids and aggressive solutions
- Improved durability and handling
- Autoclavable

Typical Applications

- Filtration of strong acids and aggressive solutions
- Venting applications
- Phase separations
- Aerosol samplings

Performance

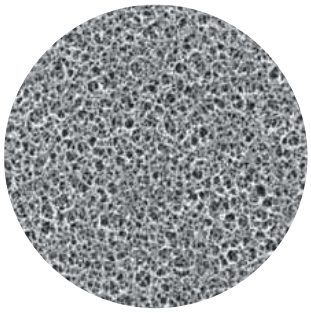
Pore Size (µm)	Bubble Point (EtOH) (kPa)	Flow Time (MeOH) (sec)	Thickness (µm)
0.22	107.9 -152.0	80 -140	100 -180
0.45	63.7-103.0	40 - 75	100 -180

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
	1.0 µm		1215503	1215504

	Dimensions Packaging	90 mm 25/pk	142 mm 25/pk	293 mm 25/pk	200x200 mm 5/pk	305x305 mm 50/pk
Pore sizes	0.22 µm	1215488	1215489		3026028	1267681
	0.45 µm	1215494	1215495	1215496	1237423	3034300
	1.0 µm	1215505	1215506			1235299

Regenerated Cellulose (RC) Membrane



RC
Regenerated Cellulose
Membrane

GVS Regenerated Cellulose membrane is a hydrophilic high strength media. Regenerated Cellulose filters have a broad solvent compatibility, and they contribute very low extractable material in a wide variety of sample solvents. Thus, they are appropriate for sample preparation in many applications and as a standalone or syringe filter membrane. This membrane media can be sterilized by all common methods keeping a mechanically stability. The superior strength assures an high chemical resistance for usage with a wide range of aqueous and organic media.

Features & Benefits

- Hydrophilic
- Excellent chemical compatibility and resistance to organic solvents
- Low non-specific adsorption
- Superior thermal resistance
- High mechanical strength
- Maximum Operating Temperature 134°C

Typical Applications

- Filtration of Aqueous and Organic Solutions
- Particle removal from organic solvents or mixtures of aqueous and non-aqueous samples
- Ultra-cleaning and de-gassing solvents and mobile phases for HPLC
- Clarification
- Protein Chemistry

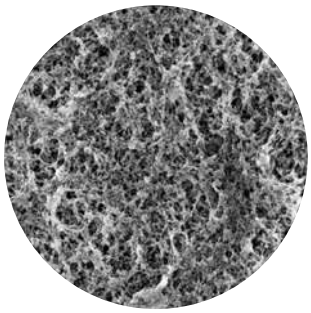
Performance

Pore Size (µm)	Typical Flow Rate (mL/min/cm² @ 10 psi)	Typical Bubble Point (psi)	Typical Thickness (µm)
0.22	10.3	63.8	≥ 145
0.45	20.6	42.1	≥ 145

Ordering information

	Dimensions	25 mm	47 mm
	Packaging	100/pk	100/pk
Pore sizes	0.22 µm	3099756	3099758
	0.45 µm	3099757	3099755

Polyvinylidene Fluoride (PVDF) Hydrophilic Membrane



PVDF
Polyvinylidene
Membrane

GVS Hydrophilic Polyvinylidene Difluoride (Hydrophilic PVDF) Filtration Membrane is a supported, hydrophilic membrane that exhibits broad chemical compatibility and low protein binding. Composed of PVDF internally supported by an inert polyester web, the resulting membrane has dimensional stability. This provides higher throughputs than competitor offerings and reduces the amount of filter changes needed during filtration. It is ideal for use in filtration applications of biological solutions. This hydrophilic membrane has a great thermal stability with maximum operating temperature of 175°F and it is autoclavable.

Features & Benefits

- Superior strength to withstand aggressive handling or use with automated equipment without breaking or tearing
- Low protein binding minimizes retention of proteins in solution
- Low extractables ensure tests will be clean with consistent results
- Lot-to-lot consistency ensures consistent flow and diffusion rates for dependable results every time

Typical Applications

- Sterilizing clarification of biological solutions.
- Preparation of protein-containing solutions prior to chromatography or other instrumental analyses.
- Useful for a wide range of applications, including aggressive and non-aggressive solvent-based mobile phase.
- Offers excellent chemical compatibility, even with aggressive acids and alcohols.
- Provides high flow rates and throughput, low extractables and broad chemical compatibility.
- Better protection of your analytical results.

Performance

Pore Size (µm)	Typical Flow Rate (mL/min/cm² @ 10 psi)	Typical Bubble Point (psi)	Typical Thickness (µm)
0.22	7	36	170
0.45	29	22	170

Ordering information

	Dimensions	25 mm	47 mm	90mm
	Packaging	100/pk	100/pk	25pk
Pore sizes	0.22 µm	3044272	3044270	3044271
	0.45 µm	3037802	3037800	3037801

Polypropylene (PP) Membrane

POLY Sep
Polypropylene
Membrane

GVS polypropylene filtration membranes are composed of pure polypropylene with absolute pore size ratings. These filters offer broad chemical compatibility allowing its use with aqueous and organic solvent samples.
The polypropylene filter has extremely low extractable levels designed to provide accurate, consistent analysis results for sensitive ion chromatography applications while prolonging column life. GVS polypropylene filter is the preferred filter membrane for HPLC applications where the detection levels are below 230 nm. The filters also exhibit negligible protein binding which, is essential for maximum sample recovery of critical, small volume protein samples.

Features & Benefits

- Broad chemical compatibility
- Hydrophobic
- HPLC applications - detection levels < 230 nm

Typical Applications

- Aqueous and organic solvent filtration
- HPLC sample preparation requiring low detection levels
- Ion chromatography
- Total digest for heavy metals

Performance

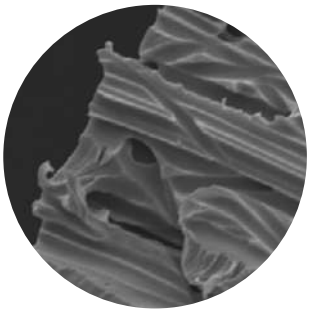
Pore Size (µm)	Minimum Bubble Point (psi; IPA)	Typical Thickness (µm)
0.1	24.6	110
0.22	92.5	160

Pore Size (µm)	Minimum Bubble Point (in: H_2O)	Typical Thickness
0.45	41	200
1.2	27	220
10	15	300

Ordering information

Dimensions Packaging	25 mm 100/pk	47 mm 100/pk	90 mm 25/pk	142 mm 25/pk	200x200 mm 5/pk
Pore sizes: 0.1 µm	1222102	1214237	1220824		1225932
0.22 µm	1214238	1214239	1214240		3095433
0.45 µm	1212379	1212380	1212381	1212383	
1.2 µm	1212390	1212391	1212392	1212394	
10.0 µm		1225792			

Polycarbonate Track Etched (PCTE) Membrane



PORETICS
PCTE Membrane

GVS Polycarbonate Track Etched (PCTE) Membrane is made from a thin polycarbonate film with precisely defined pores. It is ideally suited for use in cellular-based filtration assays as well as filtration applications where high purity is required. The membrane is produced through a two-step, proprietary manufacturing process that employs high quality standards. In the first step, polycarbonate film is exposed to ion particles that pass through it. As the ions pass through the film, they create “tracks” where the polymer is damaged. The beamed film is then exposed to a chemical that etches out the tracks creating precise, cylindrical pores. Pore density is controlled by the number of tracks per unit area, and pore size is controlled by varying the temperature, strength and time of exposure to the etching solution. This unique process allows for increased control over pore size and density to ensure the physical properties of each membrane precisely fit your specifications. The resulting membrane is a thin, translucent polycarbonate film with a smooth, flat surface. All particles larger than the pore size are captured on its surface.

Nominal Product Characteristics

Thickness	5 - 20 µm
Refractive Indices	Birefringent at 1.584 and 1.625
Water Adsorption (% wt. gain 24-hr immersion)	0.24%
Residual Ash Weight Average	0.92 µg/cm^2
Specific Gravity	0.94-0.97
Autoclavable	Yes
Leachables	Negligible
Wetting Characteristics	Hydrophilic or Hydrophobic
Wetting Agent (hydrophilic)	Polyvinylpyrrolidone (PVP)
Burst Strength Minimum	0.7 bar (10 psi)
Migration of Filter Media	0
Optical Properties	Semi-translucent

GVS offers a unique solution for Legionella analysis following the new standard UNI EN ISO 11731. Our sterile gridded membranes are suitable for this test and give you the best performances.

GVS offers the PCTE Membrane for AOX use (adsorbable organic halogens) with exceptionally low protein-binding/ extractable levels and precisely defined pores. These AOX -certified polycarbonate (PCTE) membranes are ideally suited for the detection of man-made pollution in groundwater and wastewater (organic halide adsorption determination).

To optimize the suitability of PCTE, we offer a variety of products with unique characteristics:

- PVP (polyvinylpyrillidone)-treated for a hydrophilic membrane
- AOX-certified for applications requiring extremely low extractables
- Black-dyed membrane for staining applications
- PVP-free for a hydrophobic membrane

Characteristics

- Absolute pore size and density allows for precise
- size separation
- Direct thickness and pore size measurements provide
- accurate characteristics
- Smooth, thin, glass-like surface is suitable for microscopy and cellular applications
- Superior strength allows for aggressive handling
- Low protein binding ensures clean results
- Resists chemical staining to ease microscopic visualization
- Passes USP VI Class toxicity testing for use

Typical Applications

- General filtration
- Legionella test (UNI EN ISO 11731_2017)
- Removal of red blood cells from plasma
- Flow control of reagents through assays
- Precise filtration and prefiltration
- Fuel testing
- Cytology
- Microscopy

Product Characteristics

Sterilization	Gamma Irradiation or Ethylene Oxide (EtO)
USP Class VI Testing	Passed
Extractables	Very Low
BSA Protein Binding	5 µg/cm^2
Maximum Operating Temperature	284°F (140°C)
Sealing Compatibility	Ultrasonic, Heat, Radio Frequency and Insert Molding
Pore Size Range	0.05 to 20 µm

Performance Characteristics

Pore Size (a) (µm)	Pore Density (b) (pores/cm²)	Nominal Thickness (c) (µm)	Min. Bubble Point (d) (psi)	Typical Flow Rates	
				Water (e) (mL/min/cm²)	Air (L/min/cm²)
20	4×10^4	3	1	1000	11 (g)
14	5×10^4	6	0.2	1400	63.5 (g)
12	1×10^5	8	0.4	1250	63.5 (g)
10	1×10^5	10	0.5	1150	34.5 (g)
8	1×10^5	7	0.7	1000	30 (g)
5	4×10^5	10	1.2	700	30 (g)
3	2×10^6	9	2	440	37.5 (g)
2	2×10^6	10	3	300	16.5 (f)
1	2×10^7	11	6	130	20 (f)
0.8	3×10^7	9	7	90	18 (f)
0.6	3×10^7	9	9	60	7.5 (f)
0.4	1×10^8	10	12	33	7.5 (f)
0.2	3×10^8	10	20	10	3 (f)
0.1	4×10^8	6	30	2.5	1.5 (f)
0.08	4×10^8	6	38	0.6	0.75 (f)
0.05	6×10^8	6	50	0.4	0.37 (f)
0.03	6×10^8	6	NA	0.2	0.075 (f)
0.01	6×10^8	6	NA	0.1	0.0075 (f)

(a) Tolerance + 0%, -20%
(b) Tolerance + / - 15%
(c) Tolerance + / - 10%
(d) Measured using Isopropanol (IPA)
(e) Initial flow rates using prefiltered water at 10 psid (0.7 kg/cm²)
(f) Initial flow rates using prefiltered air at 10 psid (0.7 kg/cm²)
(g) Initial flow rates using prefiltered air at 5 psi (0.35 kg/cm²)

PCTE AOX Hydrophilic Membrane
Ordering information

Dimensions / Packaging	25 mm 100/pk	47 mm 100/pk
Pore sizes		
0.4 µm	3026431	1215071

PCTE Hydrophilic Black Membrane
Ordering information

Dimensions / Packaging	13 mm 100/pk	25 mm 100/pk	47 mm 100/pk	293 mm 20/pk	203x254 mm 30/pk
Pore sizes					
0.1 µm	1215311	1215315	1221503		3048982
0.2 µm	1215185	1215609	1213889	3027176	
0.4 µm	1215142	1212790	1214567		1227213
0.6 µm	1222025	1215290	1215198		3054144**
0.8 µm	1215236	1215138	1222028	3022140	
1 µm	1221181	1215161	1222035		
2 µm		1215297		3033301	
3 µm		1222452	3032159	3033302	
5 µm	1221286	1215188	1221230		
8 µm		1229540			

** 100/pack

DISC AND SHEET MEMBRANES

PCTE Hydrophilic Membrane - Sheets and Rolls
Ordering information

Dimensions Packaging	19x42 mm 100/pk	25x80 mm 50/pk	203x254 mm 30/pk	300x3000 mm 1/pk
Pore sizes				
0.01 µm			1215116	1225184
0.03 µm			1227264	1239558
0.05 µm			1215271	3027177
0.1 µm			1215117	1239556
0.2 µm			1215118	1239557
0.4 µm			1215274	
0.6 µm			1222027	
0.8 µm			1222030	3035602
1 µm		1268126	1221429	1267667
2 µm			1221232	
3 µm			1215275	3002536
5 µm	1221295		1222080	1264835
8 µm	1220867	1220686	1222085	3033093
10 µm			1220823	3033092
12 µm				1235494
20 µm			1221231	

PCTE PVP-Free Hydrophobic Membrane
Ordering information

Dimensions Packaging	13 mm 100/pk	25 mm 100/pk	47 mm 100/pk	90 mm 30/pk	203x254 mm 30/pk	203x254 mm 30/pk	25x80 mm 50/pk
Pore sizes							
0.01 µm			1226494		3032133		
0.1 µm	1221504	1215059				1232919	
0.2 µm		1222017	1222018			1223036	
0.4 µm		1220835	1215073			1233373	
0.8 µm		1222032					
1.0 µm		1222037	1222038			1224067	
3.0 µm	1215050	1221871	1222077			1228132	1221296
5.0 µm	1215051	1221746	1222081	1222082		1225120	1221331
8.0 µm	1215052	1221293	1215148	1222086		1225783	1215042
10.0 µm	1215053	1222089	1220941			1234298	1215043
12.0 µm	1215055	1221300					1215044
14.0 µm	1221297						

PCTE Hydrophilic Membrane - Disks
Ordering information

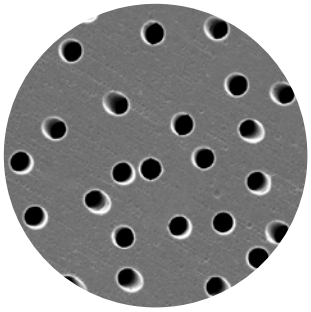
Pore sizes Dimensions Packaging	13 mm 100/pk	19 mm 100/pk	25 mm 100/pk	37 mm 100/pk	47 mm 100/pk
0.01 µm	1215046		1215321		1215068
0.03 µm	1215047		1215057		1215069
0.05 µm	1215048	1221229	1220868		1215070
0.08 µm	1222092		1215058		1222093
0.1 µm	1215605	1215056	1215606		1215608
0.2 µm	1215610	1220694	1215611		1215612 1226156*
0.4 µm	1215613		1215614	1215615	1215617 1226157*
0.6 µm	1215618		1215619		1215620
0.8 µm	1215621		1215622	1215623	1215624
1 µm	1215625	1227203	1215627	1221302	1215628
2 µm	1215985		1215062		1215629
3 µm	1215049		1215063		1215036
5 µm	1215630		1215631		1215632
8 µm	1215633	3013894	1215634		1215637
10 µm	1221009		1215638		1212661
12 µm	1215054		1215984		3027598
14 µm	1222063		1222064		1215077
20 µm	1222072		1222073		1215078

* white, gridded, sterile and single packed for Legionella test

PCTE Hydrophilic Membrane - Disks
Ordering information

Pore sizes Dimensions Packaging	62 mm 100/pk	76 mm 30/pk	76 mm 100/pk	90 mm 30/pk	142 mm 20/pk	293 mm 20/pk
0.05 µm			1221291	1221227	1221290	1222091
0.08 µm				1222094	1222095	1222096
0.1 µm			1220970	1215150	1215304	1215219
0.2 µm			1220891	1215151	1215215	1215385
0.4 µm	3023783		1228342	1215303	1215152	1215317
0.6 µm		1224680		1222026	1221485	1220861
0.8 µm		1225894		1215194	1215309	1221720
1 µm			1220860	1215153	1216611	1215145
2 µm				1222070	1222071	1221005
3 µm			3013824	1222074	1215113	1222075
5 µm			3013825	1221004	1215388	
8 µm			3034848	1215403	1215201	1222084
10 µm			1267014	1222482	1221292	1222088
12 µm				1239192		
14 µm				1222479		

Polyester Track Etched (PETE) Membrane



PORETICS
PETE Membrane

GVS PETE Membrane is made from a thin polyester film with a high density of solvent resistance. It is ideal for use in blood assays or general filtration where chemically aggressive solvents may be used. The membrane is produced through a two-step proprietary manufacturing process similar to that of the PCTE membrane. In the first step, polyester film is exposed to ion particles that pass through the film. As the ions pass through the film, they create “tracks” where the polymer is damaged. The beamed film is then exposed to a chemical solution which etches out the tracks creating precise, cylindrical pores. Pore density is controlled by the number of tracks per unit area, and pore size is controlled by varying the temperature, strength and time of exposure to the etching solution. This unique process allows for increased control over pore size and density to ensure the physical properties of each membrane precisely fit your specifications. The resulting membrane is a thin, translucent polyester film with a smooth, flat surface containing pores of controlled diameter and number. The membrane has better solvent resistance than polycarbonate and captures all particles larger than the precisely controlled pore size on its surface.

Characteristics

- Broad range of chemical compatibility for a wide range of applications
- Direct thickness and pore size measurements ensure accurate characteristics
- Naturally hydrophilic so pre-treatments and wetting agents are not required
- Smooth, thin, glass-like surface for microscopic visualization
- Low protein binding ensures clean results

Typical Applications

- General filtration
- Removal of red blood cells from plasma
- Flow control of reagents through assays
- Precise filtration and prefiltration
- Air analysis
- Filtration of aggressive solutions
- Cellular assays and diagnostics
- Trace element analysis

Product Characteristics

Sterilization	Gamma Irradiation or Ethylene Oxide (EtO)
USP Class VI Testing	Passed
Thickness	10 - 20 µm
Extractables	Low
BSA Protein Binding	< 5 µg/cm^2
Maximum Operating Temperature	284°F (140°C)
Sealing Compatibility	Ultrasonic, Heat, Radio Frequency and Insert Molding
Pore Size Range	0.2 to 10 µm

Nominal Product Characteristics

Water Adsorption (% wt. gain 24-hr immersion)	0.24%
Residual Ash Weight Average	0.92 µg/cm^2
Specific Gravity	0.94-0.97
Autoclavable	Yes
Leachables	Negligible
Wetting Characteristics	Naturally Hydrophilic
Burst Strength Minimum	0.7 bar (10 psi)
Migration of Filter Media	0
Optical Properties	Semi-translucent

Performance Characteristics

Pore Size (a) (µm)	Pore Density (b) (pores/cm^2)	Nominal Thickness (c) (µm)	Min. Bubble Point (d) (psi)	Typical Flow Rates	
				Water (e) (mL/min/cm^2)	Air (L/min/cm^2)
10	1 x 10^5	9	0.5	1150	34.5 (g)
8	1 x 10^5	7	0.7	1000	30 (g)
5	4 x 10^5	10	1.2	700	30 (g)
3	2 x 10^6	9	2	440	37.5 (g)
2	2 x 10^6	10	3	300	16.5 (f)
1	2 x 10^7	11	6	130	20 (f)
0.8	3 x 10^7	9	7	90	18 (f)
0.6	3 x 10^7	9	9	60	7.5 (f)
0.4	1 x 10^8	10	12	33	7.5 (f)
0.2	3 x 10^8	10	20	10	3 (f)

(a) Tolerance + 0%, -20%
(b) Tolerance + / - 15%
(c) Tolerance + / - 10%
(d) Measured using Isopropanol (IPA)
(e) Initial flow rates using prefiltered water at 10 psid (0.7 kg/cm^2)
(f) Initial flow rates using prefiltered air at 10 psid (0.7 kg/cm^2)
(g) Initial flow rates using prefiltered air at 5 psi (0.35 kg/cm^2)

PETE Membrane - Disks and Sheets
Ordering information

Dimensions Packaging	13 mm 100/pk	25 mm 100/pk	47 mm 100/pk	90 mm 30/pk	142 mm* 20/pk	293 mm 20/pk	203x254 mm 30/pk
0.2 µm	1220969	1221383	1215288	1222240	1221385		1220886
0.4 µm	1221387	1221388	1215373	1220702	1221389		1222242
0.8 µm		1221398	1215374	1221399		1221401	1222246
1.0 µm	1215379	1215308	1220871	1221402	1222248	1222249	1221334
2.0 µm		1221404	1221405				1222251
3.0 µm	1221409	1221410	1215367	1222253	1221411	1221412	1222254
5.0 µm	1215324	1221413	1215183	1221414	1221415	1221416	1222256
8.0 µm	1221417	1221418	1221419	1221420			1222258
10.0 µm		1220827	1215173	1221424		1221426	1222260

Pore sizes

*Bulk packaging available

Drain Disc

The polyester spun-bonded “drain” type disc prevents “pore blinding” or blockage of the capillary pores in screen membranes resulting in higher flow rates and increased throughputs. The drain disc increases flow and capture ability by lifting off of screen supports and exposing all the pores. This ensures efficient performance when placed between two filters in a serial filtration stack. The spacers prevent air locking of the downstream screen, or function as filters by binding a percentage of pores in the upstream filter.
The spacer may be sized to fit within the diameter of the O-ring in the filter holder. For example , use a 42 mm spacer under a 47 mm filter.

Characteristics

- Frequently used with PCTE (Polycarbonate) and PETE (Polyester) membranes to increase flow
- Spacer between stacked membranes

Ordering information

Product Code	Quantity	Description
1215218	100/pk	Drain Disc, 13 mm
1215141	100/pk	Drain Disc, 25 mm
1238010	100/pk	Drain Disc, 37 mm
1215500	100/pk	Drain Disc, 42 mm
1215163	100/pk	Drain Disc, 47 mm
1221182	25/pk	Drain Disc, 90 mm
1215522	25/pk	Drain Disc, 124 mm
3033452	25/pk	Drain Disc, 142 mm
3007164	25/pk	Drain Disc, 293 mm

Filter Papers

GVS filter paper is the standard for laboratory filtration. Using the highest quality material, the GVS filter paper has an enhanced mechanical strengths, quality level and reliability. GVS offers both qualitative and quantitative filter papers, with increasing degrees of purity, hardness and chemical resistance.

Qualitative Papers

GVS Qualitative low ash hardened filter paper is used in qualitative analytical techniques to determine and identify materials. Qualitative filter papers are made of refined pulp and pure cotton linters with an alpha-cellulose content of nearly 100%. The ash content of less than 0.06% is not reduced by post-treatment.
From Very Fast filtration to Very Slow filtration, GVS qualitative Papers provide a wide range of solutions for all application needs.

Low Ash / Very Fast

Very high rate of filtration with excellent retention of coarse particles and precipitates such as metal hydroxides and sulphides or gelatinous substances. Rapid filter for clean-up of biological fluids or organic extracts, food industry analysis and air pollution monitoring.

Product Characteristics

Weight	85 g/m²
Thickness	210 µm
Retention Range	15-20 µm
Ash content	<0.06 %

General Application

- Qualitative analysis
- Analysis of Biological and organic fluids
- Air monitoring
- Food analysis

Ordering information

Product Code	Diameter	Quantity
FP042DXF04QALC01	42 mm	100/pk
FP047DXF04QALC01	47 mm	100/pk
FP055DXF04QALC01	55 mm	100/pk
FP070DXF04QALC01	70 mm	100/pk
FP090DXF04QALC01	90 mm	100/pk
FP110DXF04QALC01	110 mm	100/pk
FP125DXF04QALC01	125 mm	100/pk
FP150DXF04QALC01	150 mm	100/pk
FP185DXF04QALC01	185 mm	100/pk
FP240DXF04QALC01	240 mm	100/pk
FP320DXF04QALC01	320 mm	100/pk

Low Ash / Medium

Medium retention and flow rate. For the rapid filtration of fine precipitates.
Medium grade filter paper is ideal for a wide range of laboratory applications: separation of precipitates (lead sulfate, calcium oxalate, calcium carbonate), soil analysis, seed testing, separation of solid foodstuff or extracting liquid, atmospheric dust collection. gas detection.

Product Characteristics

Weight	85 g/m²
Thickness	180 µm
Retention Range	10-13 µm
Ash content	<0.06 %

General Application

- Qualitative analysis
- Clarifying liquids
- Soil analysis and seed testing
- Food analysis
- Air monitoring

Ordering information

Product Code	Diameter	Quantity
FP042DME01QALC01	42 mm	100/pk
FP047DME01QALC01	47 mm	100/pk
FP055DME01QALC01	55 mm	100/pk
FP070DME01QALC01	70 mm	100/pk
FP090DME01QALC01	90 mm	100/pk
FP110DME01QALC01	110 mm	100/pk
FP125DME01QALC01	125 mm	100/pk
FP150DME01QALC01	150 mm	100/pk
FP185DME01QALC01	185 mm	100/pk
FP240DME01QALC01	240 mm	100/pk
FP320DME01QALC01	320 mm	100/pk

Low Ash / Medium-Slow

Medium-Slow flow speed with medium-high retention. For general filtration. Ideal for monitoring specific contaminants in the atmosphere and soil testing. For the filtration of fine precipitates.

Product Characteristics

Weight	100 g/m²
Thickness	190 µm
Retention Range	7-8 µm
Ash content	<0.06 %

General Application

- Qualitative analysis
- General filtration
- Soil analysis
- Air monitoring

Ordering information

Product Code	Diameter	Quantity
FP042DMS02QALC01	42 mm	100/pk
FP047DMS02QALC01	47 mm	100/pk
FP055DMS02QALC01	55 mm	100/pk
FP070DMS02QALC01	70 mm	100/pk
FP090DMS02QALC01	90 mm	100/pk
FP110DMS02QALC01	110 mm	100/pk
FP125DMS02QALC01	125 mm	100/pk
FP150DMS02QALC01	150 mm	100/pk
FP185DMS02QALC01	185 mm	100/pk
FP240DMS02QALC01	240 mm	100/pk
FP320DMS02QALC01	320 mm	100/pk

DISC AND SHEET MEMBRANES

Low Ash / Medium-Slow/Thick

Double thick filter paper with Medium-Slow flow speed with medium-high retention. The extra thickness provides greater wet strength for higher solute loading. Suitable for Buchner funnels and hard to clarify liquids, essences, oils and tinctures. For the filtration of fine particles.

Product Characteristics

Weight	200 g/m²
Thickness	320 µm
Retention Range	5-7 µm
Ash content	<0.06 %

General Application

- Qualitative analysis
- Buchner funnels
- High absorbency

Ordering information

Product Code	Diameter	Quantity
FP042DMS03QLTC01	42 mm	100/pk
FP047DMS03QLTC01	47 mm	100/pk
FP055DMS03QLTC01	55 mm	100/pk
FP070DMS03QLTC01	70 mm	100/pk
FP090DMS03QLTC01	90 mm	100/pk
FP110DMS03QLTC01	110 mm	100/pk
FP125DMS03QLTC01	125 mm	100/pk
FP150DMS03QLTC01	150 mm	100/pk
FP185DMS03QLTC01	185 mm	100/pk
FP240DMS03QLTC01	240 mm	100/pk
FP320DMS03QLTC01	320 mm	100/pk

Low Ash / Very Slow

Maximum particle retention. Slow flow rate. High retention of fine particles in chemical analysis. Clarification of cloudy suspensions (wine); Water and soil analysis. Ideal for extra fine-grained precipitates, barium sulphate, cuprous oxide.

Product Characteristics

Weight	85 g/m²
Thickness	170 µm
Retention Range	3-5 µm
Ash content	<0.06 %

General Application

- Qualitative analysis
- Clarifying liquids
- Water analysis
- Soil analysis

Ordering information

Product Code	Diameter	Quantity
FP042DXS05QALC01	42 mm	100/pk
FP047DXS05QALC01	47 mm	100/pk
FP055DXS05QALC01	55 mm	100/pk
FP070DXS05QALC01	70 mm	100/pk
FP090DXS05QALC01	90 mm	100/pk
FP110DXS05QALC01	110 mm	100/pk
FP125DXS05QALC01	125 mm	100/pk
FP150DXS05QALC01	150 mm	100/pk
FP185DXS05QALC01	185 mm	100/pk
FP240DXS05QALC01	240 mm	100/pk
FP320DXS05QALC01	320 mm	100/pk

Quantitative Papers

GVS Quantitative Ashless filter papers are designed for quantitative analysis and preparation of samples and gravimetric analysis. Suitable for Buchner funnels and filtration under pressure. Quantitative Ashless filter papers are made of refined pulp and pure cotton linters with an alpha-cellulose content of virtually 100%. Ash content of less than 0.007%. From Very Fast Filtration to Very Slow Filtration, the wide range of GVS Quantitative Papers provide the right solution for any application need.

Ashless / Fast

Very fast ashless filter paper. Analytical procedures with large particles or gelatinous precipitates (iron or aluminum hydroxides). Air pollution analysis to determinate gaseous compounds.

Product Characteristics

Weight	85 g/m²
Thickness	190 µm
Retention Range	20-25 µm
Ash content	<0.007 %

General Application

- Quantitative analysis
- Air monitoring
- Food industry
- paper industry

Ordering information

Product Code	Diameter	Quantity
FP042DFA41QANC01	42 mm	100/pk
FP047DFA41QANC01	47 mm	100/pk
FP055DFA41QANC01	55 mm	100/pk
FP070DFA41QANC01	70 mm	100/pk
FP090DFA41QANC01	90 mm	100/pk
FP110DFA41QANC01	110 mm	100/pk
FP125DFA41QANC01	125 mm	100/pk
FP150DFA41QANC01	150 mm	100/pk
FP185DFA41QANC01	185 mm	100/pk
FP240DFA41QANC01	240 mm	100/pk
FP320DFA41QANC01	320 mm	100/pk

Ashless / Medium

Medium retention and fast flow. Foodstuff and soil analysis. Air pollution monitoring. Analysis in mining, construction and steel industries.

Product Characteristics

Weight	85 g/m²
Thickness	180 µm
Retention Range	14-17 µm
Ash content	<0.007 %

General Application

- Quantitative analysis
- Food analysis
- Soil analysis
- Industrial analysis
- COD and TOC determination
- inorganic analysis
- Blaine test and other cement testing
- Inorganic

Ordering information

Product Code	Diameter	Quantity
FP042DME43QANC01	42 mm	100/pk
FP047DME43QANC01	47 mm	100/pk
FP055DME43QANC01	55 mm	100/pk
FP070DME43QANC01	70 mm	100/pk
FP090DME43QANC01	90 mm	100/pk
FP110DME43QANC01	110 mm	100/pk
FP125DME43QANC01	125 mm	100/pk
FP150DME43QANC01	150 mm	100/pk
FP185DME43QANC01	185 mm	100/pk
FP240DME43QANC01	240 mm	100/pk
FP320DME43QANC01	320 mm	100/pk

DISC AND SHEET MEMBRANES

Ashless / Medium-Slow

Medium speed and retention. Analysis of components in cements, clays, iron and steel products. Soil analysis. Sediments in milk. Filtration of solutions prior to atomic absorption spectrophotometry; High purity filter in atmospheric analysis.

Product Characteristics

Weight	85 g/m²
Thickness	170 µm
Retention Range	7-9 µm
Ash content	<0.007 %

General Application

- Quantitative analysis
- Gravimetric analysis
- Soil analysis
- Air monitoring
- Fat and oil in water testing

Ordering information

Product Code	Diameter	Quantity
FP042DMS40QANC01	42 mm	100/pk
FP047DMS40QANC01	47 mm	100/pk
FP055DMS40QANC01	55 mm	100/pk
FP070DMS40QANC01	70 mm	100/pk
FP090DMS40QANC01	90 mm	100/pk
FP110DMS40QANC01	110 mm	100/pk
FP125DMS40QANC01	125 mm	100/pk
FP150DMS40QANC01	150 mm	100/pk
FP185DMS40QANC01	185 mm	100/pk
FP240DMS40QANC01	240 mm	100/pk
FP320DMS40QANC01	320 mm	100/pk

Ashless / Slow

High retention and slow flow rate. Often used for filtering very fine precipitates and in gravimetric metal determination.

Product Characteristics

Weight	85 g/m²
Thickness	160 µm
Retention Range	2-4 µm
Ash content	<0.007 %

General Application:

- Quantitative analysis
- For very fine crystalline precipitates

Ordering information

Product Code	Diameter	Quantity
FP042DSL44QANC01	42 mm	100/pk
FP047DSL44QANC01	47 mm	100/pk
FP055DSL44QANC01	55 mm	100/pk
FP070DSL44QANC01	70 mm	100/pk
FP090DSL44QANC01	90 mm	100/pk
FP110DSL44QANC01	110 mm	100/pk
FP125DSL44QANC01	125 mm	100/pk
FP150DSL44QANC01	150 mm	100/pk
FP185DSL44QANC01	185 mm	100/pk
FP240DSL44QANC01	240 mm	100/pk
FP320DSL44QANC01	320 mm	100/pk

Ashless / Very Slow

Highest retention and very slow flow. Extremely difficult filtrations. Analytical precipitates: barium sulphate, matastannic acid and finely precipitated calcium carbonate. The ideal filter paper for critical gravimetric analysis.

Product Characteristics

Weight	100 g/m²
Thickness	160 µm
Retention Range	2-3 µm
Ash content	<0.007 %

General Application

- Quantitative analysis
- Critical gravimetric analysis.

Ordering information

Product Code	Diameter	Quantity
FP042DXS42QANC01	42 mm	100/pk
FP047DXS42QANC01	47 mm	100/pk
FP055DXS42QANC01	55 mm	100/pk
FP070DXS42QANC01	70 mm	100/pk
FP090DXS42QANC01	90 mm	100/pk
FP110DXS42QANC01	110 mm	100/pk
FP125DXS42QANC01	125 mm	100/pk
FP150DXS42QANC01	150 mm	100/pk
FP185DXS42QANC01	185 mm	100/pk
FP240DXS42QANC01	240 mm	100/pk
FP320DXS42QANC01	320 mm	100/pk

Glass Microfiber

GVS 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.

GF 0.7 µm

This is the filter with the highest retention performance of the range.It is particularly suited to filter samples and solvents for HPLC, being this pre-filtration most important for ensuring the success of the test. It is also suitable for biochemical test, such as clarifications, protein filtrations, cellular cultures, etc. The Trace Element Levels were obtained with an AAS (Atomic Absorption Spectrometer) with 100% dissolved fiberglass.

Product Characteristics

Basis Weight	75 g/m²
Thickness	450 µm
Retention range	0.7 µm
Binders	Binder-free
Retention DOP	99,998 %

Features & Benefits

- Very small particles retention
- Resistance to aggressive substances
- Temperature resistant up to 500°C

Typical Application

- DNA and Protein filtration
- Clarification
- Water analysis
- Biochemical determinations
- Air monitoring
- As a membrane pre-filter
- Filtration of solvents for HPLC and biochemical tests
- Cell cultures
- Protein and Enzyme filtration

Ordering information

Product Code	Diameter	Quantity
FP021DSLFFGLFC01	21mm	100/pk
FP024DSLFFGLFC01	24mm	100/pk
FP025DSLFFGLFC01	25 mm	100/pk
FP037DSLFFGLFC01	37 mm	100/pk
FP047DSLFFGLFC01	47 mm	100/pk
FP050DSLFFGLFC01	50 mm	100/pk
FP055DSLFFGLFC01	55 mm	100/pk
FP070DSLFFGLFC01	70 mm	100/pk
FP090DSLFFGLFC01	90 mm	100/pk
FP110DSLFFGLFC01	110 mm	100/pk
FP125DSLFFGLFC01	125 mm	100/pk
FP150DSLFFGLFC01	150 mm	100/pk
FP203RSLFFGLFC01	203x254 mm	100/pk
FP240DSLFFGLFC01	240 mm	100/pk

GF 1.0 µm

This filter paper is mainly used in membrane prefiltration and for filtration of suspended solids in water.
Suitable for filtration of large volumes.

Features & Benefits

- Small particles retention
- Resistance to aggressive substances
- Temperatures up to 500 °C

Product Characteristics

Basis Weight	143 g/m²
Thickness	700 µm
Retention range	1.0 µm
Binders	Binder-free
Retention DOP	99,998 %

Typical Application

- Liquid Filtration
- Clarification
- Water analysis
- Biochemical determinations
- As a membrane pre-filter
- Large volume filtration

Ordering information

Product Code	Diameter	Quantity
FP021DAM10GLFC01	21mm	100/pk
FP024DAM10GLFC01	24mm	100/pk
FP027DAM10GLFC01	27 mm	100/pk
FP037DAM10GLFC01	37 mm	100/pk
FP047DAM10GLFC01	47 mm	100/pk
FP050DAM10GLFC01	50 mm	100/pk
FP055DAM10GLFC01	55 mm	100/pk
FP070DAM10GLFC01	70 mm	100/pk
FP090DAM10GLFC01	90 mm	100/pk
FP110DAM10GLFC01	110 mm	100/pk
FP125DAM10GLFC01	125 mm	100/pk
FP150DAM10GLFC01	150 mm	100/pk
FP203RAM10GLFC01	203 X 254 mm	100/pk
FP240DAM10GLFC01	240 mm	100/pk

GF 1.2 µm

This is the most suitable filter to test for solids in suspension in water in accordance with the parameters set by the EN European regulations. In general it is suitable for any work in water control or waste water analysis, including clarification processes. In biochemical tests, it is very useful for analysing carbohydrates, cellular cultures, etc. The Trace Element Levels were obtained with an AAS (Atomic Absorption Spectrometer) with 100% dissolved fiberglass.

Product Characteristics

Basis Weight	53 g/m²
Thickness	260 µm
Retention range	1.2 µm
Binders	Binder-free
Retention DOP	99,998 %

Features & Benefits

- Extraction thimbles (cellulose, glass & quartz microfiber)
- Very small particles retention
- Resistance to aggressive substances
- Temperatures up to 500 ºC

Typical Application

- DNA and Protein filtration
- Clarification
- Water analysis
- Biochemical determinations
- Air monitoring
- As a membrane pre-filter
- Filtration of solvents for HPLC and biochemical tests

Ordering information

Product Code	Diameter	Quantity
FP021DMEFCGLFC01	21 mm	100/pk
FP024DMEFCGLFC01	24 mm	100/pk
FP025DMEFCGLFC01	25 mm	100/pk
FP037DMEFCGLFC01	37 mm	100/pk
FP047DMEFCGLFC01	47 mm	100/pk
FP050DMEFCGLFC01	50 mm	100/pk
FP055DMEFCGLFC01	55 mm	100/pk
FP070DMEFCGLFC01	70 mm	100/pk
FP090DMEFCGLFC01	90 mm	100/pk
FP110DMEFCGLFC01	110 mm	100/pk
FP125DMEFCGLFC01	125 mm	100/pk
FP150DMEFCGLFC01	150 mm	100/pk
FP254RMEFCGLFC01	254x102 mm	100/pk
FP203RMEFCGLFC01	203x254 mm	100/pk
FP240DMEFCGLFC01	240 mm	100/pk

GF 1.6 µm

Particularly suited to atmospheric pollution controls, intake controls and ozone level measurements. This product is used in testing for algae in water, in general water controls and in waste water analysis. Its use for filtering solvents in high-resolution laboratories is recommended.

Features & Benefits

- Extraction thimbles (cellulose, glass & quartz microfiber)
- Very small particles retention
- Resistance to aggressive substances
- Temperatures up to 500 °C
- Fine retention with fast flow

Product Characteristics

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

Typical Application

- General purpose laboratory filtration
- Food analysis
- Water analysis
- Biochemical determinations
- Air monitoring
- As a membrane pre-filter
- Protein filtration

Ordering information

Product Code	Diameter	Quantity
FP021DFAFAGLFC01	21 mm	100/pk
FP024DFAFAGLFC01	24 mm	100/pk
FP025DFAFAGLFC01	25 mm	100/pk
FP037DFAFAGLFC01	37 mm	100/pk
FP047DFAFAGLFC01	47 mm	100/pk
FP050DFAFAGLFC01	50 mm	100/pk
FP055DFAFAGLFC01	55 mm	100/pk
FP070DFAFAGLFC01	70 mm	100/pk
FP090DFAFAGLFC01	90 mm	100/pk
FP110DFAFAGLFC01	110 mm	100/pk
FP125DFAFAGLFC01	125 mm	100/pk
FP150DFAFAGLFC01	150 mm	100/pk
FP203RFAFAGLFC01	203 x 254 mm	100/pk
FP240DFAFAGLFC01	240 mm	100/pk

GF 2.7 µm

A coarse filter commonly used for membrane pre-filtering. Has a high particle retention for pre-filtering to ensure that the sample is clarified properly prior to passing through the membrane filter.

Features & Benefits

- Coarse particles retention
- Resistance to aggressive substances
- Temperatures up to 500 ºC
- Coarse retention with fast flow

Product Characteristics

Basis Weight	120 g/m²
Thickness	530 µm
Retention range	2.7 µm
Binders	Binder-free
Retention DOP	99,998 %

Typical Application

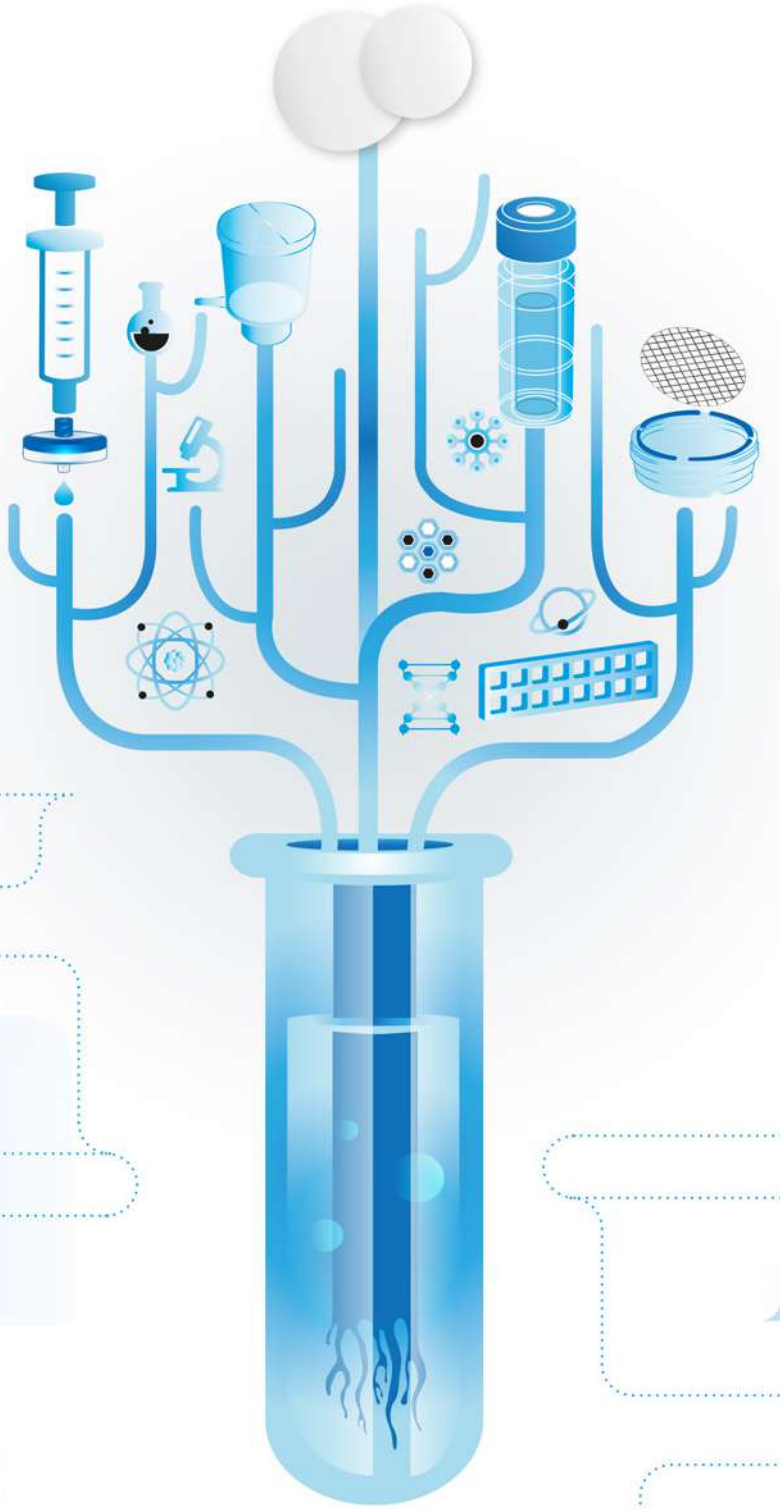
- General purpose laboratory filtration
- Clarification
- As a membrane pre-filter

Ordering information

Product Code	Diameter	Quantity
FP021DAM27GLFC01	21 mm	100/pk
FP024DAM27GLFC01	24 mm	100/pk
FP025DAM27GLFC01	25 mm	100/pk
FP037DAM27GLFC01	37 mm	100/pk
FP047DAM27GLFC01	47 mm	100/pk
FP050DAM27GLFC01	50 mm	100/pk
FP055DAM27GLFC01	55 mm	100/pk
FP070DAM27GLFC01	70 mm	100/pk
FP090DAM27GLFC01	90 mm	100/pk
FP110DAM27GLFC01	110 mm	100/pk
FP125DAM27GLFC01	125 mm	100/pk
FP150DAM27GLFC01	150 mm	100/pk
FP203RAM27GLFC01	203 x 254 mm	100/pk
FP240DAM27GLFC01	240 mm	100/pk

FILTER TECHNOLOGY

AIR MONITORING



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

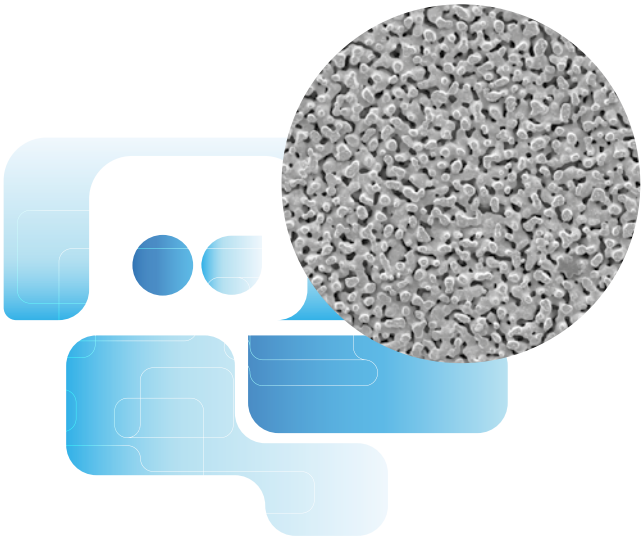
Poor Air and Water Quality around the world is a severe health risk for the population. Particulates impact the quality of the air we breathe, the water we drink and the space we live in everyday.

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



P.M. 2.5 PTFE Membrane

GVS 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	30-50 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

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

Silver Membranes

GVS silver membranes are constructed with pure metallic silver(99.97%). They combine excellent chemical resistance and high-temperature characteristics with a retention range of 0.2µm to 5µm. Silver membranes are used in a large number and variety of applications. Their unique chemical and thermal stability is especially valuable for those applications involving aggressive fluids and/or high temperatures. They are ideal collection media for analysis of crystalline silica by X-ray diffraction and for analysis of organic materials by other instrumentation techniques, such as the analysis of Polycyclic Aromatic Hydrocarbons (PAH) and Total Organic Carbons (TOC).

Features and Benefits

- High temperature resistance
- Withstand extreme chemical and thermal stress.
- Tolerant of chemically aggressive fluids.
- No dissolution or migration of the filter
- Smooth surface for particle capture and easy observation

Typical Application

- X-ray diffraction
- Scanning electron microscopy (SEM)
- Removal of air-borne contaminants according to NIOSH industrial hygiene standards
- Respirable combustible dust (RCD) sampling and analysis
- High-temperature venting; HPLC sample preparation
- Clarification, polishing, and sterilization of liquid samples
- USGS organic carbon, inorganic, and suspended sediment water analysis
- Soil and clay analysis
- Chlorine monitoring ERDA fly ash sampling
- Bacteria sampling

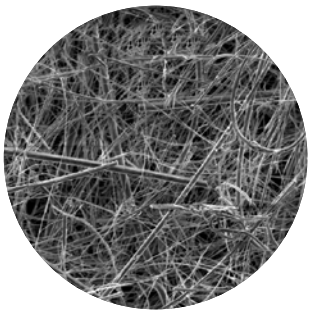
Product Characteristics

Retention Range	0.22 to 5 µm available
Maximum Temperature	400°F (204 °C)
Thickness	50 µm

Silver Membrane
Ordering information

Dimensions Packaging	13 mm 100/pk	25 mm 50/pk	37 mm 25/pk	47 mm 25/pk
Pore sizes				
0.20 µm	1211664	1145336	1145342	1145348
0.45 µm	1211663	1145335	1145341	1145347
0.8 µm	1145328	1145334	1211673	1145346
1.2 µm		1145333		1145345
3.0 µm	1211660	1145332	1211672	1211677
5.0 µm		1145331	1145337	1145343

Glass Fiber Filters with or w/o Binder



PRESep Glass Fiber Membrane

borosilicate glass fibers woven into a porous matrix and bonded by an acrylic resin. This bonding produces a filter that reduces media migration and has the strength required for high-volume aqueous filtrations. Glass Fiber membranes with a binder are usually recommended for filtrations of long duration under pressure. Glass Fiber membranes without binders are designed for solvent filtration or gravimetric analysis to avoid binder extractables. Filters without binders are recommended for analytical and gravimetric determinations.

GVS Glass Fiber membranes are biologically inert, autoclavable and highly resistant to oxidizing agents and weak acids. Glass fiber can be used to extend the life of a final filter as a prefilter or they can be used alone for low cost sample clarification. GVS Glass Fiber membranes with binders are composed of

Characteristics

- Acrylic binder
- High dirt holding capacity
- Biologically inert
- Bonding reduces media migration

Product Characteristics: Glass Fiber Filters with Binder

Max operating Temperature	165 °C
1.0 µm G20 Grade: 60 gsm	0.30 mm thick
1.0 µm G20 Grade: 203 gsm	1.14 mm thick

Product Characteristics: Glass Fiber Filters Binderless

Max operating Temperature	500 °C
0.7 µm: 60 gsm	0.44 mm thick
1.0 µm: 56 gsm	0.28 mm thick

Glass Fiber Filters with Binder
Ordering information

	Dimensions Packaging	13 mm 100/pk	22 mm 100/pk	25 mm 100/pk	42 mm 100/pk	47mm 100/pk	75 mm 25/pk	90 mm 25/pk
Pore sizes	0.5 µm		1215543	1215544		1215548		1215550
	1.0 µm (G20)	1215557		1215559	1215561	1215562	1215563	1215564
	1.0 µm (G25)	1215571	1215572	1215573		1215577		1215579

	Dimensions Packaging	124 mm 25/pk	127 mm 25/pk	142 mm 25/pk	257 mm 25/pk	293 mm 25/pk	24x24 cm 10/pk
Pore sizes	0.5 µm	1215551		1215553	1215554	1215555	1266844
	1.0 µm (G20)	1215565	1215566	1215567	1215568	1215569	
	1.0 µm (G25)	1215580		1215582	1215583	1215584	1268603

Glass Fiber Filters Binderless
Ordering information

	Dimensions Packaging	7 mm 500/pk	10 mm 500/pk	25 mm 100/pk	37 mm 500/pk	47 mm 100/pk	82 mm 100/pk
Pore sizes	0.7 µm	3029939		1215162		1215540	
	1.0 µm		1214912	1213325*	1215588	1215589*	1214974

	Dimensions Packaging	90 mm 25/pk	102 mm 100/pk	142 mm 25/pk	257 mm 100/pk	293 mm 25/pk
Pore sizes	0.7 µm	1215541		1215542		
	1.0 µm	1225509 1212763**	1214671	3034574	1220678	1220887

*500/pk **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

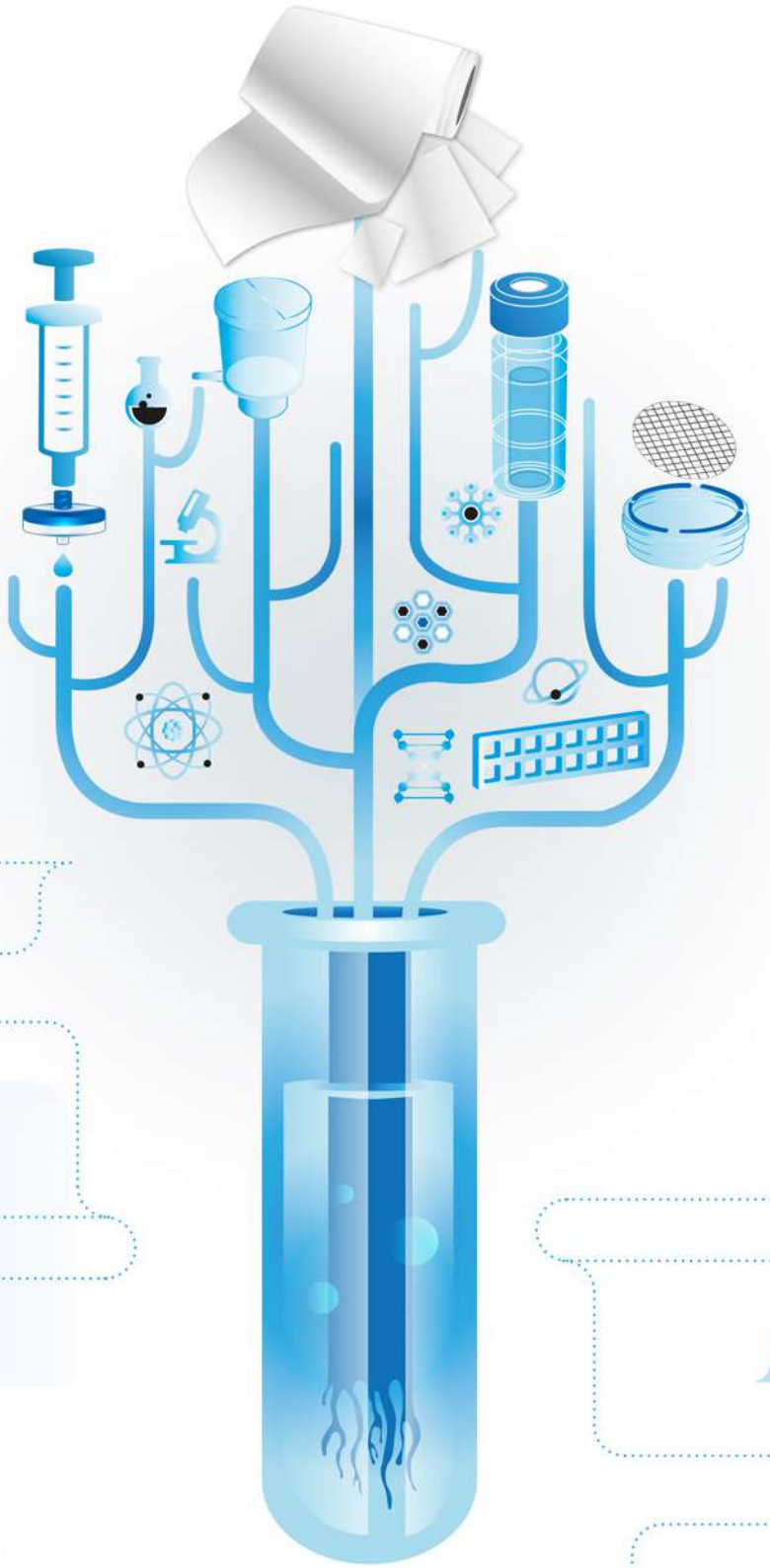
Weight	85 g/m²
Thickness	440 µm
Retention DOP	99.998 %

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
FP055D0QF1QUFC01	55 mm	100/pk
FP070D0QF1QUFC01	70 mm	100/pk
FP090D0QF1QUFC01	90 mm	100/pk
FP110D0QF1QUFC01	110 mm	100/pk
FP125D0QF1QUFC01	125 mm	100/pk
FP150D0QF1QUFC01	150 mm	100/pk
FP203R0QF1QUFC01	203 x 254 mm	100/pk

FILTER TECHNOLOGY

TRANSFER MEMBRANES



Nitrocellulose (NC)

NITRO *Pure*
Unsupported Nitrocellulose

GVS Nitrocellulose Pure Transfer Membrane is the membrane of choice for all protein or immunoblotting applications. The high sensitivity of GVS Nitrocellulose Transfer Membrane ensures excellent results in all transfers, especially in protein blotting.

Features & Benefits

- For procedures that require optimum resolution
- Membrane of choice for protein or immunoblotting applications
- Low background, easily blocked
- BSA binding capacity up to 100 µg/cm^2
- Wets out naturally
- Compatible with all detection systems

Typical Applications

- Western Blotting
- Protein & immunoblotting
- Northern Blotting
- Southern Blotting
- Dot/slot blotting
- Radiographic, chromogenic and chemiluminescent detection systems

Product Characteristics

Pore Size (µm)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm^2 @ 10 psi)	Bubble Point (psi)	Thickness (µm)
0.22	80-160	250/20	9.94-19.88	60-80	110-190
0.45	60-130	250/20	12.24-26.51	45-65	110-190

Ordering information

Pore sizes	Dimensions (mm) Packaging	70x84 mm 10/pk	100x100 mm 10/pk	150x150 mm 5/pk	200x200 mm 25/pk	200x3000 mm 1/pk	300x3000 mm 1/pk
	0.22 µm	1213991	1213999	1215463	1215392	1215469	1215458
	0.45 µm	1213888	1213314	1215476	1221976	1215483	1215471

Supported Nitrocellulose

NITRO Plus
Supported
Nitrocellulose

GVS Supported NitrocelluloseTransfer Membrane combines the binding characteristics of nitrocellulose membrane with the strength of nylon membrane. It can be easily used in any protocol utilizing unsupported nitrocellulose transfer membrane.

Features & Benefits

- Supported for procedures requiring rigorous handling
- Strong - will not curl, bend or crack after baking
- High sensitivities, low backgrounds
- Multiple reprobings
- BSA binding capacity up to 100 µg/cm^2
- Triton Free

Typical Applications

- Northern Blotting
- Southern Blotting
- Multiple re-hybridizations
- Colony/plaque lifts
- Dot/slot blotting
- Radiographic detection systems
- Chemiluminescent detection systems
- Biotinylated detection systems

Product Characteristics

Pore Size (µm)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm^2 @ 10psi)	Bubble Point (psi)	Thickness (µm)
0.22	70-150	250/20	10.60-22.72	50-75	100-140
0.45	50-130	250/20	12.24-31.81	30-55	100-130

Ordering information

Dimensions (mm) Packaging	70x84 mm 10/pk	100x100 mm 10/pk	150x150 mm 5/pk	200x200 mm 5 /pk	200x3000 mm 1/pk	300x3000 mm 1/pk
Pore sizes 0.22 µm		1214560	1212669	1212689	1212690	1212632
0.45 µm	1214978	1213943	1212596	1212597	1212602	1212590

Polyvinylidene Fluoride (PVDF)

PVDF *Pure*
Unsupported PVDF

GVS PVDF is a naturally hydrophobic, unsupported transfer membrane. It has a high binding capacity, which prevents protein from passing through the membrane, and a low background that provides for an excellent signal-noise ratio. It also has exceptional tensile strength, preventing it from cracking, tearing, breaking or curling. This membrane also has broad chemical compatibility, which is important when used with common stains such as Amido Black, Colloidal Gold, Coomassie Blue, India Ink and Ponceau-S. GVS PVDF will not degrade, distort or shrink when a high concentration of methanol is used for destaining.
Its exceptional strength, high binding capacity and chemical compatibility make GVS PVDF ideal for use in Western blotting, immunoblotting, and solid phase assays and plaque lifts.

Features & Benefits

- Superior strength: Can withstand aggressive handling or be used with automated equipment without breaking or tearing
- Low extractables: Ensures tests will be clean with consistent results
- Exceptional sensitivity: Detects low-level components
- Hydrophobic: For high protein binding
- Lot-to-lot consistency: Quality checks ensure consistent binding for dependable results every time
- BSA protein binding capacity : 125 µg/cm^2
- High range of chemical: Resistant to most commonly used chemicals compatible with chemically aggressive solvents

Typical Applications

- Western blotting
- Immunoblotting
- Solid phase assays
- Amino acid or protein analyses

Product Characteristics

Pore Size (µm)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm^2 @ 10 psi)	Bubble Point (psi)	Thickness (µm)
0.22	100-500	250/20	3.18-15.91	40-60	140-250
0.45	35-200	250/20	7.95-45.45	25-40	140-250

Ordering information

Pore sizes	Dimensions (mm) Packaging	70x84 mm 10/pk	100x100 mm 10/pk	150x150 mm 5/pk	200x200 mm 5/pk	200x3000 mm 1/pk	300x3000 mm 1/pk
	0.22 µm	1214588		1215037	1215032	1214726	1214429
	0.45 µm	1213992	1212644	1212636	1212637	1212783	1212639

Supported Polyvinylidene Fluoride (PVDF)

PVDF*Plus*
PVDF

GVS Filter Technology PVDF is a naturally hydrophobic membrane. GVS offers the widest range of this membrane: pure transfer PVDF membrane, supported transfer PVDF membrane. Polyvinylidene Difluoride membrane has a high binding capacity and low backgrounds and is ideal for use in protein binding applications such as Western blots, solid phase assays and immunoblotting procedures. PVDF ensures reproducible results with maximum sensitivity. Proteins can be electroblotted from a variety of gel matrices. In addition, PVDF membrane will not degrade, distort or shrink when using a high concentration of methanol for destaining. The exceptional tensile strength allows for easy removal of target bands without concern for the membrane tearing, fracturing or curling.

GVS Filter Technology PVDF Transfer Membrane is available in roll widths from 0.3 inch (8 mm) to 17.7 inch (450 mm), as well as in sheets and cut disks that can be customized to meet your application and size requirements. If different width is required we can slit following your needs.

Features & Benefits

- Broad chemical compatibility allows for the use of all commonly used stains
- Low backgrounds ensure the highest sensitivities across a broad range of molecular weights

Typical Applications

- Western Blotting
- Binding Assay
- Dot/Slot Blotting
- Immunoblotting
- Solid phase assays
- Amino acid or protein analyses

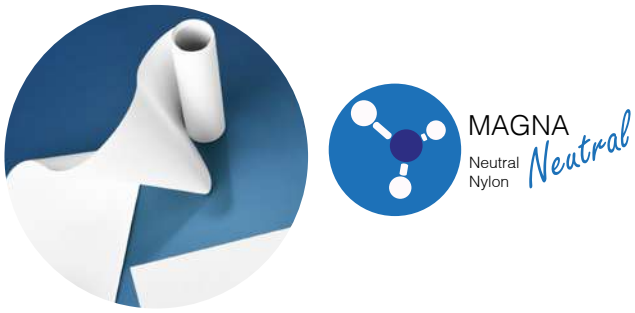
Product Characteristics

Pore Size (µm)	Flow Rate (mL / min / cm² @10psi)	Bubble Point		Thickness (µm)
		psi	bar	
0.22	> 4	> 28	> 1.9	150-200
0.45	> 7	> 23	> 1.5	150-200

Ordering information

	Dimensions (mm) Packaging	70x84 mm 10/pk	100x100 mm 10/pk	150x150 mm 5/pk	200x200 mm 5/pk	200x3000 mm 1/pk	300x3000 mm 1/pk
Pore sizes	0.22 µm	1214571	1214573	1214575	1214580	1214495	1214497
	0.45 µm	1214572	1214574	1214576	1214581	1214496	1214498

Neutral Nylon 66 Membrane



GVS Neutral Nylon Transfer Membrane is a pure polymer impregnated in by an inert polyester web. It is naturally hydrophilic and optimized for protein binding and for high, reproducible binding of nucleic acids.

Reliable Quality, Increased Efficiencies

This controlled microporous Nylon 66 membrane is cast on an inert, internal support web that gives it added dimensional strength and stability to prevent cracking, tearing, curling and breaking. This added strength and durability is essential in protocols that require aggressive handling, such as colony lifts and plaque lifts.

In addition to the dimensional strength and durability of GVS Neutral Nylon Transfer Membrane, its retention of macromolecules can also be enhanced using UV cross-linking. This process can be used to maximize the signal retention of nucleic acids and preserve the integrity of DNA or RNA transfers. The purity and consistency of GVS Neutral Nylon Transfer Membrane, coupled with its added durability and sensitivity, make it an ideal membrane for use in medical research, scientific studies or test confirmations where precise biological pattern replications, such as DNA and RNA transfers, are integral to the success of the procedure.

Features & Benefits

- Supported: has added strength and durability preventing distortion or contamination in multiple reprobings
- High binding capacity: with a nucleic acid binding capacity of approximately 350 µg/cm^2, Magna Nylon - Transfer Membrane can bind a wide range of fragment sizes, increasing the efficiency of transfers
- Hydrophilic: eliminates the need for wetting agents that can potentially interfere with biological processes
- Lot-to-lot consistency: quality checks ensure lot-to-lot consistency, both down and across the polyester web, for depenable results every time
- Maximum Operating Temperature 356°F (180°C)
- Autoclavable

Typical Applications

- Southern transfers
- Northern transfers
- Protein binding
- Microarrays
- Macroarrays
- Dot/Slot blotting
- Radiolabeled detection systems
- Non-radiolabeled detection systems
- Colony lifts
- Plaque lifts
- Library screening

Product Characteristics

Pore Size (µm)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm^2 @ 10 psi)	Bubble Point (psi)	Thickness (µm)
0.2	113-277	250/20	5.74-14.08	40-68	140-190
0.4	65-205	250/20	7.76-24.47	32-57	140-190

Disks and Sheets

Ordering information

Pore sizes	Dimensions Packaging	82 mm 50/pk	85 mm 50/pk	132 mm* 50/pk	137 mm 50/pk	150x150 mm 5/pk	200x200 mm 5/pk
	0.22 µm		1213410				1213419
	0.45 µm	1213370 1214428*	1213372	1213373	1213375	1213379	1213380

*100/pk

Pore sizes	Dimensions Packaging	200x3000 mm 1/pk	300x3000 mm 1/pk
	0.22 µm		1213405
	0.45 µm	1213403	1213364

Reprobing Charged Nylon 66 (NY+)

MAGNA*Probe*
Reprobing Charged Nylon

GVS Nylon Reprobing Charged transfer membrane is a positively charged modified nylon 66 membrane, specifically designed to allow for numerous reprobings.
The high binding capacity of 450 mg/cm² makes GVS Nylon ideal for all Southern and Northern applications, including alkaline blotting. GVS Nylon is ideally suited for all probes both radioactive and non-radioactive, including chemiluminescent and biotinylated detection systems.
GVS Nylon 66 reprobing Charged transfer membrane offers significantly increased binding, maximum "lot-to-lot" consistency, and excellent signal retention. The inherent charge on this nylon membrane along with its hydrophilic nature makes consistent repeatable results a reality for researchers.
After 12 rounds of reprobing, GVS Nylon has a lower background and higher signal.

Features & Benefits

- Supported charged nylon 66 membrane
- Specifically designed for multiple reprobings
- Used for both radiolabelled & non-radiolabelled detection systems
- Can be used for alkaline blotting
- Nucleic acid binding is 450 µg/cm²
- Maximum Operating Temperature 356°F (180°C)
- Autoclavable

Typical Applications

- Radiolabelled & non-radiolabelled detection systems
- Norther Blotting
- Southern Blotting
- Multiple Reprobings
- Alkaline Blotting
- UV Crosslinking

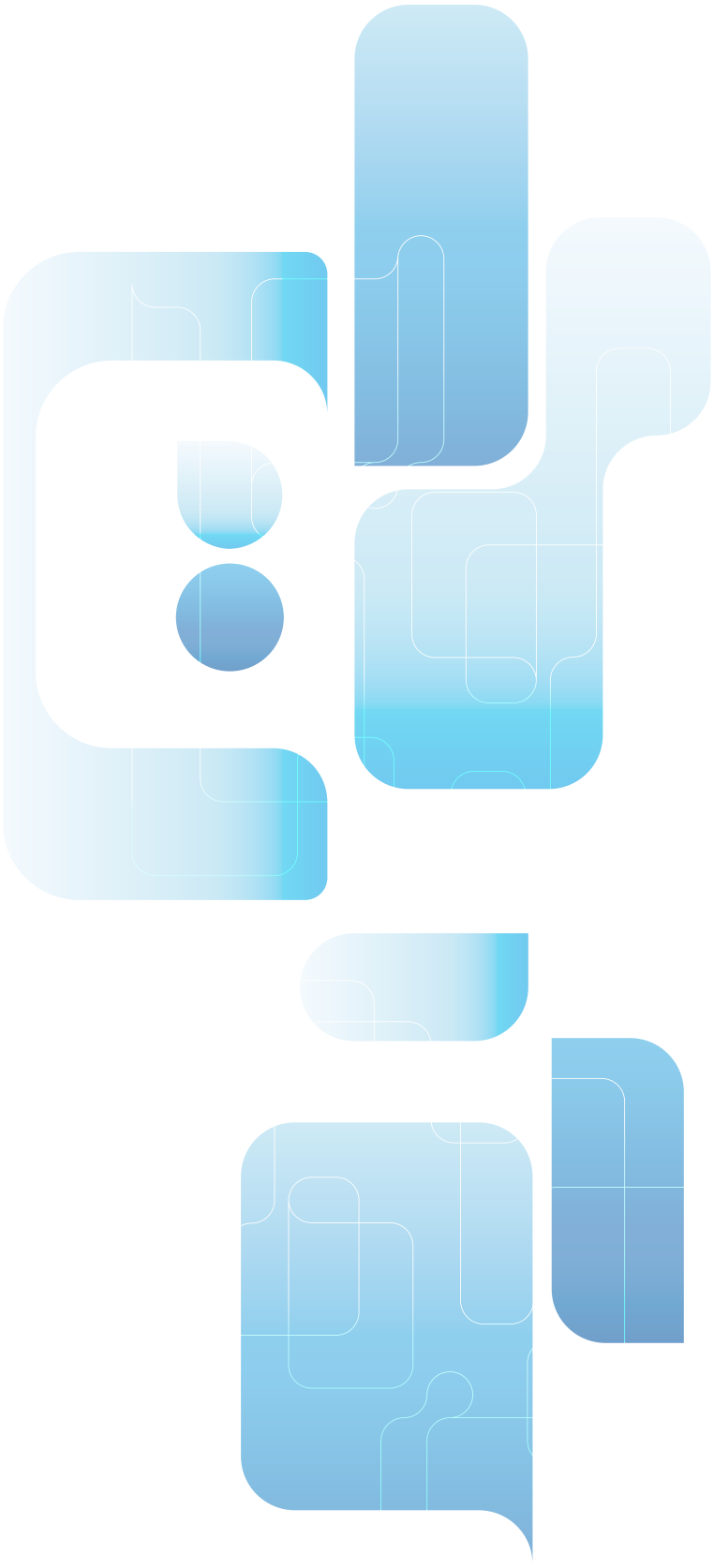
Product Characteristics

Pore Size (µm)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm² @ 10 psi)	Bubble Point (psi)	Thickness (µm)
0.45	20-75	250/20	21.21-79.53	14-20	120-190

Ordering information

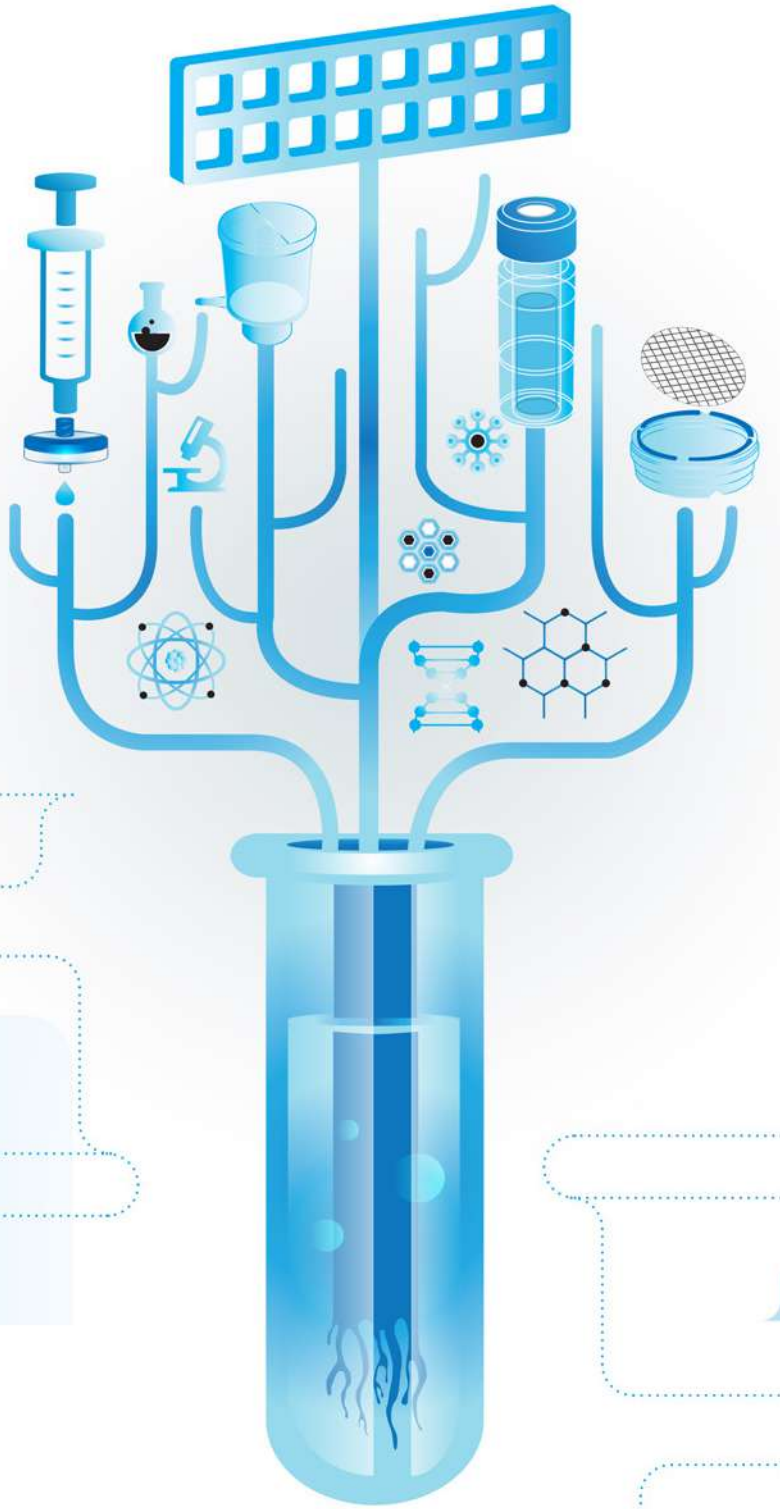
Dimensions Packaging	82 mm 50/pk	82 mm 100/pk	200x200 mm 25/pk	220x220 mm 5/pk	300x300 mm 5/pk
Pore size 0.45 µm	1226559	1226561	1226573	1226568	1226569

Dimensions Packaging	300x300 mm 25/pk	150x3000 mm 1/pk	200x3000 mm 1/pk	300x3000 mm 1/pk
Pore size 0.45 µm	1226575	1226558	1226557	1226556



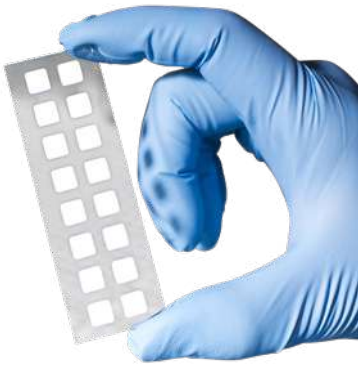
FILTER TECHNOLOGY

PROTEIN ARRAY



FAST® protein array solutions

FAST™ - Protein Microarray



GVS is proud to introduce the entire line of FAST protein microarray products:

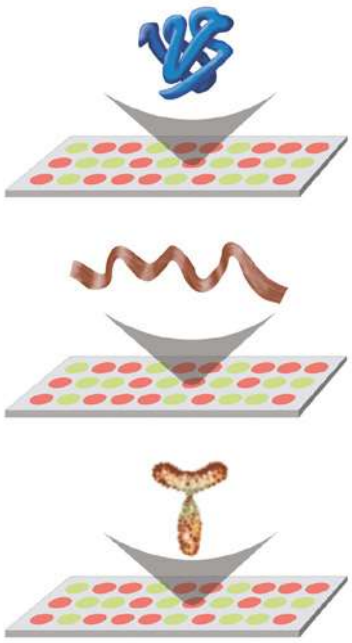
- FAST Slides
- FAST PAK Starter Kits
- Full line of Buffers and Accessories
- Scanning, Data System and Development Services

Brought to you by the team who developed and has improved the FAST line of products over the last decade, we welcome your business with products optimized for performance and reliability, using a Quality Management System registered to the ISO 9001 standard.

Protein microarrays have begun to fulfill their great potential. They are now recognized as critical tools for proteomics, biomarker research and drug discovery. They allow discovery and analysis of protein expression patterns, posttranslational modifications and protein interactions involved in cell growth and differentiation, environmental and drug responses and disease progression such as in cancer. Cited in more than 150 publications, FAST Slides have proven to be the surface of choice for designing and building protein microarrays. The surface is a proprietary nitrocellulose coating that non-covalently binds proteins maintaining their native structure. Nitrocellulose provides a homogeneous 3-D surface for uniform protein binding and significantly greater binding capacity than 2-D or ultrathin coatings. With sensitivities down to attamoles (10^{-18} moles) and near quantitative capture over a broad dynamic range of four orders of magnitude, FAST Slides offer unparalleled detection ability, reproducibility and reliability.

FAST™ Protein Arrays are ideal for many applications

Protein arrays are now recognized as a key tool for proteomics research. FAST slides offer unmatched binding capacity, sensitivity and reproducibility ideal for all of your protein array applications. GVS provides a full line of products that allow you to apply the FAST Slide technology to any multiplex need.



Protein Arrays

The high reproducibility and microporous structure of FAST Slides make them excellent for protein arrays used to diagnose infection and autoimmune diseases and for vaccine development and immunity monitoring. In protein arrays, a purified protein is spotted on the FAST Slide surface and the array is used to detect the presence of antibodies or other binding proteins in clinical or experimental samples.

Reverse Phase Protein Arrays (RPPAs)

The high binding capacity, sensitivity and reproducibility of FAST Slides make them ideal for Reverse Phase Protein Arrays (RPPAs) used for biomarker discovery and characterization and in clinical trials to monitor drug effectiveness and disease progression.
FAST Slides allow quantitative binding across the broad dynamic range of protein concentration found in complex biological samples, such as cell lysates or tumor aspirates, arrayed directly onto the slides. The expression of specific proteins is detected with antibodies to the biomarkers of interest. GVS quality controlled FAST Slide production ensures a consistent surface that allows multiple clinical samples to be interrogated with a variety of antibodies simultaneously.

Antibody Arrays or Micro-Spot Elisa

FAST slides are arrayed with multiple antibodies and the presence of specific proteins is detected by applying a complex biological sample to the slide. When used in combination with a standard curve, the unsurpassed binding capacity that retains the native conformation of proteins bound on FAST Slides allows detection and quantitation of multiple proteins in a single sample.

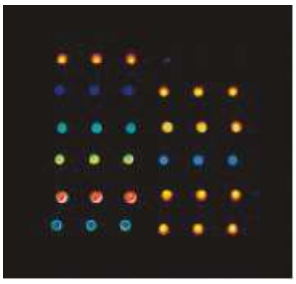
Protein Array

FAST™ Slides provide an optimum immunoassay surface

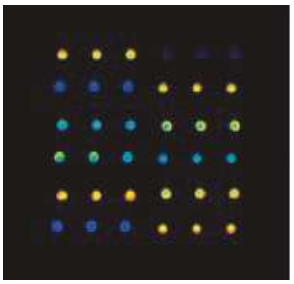
The high binding capacity over a broad dynamic range results from the surfaces sensitivity during quantitative protein recovery from complex biological samples.

FAST™ Slides offer long-term stability

FAST Slides provide a stabilizing environment such that proteins arrayed with the GVS Protein Arraying Buffer retain their binding characteristics for more than a year. As shown, there is no deterioration in the fluorescent signal on a FAST Slide from 3-12 months in storage. The long-term stability offers the flexibility of being ready whenever you are.



3 Months

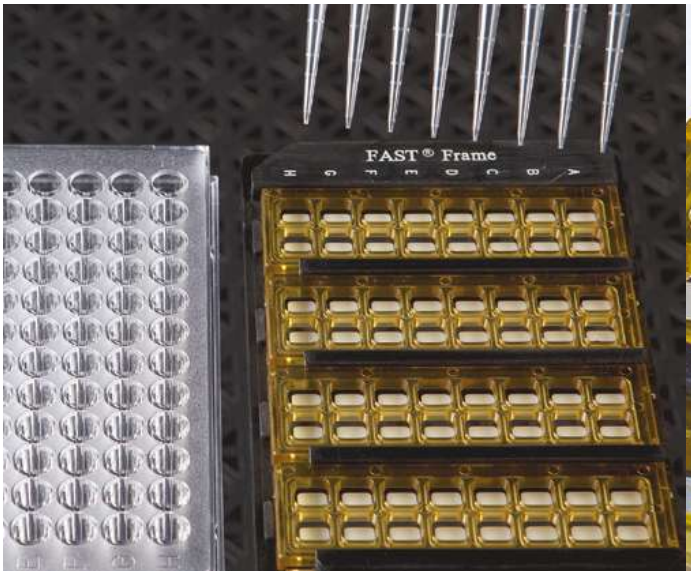


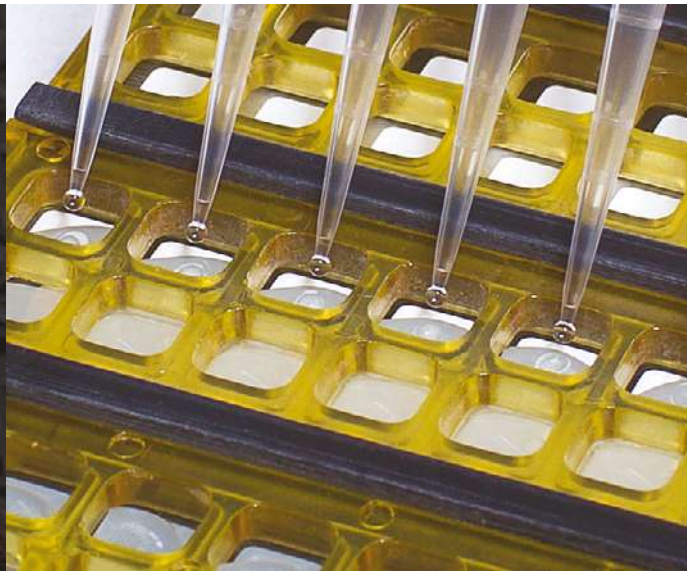
12 Months

FAST™ Slides are a broadly compatible open platform

FAST Slides are ready for printing (arraying) right out of the box with no activation. They come in different pad formats and are compatible with contact and non-contact printing methods and with existing manual arrayers, robots, scanners and all methods of detection including fluorescence, chemiluminescence, colorimetric and isotopic. Their compatibility make FAST Slides easy to set up and use with low costs and minimal start-up time.

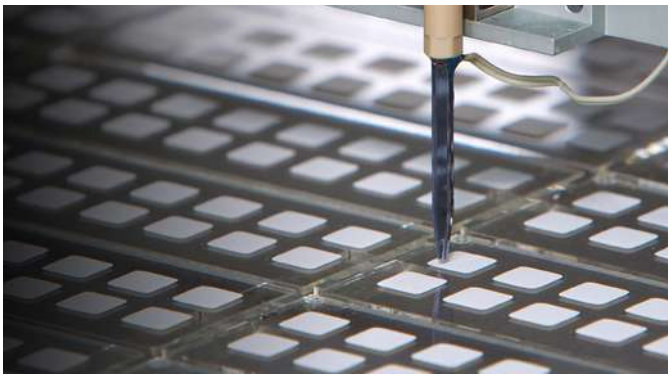
Our focus on quality at GVS (registered to the ISO:9001 standard) ensures production of the most consistent surface possible providing the most reproducible results with every slide, every time. The FAST line from GVS provides an unparalleled set of quantitative and non-quantitative multiplexed assays.





FAST® protein array solutions

FAST™ Slides - protein array surface



FAST Slides are glass slides coated with a proprietary nitrocellulose polymer. The polymer binds proteins in a noncovalent, irreversible manner and can be probed using the same method as in traditional blotting.

The 3D surface of a FAST Slide maintains reactivity of proteins and give excellent reproducible results. It is usable with fluorescent, colorimetric, chemiluminescent, or isotopic detection systems and is compatible with microarray scanners and robots.

Perhaps the most significant advantage of Fast® slides over modified glass surfaces is that the matrix retains arrayed protein in near quantitative fashion for up to a year. This property translates into antibody arrays with unparalleled sensitivity below 1pg/mL in antigen concentration. These qualities make FAST Slides the most reliable surface for microarray experiments and provide a high level confidence.
FAST Slides are suitable for many types of protein microarrays including protein arrays, reverse phase protein arrays and microspot ELISAs, also known as antibody arrays. There are tremendous advantages to using FAST Slides for immunoassays over traditional ELISAs including less sample required, better sensitivity, linearity and quantitation. A major advantage of FAST Slides technology is that hundreds or thousands of antibodies or samples can be screened simultaneously. Compared to other microarray surfaces, FAST Slides provide superior binding properties, allowing quantitative detection of proteins over four orders of magnitude in concentration.

Features & Benefits

- Superior protein binding capacity
- Highest sensitivity and dynamic range
- Excellent long-term stability of printed proteins
- Compatible with all detection methodologies
- Compatible with commercially available arraying robots

FAST Slides Ordering information

Product Code	Description	Specification	Quantity
10484182	FAST Slide 1-Pad 20 x 51 mm bar coded 20/Pk	Up to 10,000 spots	20/pk
10486111	FAST Slide 1-Pad 20 x 60 mm bar coded 20/Pk	Up to 10,000 spots	20/pk
10485317	FAST Slide 2-Pad 20 x 20 mm bar coded 10/Pk	Up to 3,600 spots	10/pk
10485320	FAST Slide 8-Pad 6 x 6 mm bar coded 10/Pk	Up to 256 spots, Pad spacing 9 mm	10/pk
10485323	FAST Slide 16-Pad 6 x 6 mm 10/Pk	Up to 256 spots, Pad spacing 9 mm	10/pk

FAST™ BUFFERS- optimized protein array

GVS Protein Array Buffers have been optimized for use on FAST Slides.

Protein Arraying Buffer

Supplied as a 2X concentrate in 10 mL plastic bottles.

- Enhances long-term protein stability and molecular recognition activity of arrayed proteins
- Enhances activity of arrayed proteins

Protein Array Washing Buffer

Supplied as a 10X concentrate in 125 mL plastic bottles.

- Excellent washing buffer for protein microarrays
- Preserves protein-protein interactions
- Optimized for use on FAST Slides

Protein Array Blocking Buffer

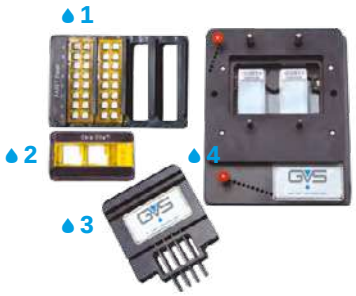
Supplied neat in 100 mL plastic bottles.

- Demonstrates superior blocking of protein microarrays
- Exhibits strong reduction of nonspecific antibody-antibody interactions
- Exhibits minimal effects on specific antibody-antigen interactions
- Results in superior signal to noise ratio in protein microarray
- Compatible with all detection methods

Protein Array Buffers Ordering information

Product Code	Description	Quantity
10485331	Protein Arraying Buffer (2X) 10 mL	4/pk
10485356	Protein Array Blocking Buffer (1X) 100 mL	1/pk
10485330	Protein Array Washing Buffer (10X) 125 mL	4/pk

FAST™ Accessories - protein array processing



Increase the ease and convenience of handling and processing FAST Slides and ensure reproducible, consistent results with every slide, every time.

- 1 FAST Frame Slide holder
- 2 Chip Clip Slide holder
- 3 MicroCaster 8-pin hand tool
- 4 MicroCaster Slide Holder

FAST Slide Incubation Chambers

Used in conjunction with the FAST Frame or Chip Clip™ Slide Holder, GVS incubation chambers have a secure gasket design forming a tight, leak-proof seal with the FAST Slides to provide a convenient means to conduct binding reactions on protein microarrays. Incubation chambers are designed specifically to fit all FAST Slide formats. Simply remove the reusable incubation chamber when the reaction is finished.

Ordering information

Product Code	Description	Quantity
10486137	Single well incubation chamber for 1 pad 20x51 mm FAST Slides	10/pk
10486087	2-well incubation chamber for 2 pad 20x20 mm FAST Slide	10/pk
10486046	16-well incubation chamber for 8- and 16- pad FAST Slide	10/pk

FAST Slide Holders

The Chip Clip securely holds one FAST Slide and incubation chamber for processing multiple arrays simultaneously, ensuring leak-proof barriers around the arrayed pads on the slide. The slide and incubation chamber are easily inserted into and removed from the Chip Clip Slide Holder; Side rails hold the chamber firmly against the slide surface. The FAST Frame Slide Holder is designed to hold up to four FAST Slides and their corresponding incubation chambers for high-throughput processing of microarrays. The 96-well spacing (9 mm center to center) of the array pads on the 16-pad FAST Slides makes the loaded FAST Frame compatible with automated liquid handling systems and 8-channel manual pipettors. Each plate processes up to 64 arrays simultaneously. The rows and columns on each plate are labeled for easy indexing and sample application. Both the Chip Clip and FAST Frame Slide Holders are constructed of autoclavable plastic and are compatible with standard 1 x 3" (25 x 76 mm) glass slides when used with GVS incubation chambers.

Ordering information

Product Code	Description	Quantity
10486001	FAST Frame Slide Holder	1/pk
10486081	Chip Clip™ Slide Holder	1/pk

MicroCaster™

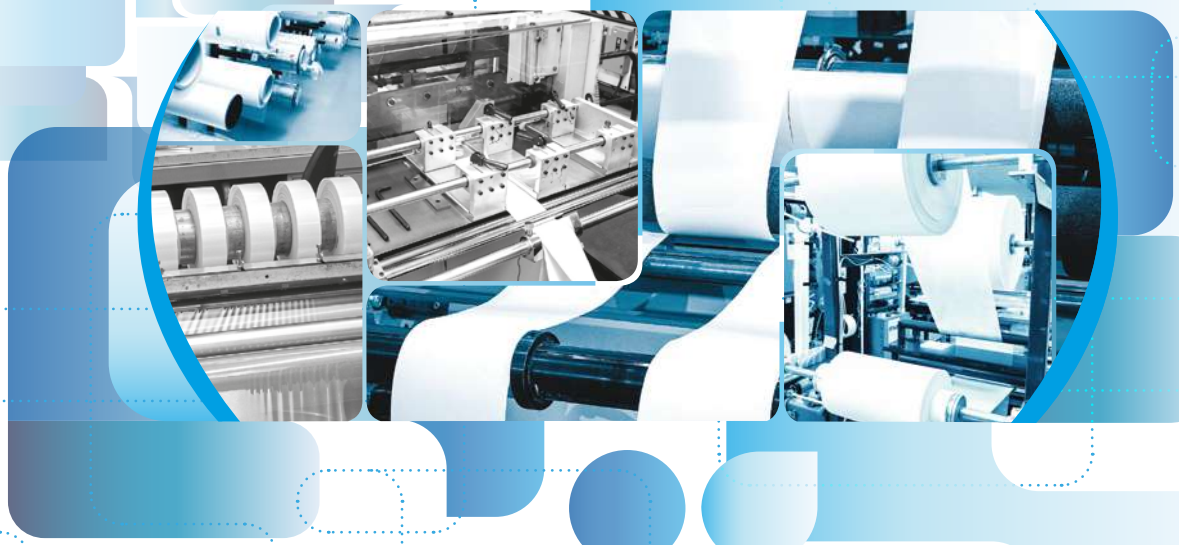
The MicroCaster is an economical, entry-level manual microarraying system. With the MicroCaster 8-pin hand tool, samples can be loaded from 96- well or 384-well plates. The MicroCaster Slide holder accommodates two slides. It has a built-in indexing system that enables precise printing of up to 768 spots in an array of 32 x 24 spots. It is designed for 1-pad FAST Slides with 20 x 51mm pad size and is compatible with other slide surfaces. MicroCaster accessories can be used to increase the flexibility of the manual arrayer system by providing accurate source-plate indexing and reliable pintool cleaning. The MicroCaster microplate indexer is compatible with standard 96-well microplates and the wash and blot station reduces the hassle of pin tool cleaning.

Ordering information

Product Code	Description	Quantity
10485047	MicroCaster System: 8-pin system hand tool, 8-pin system slide holder, pin conditioner and spare replicator pins	1/pk
10485061	MicroCaster pin conditioner, 30 mL	1/pk
10486043	Wash and blot station	1/pk 1/pk
10486044	96-well microplate indexer	

FILTER TECHNOLOGY

FILTRATION GUIDE



Polymeric Membrane Application Guide

Let GVS Filter Technology be your one-source supplier for all your roll stock filtration needs. As the global leader with the widest microporous membrane portfolio, we can consolidate your supplier list. Our staff of scientific professionals have experience in many different industries and can be of assistance no matter what your industrial, bioprocess, or laboratory application may call for.

Polymeric Hydrophilic Membrane

Membrane Type	Characteristics	Applications	Industries
CA	Hydrophilic, low non-specific binding, low adsorption, thermally stable, uniform pore structure	Protein or enzyme filtration, protein recovery, tissue culture media filtration, wine filtration, prefiltration of plasma fractions and vaccines	Laboratory-Filtration; Environmental-Beverage and Water Testing
PES	Hydrophilic, low protein binding, high throughput, asymmetric structure	Coarse particulate filtration (large pore), final filtration (small pore), biological sample prep, IV filters	Environmental-Beverage Testing; Laboratory-Filtration, Medical Infusion
PES Positively Charged	Hydrophilic, low protein binding, high throughput	IV filters, oncology drug administration, long term administration	Medical Infusion
Air Flow Stop PES	Hydrophilic air flow stop membrane	IV drip chambers	Medical Infusion
NY	Hydrophilic, internally supported, high surface area, high protein binding, low extractables, supported for strength for automated equipment handling	HPLC sample prep, clarify aqueous and organic solvents, alkaline solutions, beverage and pharma processing	Laboratory-Filtration, Analytical, Bioprocessing; Pharmaceutical; Environmental-Beverage Testing
NY Positively Charged Filtration Membrane	Higher binding capacity than NC, internally supported, can withstand multiple reprobings, hydrophilic endotoxin retention	Radiolabeled and non-radiolabeled detection systems, Northern and Southern blots (nucleic acids), Multiple reprobings, Alkaline transfers, DNA fingerprinting, UV crosslinking, IV filters	Laboratory-Molecular Biology and Diagnostics, Medical Infusion
NC	Hydrophilic, resistant to mild acids, hydrocarbons, formaldehyde and petroleum ethers, high protein binding	Gravimetric and clarifications with aqueous solutions; microbial capture and detection	Laboratory-Filtration; Environmental-Beverage and Water Testing
PVDF Hydrophilic	High Flow Rates, Low Extractables, Broad Chemical Compatibility, Very low protein binding	TC media, pharma, ingredients, HPLC	Pharma to medical
RC Regenerated Cellulose	Hydrophilic, high strength, excellent chemical compatibility and solvent resistance, low extractables, superior thermal resistance	Filtration of aqueous and organic solutions, particle removal from organic solvents, HPLC, clarification, Protein chemistry	Laboratory-Filtration

Polymeric Hydrophobic Membrane

Membrane Type	Characteristics	Applications	Industries
PVDF supported / pure Filtration Membrane	Naturally hydrophobic, pure, high sensitivity, low background, broad chemical compatibility	Protein detection via Western blotting, amino acid analysis, protein sequencing, GC sample prep	Laboratory-Molecular Biology and Diagnostics
PVDF Oleophobic / Hemophobic	Naturally hydrophobic, in/post treatment super	Air/gas venting, transducer protector, suction-aspiration, medical device	Medical to pharma, Industrial, Food&beverage, Medical venting, Automotive

Track Etched Membrane Application Guide

GVS Filter Technology Track Etched Membrane is ideally suited for use in cellular-based filtration assays as well as filtration applications where high purity is required. The membrane is produced through a two-step, proprietary manufacturing process that employs high quality standards. In the first step, the film is exposed to ion particles that pass through it. As the ions pass through the film, they create “tracks” where the polymer is damaged. The beamed film is then exposed to a chemical that etches out the tracks creating precise, cylindrical pores. Pore density is controlled by the number of tracks per unit area, and pore size is controlled by varying the temperature, strength and time of exposure to the etching solution. This unique process allows for increased control over pore size and density to ensure the physical properties of each membrane precisely fit your specifications. The resulting membrane is a thin, translucent polycarbonate film with a smooth, flat surface. All particles larger than the pore size are captured on its surface.

Track Etched Membrane Hydrophilic

Membrane Type	Characteristics	Applications	Industries
PCTE	Hydrophilic, thin, smooth, low protein binding, non-reactive, tightly controlled pore size and air flow	Sterile filtration, DI water filtration, air monitoring, bacterial removal, liposomial extraction	Laboratory-Diagnostics, and Bioprocessing, Electronics Manufacturing, Industrial Hygiene, Medical device
PCTE-AOX	Hydrophilic, AOX-certified absorbable organic halogen-free	Groundwater, wastewater testing for organic halides	Environmental-Water Testing
PETE	Hydrophilic w/no wetting agent, smooth/flat surface, precise pore size, wide solvent and chemical resistance	Trace element and aerosol analysis, batch filtration of aggressive solutions, cell studies, RBC removal from plasma	Laboratory-Diagnostics and Bioprocessing

Track etched membrane Hydrophobic

Membrane Type	Characteristics	Applications	Industries
PCTE-PVPF	Hydrophobic, smooth surface allows for rapid cell migration, low extractables, lowest binding	Chemotaxis, cell culture, blood assays, cell growth, venting applications	Laboratory-Diagnostics and Bioprocessing, Automotive, Medical device

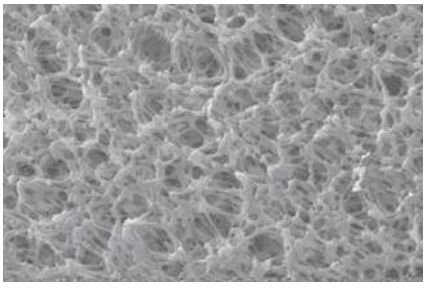
Membrane Characteristics

Filtration through a membrane means that the filter material will stop particles larger than the pore size rating. This enables an absolute pore size rating for the membranes for which they are clearly classified. Bacterial retention claims can be made based on the pore size of the membrane.

Hydrophilic – Hydrophobic Membranes

Hydrophilic membranes have permeability of aqueous solutions and once wetted, they stop gasses. This means that aqueous solutions pass through hydrophilic membranes but gas is stopped when the membrane is wet until the applied pressure exceeds the “bubble point”, at which time the air will evacuate the pore, the liquid is expelled, and the gas will go through. Dry hydrophilic membrane allows gas to pass through. Our HI-FLO PES membranes are hydrophilic membranes.

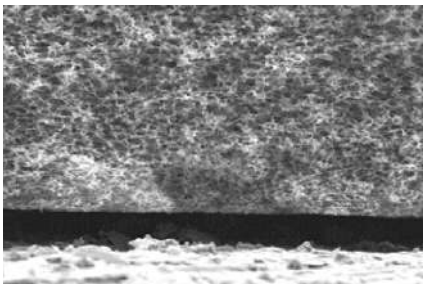
- Hydrophobic membranes have permeability to the gas, but they stop aqueous solutions. In other words, they do the opposite job when compared to hydrophilic membranes. This means that gas will pass through these membranes, but aqueous solutions will be stopped. If air or gas can reach the hydrophobic membrane, it will go through, but if the contact with the hydrophobic membrane is not possible, then the gas will not pass through. The pressure at which aqueous solutions will pass through a hydrophobic membrane is called the water breakthrough (WBT) or water intrusion pressure (WIP). PTFE membranes are hydrophobic membranes. PES membranes are hydrophilic membranes.



Membrane out side wall

Pore size

Pore size is determined by the size of the particle that is expected to be retained with a defined and high degree of efficiency. Pore size is typically stated in micrometers or microns (µm), and should clearly be designated as either nominal or absolute. Nominal pore size is the ability to retain a majority (60% - 98%) of particles having a specific dimension. Retention efficiency is also depending on such process conditions as concentration, operating pressure etc. Rating parameters can vary among manufacturers. When the pore size, or retention, is “nominal”, it should be stated at a particle size and a percent, i.e., 99.97% retention of 0.3 µm particles. Absolute pore size is the ability to retain the 100% of particles of a specific dimension under defined test conditions (particle size, challenge pressure, concentration, detection method).



Membrane cross section

Pore Size	Challenge Organism:
0.1 micron	Acholeplasma laidlawii
0.2 micron	Brevundimonas diminuta
0.45 micron	Serratia marcescens
0.8 micron	Lactobacillus species
1.2 micron	Candida albicans

The above table shows proper pore size of hydrophilic membranes to be used to retain the corresponding bacteria. Hydrophobic membranes are about ten times more efficient in retaining bacteria in air than they are in liquids using the same pore size.

Chemical compatibility

This is the ability of the membrane to resist to chemicals without mechanical or chemical damage from chemical exposure. Information about the liquid used with a specific filter material should be outlined before application to determine compatibility, GVS can assist customers in choosing the proper filter (and housing) materials.

Extractables

Extractables are contaminants (typically chemicals) that elute from the filter which might affect quality of the effluent.
Wetting agents (surfactants), manufacturing or sterilization residuals are the main cause of undesired extractables. Typical problems caused by extractables are found in the following applications:
- HPLC analysis (strange result)
- Cell culture (cytotoxicity)
- Microbiological analysis (affects the microorganism)
- Environmental analysis (contaminants)

Flushing of the line prior to use can reduce Extractables and their adverse effects.

Binding

This is the property of substances to be filtered having affinity with membranes. This could be a positive effect in some circumstances, but most of the time it can create adverse effects. Particularly it could lead to loss of active components of the liquid to be filtered reducing its beneficial effect. Our PES HI-FLO membrane is low protein binding.

Thermal Stability

This characteristic allows unchanged performance at elevated temperatures. Some membranes can only be sterilized by EtO. Others can be gamma, beta or e-beam sterilized, as well as EtO. Others can be also steam sterilized with no adverse affects. Membrane performance is sometimes reduced at temperature higher than 25°C, and high temperatures can also reduce chemical stability. PTFE membrane is widely stable (any type of sterilization) if the product is designed properly. PES membrane is suggested for EtO and irradiation (no steam sterilization).

Biosafety

These tests are conducted in compliance with ISO-10993 and USP class VI, see specifications. Tests that are conducted are: Cytotoxicity – Sensitization – Irritation intracutaneous reactivity – Systemic toxicity (acute) – Hemocompatibility (Hemolysis).

Pyrogenicity

Pyrogens are chemicals on the filter media and other components that are caused by the waste of dead bacteria. When introduced to a patient, they can elevate the patient's temperature, and can cause complications – even death. Filters that are pyrogenic can make solutions pyrogenic.
They cannot be removed by sterilization, so it is very important that non-pyrogenic filter media and components are used in the production of medical filter devices. The test to determine the pyrogenicity is the LAL test (Limulus Amebocyte Lysate test).

Bubble Point (BP)

Typically this test that is performed on hydrophilic membranes. The BP pressure is the pressure to force air through a wetted hydrophilic membrane. These tests are typically performed with water; however, this test can be conducted on hydrophobic membranes using liquids other than water that will wet the membrane. The BP is an indication of the membrane pore size, as related to actual bacterial retention. This test can also be performed on hydrophobic membranes if the correct solvent (instead of aqueous solution) is used, and is compatible with the entire product.

Water Breakthrough (WBT)

This is the test performed on hydrophobic membranes, and it is also related to the pore size of the membrane. The WBT pressure (sometimes referred to as water intrusion pressure) is the pressure it takes to force an aqueous solution through a hydrophobic membrane.

Water Flow Rate (WFR)
Typically this test is performed on hydrophilic membranes. The WFR has the aim to measure the flow of a liquid through a wetted hydrophilic membrane, at a fixed test pressure and time. This test is typically performed with water; however, it can be performed with other solutions, as long as the filter media is compatible with the liquid.

Air Flow (AF)
This is a flow rate typically related to hydrophobic membranes. It is the amount of air that passes through a fixed surface of membrane with a specific applied pressure.

Filter Efficiency (FE)
Quantity of particulate or bacteria retained compared to the total quantity of particulate or bacteria to which the filter is challenged. It is expressed in % and referred to a specific size of particles.

Effective Filtration Area (EFA)
This is the actual filtration area in a device that is subject to filtration. The sealing surfaces should be eliminated from the calculations of the device EFA.

Polymer Information
The use of plastic materials has become commonplace in many industries as their properties meet requirements for a large variety of uses. Plastics are widely used in product for lifescience, healthcare and laboratory use. GVS typical plastics include Polypropylene, Polyethylene, Acrylics, and Nylon 66 polymers, due to their excellent chemical resistance, good stress-crack resistance, moldability and autoclavability.
Thermoplastic polymers are most often supplied in the form of pellets which may contain additives to enhance processing or to provide necessary characteristics in the finished product (e.g. color, conductivity, etc.). The temperature service range of thermoplastics is limited by their loss of physical strength and eventual melting at elevated temperatures. Polymer properties for temperature and chemical resistance are dependent on the polymer's chemical chain.

Polypropylene (PP)
It is similar to polyethylene, but each unit of the chain has a methyl group attached. It is translucent, autocavable, and has no known solvent at room temperature. It is slightly more susceptible to strong oxidizing agents than conventional polyethylene because of its many branches (methyl groups, in this case). Polypropylene is noted for its excellent chemical resistance in corrosive environments. This polymer is easily welded and machined.

Typical properties:
- Clean/High Purity
- Good Dimensional Stability
- Good Organoleptic Properties
- High Clarity
- High Flow
- High Stiffness
- Homopolymer
- Low Warpage
- Narrow Molecular Weight Distribution
- Nucleated

Polyethylene (PE) Plastic

Huge family of resins obtained by polymerizing ethylene gas, and it is available in a range of flexibilities. Polyethylene can be formed by a wide variety of thermoplastic processing methods and is particularly useful where moisture resistance is required. Low-density polyethylene (LDPE) has more extensive branching, resulting in a less compact molecular structure. High-density polyethylene (HDPE) has minimal branching, which makes it more rigid and less permeable than LDPE. Linear low-density polyethylene (LLDPE) combines the toughness of low-density polyethylene with the rigidity of high-density polyethylene.

Typical properties:

- Good Processability
- Food Contact Acceptable
- Antioxidant
- High ESCR (Stress Crack Resist.)
- Low Density
- High Impact Resistance

Acrylic-based polymer

Acrylic polymer developed especially for use in the Medical Device Industry. The material is transparent and tough, offer gamma and ETO sterilization resistance, and they are easy to process and weld easily to PVC. Typical applications include disposable medical diagnostic devices such as cassettes and cuvettes.

Typical properties:

- Excellent chemical resistance to fats and oils
- Excellent bonding and welding capabilities
- Excellent bonding to PVC tubing
- Good impact strength
- Good light transmission
- Good resistance to EtO, gamma and E-beam sterilization
- Superior resistance to lipids and alcohol
- Excellent ductility

Nylon

This is a group of linear polymers with repeated amide linkages along the backbone. These are produced by an amidation of diamines with dibasic acids, or polymerisation of amino acids. Nylon is strong and tough. It resists abrasion, fatigue and impact. Nylon offers excellent chemical resistance with negligible permeation rates when used with organic solvents. However, it has poor resistance to strong mineral acids, oxidizing agents and certain salts.

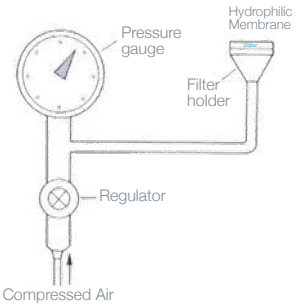
Typical properties:

- Good Chemical Resistance
- Good Colorability
- Good Corrosion Resistance
- Good Processability
- Good Toughness
- Good Wear Resistance
- High Rigidity
- High Strength
- Low Friction

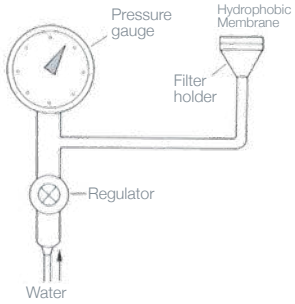
Measuring a Filter Media's Performance

GVS Filter Technology uses standard industry test methods to rate the performance of its media. For additional information contact your local sales representative.

Bubble Point



Measure of the air pressure required to force liquid from the largest wetted pore of a membrane. Serves as an indication of pore size and a barrier to particulates. The bubble point is dependent on the liquid used to wet the membrane; for a given pore size the bubble point will be higher in a liquid with a higher surface tension (such as water) than in a liquid with a lower surface tension (such as isopropyl alcohol). The bubble point rating is determined when the largest pore yields a bubble; the larger the pore, the less pressure required to form the bubble. Expressed in units of pounds/square inch (psi) or bar for membranes.



Water Breaktrough

Measure of the amount of pressure required to transmit water through the largest pore of a dry hydrophobic media. Serves as an indication of pore size for a hydrophobic membrane. The larger the pore size, the less pressure required to intrude the water. Expressed in the membrane industry in units of pounds/square inch (psi) or bar.

Water Flow

Measure of the amount of water that flows through a membrane. Related to the degree of contamination, differential pressure, total porosity, and filter area. Expressed in the membrane industry in units of milliliters/minute/square centimeter at a defined pressure.

Air Flow

Measure of the amount of air that flows through a membrane. Related to the degree of contamination, differential pressure, total porosity, and filter area. Commonly expressed in the membrane industry in liters/minute/square centimeter at a given pressure.

Filter Efficiency

Measure of the quantity of particulate retained as a function of the total number and size of the challenging particles and differential pressure. Usually expressed as a percentage of retention of predetermined particle size at a given challenge concentration. In the case of bacterial removal efficiency, this may be expressed as a log reduction value.

Biological Safety Test

Tests conducted on filter construction materials that come in contact with test solutions that simulate most body fluids. Extracts of filter construction materials are tested to establish whether there are potential "leachables" present. Testing is performed to determine whether leachables are capable of inducing measurable degrees of systemic toxicity, localized skin irritation, sensitization reaction, or other biological responses.

Pirogenicity

Property of a substance that, when injected into the body, causes a rise in body temperature. Filtration materials that come in contact with injectable fluids must meet pyrogenicity standards and are therefore classified as non-pyrogenic.

COMPATIBILITY CHART

		Filter Media														Housing			
R= Recommended L= Limited Resistance (testing before use is recommended) N= Not Recommended T= Test NR = Not Resistant		Cellulose Acetate	Nitrocellulose	Polyethersulfone	Nylon 66	PTFE (unlaminated)	PTFE (laminated)	PVDF Philic	RC	Polypropylene	Glass Fiber (binder)	Glass Fiber (no binder)	Silver	Polycarbonate	Polyester	Modified Acrylic	Polysulfone	Polystyrene	Polypropylene
Chemical		**ca**	**nc**	**pes**	**ny**	**ptu**	**ptl**	**pvdf**	**rc**	**pp**	**gfb**	**gfn**	**ag**	**pc**	**pet**	**ac**	**ps**	**pst**	**pp**
ACIDS	Acetic Acid 5%	R	R	R	R	R	R	R	R	R	T	R	R	R	R	N	R	R	R
	Acetic Acid 10%	N	N	R	L	R	R	R	R	R	T	R	R	R	R	N	R	R	R
	Acetic Acid, Glacial	N	N	R	N	R	R	R	R	R	N	R	R	L	NR	N	R	R	L
	Boric Acid	R	R	T	L	R	R	T	T	R	T	T	R	R	R	N	R	R	R
	Hydrochloric, 6N	L	N	R	N	R	R	L	N	R	N	R	R	R	L	N	R	R	T
	Hydrochloric, Conc.	N	N	R	N	R	R	R	N	R	N	R	R	R	N	N	R	R	T
	Hydrofluoric, 10%	N	N	T	N	R	R	R	L	R	N	N	R	T	T	T	T	T	R
	Hydrofluoric, 35%	N	N	T	N	R	T	R	N	T	N	N	R	T	T	T	T	T	T
	Nitric Acid, 6N	L	R	N	N	R	L	T	N	L	N	L	N	R	R	N	N	L	T
	Nitric Acid, Conc.	N	N	N	N	R	N	R	N	N	N	L	N	R	N	N	N	N	T
	Sulfuric Acid, 6N	L	R	T	N	R	L	R	L	L	N	R	N	R	R	N	N	N	T
	Sulfuric Acid, Conc.	N	N	N	N	R	N	T	N	N	N	R	N	N	N	N	N	N	T
ALCOHOLS	Amyl Alcohol	R	N	N	R	R	R	R	R	R	R	R	R	T	T	N	R	N	R
	Benzyl Alcohol	L	R	N	L	R	R	R	R	NR	N	N	R	NR	NR	R	R	N	R
	Butyl Alcohol	R	R	R	R	R	R	R	T	R	R	R	R	R	R	R	R	T	R
	Butyl Cellosolve	L	N	T	R	R	R	T	T	R	R	R	R	L	R	T	L	T	T
	Ethyl Alcohol <80%	R	R	R	R	R	R	R	T	R	R	R	R	R	R	L	R	L	T
	Ethyl Alcohol >80%	R	L	R	R	R	R	R	T	R	R	R	R	R	R	L	R	N	T
	Ethylene Glycol	R	L	R	R	R	R	R	R	R	R	R	R	R	R	T	R	T	R
	Glycerine (Glycerol)	R	R	R	R	R	R	R	R	R	R	R	R	R	R	T	R	T	R
	Isobutyl alcohol	R	R	T	R	R	R	R	T	R	N	N	R	R	R	R	R	R	T
	Isopropanol	R	L	R	R	R	R	R	R	R	R	R	R	R	R	T	R	T	T
	Methanol	R	N	R	T	R	R	R	R	R	R	R	R	R	T	R	R	R	T
	Methyl Cellosolve	L	L	T	R	R	R	R	T	R	R	R	R	N	R	T	R	T	T
	Propanol	R	R	T	R	R	R	R	R	R	R	R	R	R	R	T	R	T	R
BASES	Ammonium Hydroxide, 6N	N	N	R	N	R	R	R	L	R	N	R	R	N	L	R	R	R	T
	Potassium Hydroxide, 6N	N	N	T	R	R	R	R	L	R	N	T	R	N	N	T	R	T	T
	Sodium Hydroxide, 6N	N	N	R	N	R	R	R	L	R	N	T	R	N	NR	T	T	T	T
SOLVENTS	Acetone	N	N	N	R	R	R	N	R	R	R	R	R	L	R	N	N	N	R
	Acetonitrile	N	N	R	T	R	R	R	R	R	T	R	T	NR	T	N	N	N	R
	Amyl Acetate	L	N	L	R	R	R	R	R	R	N	R	R	R	R	N	N	N	L
	aniline	N	N	R	R	R	R	T	R	R	T	T	R	N	R	T	N	T	L
	Benezene	L	R	R	T	R	L	R	R	L	N	R	R	NR	R	N	N	N	L
	Bromoform	N	R	T	R	R	R	T	T	R	R	R	R	N	R	T	N	T	T
	Butyl Acetate	L	N	L	R	R	R	T	R	R	N	R	R	R	R	N	N	N	L
	Carbon Tetrachloride	L	R	R	R	R	L	R	R	L	N	N	R	NR	R	N	N	N	N
	Cellosolve	R	N	T	R	R	R	T	R	R	R	R	R	R	R	N	N	T	T

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R= Recommended L= Limited Resistance (testing before use is recommended) N= Not Recommended T= Test NR = Not Resistant		Filter Media														Housing			
		Cellulose Acetate	Nitrocellulose	Polyethersulfone	Nylon 66	PTFE (unlaminated)	PTFE (laminated)	PVDF Philic	RC	Polypropylene	Glass Fiber (binder)	Glass Fiber (no binder)	Silver	Polycarbonate	Polyester	Modified Acrylic	Polysulfone	Polystyrene	Polypropylene
Chemical		**ca**	**nc**	**pes**	**ny**	**ptu**	**ptl**	**pvdf**	**rc**	**pp**	**gfb**	**gfn**	**ag**	**pc**	**pet**	**ac**	**ps**	**pst**	**pp**
SOLVENTS	Chloroform	N	R	N	NR	R	L	R	R	L	R	R	R	N	R	N	L	N	L
	Cyclohexane	R	R	T	R	R	R	T	R	R	R	R	R	R	R	N	R	T	R
	Cyclohexanone	N	N	N	T	R	R	N	R	R	R	R	R	L	T	N	N	N	R
	Diethyl Acetamide	N	N	T	R	R	N	T	R	N	R	R	R	NR	NR	N	N	N	T
	Dimethyl Formamide	N	N	N	R	R	R	N	L	R	N	R	R	NR	NR	N	N	N	R
	Dimethyl Sulfoxide (DMSO)	N	N	N	R	R	R	N	R	R	N	R	T	N	R	N	N	N	T
	Dioxane	N	N	L	R	R	R	R	R	R	R	R	R	N	R	N	N	N	R
	Ethyl Ether	L	L	R	R	R	R	R	R	R	T	R	R	R	R	N	L	N	N
	Ethylene Dichloride	L	L	T	R	R	R	T	T	R	R	R	R	N	R	T	N	T	T
	Formaldehyde	L	N	R	R	R	R	R	T	R	R	R	R	R	R	N	R	N	R
	Freon TF	R	R	R	R	R	R	R	T	R	R	R	R	R	R	L	R	N	T
	Gasoline	R	R	T	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N
	Hexane	R	R	T	R	R	R	R	R	R	L	R	R	R	R	N	R	N	T
	Isopropyl Acetate	N	N	T	R	R	R	N	R	R	N	R	R	R	R	N	N	N	R
	Kerosene	R	R	T	R	R	R	R	R	R	R	R	R	R	R	N	N	N	T
	Methyl Acetate	N	N	T	R	R	R	R	R	R	N	R	R	N	R	N	N	N	R
	Methyl Ethyl Ketone (MEK)	N	N	N	R	R	R	NR	R	R	R	R	R	NR	R	N	N	N	T
	Methyl Isobutyl Ketone	N	N	T	R	R	R	N	R	R	R	R	R	NR	T	N	N	N	T
	Methylene Chloride	N	N	N	T	R	R	R	NR	R	R	R	R	N	NR	N	N	N	N
	Nitrobenzene	N	N	N	T	R	R	R	NR	R	N	N	T	N	NR	N	N	N	R
	Pentane	R	R	R	R	R	L	R	NR	L	R	R	R	R	R	N	R	N	T
	Perchloroethylene	R	R	N	R	R	R	T	R	R	N	N	R	T	T	N	L	N	L
	Pyridine	N	N	N	T	R	R	N	R	R	N	R	R	N	T	N	N	N	L
	Tetrahydrofuran	N	N	N	T	L	L	N	R	L	T	L	R	N	T	N	N	N	L
	Toluene	L	R	N	R	R	L	R	R	L	N	R	R	L	R	N	N	N	L
	Trichloroethane	L	N	L	T	R	R	T	NR	R	T	T	R	N	T	N	N	N	T
	Trichlorethylene	R	R	R	T	L	L	R	R	L	N	N	R	B	ND	N	N	N	N
	Triethylamine	R	L	T	R	R	R	T	R	R	R	R	R	L	R	T	N	T	T
	Xylene	R	R	L	T	R	L	R	R	L	R	R	R	NR	NR	N	N	N	R
MISCELLANEOUS	Cottonseed Oil	R	R	T	R	R	R	T	T	R	L	R	R	R	T	T	R	T	R
	Hydrogen Peroxide (30%)	R	R	T	R	R	R	R	R	R	R	R	R	R	R	T	R	T	R
	Kodak KMER FTFR	N	N	T	R	R	R	T	T	R	N	N	R	R	R	N	R	N	T
	Peanut Oil	R	R	T	R	R	R	T	T	R	R	R	R	R	R	T	R	T	T
	Petroleum Oils	T	R	L	T	R	T	R	R	T	T	T	R	R	R	T	T	T	R
	Sesame Oil	R	R	T	R	R	R	T	T	R	R	R	R	R	R	T	R	T	T
	Shipley (AS-111,340,1350)	N	N	T	R	R	R	T	T	R	N	N	R	R	R	N	R	N	T
	Silicone Oils	R	R	R	R	R	R	R	R	R	R	R	R	R	R	T	R	T	R
	Turpentine	R	R	T	R	R	R	T	T	R	R	R	R	R	R	T	R	T	T
	Waycoat 59	N	N	T	R	R	R	T	T	R	N	N	R	R	R	N	R	N	T

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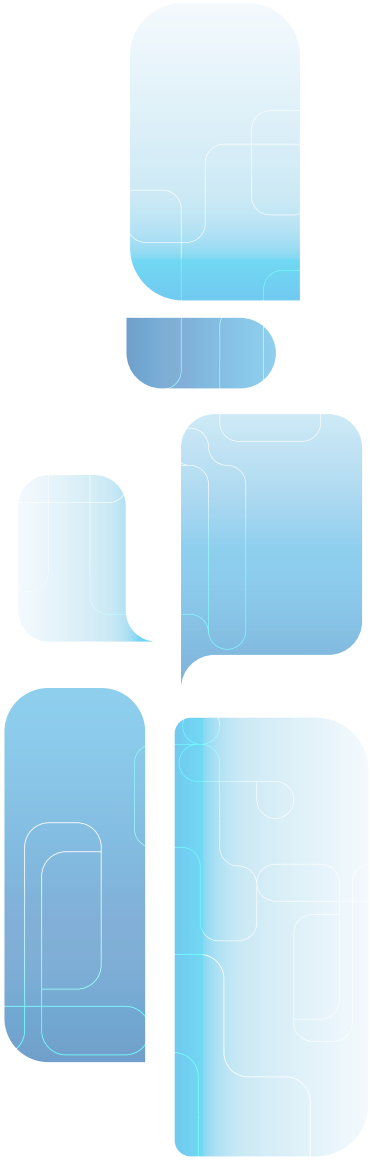

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FILTER TECHNOLOGY

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WORLDWIDE
DISTRIBUTION CENTERS

EUROPE

Italy Office Headquarters
GVS S.p.A.
Via Roma 50
40069 Zola Predosa (BO) - Italy
Tel. +39 051 6176311
Fax +39 051 6176200
lifesciences.it@gvs.com

United Kingdom
GVS Filter Technology UK Ltd.
NFC House
Vickers Industrial Estate
Mellishaw Lane, Morecambe
Lancashire LA3 3EN
Tel. +44 (0) 1524 847600
lifesciences.uk@gvs.com

Russia
GVS Russia LLC
Profsoyuznaya Street, 25-A, office 102
117418, Moscow
Russian Federation (Russia)
Tel. +7 495 0045077
lifesciences.ru@gvs.com

Romania
GVS Microfiltrazione srl
Sat Ciorani de Sus 1E
107156 Ciorani
Prahova România
Tel. +40 244 463044
lifesciences.ro@gvs.com

Turkey
GVS Türkiye
Cevizli mah. Zuhal cad. Ritim Istanbul
no: 44 A-1 Blok D.371 Maltepe / Istanbul
Tel. +90 216 504 47 67
lifesciences.tr@gvs.com

ASIA

China
GVS Technology (Suzhou) Co., Ltd.
Fengqiao Civil-Run Sci-Tech Park,
602 Changjiang Road,S.N.D.
Suzhou, China 215129
Tel. +86 512 6661 9880
Fax: +86 512 6661 9882
lifesciences.cn@gvs.com

Japan
GVS Japan K.K.
KKD Building 4F, 7-10-12 Nishishinjuku
Shinjuku-ku, Tokyo 160-0023 Japan
Tel. +81 3 5937 1447
Fax +81 3 5937 1448
lifesciences.jp@gvs.com

Korea
GVS Korea Ltd #315 Bricks Tower
368 Gyungchun-ro(Gaun-dong),
472060 Namyangju-si, Gyunggi-do
Tel: +82 31 563 9873
Fax: +82 31 563 9874
lifesciences.kr@gvs.com

AMERICA

U.S.A.
GVS North America, Inc.
63 Community Drive
Sanford, ME 04073 - USA
Tel. +1 866 7361250
lifesciences.us@gvs.com

Mexico
GVS de México
Universal No. 550, Vynmsa Aeropuerto Apodaca
Industrial Park, Ciudad Apodaca, Nuevo León,
C.P. 66626 México
Tel. +52 81 2282 9003
lifesciences.mx@gvs.com

Brazil
GVS do Brasil Ltda.
Rodovia Conego Cyriaco Scaranello Pires 251
Jd. Progresso, CEP 13190-000
Monte Mor (SP) - Brasil
Tel. +55 19 38797200
Fax +55 19 38797251
lifesciences.br@gvs.com

Argentina
GVS Argentina S.A.
Francisco Acuña de Figueroa
719 Piso:11 Of: 57
1416 Buenos Aires - Argentina
Tel. + 5411 48614750
lifesciences.ar@gvs.com

MZ ANALYSENTECHNIK

AUTHORIZED DISTRIBUTOR
MZ-Analysentechnik GmbH, Barcelona-Allee 17 • D-55129 Mainz
Tel +49 6131 880 96-0, Fax +49 6131 880 96-20
e-mail: info@mz-at.de, www.mz-at.de

www.gvs.com