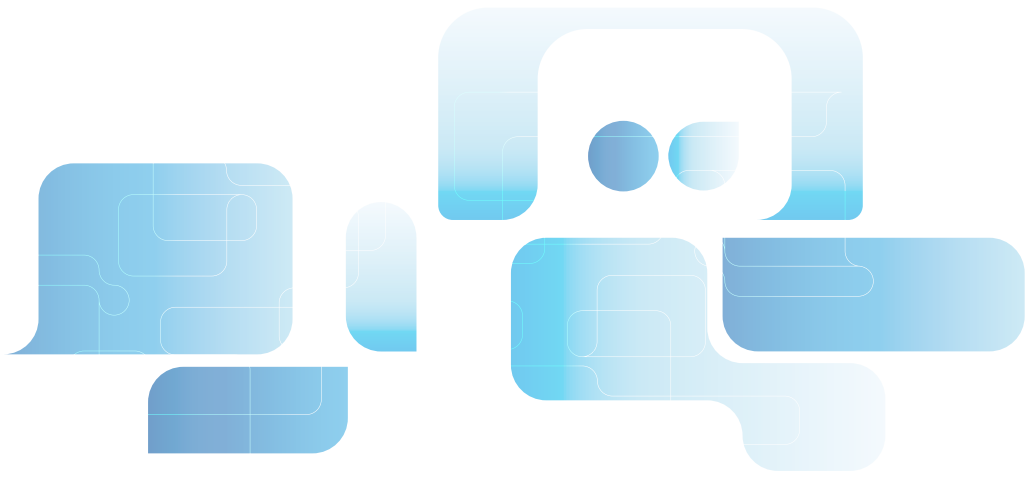










FILTER TECHNOLOGY

LIFE SCIENCES PRODUCT COLLECTION







	GVS GROUP	2
	1. MICROFILTRATION FILTER DEVICES	3
	Syringe Filters, ABLUO® - CAMEO	4
	Vent Filters	14
	Syringeless Filters SEPARA®	15
	Capsule Filters, Calyx™	16
	Centrifuge Filters - Centrex™	20
	Bottle-top Filters - ZapCap™	21
	Extractor - Ethidium bromide	22
	Filter Holders for Membranes	23
	2. MICROBIOLOGY	27
	Microbiological monitors & Analytical Funnels	28
	Manifolds	29
	Nutrient Liquid Media	30
	SwabCheck™	34
	Dilution Bottles	36
	3. DISC AND SHEET MEMBRANES	37
	Cellulose Acetate (CA) Membrane - AcetatePlus™	38
	Polyethersulfone (PES) Membrane - UltraSep™	39
	Mixed Cellulose Esters (MCE) Membrane - MicronSep™	40
	Speed Pack Sterile MCE Membrane Perforated Ribbons	42
	Nylon 66 (NY) Membrane - Magna™	43
	Polytetrafluoroethylene (PTFE) Membrane - PTFESep™	45
	Regenerated Cellulose (RC) Membrane	46
	Polyvinylidene Fluoride (PVDF) Membrane	47
	Polycarbonate Track Etched (PCTE) Membrane - Poretics™	48
	Polyester Track Etched (PETE) Membrane - Poretics™	52
	Drain Disc	53
	Filter Papers	54
	Qualitative Papers	54
	Quantitative Papers	57
	Glass Microfiber	60
	4. AIR MONITORING	65
	P.M. 2.5 PTFE Membrane	67
	Silver Membranes	68
	Glass Fiber Filters - PreSep™	69
	Quartz Microfiber Filter	70
	5. TRANSFER MEMBRANES	71
	Nitrocellulose Pure - Nitro Pure™	72
	Nitrocellulose Supported - Nitro Plus™	73
	Polyvinylidene Fluoride Pure - PVDF Pure™	74
	Polyvinylidene Fluoride Supported - PVDF Plus™	75
	Neutral Nylon 66 - Magna Neutral™	76
	Reprobing Charged Nylon 66 - Magna Probe™	77
	6. PROTEIN ARRAY	79
	FAST™ Slides	82
	FAST™ Buffers	83
	FAST™ Accessories	84
	FILTRATION GUIDE	85
	COMPATIBILITY CHART	93
	PRODUCT CODE INDEX	95

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, PTFE, RC, PE, Hydrophobic and Hydrophilic 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.

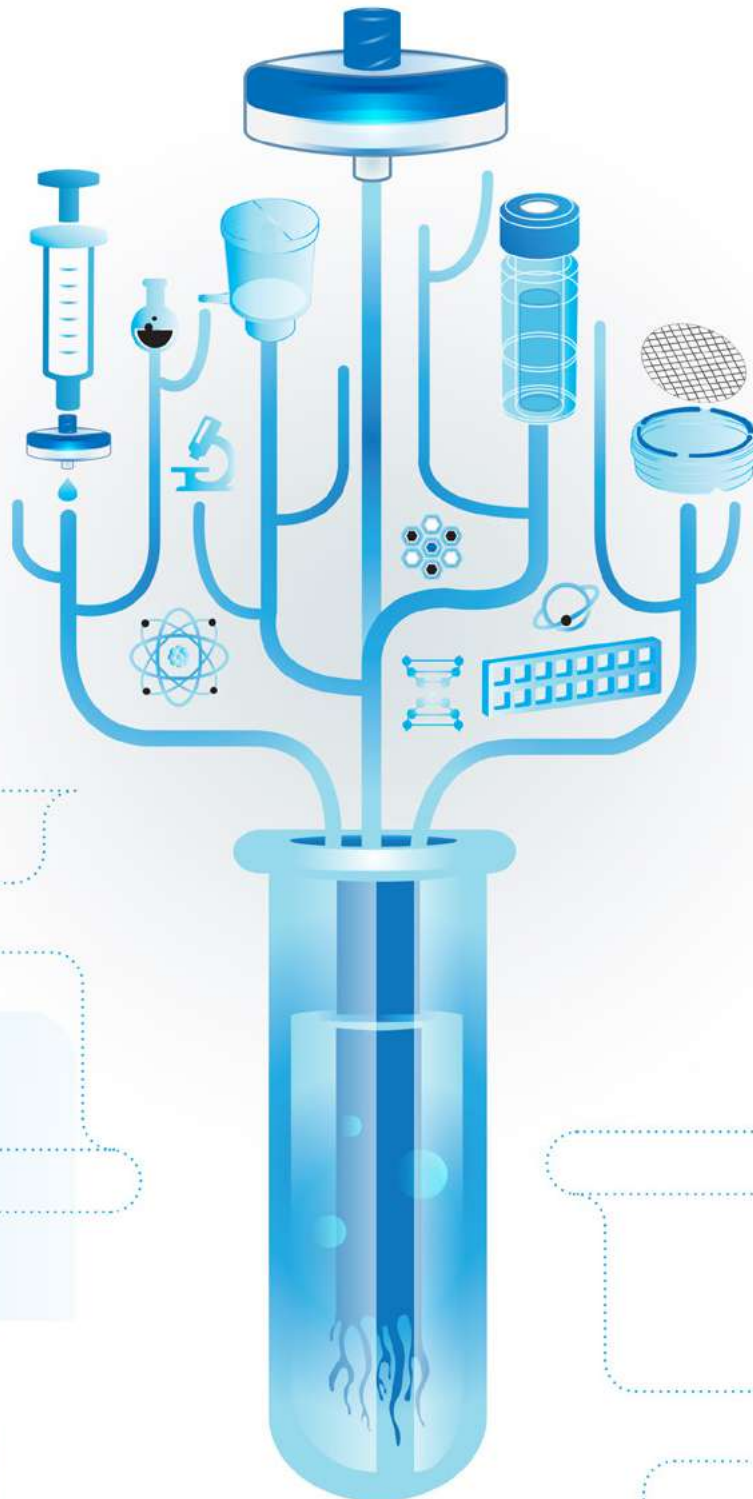
Continuing Improvement thanks to our R&D Department

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

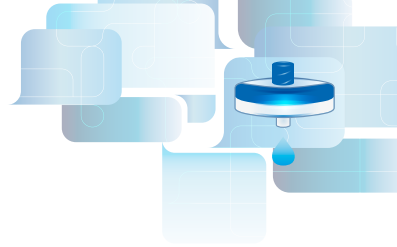
Filtering with a plunger in the vial is a rapid single step, reducing sample loss. After filtration, the sample is ready for use in auto-sampling. The pre-slit cap ensures easy and clean transfer of sample. The most useful device for single filtration... Easy to press, fast and simple to use GVS provides 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 0.20µm or 0.45µm 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.



MICROFILTRATION

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.



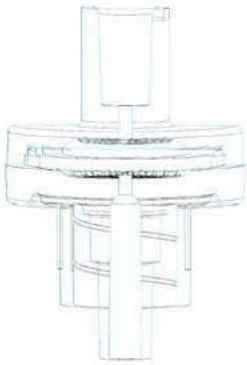
The Abluo Series is available in 13 mm and 33 mm sterile and non sterile with wide variety of membranes. Abluo is made with ultrasonic weld with two adaptor combinations available: FLL / MLL and FLL / MLS. The housing material can be acrylic or polypropylene to adapt your samples.



SYRINGE FILTERS

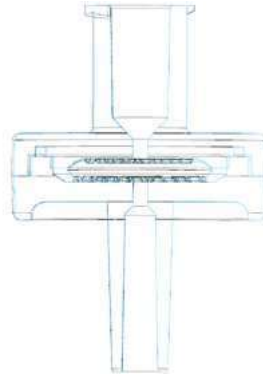
13mm Abluo CA

Ultrasonically welded



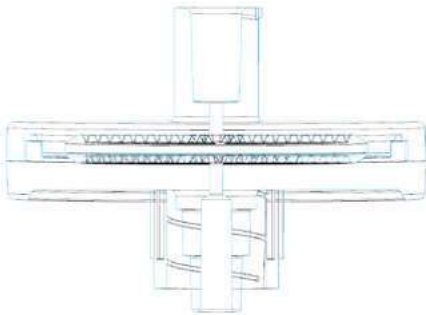
13mm Abluo RC

Ultrasonically welded



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 100/pk	Packaging 500/pk
Cellulose Acetate (CA)	0.22	FLL/MLL	Acrylic	Blue	FJ13ANCCA002DH01	FJ13ANCCA002DD01
Cellulose Acetate (CA)	0.45	FLL/MLL	Acrylic	Yellow	FJ13ANCCA004FH01	FJ13ANCCA004FD01
Cellulose Acetate (CA)	0.80	FLL/MLL	Acrylic	Green	FJ13ANCCA008EH01	FJ13ANCCA008ED01
Cellulose Acetate (CA)	1.20	FLL/MLL	Acrylic	Red	FJ13ANCCA012CH01	FJ13ANCCA012CD01
Cellulose Acetate (CA)	5.00	FLL/MLL	Acrylic	Brown	FJ13ANCCA050PH01	FJ13ANCCA050PD01
Nylon 66 (NY)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPNY002AH01	FJ13BNPNY002AD01
Nylon 66 (NY)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPNY004AH01	FJ13BNPNY004AD01
Nylon 66 (NY)	5.0	FLL/MLL	Acrylic	Transparent	N/A	FJ13ANCNY050AD01
Mixed Cellulose Esters (MCE)	0.22	FLL/MLS	Acrylic	Transparent	FJ13BNPNC002AH01	FJ13BNCNC002AD01
Mixed Cellulose Esters (MCE)	0.45	FLL/MLS	Acrylic	Transparent	FJ13BNPNC004AH01	FJ13BNCNC004AD01
Polyethersulfone (PES)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPS002AH01	FJ13BNPPS002AD01
Polyethersulfone (PES)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPPS004AH01	FJ13BNPPS004AD01
Polytetrafluoroethylene Hydrophilic (PTFE HP)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPH002AH01	FJ13BNPPH002AD01
Polytetrafluoroethylene Hydrophilic (PTFE HP)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPPH004AH01	FJ13BNPPH004AD01
Polyethylene (PE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPE002AH01	FJ13BNPPE002AD01
Polyethylene (PE)	0.50	FLL/MLS	Polypropylene	Transparent	FJ13BNPPE005AH01	FJ13BNPPE005AD01
Regenerated Cellulose (RC)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPRC002AH01	FJ13BNPRC002AD01
Regenerated Cellulose (RC)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPRC004AH01	FJ13BNPRC004AD01
Polyvinylidene Fluoride (PVDF)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPV002AH01	FJ13BNPPV002AD01
Polyvinylidene Fluoride (PVDF)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPPV004AH01	FJ13BNPPV004AD01
Polytetrafluoroethylene (PTFE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ13BNPPT002AH01	FJ13BNPPT002AD01
Polytetrafluoroethylene (PTFE)	0.45	FLL/MLS	Polypropylene	Transparent	FJ13BNPPT004AH01	FJ13BNPPT004AD01

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 100/pk	Packaging 500/pk
Cellulose Acetate (CA)	0.22	FLL/MLL	Acrylic	Blue	FJ25ANCCA002DH01	FJ25ANCCA002DD01
Cellulose Acetate (CA)	0.45	FLL/MLL	Acrylic	Yellow	FJ25ANCCA004FH01	FJ25ANCCA004FD01
Cellulose Acetate (CA)	0.80	FLL/MLL	Acrylic	Green	FJ25ANCCA008EH01	FJ25ANCCA008ED01
Cellulose Acetate (CA)	1.20	FLL/MLL	Acrylic	Red	FJ25ANCCA012CH01	FJ25ANCCA012CD01
Cellulose Acetate (CA)	5.00	FLL/MLL	Acrylic	Brown	FJ25ANCCA050PH01	FJ25ANCCA050PD01
Nylon 66 (NY)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPNY002AH01	FJ25BNPNY002AD01
Nylon 66 (NY)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPNY004AH01	FJ25BNPNY004AD01
Polyethersulfone (PES)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPS002AH01	FJ25BNPPS002AD01
Polyethersulfone (PES)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPPS004AH01	FJ25BNPPS004AD01
Mixed Cellulose Esters (MCE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPNC002AH01	FJ25BNPNC002AD01
Mixed Cellulose Esters (MCE)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPNC004AH01	FJ25BNPNC004AD01
Regenerated Cellulose (RC)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPRC002AH01	FJ25BNPRC002AD01
Regenerated Cellulose (RC)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPRC004AH01	FJ25BNPRC004AD01
Polyvinylidene Fluoride (PVDF)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPV002AH01	FJ25BNPPV002AD01
Polyvinylidene Fluoride (PVDF)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPPV004AH01	FJ25BNPPV004AD01
Polytetrafluoroethylene (PTFE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPT002AH01	FJ25BNPPT002AD01
Polytetrafluoroethylene (PTFE)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPPT004AH01	FJ25BNPPT004AD01
Polytetrafluoroethylene Hydrophilic (PTFE HP)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPH002AH01	FJ25BNPPH002AD01
Polytetrafluoroethylene Hydrophilic (PTFE HP)	0.45	FLL/MLS	Polypropylene	Transparent	FJ25BNPPH004AH01	FJ25BNPPH004AD01
Polyethylene (PE)	0.22	FLL/MLS	Polypropylene	Transparent	FJ25BNPPE002AH01	FJ25BNPPE002AD01
Polyethylene (PE)	0.50	FLL/MLS	Polypropylene	Transparent	FJ25BNPPE005AH01	FJ25BNPPE005AD01
Glass Fiber (GF)	0.70	FLL/MLS	Polypropylene	Transparent	FJ25BNPGF007AH01	FJ25BNPGF007AD01
Glass Fiber (GF)	1.00	FLL/MLS	Polypropylene	Transparent	FJ25BNPGF010AH01	FJ25BNPGF010AD01
Glass Fiber (GF)	1.20	FLL/MLS	Polypropylene	Transparent	FJ25BNPGF012AH01	FJ25BNPGF012AD01
Glass Fiber (GF)	3.10	FLL/MLS	Polypropylene	Transparent	FJ25BNPGF031AH01	FJ25BNPGF031AD01

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

MICROFILTRATION

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 cm²

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.

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

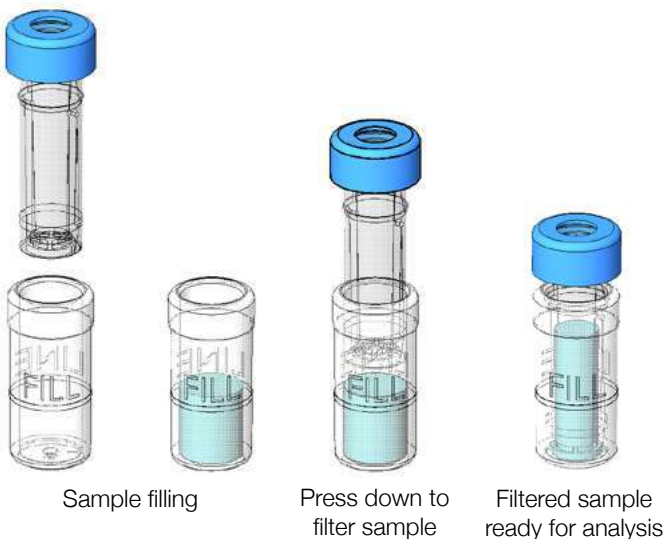
Fill Line Volume: 480 microliter

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



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, 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

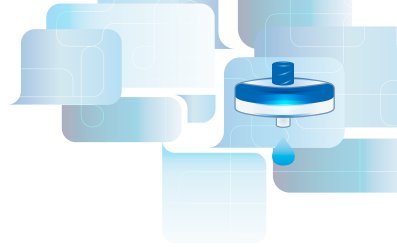
Diameter: 3.5" (9 cm)

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)

¹Varies 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



CAPSULE FILTERS

Media selection Guide

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.

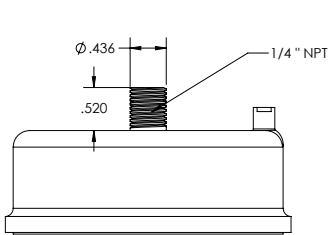
Nylon and PES media available in Polyester Housings. PES media also available in a PP housing by request.

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

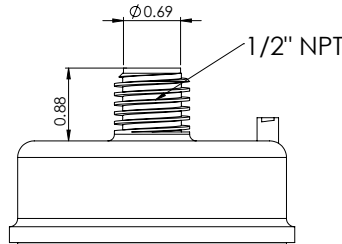
Adaptors Selection Guide

Unit of measure: inch

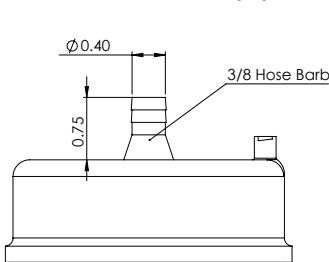
1/4 in NPT male (R)



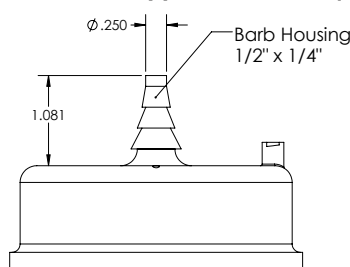
1/2 in NPT male (W)



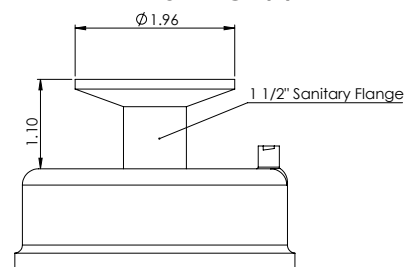
3/8 in hose barb (M)



1/4 - 1/2 in stepped hose barb (L)



1.5 in sanitary flange (Y)



MICROFILTRATION

PTFE Capsule Filters - Hydrophobic - Polypropylene housing: Ordering information

Pore Size µm	Filtration area ft ² (cm ²)	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		
		3.5 (9)		1213158		
0.2	0.8 (748)	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 ft ² (cm ²)	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				
			LL	MM	RR	WW	YY
0.1	0.8 (748)	3.5 (9)			1213540		
		4.0 (10)	1212939	1213529	1213671		
0.1	3.0 (2080)	8.8 (22)				1221768	
0.1	5.9 (5500)	11.5 (29)			1212899		
		3.5 (9)			1213561		
0.2	0.8 (748)	4.0 (10)		1213550 1213757* 1214448*			
		11.5 (29)			1212905		
0.2	5.9 (5500)	3.5 (9)			1213577		
		4.0 (10)		1214457			
0.4	0.8 (748)	11.5 (29)			1212910		
		12.0 (30)		1212908			
0.4	5.9 (5500)	12.3 (31)				1212911	

*sterile product

PES Polyethersulfone Filter Media - Polyester housing: Ordering information

Pore Size µm	Filtration area ft ² (cm ²)	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						
			LL	MM	RR	WW	YY	RM	WM
0.1	0.8 (748)	3.5 (9)			1222323				
		3.5 (9)			1213608 1214001*				
0.2	0.8 (748)	4.0 (10)	1214225*					1223129**	
		4.3 (11)			1225346				
		4.7 (12)				1213956			
0.2	3.0 (2808)	4.0 (10)	1214436*						
		8.2 (21)					1235556***		
		8.4 (21)			1215154 1223845*				
0.2	5.9 (5500)	8.8 (22)				1222327			
		3.5 (9)			1213610				
0.45	0.8 (748)	4.0 (10)	1214227*						
0.45	3.0 (2808)	8.1 (20)	1222432*						
0.45	5.9 (5500)	8.8 (22)					1215030		

* 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 cm². Can be used up to 50°C.

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 $\geq 0.2 \mu\text{m}$ in HPLC/FPLC solutions when the column packing is $\leq 10 \mu\text{m}$
- ◆ PTFE membrane filters for the retention of particles $\geq 0.45 \mu\text{m}$ 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 - 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

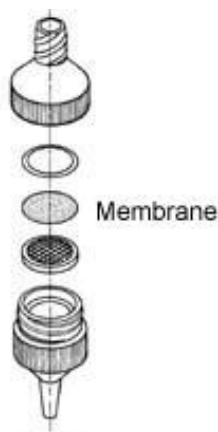
GVS offers a selection of filtration holders and apparatus that are designed to ensure precise filtration work with GVS membranes. In most applications, the filter holder is just as important as the filter for accurate results every time. Filter holders are available for a wide variety of applications 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

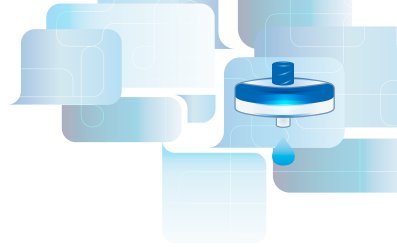
- ◆ High resistant organic components
- ◆ No need for specific tools
- ◆ Quick efficient assembly

Typical Applications

- ◆ Biofluids
- ◆ Ophthalmics
- ◆ Gas chromatography samples
- ◆ Lubricants

Ordering information

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



MICROFILTRATION

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.

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

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

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

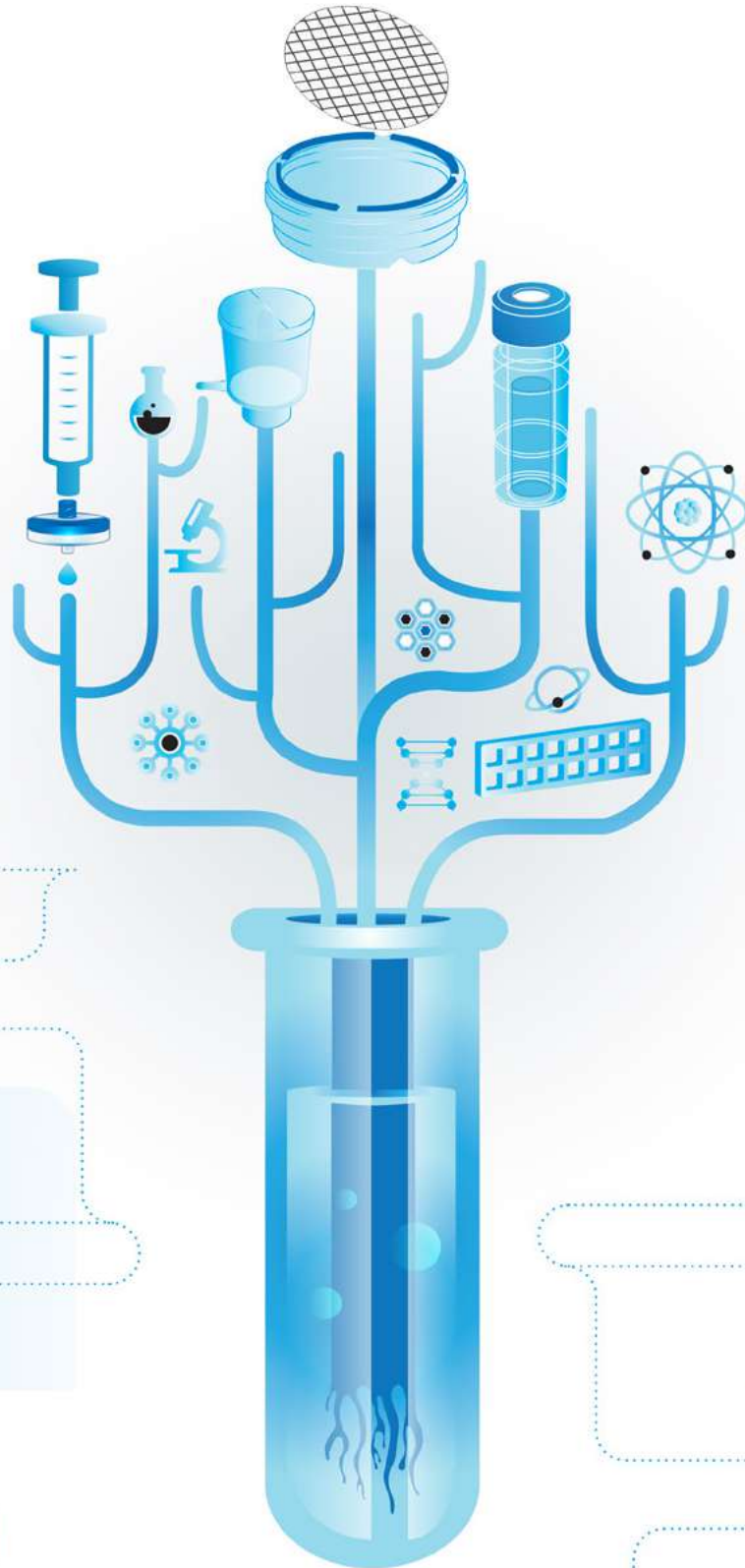
Gravi-Seal can be used with GVS Manifold, (see page 29).





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

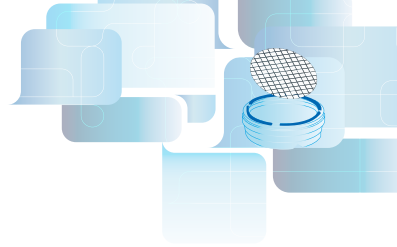
The Analytical Funnel (100 mL) is a single use, 47 mm pre-sterilized filtering units with removable sterile Nitrocellulose Membrane for use with liquid media agar plates and culturing devices.



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 Descriptions

Brilliant Green Bile Broth 2%

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

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*.

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.

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

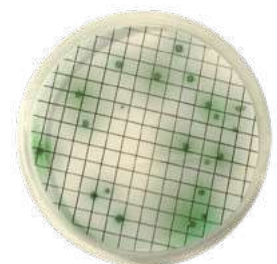
Microbiological analysis of:

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

Features & Benefits



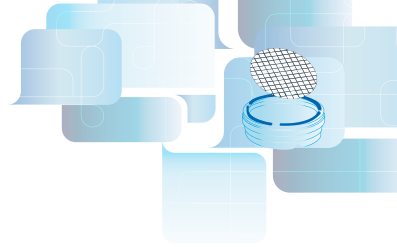
Brilliant Green Bile Broth



Pseudomonas Media: Typical Growth of *Pseudomonas aeruginosa* ATCC 10145



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

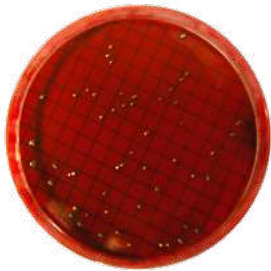
HPC Broth and HPC Broth with TTC Heterotrophic Plate Count (HPC) Broth is used to determine live heterotrophs in drinking water and other media at incubation temperatures of 35°C. All bacteria grow on HPC with indicator media and produce a red color. This is a result of the precipitation of formazan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



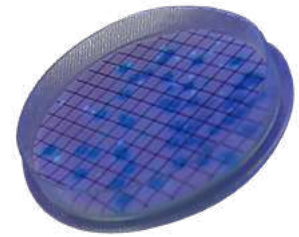
M-Green Yeast and Mold Broth:
Typical Growth of Candida Albicans
ATCC10231 on a Black Membrane

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.

MI Broth and MI Agar

MI Broth detects the presence of coliform bacteria by the production of β -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 β -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 β -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

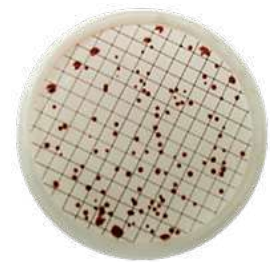
MRS medium supports luxuriant growth of all lactobacilli, even the slow growing species.

M-TGE Total Count Media

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

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.



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

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 Inoculated)

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 O157: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.

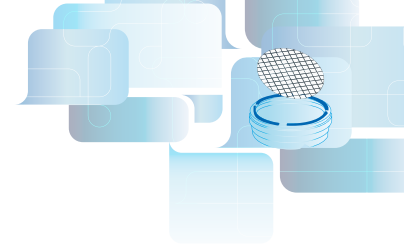
Trypticase Soy Broth – Double Strength

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.

LIQUID MEDIA



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: 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.

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.

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.

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.

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*.

Features & Benefits:

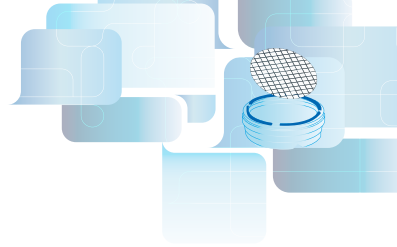
- ◆ The right test for each type of contamination
- ◆ Qualitative and semi-quantitative hygiene control
- ◆ Sterile packed and ready-for-use
- ◆ Easy to handle
- ◆ Rapid results
- ◆ Long shelf-life

Total Count Swab Kit



Coliform SwabCheck





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 Escherichia 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.

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.

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.

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.

Hygiene SwabCheck



Listeria SwabCheck



Yeast and Mold Swab Kit



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 \pm 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.

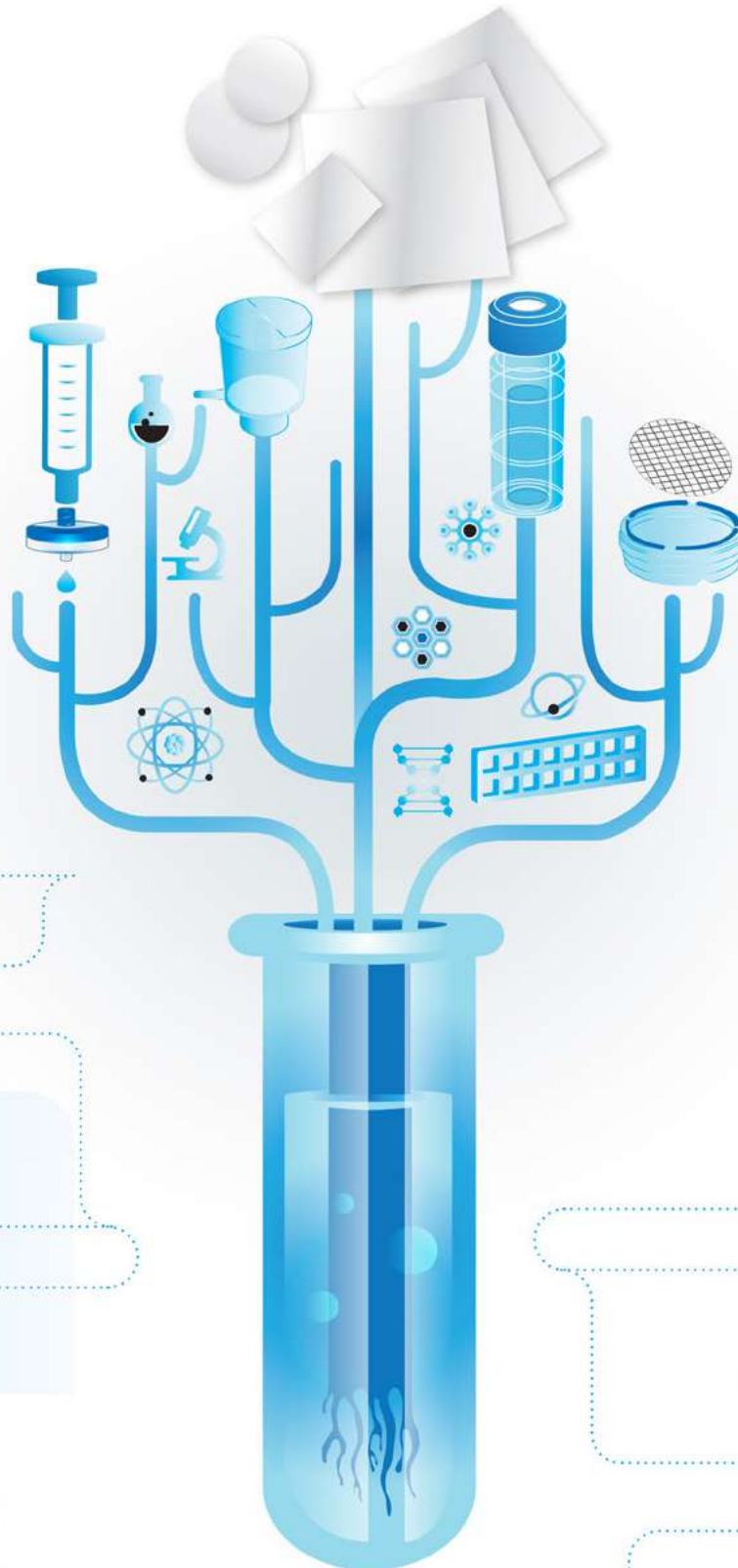
Ordering information

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



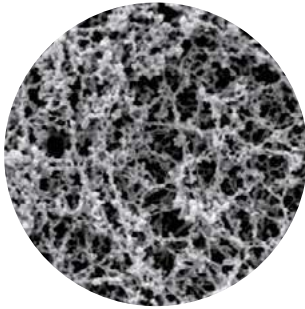
FILTER TECHNOLOGY

DISC AND SHEET MEMBRANES



DISC AND SHEET MEMBRANES

Cellulose Acetate (CA) Membrane



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

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



ULTRA Sep
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/cm ² @ 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

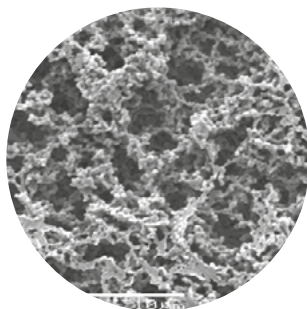
Ordering information

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	

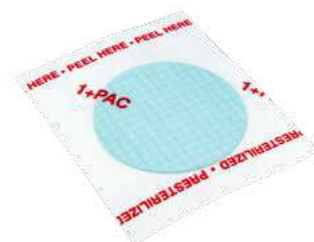
*Sterile

DISC AND SHEET MEMBRANES

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

MEMBRANES FOR FILTRATION



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

Pore sizes	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
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

Pore sizes	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
	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			

Pore sizes	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
	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

Pore sizes	Dimensions Packaging	142 mm 25/pk	293 mm 25/pk	20x20 cm 5/pk	20x20 cm 5/pk
	Color	white	white	white	black
	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			

DISC AND SHEET MEMBRANES

Speed Pack Sterile MCE Membrane Perforated Ribbons

SPEED PACK



GVS Speed Pack folded ribbons provide the user with the same quality and reliability as the GVS individually packed MCE membranes. The folded ribbons provide hands-free convenience, reduce laboratory time and boost lab efficiency. Speed Pack have ribbons designed for use with most popular membrane dispensers.

Packaged in 150 count ribbons are available to order in pack size of 150 or 600 (4 x 150). Select either gridded white or black sterilized membranes in a continuous folded ribbon for easy dispensing and convenience.

GVS MCE sterile filtration membranes are ideally used for the microbiological culturing and examination of water, beverages, beer, wine, juices, waste water, pharmaceuticals, food and other critical applications. It boosts a rapid flow rate and high throughput for consistent and uniform results.

- ◆ Available in 0.2 µm, 0.45 µm and 0.8 µm pore sizes
- ◆ Available in White or Black membranes with gridded surfaces
- ◆ Pre-sterilized (gamma irradiation) and ready to use product
- ◆ Comes in box of 150 count
- ◆ Sold in packs of 150 or 600 (4 x 150), 47 mm. For 50 mm size please contact GVS sales team
- ◆ Compatible with various dispensers (Microsart E-Motion, EZ-Pak, EZ-Pak Curve, Whatman Membrane-Butler)
- ◆ Individually sealed filters are printed with the membrane specification and lot number on the clear cover of each sealed filter
- ◆ Membranes are numbered from 1 to 150 to maintain control of the ribbon progressive usage

White MCE membranes with Black Grids are widely used for general purpose examination and enumeration of microorganisms. Commonly used for water, waste-water, pharmaceutical, medical, food and beverage analysis. The contrasting grid lines facilitate counting of colonies.

Black MCE with White Grids provide color contrast between the filter and white or beige microorganisms without the need for counter-stain. Commonly used for bottled water, carbonated beverages, beer and wine analysis. The contrasting grid lines facilitate counting of colonies.

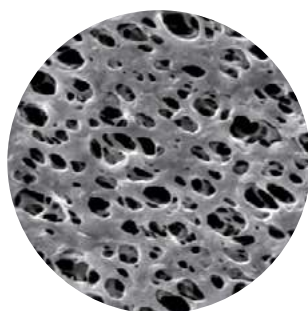
Speed Pack Ribbons of Membranes

Mixed Cellulose Esters (MCE) membrane, Sterile Ordering information

Dimensions Packaging	47 mm 150/pk	47 mm 150/pk	47 mm 600/pk	47 mm 600/pk
Color	white	black	white	black
0.2 µm	SPNCW02BG47S	on demand	SPNCW02BG47S6	on demand
0.45 µm	SPNCW04BG47S	SPNCB04WG47S	SPNCW04BG47S6	SPNCB04WG47S6
0.8 µm	SPNCW08BG47S	SPNCB08WG47S	SPNCW08BG47S6	SPNCB08WG47S6



Nylon 66 (NY) Membrane



MAGNA
Nylon Membrane

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.

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.

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

Typical Applications

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

Product Characteristics

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

Performance

Pore Size (μ m)	Flow Time (s)	Volume/Vacuum (mL/in Hg)	Flow Rate (mL/min/cm ² @ 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

DISC AND SHEET MEMBRANES

Nylon 66 (NY) Membrane, white

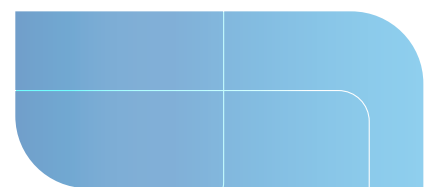
Ordering information

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

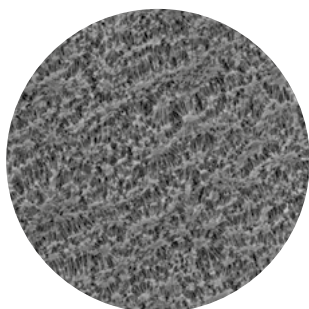
Dimensions Packaging	90 mm 25/pk	142 mm 25/pk	293 mm 25/pk	200x200 mm 5/pk	30 cm x3 m 1/pk
0.1 µm	1213763	1213764	1213765	1222859	1241477
0.22 µm	1213770	1213771	1213772	1222858	1224690
0.45 µm	1213778	1213779	1213780	1222857	1225982
0.65 µm	1213784	1213786		1222856	3052148
0.8 µm	1213791	1213792	1213793	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

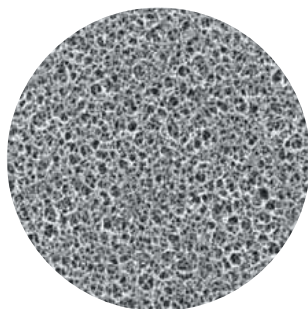
Ordering information

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

DISC AND SHEET MEMBRANES

Regenerated Cellulose (RC) Membrane



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

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 mechanical stability. The superior strength assures an high chemical resistance for usage with a wide range of aqueous and organic media.

Performance

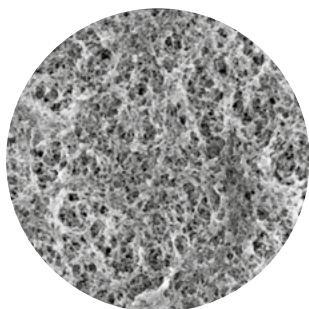
Pore Size (µm)	Typical Flow Rate (mL/min/cm ² @ 10 psi)	Typical Bubble Point (psi)	Typical Thickness (µm)
0.22	10.3	63.8	≥ 145
0.45	20.6	42.1	≥ 145

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

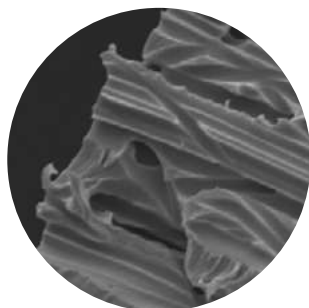
Pore Size (µm)	Typical Flow Rate (mL/min/cm ² @ 10 psi)	Typical Bubble Point (psi)	Typical Thickness (µm)
0.22	7	36	170
0.45	29	22	170

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

DISC AND SHEET MEMBRANES

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 (polyvinylpyrrolidone)-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

MEMBRANES FOR FILTRATION



Performance Characteristics

Pore Size (a) (μm)	Pore Density (b) (pores/ cm^2)	Nominal Thickness (c) (μm)	Min. Bubble Point (d) (psi)	Typical Flow Rates		(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)
				Water (e) (mL/min/ cm^2)	Air (L/min/ cm^2)	
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)	

PCTE AOX Hydrophilic Membrane

Ordering information

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

PCTE Hydrophilic Black Membrane

Ordering information

Pore sizes	Dimensions Packaging	13 mm 100/pk	25 mm 100/pk	47 mm 100/pk	293 mm 20/pk	203x254 mm 30/pk
	0.1 μm		1215311	1215315	1221503	
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					

MEMBRANES FOR FILTRATION



PCTE Hydrophilic Membrane - Disks

Ordering information

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

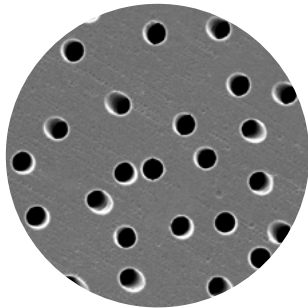
PCTE Hydrophilic Membrane - Disks

Ordering information

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		

DISC AND SHEET MEMBRANES

Polyester Track Etched (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 $\mu\text{g}/\text{cm}^2$
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 $\mu\text{g}/\text{cm}^2$
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) ($\text{mL}/\text{min}/\text{cm}^2$)	Air ($\text{L}/\text{min}/\text{cm}^2$)
10	1×10^5	9	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)

- (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)

MEMBRANES FOR FILTRATION



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

DISC AND SHEET MEMBRANES

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/m ²
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



FILTER PAPERS

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/m ²
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/m ²
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/m ²
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

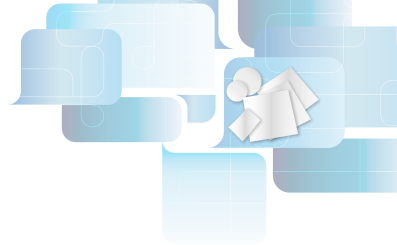
Weight	85 g/m ²
Thickness	170 µm
Retention Range	3-5 µm
Ash content	<0.06 %

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



FILTER PAPERS

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/m ²
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/m ²
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/m ²
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/m ²
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, manganic acid and finely precipitated calcium carbonate. The ideal filter paper for critical gravimetric analysis.



Product Characteristics

Weight	100 g/m ²
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



DISC AND SHEET MEMBRANES

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/m ²
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



FILTER PAPERS

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.

Product Characteristics

Basis Weight	143 g/m ²
Thickness	700 µm
Retention range	1.0 µm
Binders	Binder-free
Retention DOP	99,998 %

Features & Benefits

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

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

DISC AND SHEET MEMBRANES

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/m ²
Thickness	260 µm
Retention range	1.2 µm
Binders	Binder-free
Retention DOP	99,998 %

Features & Benefits

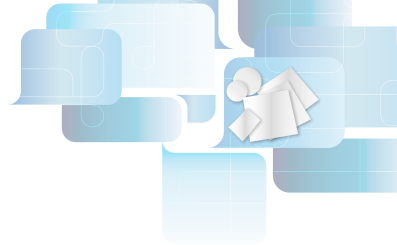
- ◆ Extraction thimbles (cellulose, glass & quartz microfiber)
- ◆ Very small particles retention
- ◆ Resistance to aggressive substances
- ◆ Temperatures up to 500 °C

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

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



FILTER PAPERS

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.

Product Characteristics

Basis Weight	52 g/m ²
Thickness	260 µm
Retention range	1.6 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 °C
- ◆ Fine retention with fast flow

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

DISC AND SHEET MEMBRANES

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 °C
- ◆ Coarse retention with fast flow

Product Characteristics

Basis Weight	120 g/m ²
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

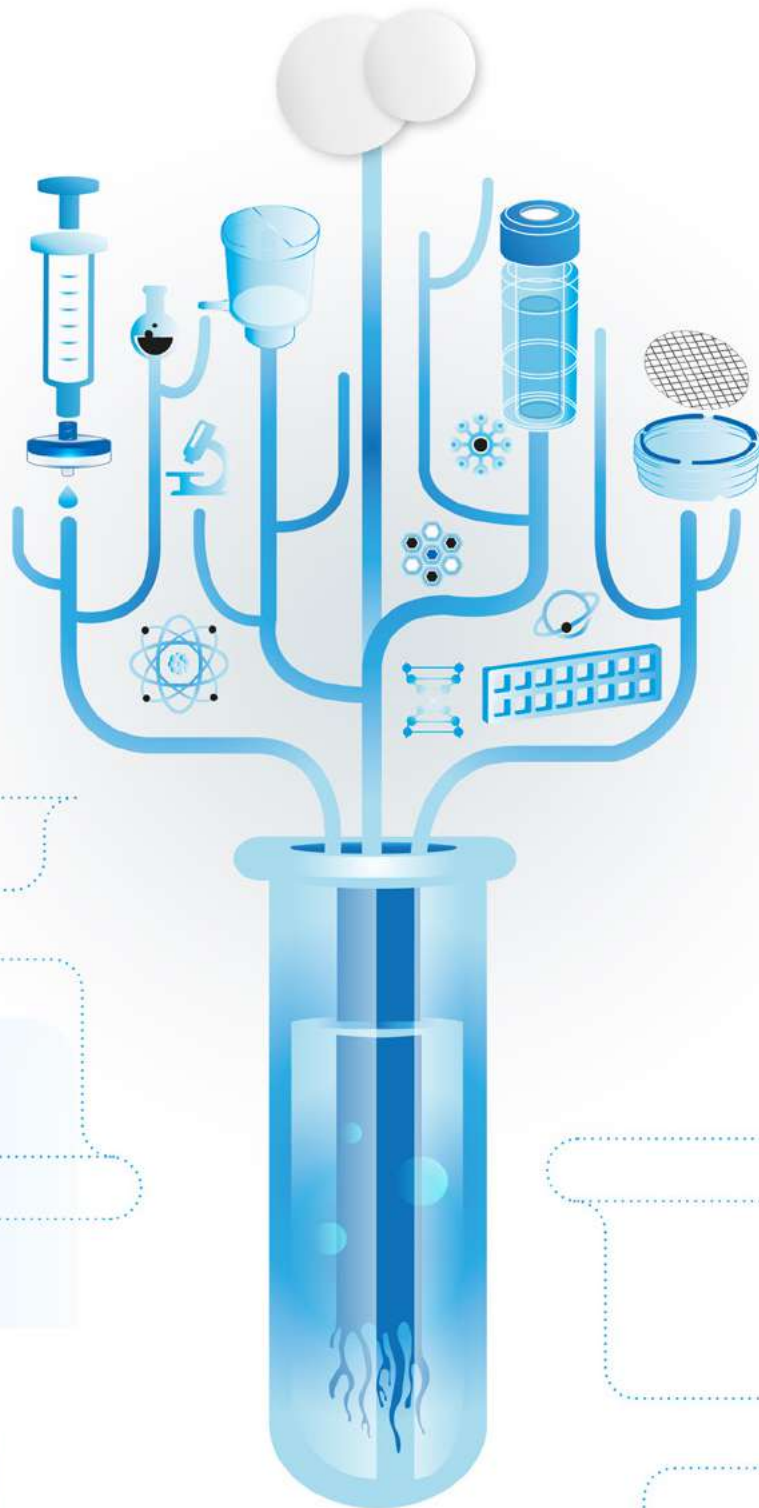
Ordering information

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.

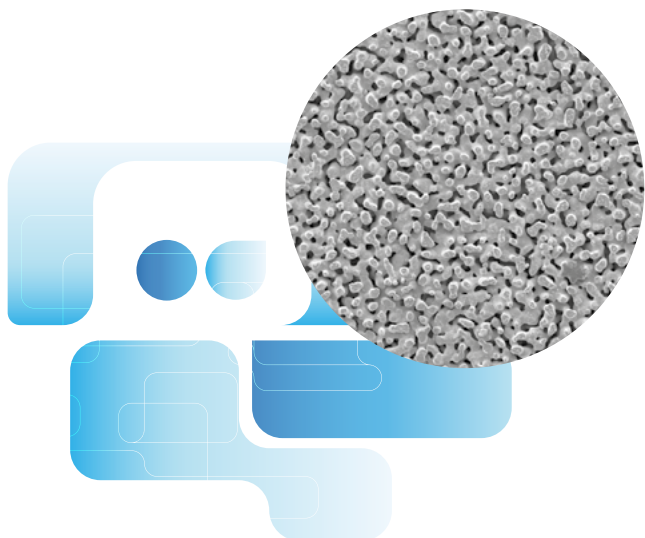
Standards and regulations for air and water particulate monitoring have been established by global environmental agencies to define, measure and mitigate issues. Regulations provide established methods for the analysis and definition of air and water quality. Global Standards have been established to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

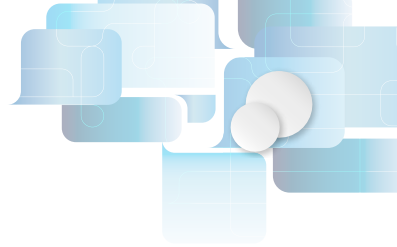
GVS supports the need for environmental monitoring and controls and offers a comprehensive suite of products developed for the air and water monitoring market. These include membranes and filters for air particulate monitoring, water quality, chemical, soil and asbestos analysis. GVS products are designed 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 (0.3 μm)	99.7 %
Pressure drop (0.3 μm) @16.67 l/min clean air	30 cm water
Alkalinity	<25 $\mu\text{eq/g}$ 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



SILVER
Silver
Membrane

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 0.2 μm to 5 μm. 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

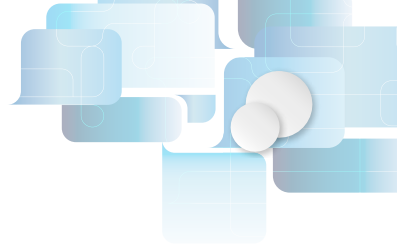
Product Characteristics

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

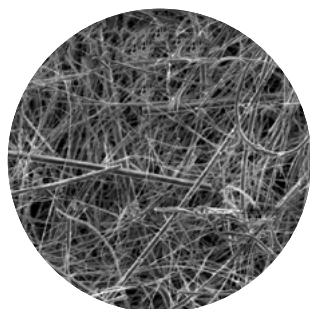
Silver Membrane

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



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 (G15)		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 (G15)	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	1.0 µm (G40)		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	1.0 µm (G40)	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/m ²
Thickness	440 μm
Retention DOP	99.998 %

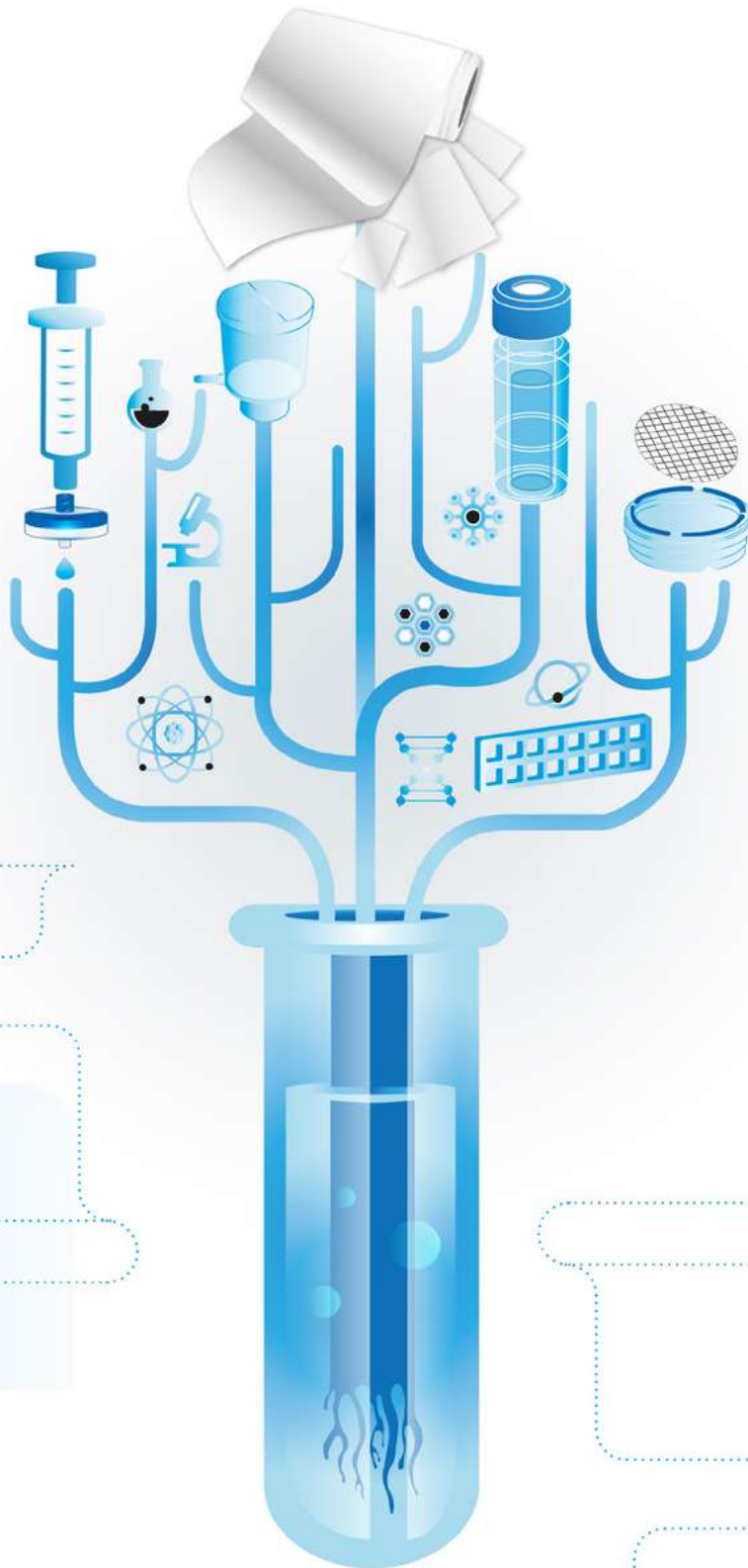
Ordering information

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



TRANSFER MEMBRANES

Nitrocellulose (NC)



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/cm²
- ◆ 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

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

Pore sizes



Supported Nitrocellulose



GVS Supported Nitrocellulose Transfer 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/cm²
- ◆ 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
0.22 µm		1214560	1212669	1212689	1212690	1212632
0.45 µm	1214978	1213943	1212596	1212597	1212602	1212590

Pore sizes

TRANSFER MEMBRANES

Polyvinylidene Fluoride (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/cm²
- ◆ 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

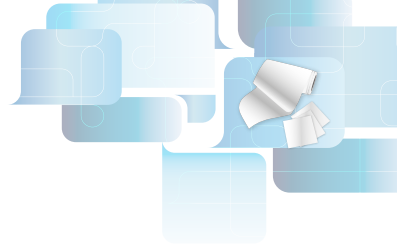
Product Characteristics

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

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

Pore sizes



Supported Polyvinylidene Fluoride (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 / cm ² @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
0.22 µm	1214571	1214573	1214575	1214580	1214495	1214497
0.45 µm	1214572	1214574	1214576	1214581	1214496	1214498

Pore sizes

TRANSFER MEMBRANES

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/cm², 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 dependable 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

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

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

Features & Benefits

- ◆ Supported charged nylon 66 membrane
- ◆ Specifically designed for multiple reprobing
- ◆ 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
- ◆ Northern Blotting
- ◆ Southern Blotting
- ◆ Multiple Reprobings
- ◆ Alkaline Blotting
- ◆ UV Crosslinking

GVS Nylon Reprobing Charged transfer membrane is a positively charged modified nylon 66 membrane, specifically designed to allow for numerous reprobing.

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.

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)
0.45	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

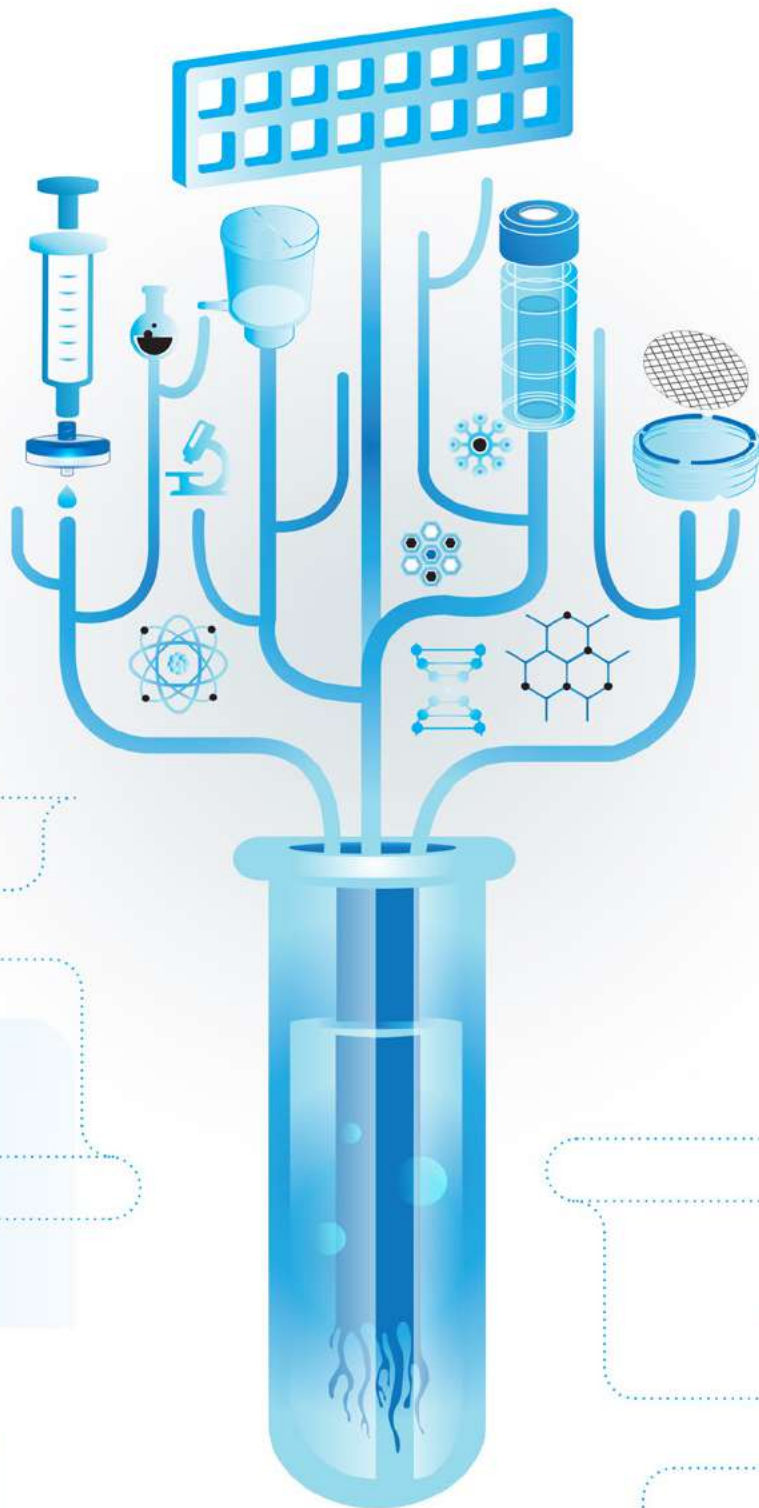
Dimensions Packaging	300x300 mm 25/pk	150x3000 mm 1/pk	200x3000 mm 1/pk	300x3000 mm 1/pk
Pore size 0.45 µm	1226575	1226558	1226557	1226556





FILTER TECHNOLOGY

PROTEIN ARRAY



FAST™ - Protein 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



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.

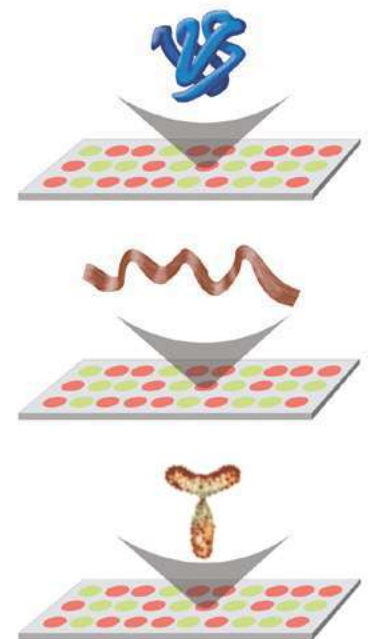
◆ Reverse Phase Protein Arrays (RPPAs)

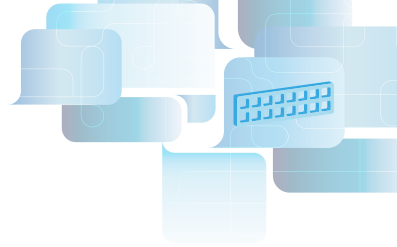
The high binding capacity, sensitivity and reproducibility of FAST Slides make them ideal for Reverse Phase Protein Arrays (RPPAs) used for biomarker discovery and characterization and in clinical trials to monitor drug effectiveness and disease progression.

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.





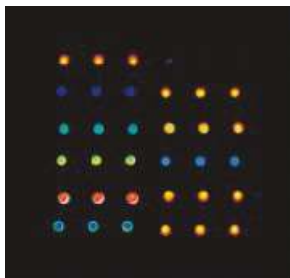
PROTEIN ARRAY

FAST™ Slides provide an optimum immunoassay surface

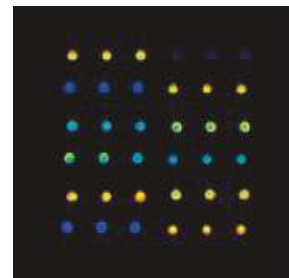
The high binding capacity over a broad dynamic range results from the surfaces sensitivity during quantitative protein recovery from complex biological samples.

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

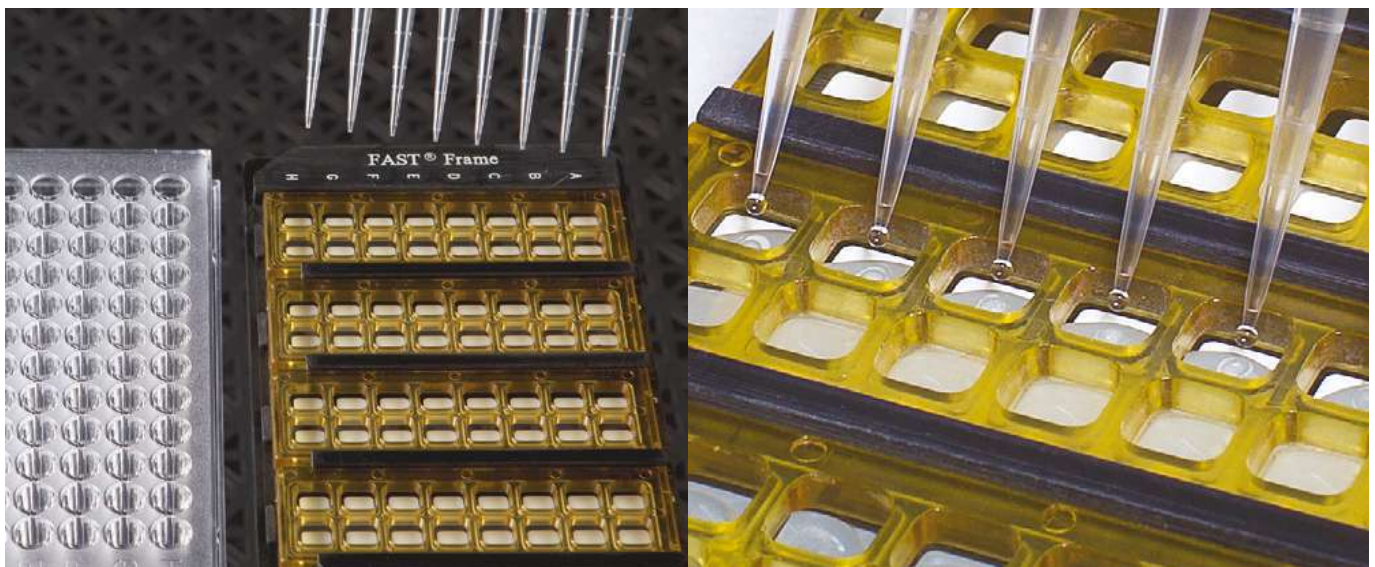


12 Months

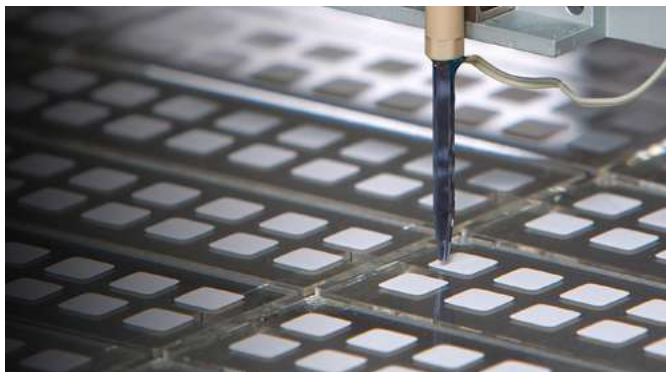
FAST™ Slides are a broadly compatible open platform

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™ 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.

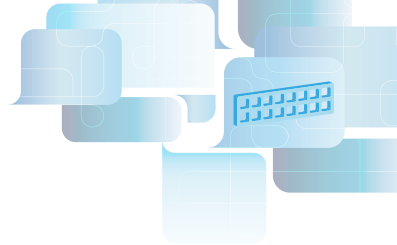
FAST Slides are suitable for many types of protein microarrays including protein arrays, reverse phase protein arrays and microspot ELISAs, also known as antibody arrays. There are tremendous advantages to using FAST Slides for immunoassays over traditional ELISAs including less sample required, better 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
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



PROTEIN ARRAY

FAST™ Accessories - protein array processing

FAST®
protein array solutions



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

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



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

POLYMERIC & TRACK ETCHED MEMBRANES



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, liposomal 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-PVDF	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

FILTRATION GUIDE

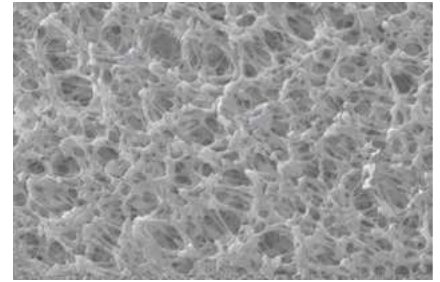
Membrane Characteristics

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.

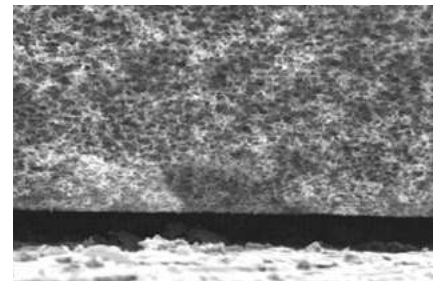
- Hydrophobic membranes have permeability to the gas, but they stop aqueous solutions. In other words, they do the opposite job when compared to hydrophilic membranes. This means that gas will pass through these membranes, but aqueous solutions will be stopped. If air or gas can reach the hydrophobic 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.

FILTRATION GUIDE

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

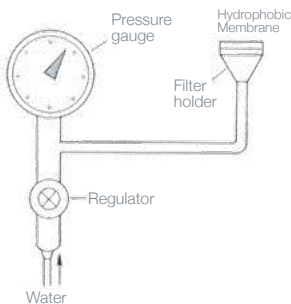
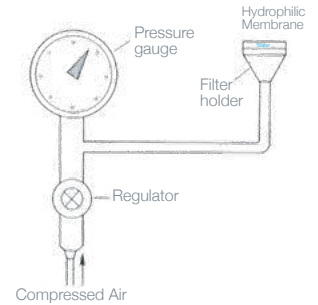
FILTRATION GUIDE

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 Breakthrough

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				
		Cellulose Acetate	Nitrocellulose	Polyethersulfone	Nylon 66	PTFE (unlaminated)	PTFE (laminated)	PVDF Philic	RC	Glass Fiber (binder)	Glass Fiber (no binder)	Silver	Polycarbonate	Polyester	Modified Acrylic	Polysulfone	Polystyrene	Polypropylene
Chemical		ca	nc	pes	ny	ptu	ptl	pvd	rc	gfb	gfn	ag	pc	pet	ac	ps	pst	pp
ACIDS	Acetic Acid 5%	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	T	R	R	R	R	N	R	R	R
	Acetic Acid, Glacial	N	N	R	N	R	R	R	R	N	R	R	L	NR	N	R	R	L
	Boric Acid	R	R	T	L	R	R	T	T	T	T	R	R	R	N	R	R	R
	Hydrochloric, 6N	L	N	R	N	R	R	L	N	N	R	R	R	L	N	R	R	T
	Hydrochloric, Conc.	N	N	R	N	R	R	R	N	N	R	R	R	N	N	R	R	T
	Hydrofluoric, 10%	N	N	T	N	R	R	R	L	N	N	R	T	T	T	T	T	R
	Hydrofluoric, 35%	N	N	T	N	R	T	R	N	N	N	R	T	T	T	T	T	T
	Nitric Acid, 6N	L	R	N	N	R	L	T	N	N	L	N	R	R	N	N	L	T
	Nitric Acid, Conc.	N	N	N	N	R	N	R	N	N	L	N	R	N	N	N	N	T
	Sulfuric Acid, 6N	L	R	T	N	R	L	R	L	N	R	N	R	R	N	N	N	T
	Sulfuric Acid, Conc.	N	N	N	N	R	N	T	N	N	R	N	N	N	N	N	N	T
ALCOHOLS	Amyl Alcohol	R	N	N	R	R	R	R	R	R	R	R	T	T	N	R	N	R
	Benzyl Alcohol	L	R	N	L	R	R	R	R	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	T	R
	Butyl Cellosolve	L	N	T	R	R	R	T	T	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	L	R	L	T
	Ethyl Alcohol >80%	R	L	R	R	R	R	R	T	R	R	R	R	R	L	R	N	T
	Ethylene Glycol	R	L	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	T	R	T	R
	Isobutyl alcohol	R	R	T	R	R	R	R	T	N	N	R	R	R	R	R	R	T
	Isopropanol	R	L	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	T	R	R	R	T
	Methyl Cellosolve	L	L	T	R	R	R	R	T	R	R	R	N	R	T	R	T	T
Propanol	R	R	T	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	N	R	R	N	L	R	R	R	T
	Potassium Hydroxide, 6N	N	N	T	R	R	R	R	L	N	T	R	N	N	T	R	T	T
	Sodium Hydroxide, 6N	N	N	R	N	R	R	R	L	N	T	R	N	NR	T	T	T	T
SOLVENTS	Acetone	N	N	N	R	R	R	N	R	R	R	R	L	R	N	N	N	R
	Acetonitrile	N	N	R	T	R	R	R	R	T	R	T	NR	T	N	N	N	R
	Amyl Acetate	L	N	L	R	R	R	R	R	N	R	R	R	R	N	N	N	L
	aniline	N	N	R	R	R	R	T	R	T	T	R	N	R	T	N	T	L
	Benzene	L	R	R	T	R	L	R	R	N	R	R	NR	R	N	N	N	L
	Bromoform	N	R	T	R	R	R	T	T	R	R	R	N	R	T	N	T	T
	Butyl Acetate	L	N	L	R	R	R	T	R	N	R	R	R	R	N	N	N	L
	Carbon Tetrachloride	L	R	R	R	R	L	R	R	N	N	R	NR	R	N	N	N	N
	Cellosolve	R	N	T	R	R	R	T	R	R	R	R	R	R	N	N	T	T

COMPATIBILITY CHART

		Filter Media												Housing				
		Cellulose Acetate	Nitrocellulose	Polyethersulfone	Nylon 66	PTFE (unlaminated)	PTFE (laminated)	PVDF Philic	RC	Glass Fiber (binder)	Glass Fiber (no binder)	Silver	Polycarbonate	Polyester	Modified Acrylic	Polysulfone	Polystyrene	Polypropylene
Chemical		ca	nc	pes	ny	ptu	ptl	pvd	rc	gfb	gfn	ag	pc	pet	ac	ps	pst	pp
SOLVENTS	Chloroform	N	R	N	NR	R	L	R	R	R	R	R	N	R	N	L	N	L
	Cyclohexane	R	R	T	R	R	R	T	R	R	R	R	R	R	N	R	T	R
	Cyclohexanone	N	N	N	T	R	R	N	R	R	R	R	L	T	N	N	N	R
	Diethyl Acetamide	N	N	T	R	R	N	T	R	R	R	R	NR	NR	N	N	N	T
	Dimethyl Formamide	N	N	N	R	R	R	N	L	N	R	R	NR	NR	N	N	N	R
	Dimethyl Sulfoxide (DMSO)	N	N	N	R	R	R	N	R	N	R	T	N	R	N	N	N	T
	Dioxane	N	N	L	R	R	R	R	R	R	R	R	N	R	N	N	N	R
	Ethyl Ether	L	L	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	N	R	T	N	T	T
	Formaldehyde	L	N	R	R	R	R	R	T	R	R	R	R	R	N	R	N	R
	Freon TF	R	R	R	R	R	R	R	T	R	R	R	R	R	L	R	N	T
	Gasoline	R	R	T	R	R	R	R	R	R	R	R	R	R	N	R	N	N
	Hexane	R	R	T	R	R	R	R	R	L	R	R	R	R	N	R	N	T
	Isopropyl Acetate	N	N	T	R	R	R	N	R	N	R	R	R	R	N	N	N	R
	Kerosene	R	R	T	R	R	R	R	R	R	R	R	R	R	N	N	N	T
	Methyl Acetate	N	N	T	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	NR	R	N	N	N	T
	Methyl Isobutyl Ketone	N	N	T	R	R	R	N	R	R	R	R	NR	T	N	N	N	T
	Methylene Chloride	N	N	N	T	R	R	R	NR	R	R	R	N	NR	N	N	N	N
	Nitrobenzene	N	N	N	T	R	R	R	NR	N	N	T	N	NR	N	N	N	R
	Pentane	R	R	R	R	R	L	R	NR	R	R	R	R	R	N	R	N	T
	Perchloroethylene	R	R	N	R	R	R	T	R	N	N	R	T	T	N	L	N	L
	Pyridine	N	N	N	T	R	R	N	R	N	R	R	N	T	N	N	N	L
	Tetrahydrofuran	N	N	N	T	L	L	N	R	T	L	R	N	T	N	N	N	L
	Toluene	L	R	N	R	R	L	R	R	N	R	R	L	R	N	N	N	L
	Trichloroethane	L	N	L	T	R	R	T	NR	T	T	R	N	T	N	N	N	T
	Trichlorethylene	R	R	R	T	L	L	R	R	N	N	R	B	ND	N	N	N	N
	Triethylamine	R	L	T	R	R	R	T	R	R	R	R	L	R	T	N	T	T
	Xylene	R	R	L	T	R	L	R	R	R	R	R	NR	NR	N	N	N	R
	MISCELLANEOUS	Cottonseed Oil	R	R	T	R	R	R	T	T	L	R	R	R	T	T	R	T
Hydrogen Peroxide (30%)		R	R	T	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	N	N	R	R	R	N	R	N	T
Peanut Oil		R	R	T	R	R	R	T	T	R	R	R	R	R	T	R	T	T
Petroleum Oils		T	R	L	T	R	T	R	R	T	T	R	R	R	T	T	T	R
Sesame Oil		R	R	T	R	R	R	T	T	R	R	R	R	R	T	R	T	T
Shipley (AS-111,340,1350)		N	N	T	R	R	R	T	T	N	N	R	R	R	N	R	N	T
Silicone Oils		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	T	R	T	T
Waycoat 59		N	N	T	R	R	R	T	T	N	N	R	R	R	N	R	N	T



PRODUCT CODE INDEX

Product Code	Page								
1225 885	35	1212978	16	1213783	40	1214436	16	1215030	16
759310	63	1212987	16	1213784	40	1214448	16	1215032	70
1145328	64	1212992	16	1213786	40	1214457	16	1215036	47
1145331	64	1213037	34	1213788	40	1214465	35	1215037	70
1145332	64	1213124	34	1213789	40	1214475	35	1215042	46
1145333	64	1213155	16	1213790	40	1214495	71	1215043	46
1145334	64	1213158	16	1213791	40	1214496	71	1215044	46
1145335	64	1213160	16	1213792	40	1214497	71	1215046	47
1145336	64	1213161	16	1213793	40	1214498	71	1215047	47
1145337	64	1213305	34	1213794	40	1214526	21	1215048	47
1145341	64	1213314	68	1213796	40	1214527	37	1215049	47
1145342	64	1213316	34	1213797	40	1214532	35	1215050	46
1145343	64	1213325	65	1213798	40	1214533	37	1215051	46
1145345	64	1213358	34	1213799	40	1214554	37	1215052	46
1145346	64	1213364	72	1213800	40	1214560	69	1215053	46
1145347	64	1213370	72	1213804	34	1214565	37	1215054	47
1145348	64	1213372	72	1213805	34	1214567	45	1215055	46
1211660	64	1213373	72	1213810	40	1214568	35	1215056	47
1211663	64	1213375	72	1213811	40	1214571	71	1215057	47
1211664	64	1213379	72	1213812	40	1214572	71	1215058	47
1211672	64	1213380	72	1213813	40	1214573	71	1215059	46
1211673	64	1213403	72	1213815	40	1214574	71	1215062	47
1211677	64	1213405	72	1213816	40	1214575	71	1215063	47
1212374	34	1213410	72	1213825	40	1214576	71	1215068	47
1212375	34	1213419	72	1213845	40	1214580	71	1215069	47
1212517	34	1213529	16	1213865	22	1214581	71	1215070	47
1212590	69	1213540	16	1213882	22	1214588	70	1215071	45
1212596	69	1213550	16	1213883	22	1214604	35	1215073	46
1212597	69	1213561	16	1213888	68	1214669	35	1215074	34
1212602	69	1213577	16	1213889	45	1214671	65	1215077	47
1212620	34	1213608	16	1213943	69	1214726	70	1215078	47
1212632	69	1213610	16	1213956	16	1214756	35	1215113	47
1212636	70	1213643	37	1213958	34	1214759	35	1215116	46
1212637	70	1213671	16	1213991	68	1214760	35	1215117	46
1212639	70	1213757	16	1213992	70	1214839	37	1215118	46
1212644	70	1213760	40	1213999	68	1214866	37	1215138	45
1212648	34	1213761	40	1214001	16	1214872	37	1215141	49
1212661	47	1213762	40	1214038	34	1214880	40	1215142	45
1212669	69	1213763	40	1214124	22	1214881	40	1215145	47
1212689	69	1213764	40	1214169	35	1214882	37	1215148	46
1212690	69	1213765	40	1214170	35	1214898	37	1215150	47
1212763	65	1213766	40	1214171	35	1214909	37	1215151	47
1212783	70	1213768	40	1214193	35	1214912	65	1215152	47
1212790	45	1213769	40	1214225	16	1214920	35	1215153	47
1212846	34	1213770	40	1214227	16	1214923	37	1215154	16
1212899	16	1213771	40	1214250	21	1214941	37	1215161	45
1212905	16	1213772	40	1214260	21	1214950	37	1215163	49
1212908	16	1213774	40	1214357	34	1214956	40	1215173	49
1212910	16	1213775	40	1214370	34	1214959	37	1215183	49
1212911	16	1213778	40	1214396	37	1214974	65	1215185	45
1212937	16	1213779	40	1214411	34	1214977	37	1215188	45
1212939	16	1213780	40	1214428	72	1214978	69	1215194	47
1212942	34	1213782	40	1214429	70	1215027	37	1215198	45

PRODUCT CODE INDEX

1215201	47	1215432	37	1215564	65	1216719	37	1221398	49
1215207	37	1215433	37	1215565	65	1216720	37	1221399	49
1215215	47	1215435	37	1215566	65	1216721	37	1221401	49
1215218	49	1215437	37	1215567	65	1216723	37	1221402	49
1215219	47	1215438	37	1215568	65	1216724	37	1221404	49
1215236	45	1215440	37	1215569	65	1220671*	40	1221405	49
1215237	37	1215441	37	1215571	65	1220678	65	1221409	49
1215238	35	1215442	37	1215572	65	1220686	46	1221410	49
1215257	37	1215448	37	1215573	65	1220694	47	1221411	49
1215263	37	1215450	37	1215577	65	1220702	49	1221412	49
1215271	46	1215451	37	1215579	65	1220823	46	1221413	49
1215274	46	1215452	37	1215580	65	1220827	49	1221414	49
1215275	46	1215453	37	1215582	65	1220835	46	1221415	49
1215281	37	1215455	37	1215583	65	1220860	47	1221416	49
1215288	49	1215456	37	1215584	65	1220861	47	1221417	49
1215290	45	1215458	68	1215588	65	1220867	46	1221418	49
1215297	45	1215463	68	1215589	65	1220868	47	1221419	49
1215303	47	1215464	37	1215590	37	1220871	49	1221420	49
1215304	47	1215469	68	1215605	47	1220886	49	1221424	49
1215305	37	1215471	68	1215606	47	1220887	65	1221426	49
1215308	49	1215476	68	1215608	47	1220891	47	1221429	46
1215309	47	1215483	68	1215609	45	1220941	46	1221441	40
1215311	45	1215485	41	1215610	47	1220950	20	1221485	47
1215315	45	1215486	41	1215611	47	1220969	49	1221503	45
1215316	37	1215487	41	1215612	47	1220970	47	1221504	46
1215317	47	1215488	41	1215613	47	1221004	47	1221546	34
1215321	47	1215489	41	1215614	47	1221005	47	1221720	47
1215323	37	1215491	41	1215615	47	1221008	35	1221730	34
1215324	49	1215492	41	1215617	47	1221009	47	1221746	46
1215367	49	1215493	41	1215618	47	1221181	45	1221768	16
1215368	35	1215494	41	1215619	47	1221182	49	1221871	46
1215373	49	1215495	41	1215620	47	1221227	47	1221948	37
1215374	49	1215496	41	1215621	47	1221229	47	1221955	37
1215376	37	1215500	49	1215622	47	1221230	45	1221976	68
1215379	49	1215503	41	1215623	47	1221231	46	1222017	46
1215380	37	1215504	41	1215624	47	1221232	46	1222018	46
1215385	47	1215505	41	1215625	47	1221286	45	1222025	45
1215388	47	1215506	41	1215627	47	1221290	47	1222026	47
1215392	68	1215522	49	1215628	47	1221291	47	1222027	46
1215396	35	1215533	34	1215629	47	1221292	47	1222028	45
1215403	47	1215543	65	1215630	47	1221293	46	1222030	46
1215409	37	1215544	65	1215631	47	1221295	46	1222032	46
1215411	37	1215548	65	1215632	47	1221296	46	1222035	45
1215412	37	1215550	65	1215633	47	1221297	46	1222037	46
1215415	37	1215551	65	1215634	47	1221300	46	1222038	46
1215416	37	1215553	65	1215635	34	1221302	47	1222063	47
1215419	37	1215554	65	1215637	47	1221331	46	1222064	47
1215421	37	1215555	65	1215638	47	1221334	49	1222070	47
1215424	37	1215557	65	1215676	34	1221383	49	1222071	47
1215425	37	1215559	65	1215984	47	1221385	49	1222072	47
1215427	34	1215561	65	1215985	47	1221387	49	1222073	47
1215428	37	1215562	65	1216611	47	1221388	49	1222074	47
1215431	37	1215563	65	1216718	37	1221389	49	1222075	47

PRODUCT CODE INDEX

1222077	46	1225120	46	1242278	35	3052148	40	10496106	29
1222080	46	1225184	46	1262579	21	3052874	34	10496108	29
1222081	46	1225346	16	1264835	46	3053082	37	10496109	29
1222082	46	1225460	37	1266844	65	3053377	37	10496112	29
1222084	47	1225509	65	1267014	47	3054144	45	10496113	29
1222085	46	1225781	37	1267667	46	3057106	35	10496114	29
1222086	46	1225783	46	1267681	41	3061196	34	10496116	29
1222088	47	1225881	35	1268126	46	3099755	42	10496119	29
1222089	46	1225882	35	1268603	65	3099756	42	10496120	29
1222091	47	1225883	35	3002536	46	3099757	42	10496121	29
1222092	47	1225884	35	3007164	49	3099758	42	10496124	29
1222093	47	1225885	35	3013824	47	10443401	18	10496125	29
1222094	47	1225894	47	3013825	47	10443411	18	10496146	29
1222095	47	1225982	40	3013826	40	10443421	18	10496151	29
1222096	47	1225985	35	3013894	47	10443423	18	10496164	29
1222230	35	1226156	47	3018505	35	10443425	18	10496192	29
1222240	49	1226157	47	3022140	45	10443430	18	10496705	29
1222242	49	1226158	35	3023783	47	10443435	18	10496707	29
1222246	49	1226159	35	3026028	41	10448030	19	10496708	29
1222248	49	1226494	46	3026365	35	10448031	19	10496709	29
1222249	49	1226556	73	3026431	45	10467001	17	10496710	29
1222251	49	1226557	73	3026917	40	10467002	17	10496714	29
1222253	49	1226558	73	3027176	45	10467003	17	10496744	29
1222254	49	1226559	73	3027177	46	10467004	17	10496847	29
1222256	49	1226561	73	3027598	47	10467005	17	10496851	29
1222258	49	1226568	73	3029505	35	10467006	17	10497500	24
1222260	49	1226569	73	3032133	46	10467007	17	10497501	24
1222267	35	1226573	73	3032159	45	10467008	17	10497502	24
1222323	16	1226575	73	3032875	35	10467009	17	10497503	24
1222327	16	1226664	35	3032876	35	10467010	17	10497504	24
1222432	16	1226665	35	3033092	46	10467011	17	10497506	24
1222452	45	1227203	47	3033093	46	10467012	17	10497507	24
1222479	47	1227213	45	3033301	45	10467013	17	10497508	24
1222482	47	1227264	46	3033302	45	10467015	17	10497509	24
1222851	40	1228132	46	3033452	49	10467017	17	10497510	24
1222854	40	1228342	47	3034300	41	10467019	17	10497511	24
1222855	40	1229540	45	3034574	65	10467021	17	10497600	24
1222856	40	1230356	40	3034848	47	10484182	78	10497601	24
1222857	40	1232919	46	3034974	34	10485317	78	10497602	24
1222858	40	1233373	46	3034975	34	10485323	78	10497603	24
1222859	40	1234298	46	3035602	46	10485330	79	10498303	32
1222980	37	1235299	41	3037376	35	10485331	79	10498304	32
1223036	46	1235494	46	3037800	43	10485356	79	10498305	32
1223340	35	1235748	35	3037801	43	10486001	80	10498306	32
1223845	16	1236292	35	3037802	43	10486046	80	10498315	32
1223871	35	1237423	41	3041202	34	10486081	80	10498316	32
1224067	46	1238010	49	3044270	43	10486087	80	10498402	32
1224211	34	1239192	47	3044271	43	10486111	78	10498404	32
1224490	35	1239556	46	3044272	43	10486137	80	10498406	32
1224492	35	1239557	46	3048260	40	10496101	29	10498407	32
1224496	35	1239558	46	3048982	45	10496102	29	10498408	32
1224680	47	1240382	34	3049247	34	10496103	29	10498503	32
1224690	40	1241477	40	3050851	37	10496104	29	10498504	32

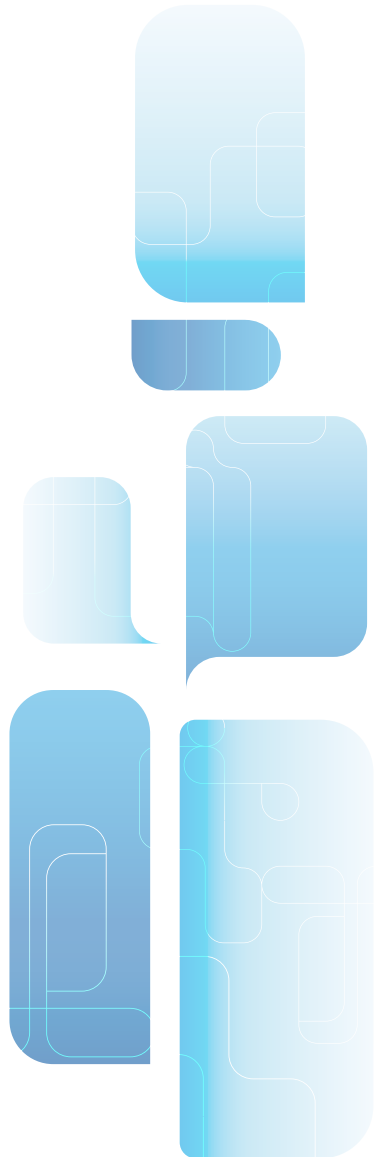
PRODUCT CODE INDEX

10498505	32	FJ13BSCPS002AL01	10	FJ25BNPPV002AD01	9	FP042DXF04QALC01	50
10498521	32	FJ13BSCPS004AL01	10	FJ25BNPPV002AH01	9	FP042DXS05QALC01	52
10498550	25	FJ13BSCP002AL01	10	FJ25BNPPV004AD01	9	FP042DXS42QANC01	55
10498763	25	FJ13BSCP004AL01	10	FJ25BNPPV004AH01	9	FP047D0QF1QUFC01	66
10498764	25	FJ25ANCCA002DD01	9	FJ25BNPRC002AD01	9	FP047DAM10GLFC01	57
FJ13ANCCA002DD01	8	FJ25ANCCA002DH01	9	FJ25BNPRC002AH01	9	FP047DAM27GLFC01	60
FJ13ANCCA002DH01	8	FJ25ANCCA004FD01	9	FJ25BNPRC004AD01	9	FP047DFA41QANC01	53
FJ13ANCCA004FD01	8	FJ25ANCCA004FH01	9	FJ25BNPRC004AH01	9	FP047DFAFAGLFC01	59
FJ13ANCCA004FH01	8	FJ25ANCCA008ED01	9	FJ25BSCCA002AL01	11	FP047DME01QALC01	51
FJ13ANCCA008ED01	8	FJ25ANCCA008EH01	9	FJ25BSCCA004AL01	11	FP047DME43QANC01	53
FJ13ANCCA008EH01	8	FJ25ANCCA012CD01	9	FJ25BSCCA008AL01	11	FP047DMEFCGLFC01	58
FJ13ANCCA012CD01	8	FJ25ANCCA012CH01	9	FJ25BSCNC002AL01	11	FP047DMS02QALC01	51
FJ13ANCCA012CH01	8	FJ25ANCCA050PD01	9	FJ25BSCNC004AL01	11	FP047DMS03QLTC01	52
FJ13ANCCA050PD01	8	FJ25ANCCA050PH01	9	FJ25BSCNY001AL01	11	FP047DMS40QANC01	54
FJ13ANCCA050PH01	8	FJ25ASCCA002DL01	11	FJ25BSCNY002AL01	11	FP047DSL44QANC01	54
FJ13ANCNY050AD01	8	FJ25ASCCA004FL01	11	FJ25BSCNY004AL01	11	FP047DSLFFGLFC01	56
FJ13ASCCA002DL01	10	FJ25ASCCA008EL01	11	FJ25BSCNY012AL01	11	FP047DXF04QALC01	50
FJ13ASCCA004FL01	10	FJ25ASCCA012CL01	11	FJ25BSCNY050AL01	11	FP047DXS05QALC01	52
FJ13ASCCA008EL01	10	FJ25ASCCA050PL01	11	FJ25BSCPS002AL01	11	FP047DXS42QANC01	55
FJ13ASCCA012CL01	10	FJ25BNCNC002AD01	9	FJ25BSCPS004AL01	11	FP050D0QF1QUFC01	66
FJ13ASCCA050PL01	10	FJ25BNCNC004AD01	9	FJ25BSCPS008AL01	11	FP050DAM10GLFC01	57
FJ13BNCNC002AD01	8	FJ25BNPGF007AD01	9	FJ25BSCP002AL01	11	FP050DAM27GLFC01	60
FJ13BNCNC004AD01	8	FJ25BNPGF007AH01	9	FJ25BSCP004AL01	11	FP050DFAFAGLFC01	59
FJ13BNPNC002AH01	8	FJ25BNPGF010AD01	9	FP021DAM10GLFC01	57	FP050DMEFCGLFC01	58
FJ13BNPNC004AH01	8	FJ25BNPGF010AH01	9	FP021DAM27GLFC01	60	FP050DSLFFGLFC01	56
FJ13BNPNY002AD01	8	FJ25BNPGF012AD01	9	FP021DFAFAGLFC01	59	FP055D0QF1QUFC01	66
FJ13BNPNY002AH01	8	FJ25BNPGF012AH01	9	FP021DMEFCGLFC01	58	FP055DAM10GLFC01	57
FJ13BNPNY004AD01	8	FJ25BNPGF031AD01	9	FP021DSLFFGLFC01	56	FP055DAM27GLFC01	60
FJ13BNPNY004AH01	8	FJ25BNPGF031AH01	9	FP024DAM10GLFC01	57	FP055DFA41QANC01	53
FJ13BNPPE002AD01	8	FJ25BNPNC002AD01	9	FP024DAM27GLFC01	60	FP055DFAFAGLFC01	59
FJ13BNPPE002AH01	8	FJ25BNPNC002AH01	9	FP024DFAFAGLFC01	59	FP055DME01QALC01	51
FJ13BNPPE005AD01	8	FJ25BNPNC004AD01	9	FP024DMEFCGLFC01	58	FP055DME43QANC01	53
FJ13BNPPE005AH01	8	FJ25BNPNC004AH01	9	FP024DSLFFGLFC01	56	FP055DMEFCGLFC01	58
FJ13BNPPH002AD01	8	FJ25BNPNY002AD01	9	FP025D0QF1QUFC01	66	FP055DMS02QALC01	51
FJ13BNPPH002AH01	8	FJ25BNPNY002AH01	9	FP025DAM27GLFC01	60	FP055DMS03QLTC01	52
FJ13BNPPH004AD01	8	FJ25BNPNY004AD01	9	FP025DFAFAGLFC01	59	FP055DMS40QANC01	54
FJ13BNPPH004AH01	8	FJ25BNPNY004AH01	9	FP025DMEFCGLFC01	58	FP055DSL44QANC01	54
FJ13BNPPS002AD01	8	FJ25BNPPE002AD01	9	FP025DSLFFGLFC01	56	FP055DSLFFGLFC01	56
FJ13BNPPS002AH01	8	FJ25BNPPE002AH01	9	FP027DAM10GLFC01	57	FP055DXF04QALC01	50
FJ13BNPPS004AD01	8	FJ25BNPPE005AD01	9	FP037DAM10GLFC01	66	FP055DXS05QALC01	52
FJ13BNPPS004AH01	8	FJ25BNPPE005AH01	9	FP037DAM10GLFC01	57	FP055DXS42QANC01	55
FJ13BNPPT002AD01	8	FJ25BNPPH002AD01	9	FP037DAM27GLFC01	60	FP070D0QF1QUFC01	66
FJ13BNPPT002AH01	8	FJ25BNPPH002AH01	9	FP037DFAFAGLFC01	59	FP070DAM10GLFC01	57
FJ13BNPPT004AD01	8	FJ25BNPPH004AD01	9	FP037DMEFCGLFC01	58	FP070DAM27GLFC01	60
FJ13BNPPT004AH01	8	FJ25BNPPH004AH01	9	FP037DSLFFGLFC01	56	FP070DFA41QANC01	53
FJ13BNPPV002AD01	8	FJ25BNPPS002AD01	9	FP042DFA41QANC01	53	FP070DFAFAGLFC01	59
FJ13BNPPV002AH01	8	FJ25BNPPS002AH01	9	FP042DME01QALC01	51	FP070DME01QALC01	51
FJ13BNPPV004AD01	8	FJ25BNPPS004AD01	9	FP042DME43QANC01	53	FP070DME43QANC01	53
FJ13BNPPV004AH01	8	FJ25BNPPS004AH01	9	FP042DMS02QALC01	51	FP070DMEFCGLFC01	58
FJ13BNPRC002AD01	8	FJ25BNPPT002AD01	9	FP042DMS03QLTC01	52	FP070DMS02QALC01	51
FJ13BNPRC002AH01	8	FJ25BNPPT002AH01	9	FP042DMS40QANC01	54	FP070DMS03QLTC01	52
FJ13BNPRC004AD01	8	FJ25BNPPT004AD01	9	FP042DSL44QANC01	54	FP070DMS40QANC01	54
FJ13BNPRC004AH01	8	FJ25BNPPT004AH01	9	FP042DXF02QALC01	50	FP070DSL44QANC01	54



PRODUCT CODE INDEX

FP070DSLFFGLFC01	56	FP150DAM10GLFC01	57	FP320DSL44QANC01	54
FP070DXF04QALC01	50	FP150DAM27GLFC01	60	FP320DXF04QALC01	50
FP070DXS05QALC01	52	FP150DFA41QANC01	53	FP320DXS05QALC01	52
FP070DXS42QANC01	55	FP150DFAFAGLFC01	59	FP320DXS42QANC01	55
FP090D0QF1QUFC01	66	FP150DME01QALC01	51	MV32ANPNY002BC01	13
FP090DAM10GLFC01	57	FP150DME43QANC01	53	MV32ANPNY004UC01	13
FP090DAM27GLFC01	60	FP150DMEFCGLFC01	58	MV32ANPPS002EC01	13
FP090DFA41QANC01	53	FP150DMS02QALC01	51	MV32ANPPS004WC01	13
FP090DFAFAGLFC01	59	FP150DMS03QLTC01	52	MV32ANPPT002TC01	13
FP090DME01QALC01	51	FP150DMS40QANC01	54	MV32ANPPT004CC01	13
FP090DME43QANC01	53	FP150DSL44QANC01	54	MV32ANPPV002FC01	13
FP090DMEFCGLFC01	58	FP150DSLFFGLFC01	56	MV32ANPPV004IC01	13
FP090DMS02QALC01	51	FP150DXF04QALC01	50	MV32ANPRC002GC01	13
FP090DMS03QLTC01	52	FP150DXS05QALC01	52	MV32ANPRC004LC01	13
FP090DMS40QANC01	54	FP150DXS42QANC01	55	SPNB04WG47S1	38
FP090DSL44QANC01	54	FP185DFA41QANC01	53	SPNB04WG47S6	38
FP090DSLFFGLFC01	56	FP185DME01QALC01	51	SPNB08WG47S1	38
FP090DXF04QALC01	50	FP185DME43QANC01	53	SPNB08WG47S6	38
FP090DXS05QALC01	52	FP185DMS02QALC01	51	SPNCB04WG47S	38
FP090DXS42QANC01	55	FP185DMS03QLTC01	52	SPNCB04WG47S6	38
FP110D0QF1QUFC01	66	FP185DMS40QANC01	54	SPNCB08WG47S	38
FP110DAM10GLFC01	57	FP185DSL44QANC01	54	SPNCB08WG47S6	38
FP110DAM27GLFC01	60	FP185DXF04QALC01	50	SPNCW02BG47S	38
FP110DFA41QANC01	53	FP185DXS05QALC01	52	SPNCW02BG47S6	38
FP110DFAFAGLFC01	59	FP185DXS42QANC01	55	SPNCW04BG47S	38
FP110DME01QALC01	51	FP203R0QF1QUFC01	66	SPNCW04BG47S6	38
FP110DME43QANC01	53	FP203RAM10GLFC01	57	SPNCW08BG47S	38
FP110DMEFCGLFC01	58	FP203RAM27GLFC01	60	SPNCW08BG47S6	38
FP110DMS02QALC01	51	FP203RFAFAGLFC01	59	SPNW02BG47S1	38
FP110DMS03QLTC01	52	FP203RMEFCGLFC01	58	SPNW02BG47S6	38
FP110DMS40QANC01	54	FP203RSLFFGLFC01	56	SPNW04BG47S1	38
FP110DSL44QANC01	54	FP240DAM10GLFC01	57	SPNW04BG47S6	38
FP110DSLFFGLFC01	56	FP240DAM27GLFC01	60	VF50ANPPT002AC01	12
FP110DXF04QALC01	50	FP240DFA41QANC01	53	VF50ANPPT004AC01	12
FP110DXS05QALC01	52	FP240DFAFAGLFC01	59	VF50ASPPT002AX01	12
FP110DXS42QANC01	55	FP240DME01QALC01	51	VF50ASPPT004AX01	12
FP125D0QF1QUFC01	66	FP240DME43QANC01	53		
FP125DAM10GLFC01	57	FP240DMEFCGLFC01	58		
FP125DAM27GLFC01	60	FP240DMS02QALC01	51		
FP125DFA41QANC01	53	FP240DMS03QLTC01	52		
FP125DFAFAGLFC01	59	FP240DMS40QANC01	54		
FP125DME01QALC01	51	FP240DSL44QANC01	54		
FP125DME43QANC01	53	FP240DSLFFGLFC01	56		
FP125DMEFCGLFC01	58	FP240DXF04QALC01	50		
FP125DMS02QALC01	51	FP240DXS05QALC01	52		
FP125DMS03QLTC01	52	FP240DXS42QANC01	55		
FP125DMS40QANC01	54	FP254RMEFCGLFC01	58		
FP125DSL44QANC01	54	FP320DFA41QANC01	53		
FP125DSLFFGLFC01	56	FP320DME01QALC01	51		
FP125DXF04QALC01	50	FP320DME43QANC01	53		
FP125DXS05QALC01	52	FP320DMS02QALC01	51		
FP125DXS42QANC01	55	FP320DMS03QLTC01	52		
FP150D0QF1QUFC01	66	FP320DMS40QANC01	54		



CATALOG GVS
Copyright © 2021 GVS © S.p.A
All Right Reserved
Printed in Italy

Printing History:
Version: 03/12/2021

While every precaution has been taken in the preparation of this catalog, data are subject to change without notice.

Results in specific application of GVS products may vary according to the conditions and applications. GVS assumes no responsibility for damage resulting from incorrect use of our products.



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. Zuhul 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

India
GVS Filter India Pvt Ltd
Unit No 35 & 36 on First Floor
Ratna Jyot Industrial Premises Irla Lane,
Irla Vile Parle, Mumbai 400056, India
lifesciences.in@gvs.com

Malaysia
GVS Filtration Sdn.Bhd
Lot No 10F-2B, 10th Floor, Tower 5 @ PFCC
Jalan Puteri 1/2, Bandar Puteri
47100 Puchong, Selangor, Malaysia
Tel: +60 3 7800 0062
lifesciences.my@gvs.com

Thailand
GVS Filtration Co., Ltd.
88 Ratchadaphisek Rd,
Office 10E03 - Khlong Toei,
Bangkok 10110
lifesciences.th@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

Puerto Rico
GVS Puerto Rico, LLC
98 Carr 194 - Fajardo,
Puerto Rico, 00738-2988, USA
Tel. +1.787.355.4100
e-mail: gvspuertorico@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
Jardim Chapadão, CEP 13193-580
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