Whatman®
Part of GE Healthcare

Sample preparation guide

Unprecedented performance and choice

Contents

Whatman, now part of GE Healthcare, creates a center of excellence in separations technology. As a global leader in filtration technology, we provide innovative separations products for the scientific community. Whatman has developed total sample preparation solutions with an extensive range of high quality filtration devices and membranes.

This sample preparation guide provides an overview of just some of the products that have been developed for use in chromatography applications. Products include:

- An innovative membrane which can be used for many different types of sample. The Regenerated Cellulose Membrane (RC) - page 2
- Flexible solutions for field and laboratory based sample preparation prior to analysis of dissolved heavy metals - pages 2 to 3
- An HPLC certified syringe filter. SPARTAN - pages 4 to 5
- Solutions for your difficult to filter samples. Filter two to five times more sample volume with Whatman GD/X syringe filters - pages 6 to 7
- Mini-UniPrep syringless filters which process samples 3 times faster. Important for all UHPLC users - pages 8 to 9
- Autovial syringeless devices simplify sample preparation - page 10
- Roby automatable syringe filters specially designed for dissolution testing and content uniformity testing instruments - page 11
- Multiwell plates which can offer solutions for high throughput sample preparation - page 12

For further assistance please contact our technical support department:
information@whatman.com

Superior performance, great flexibility - regenerated cellulose membrane

Flexibility is one of the key criteria requested in filter media used for chromatography sample preparation and solvent preparation. Users expect solvent compatibility, robustness, low protein binding, filtration efficiency, purity, and a choice of pore sizes.

In response to these requirements, Whatman developed the Regenerated Cellulose (RC) membrane which enables customers to select one membrane for a wide range of applications. This filter media is based on a cellulose acetate membrane and is therefore hydrophilic. Additional production steps create a highly resistant pure membrane that is compatible with a number of solvents including acetonitrile, methanol, and tetrahydrofuran.

So if you are currently using PTFE media for solvents and a cellulose acetate based membrane for aqueous solutions, please try the Whatman RC membrane which will offer you greater flexibility in your day-to-day tests.

Products available with this membrane are indicated by this symbol.

MEMBRANE RC AVAILABLE

To find the right membrane for your sample solvent, please see the Chemical Compatibility Table on page 13.

Mobile phase filtration

In order to maximize column lifetime and minimize equipment downtime, it is important to ensure that both the sample and the mobile phase being used are free of particulate matter that can potentially damage injector and pump seals or block the analytical column. This is particularly important for those columns with a narrow bore or packed with small diameter media.

To successfully filter and degas the mobile phase all you need is the GV050/2 vacuum filtration device and RC membranes. Simply place a 47 or 50 mm membrane into the unit and connect the GV050/2 via tubing to a vacuum source.

Features and benefits

- Clear signal and reduced downtime - no more pump downtime caused by air locks and particulate in check valves
- Resistant glass construction - no contact with plastic parts ensures filtration without extraction of plasticizer that can cause false signals:
  - 250 ml glass funnel
  - tapered funnel base, tapered top, clamp
  - 1000 ml Erlenmeyer flask
- Universal - no need for a separate hydrophobic filter such as PTFE. Even organic samples can be filtered due to the excellent compatibility of the RC membrane

Replacement parts are available for this product. Contact **information@whatman.com** for further details.

GV050/2 vacuum filtration device effectively filters and degasses the mobile phase.

Ordering Information

Product	Quantity	Code No.
GV050/2 Glass vacuum filter holder	1	10442200

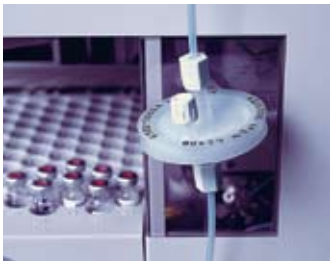
In addition to batch filtration, mobile phases can also be filtered inline using the Whatman Inline Filtration Degasser (IFD). These IFD devices are easily connected between the mobile phase reservoir and the HPLC device and ensure filtration up to 0.2 µm and degassing of the mobile phase. The filters are available in two formats for use with solvent and aqueous solutions.

Features and benefits

- Clear signals and reduced downtime – no more pump downtime caused by air locks and particulate in check valves
- HPLC grade polypropylene housing
- Solvent IFD contains a 0.2 µm polypropylene membrane for use with organic solvents (minimum 80% organic content)
- Aqueous IFD contains a 0.2 µm nylon membrane for aqueous based mobile phases

Application

- Mobile phase filtration and degassing



Mobile phase filtered inline using the Aqueous/Solvent IFD device.

Whatman RC membranes for use with the GV050/2 unit.

For your reference

Regenerated Cellulose (**RC**): low nonspecific protein binding membrane for samples in aqueous solutions and/or organic solvents.

Cellulose Acetate (**CA**): low nonspecific protein binding and high loading capacity membrane for biological solutions.

Polytetrafluoroethylene (**PTFE**): for samples with > 50% organic solvent.

Nylon membrane (**NYL**): for aqueous and organic samples within a pH range of 3 to 10.

Polypropylene (**PP**): hydrophobic membrane, resistant to a wide range of organic solvents.

Glass microfiber (**GMF**): depth filter for samples in aqueous or organic solutions.

Ordering Information

Product	Quantity	Code No.
Solvent IFD, 0.2 µm PP	10	6725-5002
Solvent IFD, 0.2 µm PP*	10	6725-5002A
Aqueaus IFD, 0.2 µm NYL	10	6726-5002
Aqueaus IFD, 0.2 µm NYL*	10	6726-5002A
IFD End Fitting Kit	10 pairs	6725-5000

*Non o-ring style - accepts 1/8" tubing only.

Ordering Information

Product	Quantity	Code No.
Regenerated cellulose		
RC58 0.2 µm, 47 mm	100	10410312
RC58 0.2 µm, 50 mm	100	10410314
RC55 0.45 µm, 47 mm	100	10410212
RC55 0.45 µm, 50 mm	100	10410214
PTFE		
TE35 0.2 µm, 47 mm	50	10411411
TE35 0.2 µm, 50 mm	50	10411413
TE36 0.45 µm, 47 mm	50	10411311
TE36 0.45 µm, 50 mm	50	10411313

Other membranes, pore sizes, and dimensions available.
Contact information@whatman.com.

HPLC sample preparation

SPARTAN is one of the most versatile syringe filters for almost all HPLC samples. The hydrophilic, low protein binding membrane is made of regenerated cellulose and is both chemically resistant and free of interfering extractables. The housing is made of HPLC grade polypropylene to ensure the highest possible performance.

SPARTAN is available with 13 mm diameter for samples < 5 ml and with 30 mm diameter and a large surface area for sample volumes > 5 ml.

Features and benefits

- Universal – no need for a separate hydrophobic filter such as PTFE. Even organic samples can be filtered with SPARTAN due to the excellent compatibility of the RC membrane
- Batch certificate – offering unrivalled purity, each batch of SPARTAN is tested with acetonitrile, methanol, and water at wavelengths of 210 and 254 nm for UV-absorbing extractables. This data is then documented and available to download at www.whatman.com/hplc-certificate
- 13 mm diameter device with extremely low dead volume < 10 µl
- 13 mm diameter device with Mini-Tip is designed for direct filtration into vials or small neck bottles
- Colored rims differentiate the SPARTAN syringe filter by pore size
- Convenience on the bench – SPARTAN is supplied in a reusable box that ensures product integrity from the first to the last filter. The easy-to-open and close box is suitable for all kinds of HPLC accessories

Application

- HPLC sample preparation of easy-to-filter samples

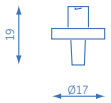
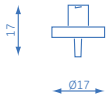
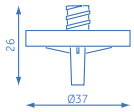
SPARTAN syringe filters available in 13 and 30 mm formats.

Related Products

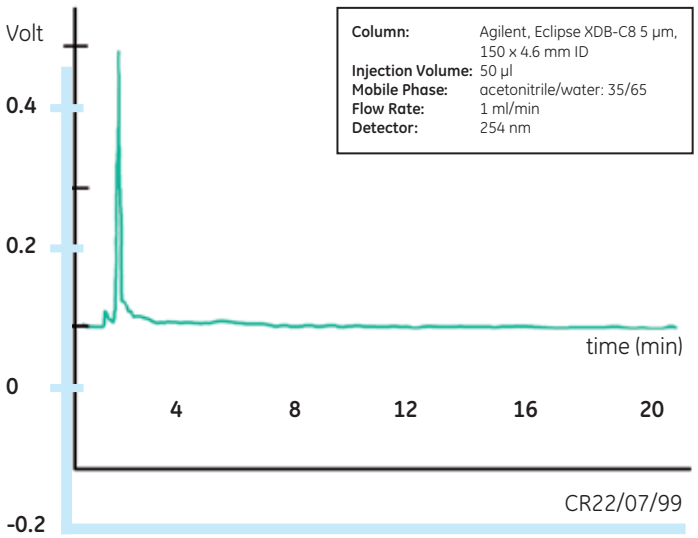
Other products are also available in the extensive Whatman sample preparation portfolio. Contact information@whatman.com to request a copy of our Syringe Filters brochure.

A. ReZist PTFE membrane to filter aggressive organic solvents.
B. Puradisc FP Cellulose acetate membrane, low protein binding and available sterile.
C. Puradisc Available in 4, 13, and 25 mm formats with a choice of pore size and media (PVDF, nylon, PP etc.).

Technical Specification

Diameter mm	Max. Operating Pressure kPa/bar	Max. Operating Temperature °C	Effective Filter Area cm²	Hold-up Volume After Air Purging µl	Inlet	Outlet	
13	700/7	60	0.75	< 10	Luer lock inner cone (female)	Luer outer cone (male)	
13	700/7	60	0.75	< 10	Luer lock inner cone (female)	Mini-Tip	
30	700/7	60	5.7	< 50	Luer lock inner cone (female)	Luer outer cone (male)	

SPARTAN 30/0.45 µm RC



Results indicating an absence of extractables after using a SPARTAN syringe filter.

Ordering Information

Product	Quantity	Code No.
SPARTAN		
13, 0.2 µm RC MT	100	10463040
13, 0.45 µm RC MT	100	10463030
13, 0.2 µm RC	100	10463100
13, 0.45 µm RC	100	10463110
30, 0.2 µm RC	100	10463060
30, 0.45 µm RC	100	10463050
ReZist		
13, 0.2 µm PTFE MT	100	10463703
13, 0.45 µm PTFE MT	100	10463713
30, 0.2 µm PTFE	100	10463503
30, 0.45 µm PTFE	100	10463513

Also available in 500 pack. Other membranes, pore sizes, and diameters available. Contact information@whatman.com.
MT - Mini-Tip outlet.

SPARTAN 13 mm syringe filter shown with Mini-Tip for accurate dispensing into small neck bottles and vials.

Preparation of hard-to-filter samples

GD/X Syringe Filters

Whatman GD/X syringe filters are an excellent choice for filtering high-particulate or viscous solutions. These high quality disposable syringe filters include glass microfiber prefilters, allowing you to filter more of your sample in less time, significantly enhancing laboratory efficiency.

Features and benefits

- Increased volume throughput – volume of sample filtered can be two to five times greater than with conventional filters
- Superior performance – four layers of filtration media reduce blockage and mid-operation filter replacement
- Less hand force required – the novel prefilter layer allows high-particulate samples to be filtered with less hand force, minimizing operator fatigue

Applications

- HPLC sample preparation for hard-to-filter or viscous samples
- General filtration of hard-to-filter or viscous samples

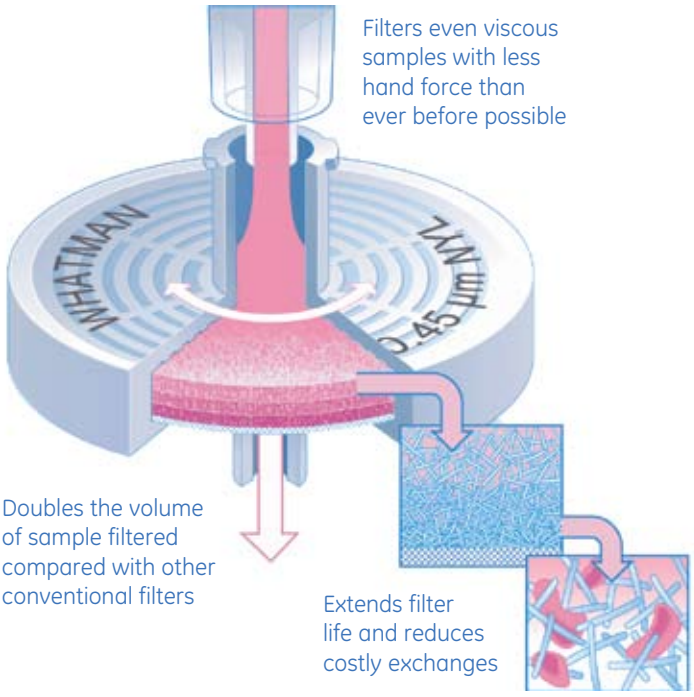


Illustration indicating the composition of the layers with the GD/X syringe filter.

Technical Specification - GD/X and GD/XP

Filtration area:	25 mm: 4.6 cm²	
Maximum pressure:	25 mm: 5.2 bar (75 psi) at 20°C	
Biosafety:	All materials pass USP Class VI test for plastics	
Materials of construction:	**Housing:** **Filtration Media:**	Polypropylene As specified
Hold-up volume:	**25 mm: Full Housing:** **With Purge:**	~ 1.4 ml ~ 250 µl
Connectors:	**Inlet:** **Outlet:**	Female Luer Lock (FLL) Male Slip Luer (MSL)
Flow direction:	Flow from inlet to outlet (FLL to MSL)	
Sterilization:	Can be autoclaved at 121°C for 20 min	

Ordering Information

Product	Quantity	Code No.
GD/X 25, 0.2 µm RC	150	6887-2502
GD/X 25, 0.45 µm RC	150	6882-2504
GD/X 25, 0.2 µm NYL	150	6870-2502
GD/X 25, 0.45 µm NYL	150	6870-2504
GD/X 25, 0.2 µm PVDF	150	6872-2502
GD/X 25, 0.45 µm PVDF	150	6872-2504
GD/X 25, 0.2 µm PTFE	150	6874-2502
GD/X 25, 0.45 µm PTFE	150	6874-2504
GD/X 25, 0.2 µm PES	150	6876-2502
GD/X 25, 0.45 µm PES	150	6876-2504

Also available in 1500 pack. Other membranes, pore sizes, and diameters available. Contact information@whatman.com.

GD/XP Syringe Filters

Whatman GD/XP disposable syringe filters are designed for use with hard-to-filter samples that require inorganic ion analysis, as levels of ion extractables are minimized. GD/XP syringe filters contain a two layer prefilter stack comprised of 20 µm and 5 µm polypropylene filters. The last stage of filtration is a choice of membrane, which is positioned below the prefilter stack.

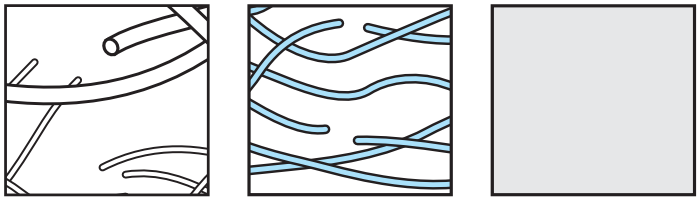
Features and benefits

- Similar to GD/X syringe filters
- Low level of ion extractables minimizes sample contamination

Applications

- HPLC sample preparation for hard-to-filter samples
- Sample preparation prior to dissolved heavy metals analysis

Illustration showing the filtration layers within the GD/XP syringe filter.



A. Layer 1 shows a 20 µm polypropylene prefilter.

B. Layer 2 shows a 5 µm polypropylene prefilter.

C. Layer 3 is a membrane with fine particle retention.

Related Products

Polydisc™ GW and Polycap™ GW have been developed for the preparation of larger volumes of groundwater samples for the analysis of dissolved heavy metals.

Examples of Polydisc GW and Polycap GW devices.

Technical Specification

	Polydisc GW	Polycap GW
Filtration area:	20.4 cm^2	600 cm^2

Ordering Information

Product	Quantity	Code No.
GD/XP 25, 0.45 µm NYL	150	6970-2504
GD/XP 25, 0.45 µm PVDF	150	6972-2504
GD/XP 25, 0.45 µm PTFE	150	6974-2504
GD/XP 25, 0.45 µm PP	150	6978-2504
GD/XP 25, 0.45 µm PES	150	6994-2504

Also available in 1500 pack.

Ordering Information

Polydisc GW

Pore Size	Prefilter/Media	Quantity	Code No.
0.45 µm	Quartz fiber/Nylon	20	10463400
0.45 µm	Quartz fiber/Nylon	50	10463401

Polycap GW

Pore Size	Media	Connections		Quantity	Code No.
		Inlet	Outlet		
0.45 µm	PES	SB	SB	1	6714-6004
0.45 µm	PES	SB	SB	100	6724-6004
1.0 µm	PP	SB	SB	1	6703-6010
1.0 µm	PP	SB	SB	100	6723-6010
5.0 µm	PP	SB	SB	1	6703-6050
5.0 µm	PP	SB	SB	100	6723-6050

UHPLC/HPLC sample preparation

Whatman Mini-UniPrep Syringeless Filters provide a faster, easier way to remove particulates from samples being prepared for HPLC/UHPLC analysis. Place the sample (400 µl) into the vial, insert the plunger, and compress. Your sample is filtered, rapidly and easily.

The Mini-UniPrep device replaces syringes, syringe filters, vials, and pierceable caps, reducing the amount of consumables required in the laboratory. And importantly, these all-in-one filtration and storage vials allow you to prepare samples in one-third the time of standard methods.

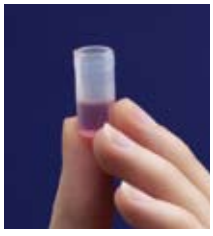
Add up the time savings and reduced costs and you´ll see huge benefits for your laboratory. Mini-UniPrep can be used with standard robotics on HPLC instruments with sensitive needles, ensuring high throughput and greatly enhanced laboratory productivity.

Three-times faster sample preparation combined with reduced solvent usage.

Features and benefits

- Ease of use – all-in-one filtration and storage vial allows you to process samples in one-third the time
- Compatible with all major autosamplers – allows you to speed processes
- Fewer consumables required – reduce costs by up to 40%
- Offers a highly efficient, simple alternative for removing unwanted protein prior to HPLC/MS analysis
- Fewer consumables and less solvent reduces waste disposal costs

The Mini-UniPrep filter on the left is shown with fluid in the chamber. On the right, the filter plunger is shown compressed with the sample ready for analysis.



Simple
Place unfiltered sample in chamber.

Innovative
Compress filter plunger into sample chamber. Clean filtrate fills reservoir from bottom up.

Efficient
Multi-process with the Mini-UniPrep compressor.

Convenient
The Mini-UniPrep vial shape fits easily into autosamplers.

Automation Ready
Available with a slit septum cap, Mini-UniPrep can be used with standard robotics on HPLC instruments.

Amber Mini-UniPrep Syringeless Filter

Features and benefits

- Amber colorant – prevents photo degradation of light-sensitive samples. Same colorant used in pharmaceutical containers designed to meet USP specifications for light resistance
- Translucent amber chamber and plunger – 'see-through' clarity to enable visual inspection

Application

- Use with any compound that requires protection from light, such as vitamins and catecholamines

The Amber Mini-UniPrep Syringeless Filter.

Slit Septum Mini-UniPrep Syringeless Filter

Features and benefits

- Slit septum cap – enables Mini-UniPrep to be used with current robotics on HPLC instruments for high throughput automation
- Increases needle longevity – eliminates coring problems
- Durable yet flexible – slit septum cap has been designed specifically for instruments with sensitive sampling needs

Application

- Use with standard robotics on HPLC instruments with sensitive needles, allowing for higher throughput

Technical Specification

Dimensions:	Equivalent in size to 12 x 32 mm vials	
Materials of construction:	**Housing and cap:**	Polypropylene
	Filtration media:	As specified
	Septum:	PTFE membrane and silicone rubber
Filtering capacity:	0.4 ml	
Nominal force needed to compress:	Approximately 0.6 bar (8 psi)	
Maximum operating temperature:	50°C (120°F)	

Ordering Information

Product	Quantity	Code No.
MUP, 0.2 µm RC	100	UN203NPERC
MUP, 0.2 µm PVDF	100	UN203NPEAQU
MUP, 0.2 µm NYL	100	UN203NPENYL
MUP, 0.2 µm PTFE	100	UN203NPEORG
MUP, 0.2 µm PES	100	UN203NPEPES
MUP, 0.2 µm PP	100	UN203NPEPP
MUP, 0.45 µm RC	100	UN203NPURC
MUP, 0.45 µm PVDF	100	UN203NPUAQU
MUP, 0.45 µm NYL	100	UN203NPUNYL
MUP, 0.45 µm PTFE	100	UN203NPUORG
MUP, 0.45 µm PES	100	UN203NPUPES
MUP, 0.45 µm PP	100	UN203NPUPP
MUP Amber, 0.2 µm PVDF	100	UN203APEAQU
MUP Amber, 0.2 µm PTFE	100	UN203APEORG
MUP Amber, 0.2 µm PES	100	UN203APEPES
MUP Amber, 0.45 µm PVDF	100	UN203APUAQU
MUP Amber, 0.45 µm PTFE	100	UN203APUORG
MUP Amber, 0.45 µm PES	100	UN203APUPES
MUP 6 Place Compressor	1	CR0000006

Also available in 1500 pack. Other membranes and pore sizes available. Also available with slit septum.
Contact information@whatman.com.

Syringeless sample preparation

Autovial Syringeless Filters

Autovial syringeless filters are preassembled filtration devices for removing particulates from samples. They replace syringe-coupled filtration devices with a single, disposable unit. Autovial devices are comprised of two parts: a graduated filter barrel and a plunger. The proven design features an integral filter, built-in air purge, and a support stand that protects the recessed slip Luer tip. They are available in 5 and 12 ml volume capacities.

Features and benefits

- Single unit convenience saves time - no assembly required – easier to load
- Choice of filter media - compatible with a wide range of sample types
- Suitable for hazardous samples - self-contained device eliminates risk of filter pop-off
- Built-in air purge maximizes sample recovery
- Sterile option available to maintain sample integrity
- Novel prefilter design for difficult-to-filter samples

Application

- Sample preparation of 5 to 12 ml sample volumes

Autovial syringeless filter.

Technical Specification

	Autovial 5	Autovial 12
Housing:	Polypropylene	Polypropylene
Filtration area:	1.7 cm^2	3.0 cm^2
Capacity:	5 ml	12 ml
Volume 'hold-up':	30 µl	140 µl
Outlet connection:	Male slip Luer	Male slip Luer
Autoclavable:	121°C for 20 min	121°C for 20 min

Ordering Information

Product	Quantity	Code No.
Autovial 5		
Autovial 5, 0.2 µm PTFE	50	AV115NPEORG
Autovial 5, 0.45 µm PVDF	50	AV115NPUAQU
Autovial 5, 0.45 µm NYL	50	AV115NPUNYL
Autovial 5, 0.45 µm PTFE	50	AV115NPUORG
Autovial 5, 0.45 µm GMF	50	AV115UGMF
Autovial 12 (GMF prefilter)		
Autovial 12, 0.2 µm PVDF	50	AV125EAQU
Autovial 12, 0.2 µm NYL	50	AV125ENAO
Autovial 12, 0.2 µm PTFE	50	AV125EORG
Autovial 12, 0.45 µm PVDF	50	AV125UAQU
Autovial 12, 0.45 µm CA	50	AV125UCA
Autovial 12, 0.45 µm GMF	50	AV125UGMF
Autovial 12, 0.45 µm NYL	50	AV125UNAO
Autovial 12, 0.45 µm PTFE	50	AV125UORG
Autovial 12 Sterile (GMF prefilter)		
Autovial 12, 0.2 µm PVDF S	40	AV125SAQU
Autovial 12, 0.2 µm NYL S	40	AV125SNAO
Autovial 12, 0.2 µm PTFE S	40	AV125SORG

Dissolution testing - content uniformity testing

Roby syringe filters are color coded for easy identification of membrane type.

The sample removed from dissolution test apparatus not only contains the dissolved active pharmaceutical ingredient (API) but may also contain fragments of the undissolved dosage form. If these undissolved fragments (e.g., tablet) are left in the sample for a period of time, they will dissolve, resulting in an increase in the quantity of API present in solution. This will result in a falsely high rate of release for the API. Additionally, if the sample is used unfiltered, any solid material in the sample will prematurely block HPLC columns or may interfere with spectrophotometric determinations (e.g., UV/Vis analysis) due to light scattering.

Roby syringe filters fit automated robot systems of Sotax, Caliper, Erweka, and Varian for sample preparation during dissolution testing. The housing characteristics are specified to meet the requirements for these dissolution instruments.

As each type of sample in a dissolution bath differs in viscosity, type of active pharmaceutical ingredient, and dissolvability, the Roby syringe filters are available in a range of different media. For difficult-to-filter samples Roby syringe filters have an integral glass microfiber prefilter to increase loading capacity and flowthrough characteristics.

Features and Benefits

- Automatable design
- Different membranes available
- Optional glassfiber prefilter to avoid filter blockage

Applications

- Filtration of samples for dissolution testing
- Filtration of samples for content uniformity testing

Method development laboratories often use different types of samples to determine the most appropriate filter for their drug. The Roby Validation Kit contains six different media configurations and a step-by-step manual for validation of the best sample preparation syringe filter for your dissolution testing.

Roby validation kit for convenient testing of filtration media.

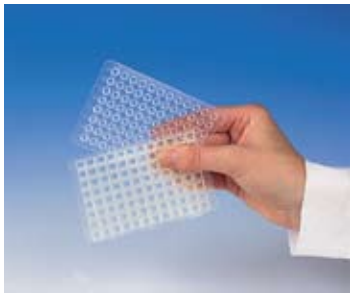
Ordering Information

Product	Quantity	Code No.
Roby 25, 0.1 µm GF92	200*	10463801
Roby 25, 0.1 µm GF92	1000	10463800
Roby 25, 0.45 µm NYL	200*	10463803
Roby 25, 0.45 µm NYL	1000	10463802
Roby 25, 0.45 µm NYLGF	200*	10463805
Roby 25, 0.45 µm NYLGF	1000	10463804
Roby 25, 0.45 µm RC	200*	10463807
Roby 25, 0.45 µm RC	1000	10463806
Roby 25, 0.45 µm RCGF	200*	10463809
Roby 25, 0.45 µm RCGF	1000	10463808
Roby 25, 0.45 µm CAGF	200*	10463813
Roby 25, 0.45 µm CAGF	1000	10463812
Roby 25, 0.7 µm GF55	200*	10463814
Roby 25, 0.7 µm GF55	1000	10463815
Roby Validation Kit+	1	10463898

* 8 tubes with 25 pieces each.

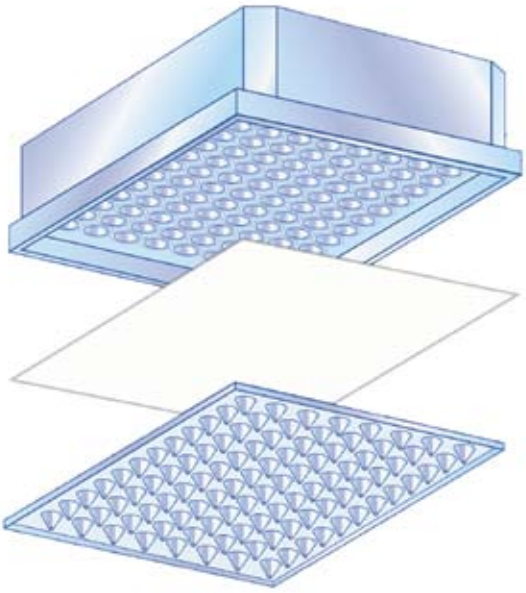
\+ Filter validation kit includes:
Roby 25 NL, Roby 25 NL-GF92, Roby 25 RC, Roby 25 RC-GF92, Roby 25 GF55, Roby 25 GF92.

High throughput sample preparation



Pierceable cap mats individually seal the top of each well in a filter or collection microplate.

2 ml UNIFILTER microplate.



Schematic illustrating the construction of a UNIFILTER microplate.

Whatman UNIFILTER microplates with 96 filter-bottom wells are convenient and ready to use. The glass filled polypropylene construction of the 2 ml UNIFILTER microplate permits chemical and heat resistant operation. The proprietary drip director design of Whatman UNIFILTER microplates ensures precise collection of the filtrate to allow for further processing and analysis.

The filtration is performed simultaneously by using a vacuum pump together with the UniVac™ 3 collection manifold which enables the filtered sample to be collected for further analysis.

Whatman pierceable capmats can protect samples and improve productivity. Designed to provide a secure positive seal for each individual well, these high quality, reusable closures are produced using chemically resistant biosafe silicone rubber which is stable over a broad range of temperatures.

UniVac 3 collection manifold used when the filtrate is required for subsequent analysis.

Features and benefits

- Automation friendly design – SBS footprint and geometry permit automatic handling of the plates
- No cross-talk - integral filter design prevents well-to-well cross contamination
- No sample contamination - the housing is made from HPLC grade polypropylene to prevent elution of additives

Application

- HPLC sample preparation of large quantity, small volume samples

Ordering Information

Product	Quantity	Code No.
UNIFILTER 0.45 µm PVDF, GFPP	25	7700-7206
UNIPLATE PP	25	7701-5200
Capmat square format, silicone	50	7704-0104
UniVac 3 Teflon™ coated aluminum	1	7705-0102

Chemical compatibility table

Solvent	GMF	NYL	PES	PP	PTFE	PVDF	RC
Acetic acid 5%	R	R	R	R	R	R	R
Acetic acid, glacial	R	LR	R	R	R	R	NR
Acetone	R	R	NR	R	R	NR	R
Acetonitrile	R	R	R	R	R	R	R
Ammonia, 6 N	LR	R	R	R	R	LR	LR
Amyl acetate	R	R	LR	R	R	LR	R
Amyl alcohol	R	R	NR	R	R	R	R
Benzene*	R	LR	R	LR	R	R	R
Benzyl alcohol*	R	LR	NR	R	R	R	R
Boric acid	R	LR	+	R	R	R	R
Butyl alcohol	R	R	R	R	R	R	R
Butyl chloride*	R	NR	+	NR	R	R	+
Carbon tetrachloride*	R	LR	R	LR	R	R	R
Chloroform*	R	NR	NR	LR	R	R	R
Cyclohexanone	R	NR	NR	R	R	R	R
Chlorobenzene	R	+	NR	+	R	R	R
Citric acid	R	LR	R	+	R	R	R
Cresol	R	NR	NR	R	R	NR	R
Cyclohexane	R	R	R	R	R	R	R
Diethyl acetamide	R	R	+	R	R	NR	R
Dimethyl formamide	R	R	NR	R	R	NR	LR
Dioxane	R	R	LR	R	R	LR	R
DMSO	R	R	NR	R	R	LR	LR
Ethanol	R	R	R	R	R	R	R
Ethers	R	R	R	R	R	LR	R
Ethyl acetate	R	R	NR	R	R	LR	R
Ethylene glycol	R	R	R	R	R	R	R
Formaldehyde	R	R	R	R	R	R	R
Formic acid	R	NR	R	R	R	R	LR
Freon TF	R	R	R	R	R	R	+
Hexane	R	R	R	R	R	R	R
Hydrochloric acid (Conc)	R	NR	R	LR	R	R	NR
Hydrofluoric acid	NR	NR	+	LR	R	R	NR
Isobutyl alcohol	R	R	+	R	R	R	R
Isopropyl alcohol	R	R	+	R	R	R	R
Methanol	R	R	R	R	R	R	R
Methyl ethyl ketone	R	R	NR	R	R	R	R
Methylene chloride*	R	NR	NR	LR	R	R	R
Nitric acid (Conc)	R	NR	NR	NR	R	NR	NR
Nitric acid, 6 N	R	NR	LR	LR	R	LR	LR
Nitrobenzene*	R	LR	NR	R	R	R	R
Pentane	R	R	R	R	R	R	R
Perchloroethylene	R	R	NR	R	R	R	R
Phenol (0.5%)	R	R	NR	R	R	R	R
Pyridine	R	LR	NR	R	R	R	R
Sodium hydroxide, 6 N	NR	LR	R	R	R	NR	NR
Sulfuric acid (Conc)	R	NR	NR	NR	R	NR	NR
Tetrahydrofuran	R	R	NR	LR	R	R	R
Toluene*	R	LR	NR	LR	R	R	R
Trichloroethane*	R	LR	NR	R	R	R	R
Trichloroethylene*	R	NR	NR	R	R	R	R
Water	R	R	R	R	R	R	R
Xylene*	R	LR	LR	LR	R	R	R

R = Resistant; LR = Limited Resistance; NR = Non Resistant; + = Insufficient Data.
* = Short term resistance of housing.

First published April 2009.

GE Healthcare Bio-Sciences AB,
Bjorkgatan 30, 751 84 Uppsala, Sweden.

GE Healthcare UK Limited, Amersham Place,
Little Chalfont, Buckinghamshire, HP7 9NA, UK.

GE Healthcare Europe, GmbH, Munzinger Strasse 5,
D-79111 Freiburg, Germany.

GE Healthcare Bio-Sciences Corp., 800 Centennial Avenue,
P.O. Box 1327, Piscataway, NJ 08855-1327, USA.

GE Healthcare Bio-Sciences KK, Sanken Bldg., 3-25-1,
Hyakunincho, Shinjuku-ku, Tokyo 169-0073, Japan.

Whatman International Limited, a General Electric Company, going to market as GE Healthcare.

For further information, please visit
www.gelifesciences.com/whatman or
contact your regional representative.

Whatman International Limited
Springfield Mill, James Whatman Way
Maidstone, Kent
ME14 2LE, UK

www.gelifesciences.com/whatman

imagination at work

S9036-867-AA 04/2009