# Whatman

Tailored solutions for your filtration needs

cytiva

# Contents

# Your needs, our custom solutions

**Whatman™ filter papers, membranes, and devices from Cytiva can be tailored to your specific application and manufacturing needs.**

**Our filtration products can be customized according to configurations, pore sizes, flow rates, housing sizes, connectors, and adapters, among other options.**

## Our commitment to you

Through our expertise, gained over more than 250 years of experience in delivering high-quality filtration products to our customers, we will help you find the right solution to your needs.

Our manufacturing sites across the globe rely on quality systems designed to meet the rigorous requirements of ISO-9001:2008 Standards at a minimum. We can also support requests under ISO 13485.

# By your side, all along the journey

## Requirements analysis

We listen to your needs and advise on filtration products that best fit your requirements.

Be it a modification to an existing product or a new product realized just for you, our bespoke filtration solution will be designed to fit your exact needs.

## Manufacturing

Complying with rigorous quality management systems, we will manufacture the filtration product you need.

## Ongoing support

We will offer you full post-market support, including process improvements and full auditing.

# 01 Cellulose filter paper

Whatman cellulose filters are manufactured from high-quality cotton linters treated to achieve an alpha cellulose content of at least 98%. Our cellulose filter papers are used for general filtration and exhibit particle retention levels down to 2.5 µm. We offer a wide choice of retention and flow rate combinations to suit your very own laboratory application. Grammage and thickness vary 40–700 gsm (± 10%) and 80–2600 µm, respectively.

## Paper grades

Our cellulose filter papers are available in different grades and can be categorized as follows: Qualitative, quantitative, application specific, wet strengthened, and general-purpose filter grades.

### Qualitative paper

Qualitative papers are used in qualitative analytical techniques to identify the presence of materials in a sample. Our qualitative filters are also available pre-pleated, giving improved flow rate and increased loading capacity.


**Find out more**

## Quantitative paper

Whatman quantitative filters are designed for gravimetric analysis and the preparation of samples for instrument analysis. They are available in three formats designed for specific requirements.

Find out more


## Folded (pre-pleated) paper

Whatman qualitative and quantitative grades are offered in this convenient format which has major advantages over flat circles.

Find out more


## Wet strengthened/general purpose paper

These extremely strong filter papers have a high wet strength due to the addition of a small quantity of chemically stable resin. Their use in normal qualitative applications will not introduce any significant impurities into the filtrate.

Find out more

## Application-specific paper

Cytiva offers Whatman cellulose filter papers for specific applications. The product range includes filter papers for use in soil analysis and for the sugar industry.

Find out more

# Customization options

All our cellulose grades can be customized to meet your specific application needs. They are all available as either flat or folded. Below is an overview of our custom capabilities, from production to treatment options.

## **Production options** – cellulose

| Material | Properties | Conversion |
|---|---|---|
| • Cotton linter<br>• Specialty wood pulps<br><br>**Manufacturing specifications**<br>• Airflow<br>• Grammage<br>• Thickness<br>• Mechanical strength<br>• Particle retention<br>• Wicking rate<br>• Filtration performance<br>• Surface characteristics | **Grammage**<br>40–700 gsm (± 10%)<br><br>**Thickness**<br>80–2600 µm | Our master reels can be cut to different dimensions<br><br>**Cutting**<br>• Sheet length: 430–790 mm<br>• Sheet width: 460–1500 mm<br><br>**Slitting**<br>• Slitting: 6–1500 mm<br>• Tolerances up to ± 0.5 mm<br>• Max rewind diameter: 1200 mm<br><br>**Punching**<br>• Circles: 10–500 mm diameter<br>• Shapes and patterns possible |

Our paper products can be post-treated to your needs with respect to strength, hydrophobicity, and oleophobicity.

## **Treatment options** – cellulose

| Controlled impregnation | Acid treatment | Lamination |
|---|---|---|
| A chemical is added to a substrate to enhance mechanical properties and make the filter sensitive to specific analytes.<br><br>**Max width**<br>300 mm<br><br>**Substrates**<br>Water-based chemicals (e.g., FTA and silicone) | It reduces ash content, so hardening the paper and reducing impurities.<br><br>**Sheet width**<br>400–860 mm | A nonchemical process to strengthen paper.<br><br>**Max width**<br>100 mm<br><br>**Min wet strength**<br>2N/15 mm |

# 02 Glass and quartz

Whatman glass microfiber filters are manufactured from 100% borosilicate glass and are available with or without binder. These depth filters combine fast flow rates with high loading capacity and the retention of very fine particles, extending into the sub-micron range.

Glass microfiber filters can be used at temperatures up to 550°C and are excellent for use in applications involving air filtration and for gravimetric analysis of volatile materials where ignition is involved.

# Glass microfiber filter paper

Whatman glass microfiber filters have a fine capillary structure and can absorb significantly larger quantities of water than an equivalent cellulose filter, making them suitable for spot tests and liquid scintillation counting methods. The filters can also be made completely transparent for subsequent microscopic examination.

## Glass microfiber grades

### Binder-free glass microfiber filter papers

We offer eight different types of glass microfiber filters without binder: GF/A (1.6 µm), GF/B (1.0 µm), GF/C (1.2 µm), GF/D (2.7 µm), GF/F (0.7 µm), 934-AH™ (1.5 µm), EPM 2000, and GMF 150 (1—2 µm).

**Find out more**


### Glass microfiber filter papers with binder

We offer eight different types of glass microfiber filters with binder: GF 6, GF 8, GF 9, GF 10, GF 92, F319-04, HGF61, and HFG62.

**Find out more**


### Quartz paper

Whatman quartz filters are highly resistant to heat, with some grades withstanding temperatures up to 900°C. Particularly suitable for air filtration and monitoring applications.

**Find out more**

# Customization options

All our glass and quartz grades can be customized to meet your specific application needs. Below is an overview of our custom capabilities, from production to treatment options.

## **Production options** – glass and quartz

| Material | Properties | Conversion |
|---|---|---|
| • Borosilicate<br>• Low sodium<br>• Quartz<br>• Graded density media<br><br>**Manufacturing specifications**<br>• Airflow<br>• Grammage<br>• Thickness<br>• Mechanical strength<br>• Particle retention<br>• Wicking rate<br>• Filtration performance<br>• Surface characteristics | **Grammage**<br>20–280 gsm (± 10%)<br><br>**Thickness**<br>100–2000 µm<br><br>**Particle retention range**<br>0.7–2.7 µm<br><br>**Heat resistant**<br>up to 550°C | Our master reels can be cut to different dimensions<br><br>**Cutting**<br>• Sheet length: 430–790 mm<br>• Sheet width: 460–1500 mm<br><br>**Slitting**<br>• Slitting: 6–1500 mm<br>• Tolerances up to ± 0.5 mm<br>• Max rewind diameter: 1200 mm<br><br>**Punching**<br>• Circles: 10–500 mm diameter<br>• Shapes and patterns possible |

Our glass and quartz products can be post-treated to your needs with respect to strength, hydrophobicity, and oleophobicity.

## **Treatment options** – glass and quartz

| Controlled impregnation | Calendering | Firing | Lamination |
|---|---|---|---|
| A chemical is added to a substrate to enhance mechanical properties and make the filter sensitive to specific analytes<br><br>**Max width**<br>300 mm<br><br>**Online substrates**<br>Water-based chemicals (e.g., FTA and silicone)<br><br>**Offline substrates**<br>Liquid PVA, acrylic binders, oleophobic and hydrophobic agents | Consolidation of sheets by cold or hot pressing makes the paper product smooth.<br><br>**Sheet width**<br>500–1020 mm<br><br>**Grammage**<br>20–40 gsm | It ensures a product complies with organic content requirements.<br><br>**Max sheet size**<br>550 × 850 mm<br><br>< 1% loss on ignition | A nonchemical process to strengthen paper.<br><br>**Max width**<br>100 mm<br><br>**Min wet strength**<br>2N/15 mm |

# 03 Membranes

**Whatman membrane filters offer accurately controlled pore size distribution and higher strength and flexibility, ensuring reproducibility and consistency. Available in a range of pore sizes and formats including sterile and autoclave packs and colored and gridded forms for specialized applications.**

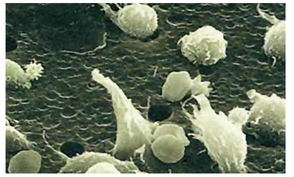
# Capillary (true) pore membranes

Our capillary pore membranes can be distinguished between track-etched polycarbonate membranes, manufactured using proprietary technology to give them a closely controlled pore size distribution, and the Anopore™ inorganic membranes.

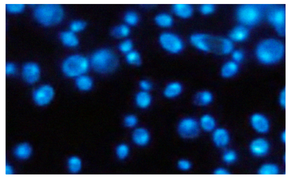
## Track-etched polycarbonate membranes

Whatman track-etched membranes are manufactured using proprietary technology to produce a precision membrane filter with a closely controlled pore size distribution. These membranes include Cyclopore™ polycarbonate, Nuclepore™ polycarbonate, chemotaxis membranes, black polycarbonate, and polycarbonate membranes for cell culture.

**Find out more**



Chemotaxis membranes

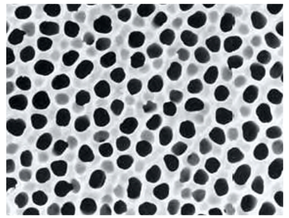


Yeast cells on Black Cyclopore with DAPI Stain

## Anopore inorganic membranes

This material has a precise, nondeformable honeycomb pore structure, with no lateral crossover between individual pores, that filters at precisely the stated cut-off, allowing no larger sized particles to pass through the membrane.

**Find out more**



Anodisc pore structure

# Tortuous path (pore) membranes

Our tortuous path membranes can be categorized as follows: Cellulosic membranes, PTFE membranes, PM2.5 air monitoring membranes, nylon membranes, and polyamide membranes.

## *Cellulosic membranes*

### Regenerated cellulose membranes

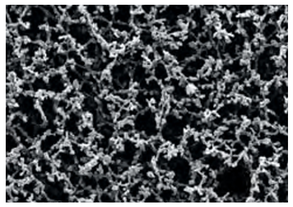
Made of pure cellulose, without any wetting agents.

**Find out more**

### Cellulose acetate membranes

Whatman cellulose acetate membrane filters have very low protein binding, which minimizes sample loss when filtering protein-based aqueous samples. Due to their high chemical resistance, cellulose acetate membrane filters reliably prepare liquid scintillation cocktail for scintillation counter measurement. Additionally, the highly heat resistant membranes can filter hot liquids and hot gases.

**Find out more**



Cellulose acetate membrane
(Type ST 68, 0.8 µm)

### Cellulose nitrate membranes

Recommended for the majority of routine applications, this membrane is manufactured under strictly controlled conditions. The user will benefit from recent performance improvements to Whatman membrane filters, including very narrow pore size distribution and low levels of extractables.

**Find out more**

### Mixed cellulose ester membranes

Whatman mixed cellulose ester membranes are composed of cellulose acetate and cellulose nitrate. These membranes are characterized by a smoother and more uniform surface than pure nitrocellulose filters.

**Find out more**


## *PTFE membranes*

Whatman PTFE membranes are chemically stable and inert. They are suitable for applications involving aggressive organic solvents, strong acids and alkalis. PTFE membranes are particularly suitable for preparing samples for HPLC analysis.

The hydrophobic nature of the membrane also has applications for air and gas sterilization. The membrane is laminated onto a nonwoven polypropylene support web for improved strength and handling, and can be used at temperatures up to 120°C.

**Find out more**


## *PM2.5 air monitoring membranes*

A high-purity, thin PTFE membrane in a sequentially numbered, chemically resistant polypropylene support ring for PM 2.5 ambient air monitoring. Whatman PM 2.5 membranes have low tare mass for accurate gravimetric determinations. The thermally stable design prevents curling, keeps the membrane flat, and makes the filter robot-friendly.

**Find out more**



## *Nylon membranes*

High-quality nylon membranes are suitable for filtering aqueous solutions and most organic solvents. The membranes are suitable for use with a wide range of biological preparations and can be used where other membranes are unsuitable or difficult to use.

Nylon membranes are hydrophilic, removing the need for wetting agents that could be extracted when filtering aqueous solutions. The membranes are flexible, durable and tear resistant, and can be autoclaved at 135°C.

**Find out more**

## *Polyamide membranes*

Whatman polyamide membranes are made from pure polyamide, making them the recommended filter for clarification and sterile filtration. Polyamide membrane filters are mechanically very strong and exhibit excellent wet strength and dry strength. They are hydrophilic, making them suitable for aqueous and organic solutions, and can be used up to 135°C.

**Find out more**

# Customizable membrane options

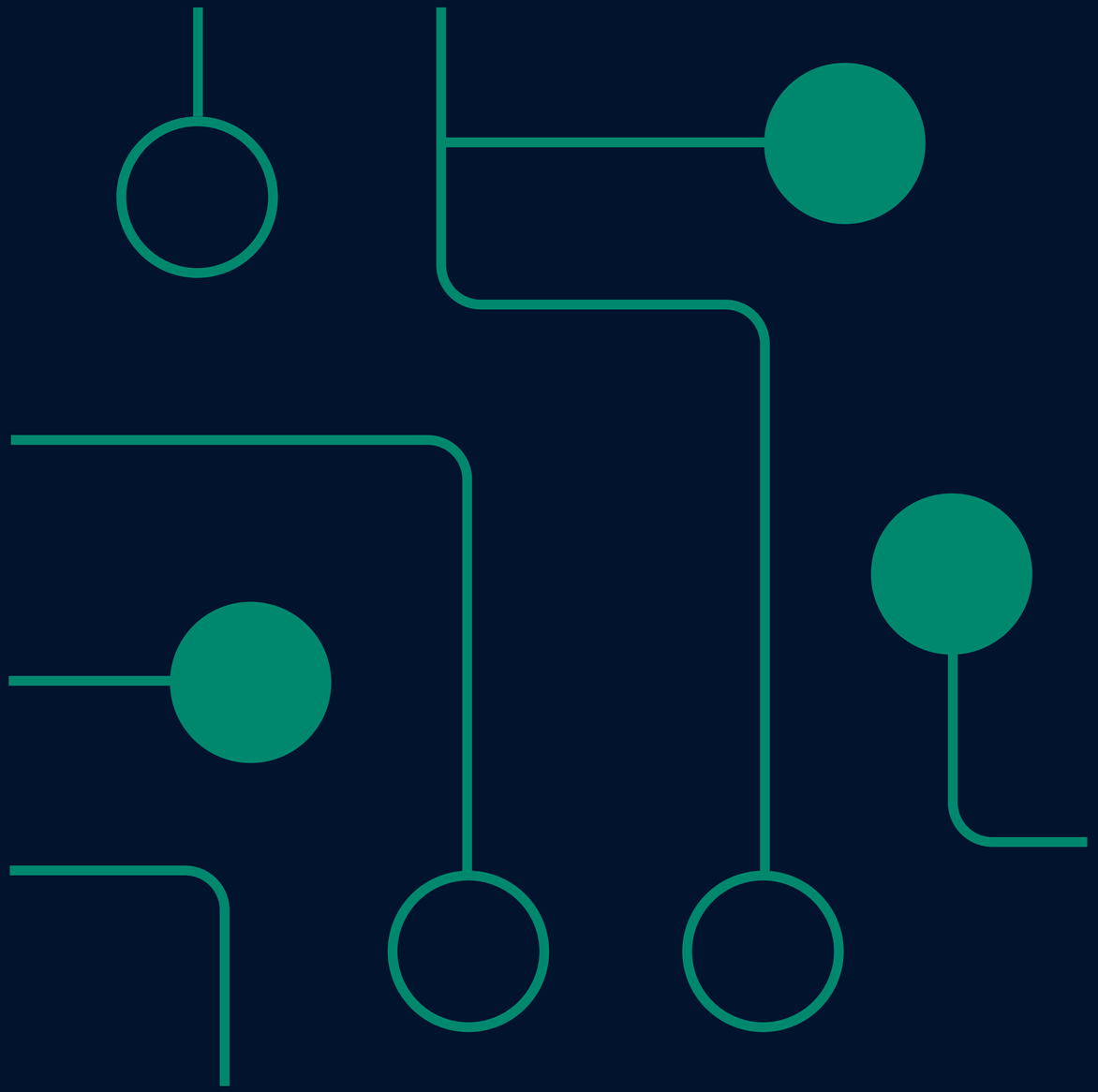
All our membranes can be customized to meet your specific application needs. Below is an overview of our custom capabilities, from production to treatment options.

| Capabilities (manufacturing) | Capabilities (membranes)* | Capabilities (conversion)† | Treatments (membranes) |
|---|---|---|---|
| **Casting**<br>• Dry<br>• Wet | **Manufacturing specifications**<br>• Pore size<br>• Thickness<br>• Water flow rate<br>• Capillary rise/flow time<br>• Burst strength<br>• Porosity<br>• Protein binding<br>• Leachables<br>• Autoclavable<br>• Bubble point (unbacked only)<br>• Flow-through (unbacked only)<br>• Scanning electron microscope use<br>• Laser scanning microscope | **Sheet cutting**<br>Dimensions:<br>• Min: 10 × 10 mm<br>• Max: 640 × 1200 mm<br>**Slitting**<br>• Precision slitting: 6–1500 mm<br>• Tolerances: up to ± 0.5 mm<br>• Max rewind diameter: 250 mm<br>**Punching**<br>• Circles: 6–500 mm diameter<br>• Shapes and patterns possible | **Backing**<br>• Unbacked<br>• Foil-backed<br>• PTFE-backed<br>– Polyester, polypropylene, or Halar™<br>**Supported Impregnation**<br>**Lamination**<br>**Coloring**<br>**Printing**<br>**Sterilization** |

* General manufacturing limits may differ for membrane grades as limiting factor is master reel width

† Dependent on membrane grade

# 04
# Devices



# Disk filters

## Filter housings

Cytiva offers a broad range of disk filters for small-to-medium-volume filtration. Filter diameters range from 4 mm to 60 mm and filter housings range from polypropylene to polycarbonate. Choose the filter that best suits the needs of your application.

Select from several filter configurations, connector, and color options. Single and stepped hose barbs, male threads and female and male Luer locks are among the many available connectors.

Disk filters can accommodate a wide variety of filter materials, ranging from high flow polyethersulfone, hydrophobic PTFE membrane, woven polypropylene or polyethylene screens, and glass microfiber.

Select 4 mm, 13 mm, 25 mm, and 60 mm filter housings can be pad printed with a company logo or other important information in corporate colors as requested. Hot stamping (a highly durable engraving process) is also available in a variety of colors around the circumference of the 50 mm filters.

Whatman disk filters are typically supplied in bulk, although these products can also be packaged to customer specifications in blisters, boxes, or individual bags. Many choices are available for packaging labeling, including printing on blister backings as well as box and bag labels.

Applications for disk filter products include vents, suction pump protection, equipment and/or sensor protection, insufflation, and particulate removal from liquid solutions.

## Abbreviations

| | |
|---|---|
| **ML** | Male Luer |
| **FLL** | Female Luer Lock |
| **MLL** | Male Luer Lock |
| **MSF** | Male Slip Fitting |
| **FNPT** | Female National Pipe Thread |
| **MNPT** | Male National Pipe Thread |
| **SLPM** | Standard Liters Per Minute |
| **RC** | Regenerated Cellulose |
| **PP** | Polypropylene |
| **PES** | Polyethersulfone |
| **GMF** | Glass Microfiber |
| **PTFE** | Polytetrafluoroethylene |
| **NWPP** | Non-Woven Polypropylene |
| **ABS** | Acrylonitrile Butadiene Styrene |
| **PVDF** | Polyvinylidene Fluoride |
| **TEM** | Track-Etched Membrane |

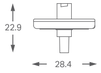
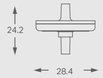
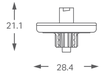
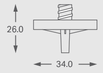
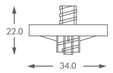
## 4 mm, 13 mm, 25 mm, 30 mm syringe filters

Cytiva offers a wide selection of products for small volume filtration.

Select from several filter configurations and connector options, including many housing and overmold color tints. Female and male Luer locks, male slip Luers, male slip fitting connectors, and tube tips are available.

A wide variety of filter materials can be incorporated into Whatman small volume filters, ranging from PTFE, nylon, PES, GMF, and screens.

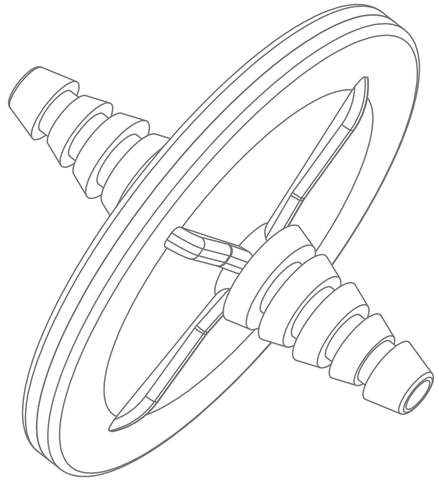
Applications include: equipment and/or sensor protection, syringe filters for laboratory use, particulate removal from liquid solutions and transducer protectors.

| Dimensions (mm) | Name | Connectors | Effective filtration area ($cm^2$) | Typical membranes available* | Housing description |
|---|---|---|---|---|---|
|  | 4 mm | FLL/ML | 0.2 | Nylon, PTFE, PVDF, PES | Polypropylene |
|  | 13 mm | FLL/ML | 1.3 | Nylon, PVDF, PTFE, PES, GMF | Polypropylene: pad print available |
|  | 13 mm overmolded | FLL/ML | 0.75 | PTFE | Polypropylene: color overmold available: green, yellow, white, grey, brown |
|  | 13 mm overmolded | FLL/tube tip | 0.75 | PTFE | Polypropylene: color overmold available: green, yellow, white, grey, brown |
|  | 25 mm | FLL/ML | 4.2 | PTFE, PVDF, Nylon, GMF, PES, Screen, PP Membrane, and NWPP | Polypropylene: pad print available |
|  | 25 mm | MSF/ML | 4.2 | PTFE, PVDF, Nylon, GMF, PES, Screen, PP Membrane, and NWPP | Polypropylene: pad print available |
|  | 25 mm | FLL/MLL | 4.2 | PTFE, PVDF, Nylon, GMF, PES, Screen, PP Membrane, and NWPP | Polypropylene: pad print available |
|  | 30 mm | FLL/ML | 5.7 | PTFE, GMF | Polycarbonate and polypropylene: color overmold available: red, yellow, green, brown, white, orange |
|  | 30 mm | FLL/MLL | 5.7 | PTFE, GMF | Polycarbonate and polypropylene: color overmold available: red, yellow, green, brown, white, orange |

*Custom filters using other available membranes can be considered; MNPT is Male National Pipe Thread

# 50 mm Disk filter housing

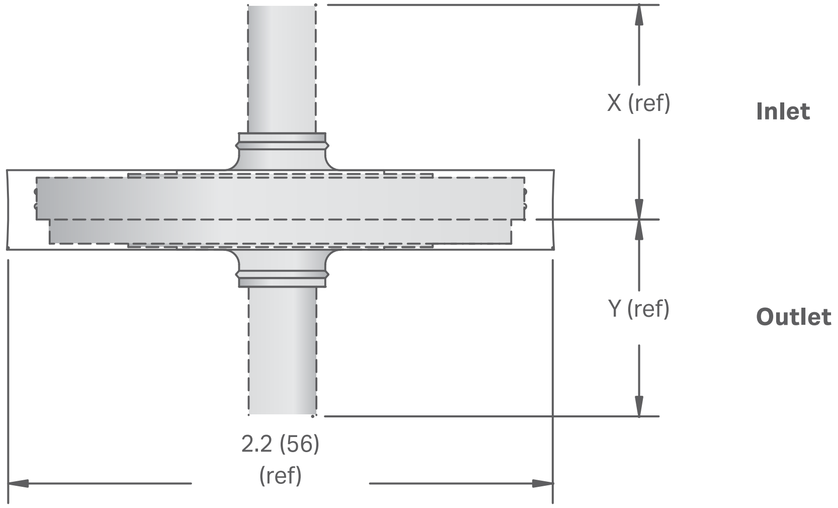
A compact and efficient design allows 50 mm filters to fit within a variety of critical dimensions. A large number of connector combinations are possible on this versatile and durable filter. The 50 mm disk filter can accommodate a wide variety of filter media including PTFE and screens, which are available in many pore sizes. The lightweight configuration is manufactured using only virgin polypropylene. Typical applications for 50 mm filters include suction pump protection, gas filtration, and venting.



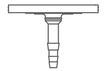
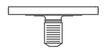
## Whatman 6–14 mm stepped barb housing disk filter – Technical data

- Polypropylene housing 6–14 mm connectors
- Currently available with nylon, PTFE*
- Effective filtration area: 20.4 $cm^2$
- Maximum operating pressure: 65 psi/4.5 bar
- Dimensions: Width: 63.2 mm Height: 67.2 mm

*Custom filters using other available membranes can be considered



| | Inlet | X inch (mm) |
|---|---|---|
|  | 1/4"–3/8" Hose barb (6–10 mm) | 0.9 (23) |
|  | 1/4" Hose barb (6 mm) | 0.9 (23) |
|  | 3/16"–1/4" Hose barb (4–6 mm) | 1.1 (28) |
|  | 3/8"–1/2" Hose barb (9–12 mm) | 1.0 (26) |
|  | 1/8" MNPT | 0.8 (20) |
|  | 5/16" - 24 MNPT | 0.9 (23) |

| | Outlet | Y inch (mm) |
|---|---|---|
|  | 1/4"–3/8" Hose barb (6–10 mm) | 1.0 (25) |
|  | 1/4" Hose barb (6 mm) | 1.0 (25) |
|  | 3/16"–1/4" Hose barb (4–6 mm) | 1.1 (28) |
|  | 3/8"–1/2" Hose barb (9–12 mm) | 1.1 (28) |
|  | 1/8" MNPT | 0.8 (21) |
|  | 5/16" - 24 MNPT | 1.0 (25) |

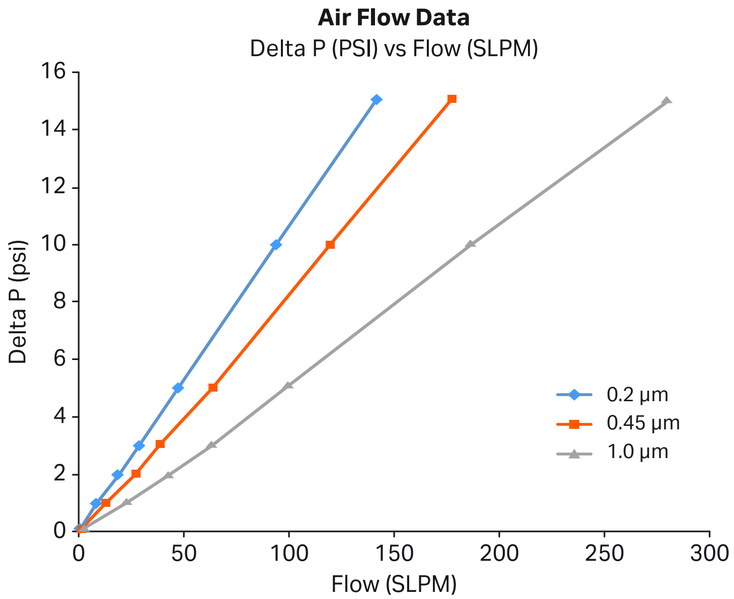
**50 mm Disk filter — Technical data**

- Housing — Polypropylene
- Effective filtration area: 16 cm²
- Maximum operating pressure: 60 psi/4.1 bar

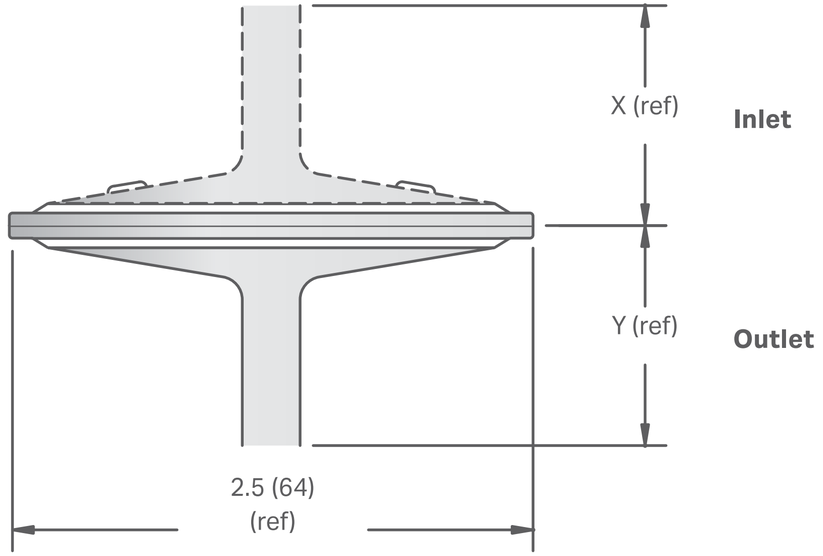
# 60 mm Disk filter housing

The special housing design of the 60 mm filter allows for higher flow rates and lower pressure compared with the 50 mm design. A wide variety of connectors make this filter useful for many applications for filtering air and gas streams. Custom tapered connectors are specially designed to fit directly onto suction canisters, making this filter well suited for suction vacuum protection. The housing is made entirely of virgin polypropylene. Applications for 60 mm filters include suction pump protection, insufflation, and air/gas filtration.

60 mm Disk Filters




Typical air flow rates for 60 mm disk filter with PTFE membrane*




*Contact your Cytiva representative for additional technical data ; psi is pounds per square inch; SLPM is Standard Liters Per Minute

| | Inlet | X inch (mm) |
|---|---|---|
|  | 1/4″ Single hose barb (6 mm) | 1.1 (27) |
|  | 3/8″–1/2″ Hose barb (9–12 mm) | 1.2 (29) |
|  | 1/4″–3/8″ Hose barb (6–10 mm) | 1.1 (27) |
|  | Tapered connector | 0.9 (23) |

**60 mm Disk filter — Technical data**

- Housing — Polypropylene
- Effective filtration area: 25 $cm^2$
- Maximum operating pressure: 30 psi/2.1 bar

| | Outlet | Y inch (mm) |
|---|---|---|
|  | 1/4″ Single hose barb (6 mm) | 1.1 (27) |
|  | 3/8″–1/2″ Hose barb (9–12 mm) | 1.2 (29) |
|  | 1/4″–3/8″ Hose barb (6–10 mm) | 1.1 (27) |
|  | Tapered connector | 0.9 (23) |
|  | 1/8″ MNPT | 1.1 (27) |
|  | 1/4″ MNPT | 1.1 (27) |

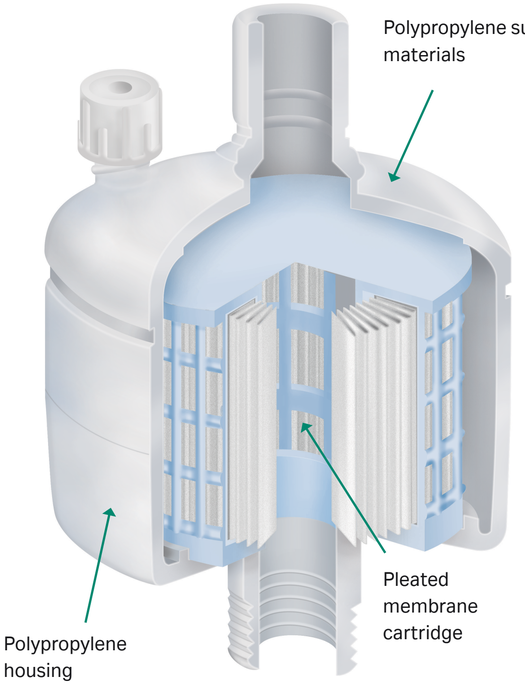
# Capsule filters

Three standard capsule sizes are available. Small, medium, and large capsule filters allow the user the flexibility to accommodate a variety of filtrate volumes and placement constraints. Mix and match a combination of connectors, media, and housing to create the configuration that best suits your application. All support and housing materials are 100% polypropylene. No adhesives or glues are used.

A wide variety of filter materials can be incorporated into Whatman capsule filters. High flow PES is available for use with both liquids and dry gases. Durable hydrophobic PTFE membrane is an excellent choice for aggressive chemical and air/gas stream filtration. Hydrophilic nylon for aqueous solutions and durable non-woven polypropylene depth media for heavy duty fine filtration are also offered. Hydrophobic glass microfiber for high bacteriological efficiency and granulated media help complete the mix of available filtration materials.

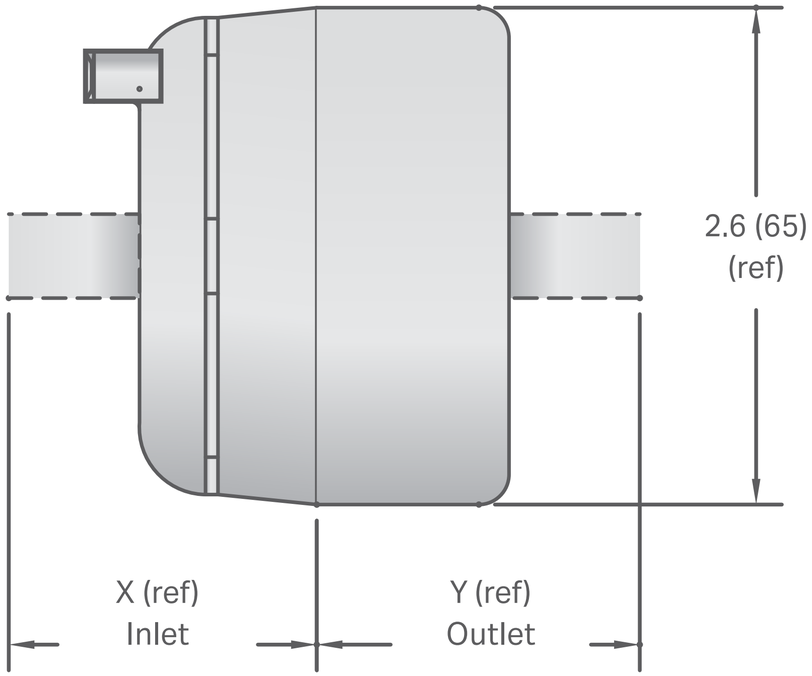
Granulated media such as carbon or desiccant can be added to the medium and large capsule housings.

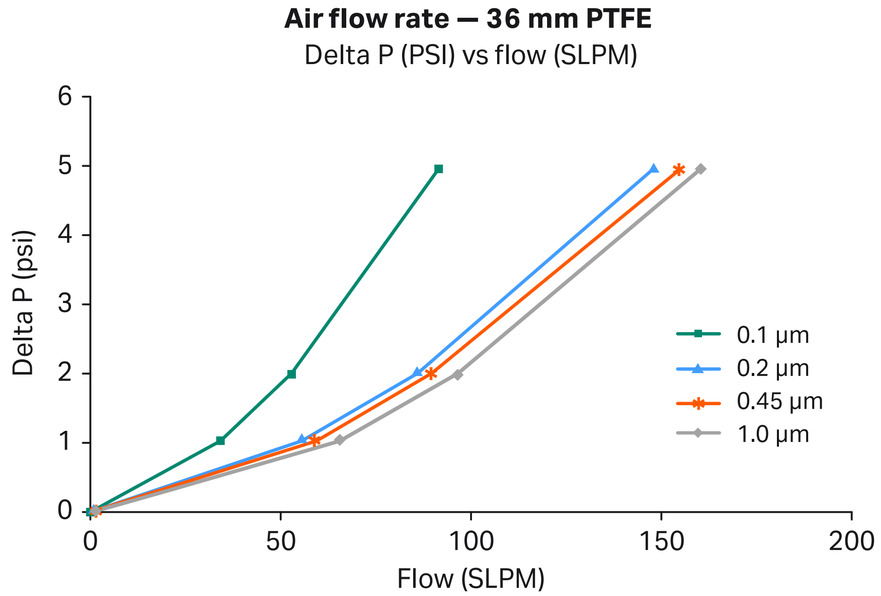
Applications for this wide range of capsule filter products include equipment and/or sensor protection, particulate removal from aqueous solutions and other liquids, and sterilizing grade filtration for critical point-of-use applications.




Cut-away view of capsule filter

# Small capsule




Typical air flow rates for small capsule with PTFE membrane†

†Contact your Cytiva representative for additional technical data

| | Inlet | X inch (mm) |
|---|---|---|
|  | 22 mm Respiratory fitting | 2.2 (25) |
|  | 3/8″ FNPT | 1.2 (30) |
|  | 1/4″–3/8″ Hose barb (6–10 mm) | 1.7 (43) |
|  | 3/8″–1/2″ Hose barb (9–12 mm) | 1.8 (46) |
|  | Molded LEGRIS Q—CONNECT | 1.8 (46) |
|  | 1/4″ MNPT | 1.8 (46) |
|  | 1 1/2″ Sanitary fitting | 2.5 (64) |
|  | 1/2″ Hose barb (12 mm) | 1.8 (46) |

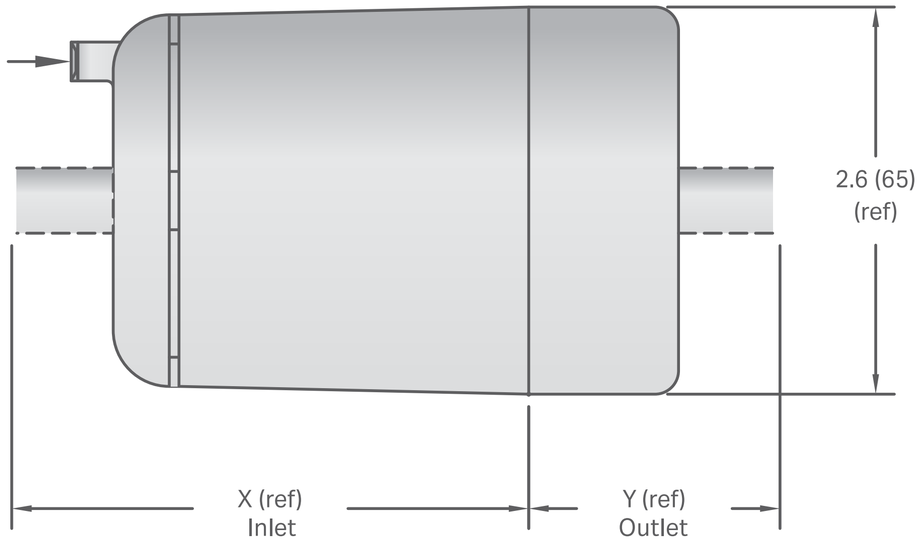
| | Outlet | Y inch (mm) |
|---|---|---|
|  | 22 mm Respiratory fitting | 2.0 (50) |
|  | 3/8″ FNPT | 0.9 (23) |
|  | 1/4″–3/8″ Hose barb (6–10 mm) | 1.8 (46) |
|  | 3/8″–1/2″ Hose barb (9–12 mm) | 1.9 (48) |
|  | 1/2″ Dry seal thread | 1.8 (46) |
|  | 1/4″ MNPT | 1.8 (46) |
|  | 1 1/2″ Sanitary fitting | 1.7 (43) |
|  | 1/2″ Hose barb (12 mm) | 1.9 (48) |

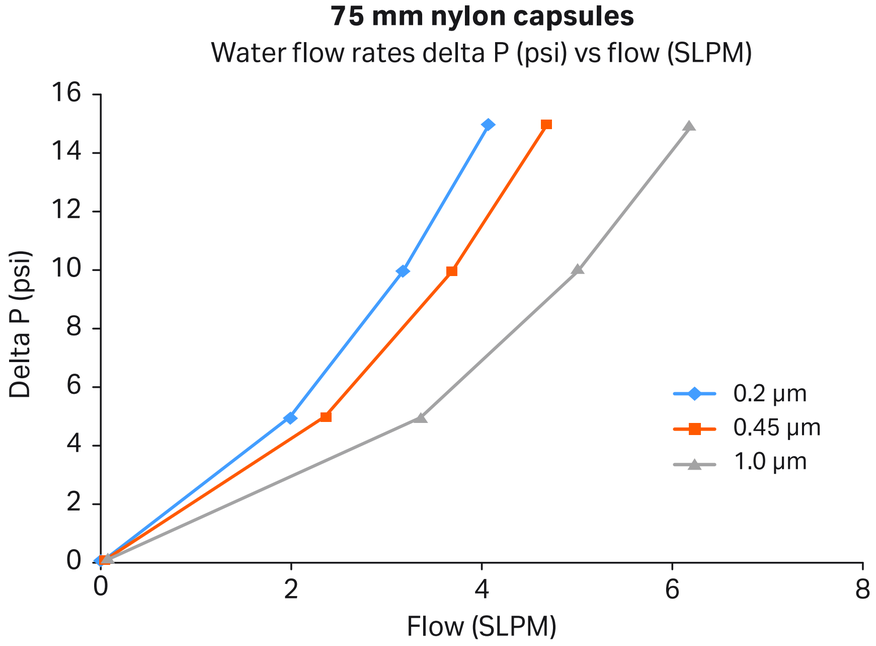
**Small capsule — Technical data**

- Housing — Polypropylene
- Average effective filtration area: 500 $cm^2$*
- Maximum operating pressure: 60 psi/4.1 bar
- Most inlets have a fully threaded vent. Some inlet options are available without a vent

*May vary with different membranes or media

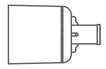
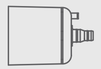
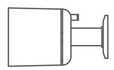
# Medium capsule




Typical water flow rates for medium capsule with nylon membrane†

†Contact your Cytiva representative for additional technical data

| | Inlet | X inch (mm) |
|---|---|---|
|  | 1/4″–3/8″ Hose barb (6–10 mm) | 2.8 (71) |
|  | 3/8″ FNPT | 3.1 (78) |
|  | 22 mm Respiratory fitting | 4.1 (104) |
|  | 1/2″ Hose barb (12 mm) | 3.7 (94) |
|  | 1/4″ MNPT | 3.7 (94) |
|  | 3/8″–1/2″ Hose barb (9–12 mm) | 4.5 (114) |
|  | 1 1/2″ Sanitary fitting | 4.4 (102) |
|  | W/ LEGRIS Q – CONNECT | 3.7 (94) |

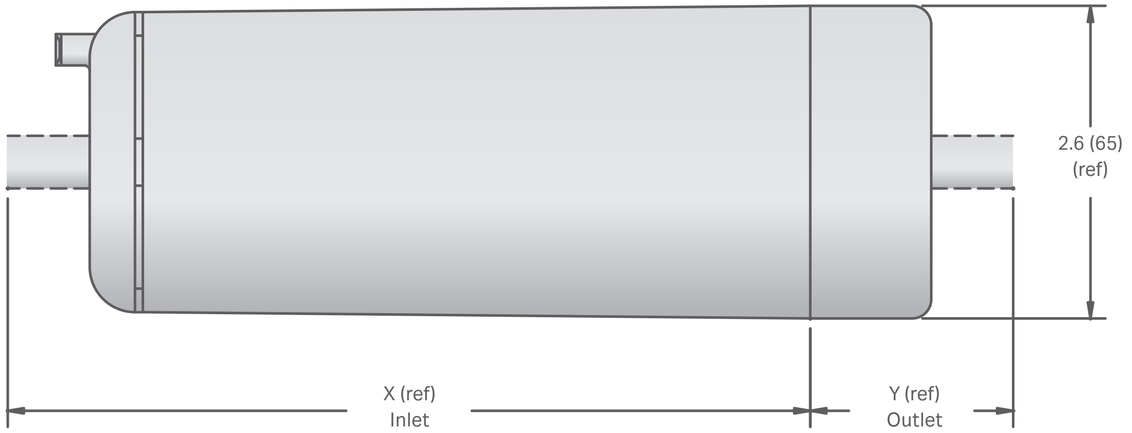
| | Outlet | Y inch (mm) |
|---|---|---|
|  | 1/4″–3/8″ Hose barb (6–10 mm) | 1.8 (46) |
|  | 3/8″ FNPT | 0.9 (23) |
|  | 22 mm Respiratory fitting | 2.0 (50) |
|  | 1/2″ Hose barb (12 mm) | 1.9 (48) |
|  | 1/4″ MNPT | 1.8 (47) |
|  | 3/8″–1/2″ Hose barb (9–12 mm) | 1.9 (48) |
|  | 1 1/2″ Sanitary fitting | 1.7 (43) |
|  | 1/2″ Dry seal thread | 1.8 (46) |

**Medium capsule — Technical data**

- Housing — Polypropylene
- Average effective filtration area: 1000 $cm^2$*
- Maximum operating pressure: 60 psi/4.1 bar
- Most inlets have a fully threaded vent. Some inlet options are available without a vent

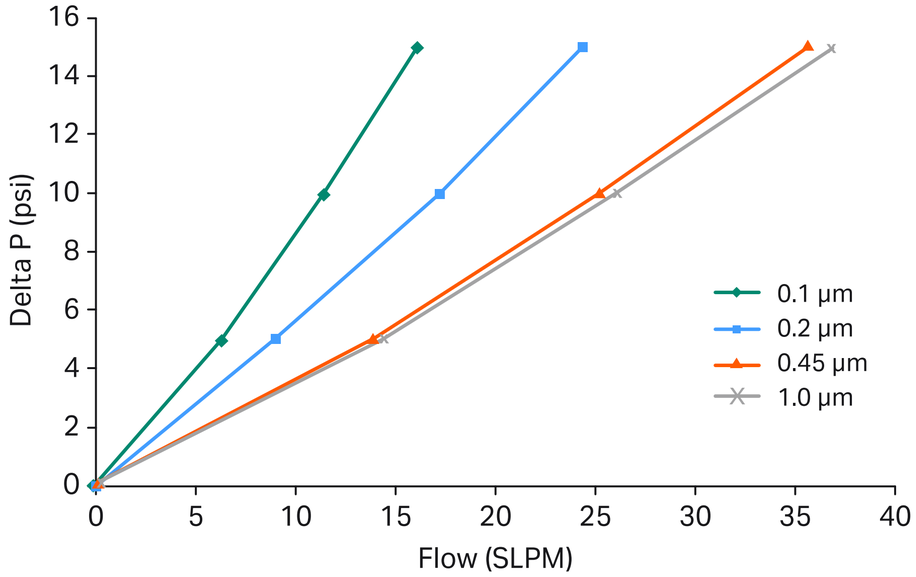
*May vary with different membranes or media

# Large capsule




**150 mm PES capsules**

Water flow rates delta P (psi) vs flow (SLPM)




Typical water flow rates for large capsule with PES membrane†

†Contact your Cytiva representative for additional technical data

| | Inlet | X inch (mm) |
|---|---|---|
|  | 3/8"–1/2" Hose barb (9–12 mm) | 6.9 (175) |
|  | 3/8" FNPT | 6.2 (157) |
|  | 1/2" Hose barb (12 mm) | 6.8 (173) |
|  | 1/4"–3/8" Hose barb (6–10 mm) | 6.7 (170) |
|  | 1/4" MNPT | 6.8 (173) |
|  | 1 1/2" Sanitary fitting | 7.5 (191) |
|  | 22 mm Respiratory fitting | 7.2 (183) |
|  | W/ LEGRIS Q – CONNECT | 6.8 (173) |

| | Outlet | Y inch (mm) |
|---|---|---|
|  | 3/8"–1/2" Hose barb (9–12 mm) | 1.9 (48) |
|  | 3/8" FNPT | 0.9 (23) |
|  | 1/2" Hose barb (12 mm) | 1.9 (48) |
|  | 1/4"–3/8" Hose barb (6–10 mm) | 1.8 (46) |
|  | 1/4" MNPT | 1.8 (46) |
|  | 1 1/2" Sanitary fitting | 1.7 (43) |
|  | 22 mm Respiratory fitting | 2.0 (50) |
|  | 1/2" Dry seal thread | 1.8 (46) |

**Large capsule — Technical data**
- Housing — Polypropylene
- Average effective filtration area: 1500 cm²*
- Maximum operating pressure: 60 psi/4.1 bar

*May vary with different membranes or media

# Capsule filters

## Elliptical and 60 mm insufflation filters

Cytiva produces a special line of 60 mm and elliptical disk filters specially designed for filtering $CO_2$ gas. These insufflation filters contain a special ULPAplus filter medium that is rated in air to retain particles ≥ 0.1 µm at 99.99% and provides a hydrophobic barrier to contain a column of aqueous liquid for 5 minutes @ 1 psi pressure.

60 mm insufflation filters are available with a variety of hose barb connectors and are suitable for insufflators with flow ≤ 20 SLPM. The Whatman Elliptical insufflation filter is suitable for flow > 20 SLPM.

### Elliptical filter — Technical data

- Housing — Polypropylene
- Effective filtration area: 40 cm²
- Connectors: ¼"– ¾" (6–10 mm) hose barbs
- Inlet pad printed insufflator side

# Customization options

**Custom labeling and packaging is available for your OEM filter. Several methods are available for adding your company logo and important product information to your filter. The four labeling methods are described on pages 30 and 31.**

**Please note that certain products can only accommodate certain types of labeling (compatible products are listed under each category).**

**A wide variety of bags, boxes, jars, blisters, and peel pouches are available. Ethylene Oxide (EtO) and gamma sterilization methods are also available. Custom adapters are also available for many filters.**


## Adhesive labels

*Can be affixed directly to the capsule or on the outside of a box or bag for any product in the line.*

Adhesive labels can be made from a variety of materials depending on the environment in which they will be used. Cytiva offers materials that can withstand multiple autoclave cycles without ink smearing or fading. Special coated labels are available for products that must endure aggressive solvents.


## Hot stamping

*For use on 50 mm mold rings and the flat surface of the capsule outlet*

This process allows highly durable and legible text to be engraved directly into the filter housing, making hot stamping suitable for filters that must endure adverse conditions. Standard hot stamp colors include red, blue, green, and black.

## Adapters

*Threaded connectors can accommodate spin-welded or hand-sealed adapters*

Along with the wide variety of molded connector options for Whatman OEM filters we can also incorporate custom adapters of your choice in many of the capsule filters or threaded connector disk filters.

## Printed blister lids

*For use with blister packaged 25 mm and 50 mm filters as well as peel pouch packaged products*

High-density polyethylene is used to seal blister packaged and most peel pouch packaged filters. This material can be printed to your specifications. Your information (logo, lot number, expiration date, etc.) can be printed directly onto the seal in your choice of color. (Peel pouch packages can also be enclosed with paper.)

## Pad printing

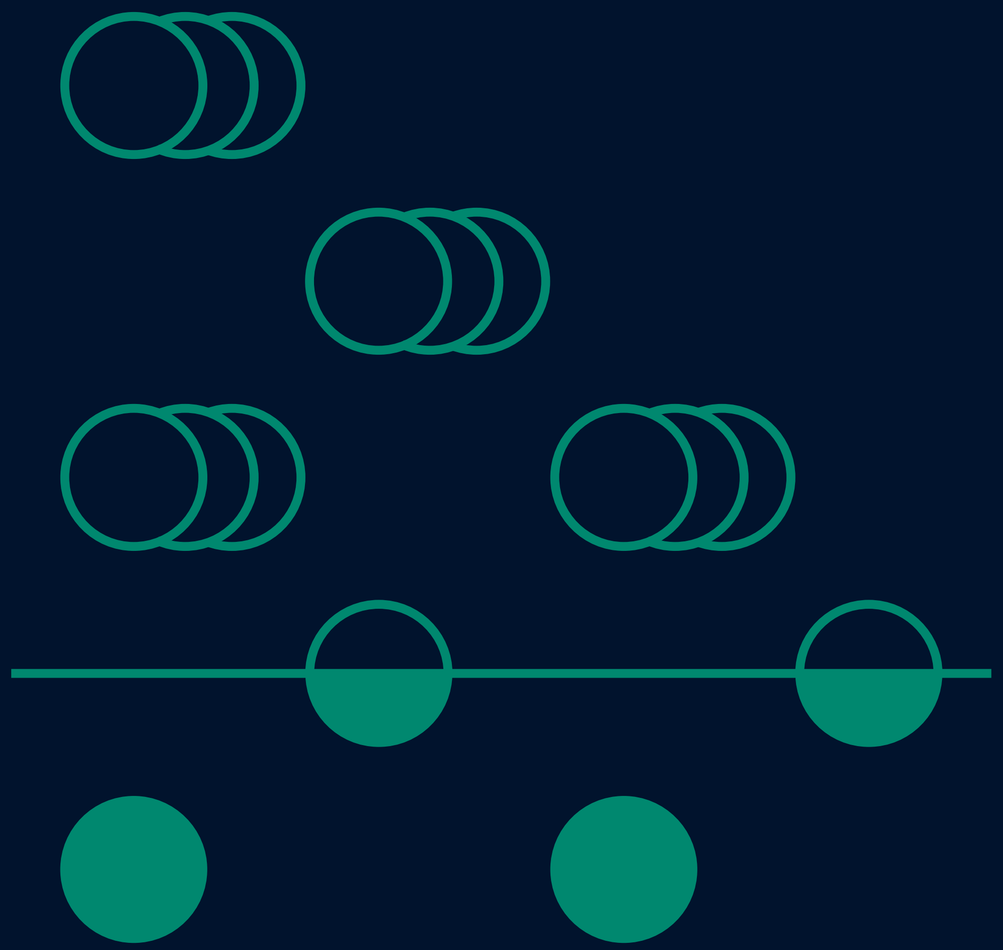
*60 mm, elliptical, and capsule housings can be pad printed, as well as selected 4 mm, 13 mm, and 25 mm filters*

Pad printing is a high resolution ink transfer process that produces clean sharp images. It allows for some design latitude, such as adding your company logo. Standard ink colors include red, blue, green, and black.


Sterile packaging


Pad printing

# Filtration basics and design considerations



## Which Cytiva product is right for your application?

Choosing the filtration solution that specifically addresses your unique product development and application needs can be an extremely complex process.

A host of factors related to performance, chemical properties, and configuration ultimately determine which filter options are right for you.

This section provides a brief overview of filtration design, purpose, and functionality. For in-depth, expert consultation on filtration evaluation and selection, please contact your Cytiva representative.

- **Filter media:** Although there are numerous types of filter media, those most commonly used are described below. As a broad classification, there are two trapping mechanisms: (1) membranes and woven media rely on surface retention, whereby the pore/mesh size determines the capture capabilities; and (2) depth filters trap particles within their layered matrix.
- **Hydrophilic vs hydrophobic:** Hydrophilic media attract water and can be wetted; hydrophobic media repel water and can only be wetted with low-surface tension liquids, making it suitable for gas filtration and venting applications
- **Pore size:** Ratings refer to the size of a specific particle or organism retained by the filter membrane to a specific degree of efficiency. Nominal pore ratings refer to the membrane's ability to retain the majority of the particulates at the rated pore size and larger. Absolute pore size ratings indicate the pore size at which a challenge organism of a particular size will be retained with 100% efficiency under defined test conditions.
- **Extractables:** The contaminants that elute from the filter membrane and may adversely affect effluent quality. Extractables may include wetting agents in the filter membrane, manufacturing debris, sterilization residue, or adhesives.
- **Flow rate and throughput:** Viscosity determines a liquid's resistance to flow. The higher a liquid's viscosity, the lower the flow rate and the higher the differential pressure required to achieve a given flow rate.
- **Porosity:** Porosity is the measure of all pores in a membrane; more pores yield higher flow rates

# Questions to consider when designing your filter:

- Application: What is the function of the filter?
- Compatibility: What solution (liquid or gas) will be filtered?
- Volume: How much will be filtered, and for how long?
- What flow rate is necessary? At what DP (Differential Pressure)?
- What retention value is necessary (Absolute/Nominal)?
- What connectors are suitable for the product?
- Size constraints?
- Filter membrane preference?
- Does the filter need to be hydrophilic or hydrophobic?
- Temperature requirements?
- Sterilization: Does the product need to be sterile? If so, by what method?
- Is the product a medical device?
- Does the product need to be reusable or disposable?
- Special packaging required?

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For local office contact information, visit cytiva.com/contact

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