



Pall Corporation

## Material Selection for Venting Applications

Contaminant  
Control

Moisture  
Control


Temperature  
Stabilization

Pressure  
Equalization



*Filtration. Separation. Solution.<sup>SM</sup>*

# VENTING IS ALL AROUND US

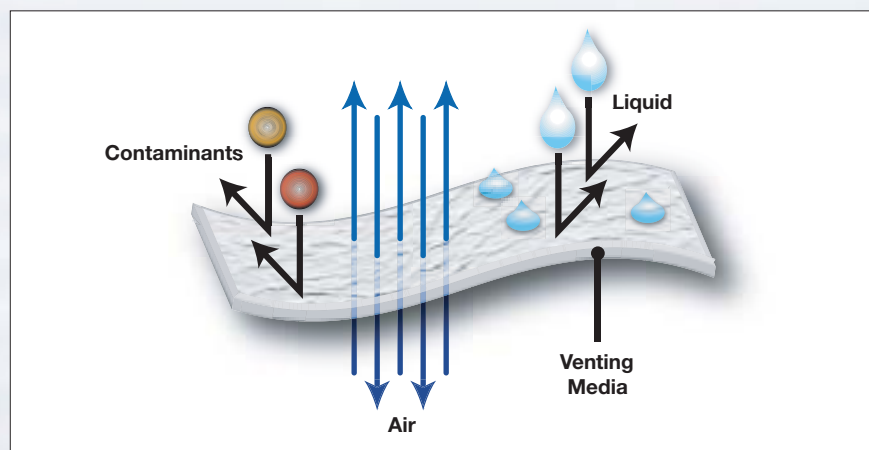
The background of the page is a complex, abstract composition. The top half features a dark blue gradient. Below this, the left side is a vertical band with a dark blue, textured surface resembling water droplets. The right side is a lighter blue area with soft, ethereal light rays emanating from the top right. In the center, there are several overlapping, semi-transparent geometric shapes: a large circle, a smaller circle, and a ring-like structure. The overall aesthetic is clean, modern, and technical.

Vents are everywhere—in our cell phones and computer hard drives, in the brakes and headlights on our cars, even in our shampoo and detergent bottles. They're often hidden from view, so they're easily overlooked and taken for granted. But without venting, many of the items we use each day would malfunction, break, or become contaminated.

In the manufacturing environment, certain processes and equipment depend on venting to improve efficiency; others would not function without it. The long-term benefits of industrial venting—more effective processes, improved product, and reduced product loss—add up to significant, ongoing cost savings.

# VENTING FUNDAMENTALS

Venting involves the transport of air, gas, or vapor through a porous hydrophobic and/or oleophobic medium, into and out of a confined area. The medium serves as a barrier against infiltration and contamination from debris, moisture, microorganisms, and other undesirable elements. Venting can prevent the overheating and pressure destabilization that can occur during the manufacturing process or within a product during normal use.



*Venting involves the passage of air through the medium while liquid and contaminants are repelled at the surface.*

## MEDIA SELECTION

The most suitable medium for a particular application depends on the application's venting requirements. Will the material be used for venting portable electronic devices, where high acoustic transparency is essential? For food packaging, where food contact regulation compliance is mandatory? Or for ABS brakes, where high mechanical strength is crucial? To meet the requirements of a wide variety of industrial applications, Pall offers venting media with different chemical compositions—PTFE, acrylic copolymer, polyethersulfone polymer, and glass fiber. These media are further characterized by their ability to repel water-based fluids (hydrophobic)<sup>1</sup> and oil-based fluids (oleophobic)<sup>2</sup>. We work with you to determine which medium is best suited for your application by assessing basic venting requirements as well as specific physical property and formatting requirements.

## INDUSTRIAL VENTING APPLICATIONS

Venting is particularly useful for manufacturers in the electronics, food and beverage, and transportation industries. Within each of these industries, there are numerous applications for which venting meets requirements, solves problems, or provides benefits. Its use has become more commonplace as manufacturers become aware of specific advantages for their applications and the varied capabilities of venting media. Refer to pages 4 and 5 for typical applications within your industry that use venting.

<sup>1</sup> Hydrophobic media repel high surface tension liquids such as water, and generally will not wet out in aqueous solutions such as salt water, rain, and cola.

<sup>2</sup> Oleophobic media repel both low surface tension and high surface tension liquids. They generally will not wet out in oil-based solutions such as gasoline, brake fluid, transmission fluid, and most other automotive fluids and lubricants.

<sup>3</sup> Repel™ treatment is Pall's proprietary process by which oleophobic properties are imparted to membranes.

## Find your venting solution

### Hydrophobic products

#### Emflon® PTFE membrane

This versatile, hydrophobic membrane remains permanently resistant to high surface tension liquids while venting gases. It is available in two formats: unsupported or laminated to polyester or polypropylene support materials.

#### Pallflex® media

Each product in the Pallflex family of hydrophobic media is uniquely comprised of glass fibers and other hydrophobic materials. Some Pallflex media undergo treatment that imparts oleophobic properties. Pallflex media exhibit a wide range of airflows and water intrusion pressures. This flexibility makes them extremely useful for venting applications. Additionally, they are easily welded (sonically or thermally) into industrial devices.

### Oleophobic products

#### Supor® R membrane

The Supor R membrane is constructed of a modified polyethersulfone polymer that is cast on a non-woven polyester support and is Repel™<sup>3</sup> treated for superior oleophobicity/hydrophobicity. Non-wettable by most low surface tension liquids, the media is ideally suited for venting applications requiring a barrier to liquids while allowing high air flow.

#### Versapor® R membrane

This membrane is constructed of a modified acrylic copolymer that is cast on a thin, non-woven support and Repel treated for superior oleophobicity/hydrophobicity. The media is non-wettable by most low surface tension liquids, is sealable using a variety of techniques, and is very strong, making it extremely versatile.

*For product performance information, refer to page 6.*



# MEDIA REQUIREMENTS FOR VENTING APPLICATIONS

Each venting application requires media with specific characteristics. Whether your requirements are typical or unique, Pall can provide the media solution you need. We offer standard media suitable for typical venting applications, as well as customized media in virtually endless combinations of sizes and formats<sup>4</sup>. Please contact us if your application is not listed and you think that venting might be of benefit to you.

## Electronics Industry



Applications	Media Requirements	
Black boxes	<ul style="list-style-type: none"> <li>• Able to withstand wetting by automotive fluids</li> <li>• Insert moldable</li> </ul>	<ul style="list-style-type: none"> <li>• Resistant to temperatures within a wide range</li> <li>• Resistant to UV</li> </ul>
Electric motors	<ul style="list-style-type: none"> <li>• Clean media</li> <li>• Low back pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Low cost</li> </ul>
Electronic control units	<ul style="list-style-type: none"> <li>• Clean media</li> <li>• Easily die cut and sealed</li> </ul>	<ul style="list-style-type: none"> <li>• Good chemical resistance</li> </ul>
Portable electronic devices	<ul style="list-style-type: none"> <li>• Clean media</li> <li>• Easily die cut and sealed</li> <li>• High acoustic transparency</li> </ul>	<ul style="list-style-type: none"> <li>• Low back pressure</li> <li>• Low cost</li> <li>• Thin or low profile</li> </ul>
Hard drive absorbers and filters	<ul style="list-style-type: none"> <li>• Low back pressure</li> <li>• ULPA rated</li> </ul>	<ul style="list-style-type: none"> <li>• Very clean media (no trace amounts of silicon; no acid vapor or halogen contamination)</li> </ul>
Marine electronic enclosures	<ul style="list-style-type: none"> <li>• Easily die cut and sealed</li> <li>• High water intrusion pressure</li> <li>• Low back pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Resistant to salt water</li> <li>• Resistant to UV</li> </ul>
Sensors	<ul style="list-style-type: none"> <li>• Clean media</li> <li>• Easily die cut and sealed</li> </ul>	<ul style="list-style-type: none"> <li>• Good chemical resistance</li> <li>• Low back pressure</li> </ul>
Transducer protectors	<ul style="list-style-type: none"> <li>• Clean media</li> <li>• Easily die cut and sealed</li> </ul>	<ul style="list-style-type: none"> <li>• Good chemical resistance</li> <li>• Low back pressure</li> </ul>
Wafer FOUPs <sup>5</sup> and carriers	<ul style="list-style-type: none"> <li>• Low back pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Very clean media (no trace amounts of silicon; no acid vapor or halogen contamination)</li> </ul>

## Benefits of venting

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>• Contamination control</li> <li>• Cost savings</li> <li>• Design flexibility</li> <li>• High permeability rates</li> </ul> | <ul style="list-style-type: none"> <li>• Increased system reliability</li> <li>• Parts remain free of corrosion</li> <li>• Pressure equalization</li> <li>• Reactive surfaces are not poisoned</li> </ul> | <ul style="list-style-type: none"> <li>• Sensing surfaces are not fouled</li> <li>• Short circuits are prevented</li> <li>• Temperature stabilization</li> </ul> |
|--|---|--|

<sup>4</sup> For information about our standard media products, refer to page 6. For inquiries about custom products, please contact your regional Pall Industrial Materials representative or e-mail us at [industrialmaterials@pall.com](mailto:industrialmaterials@pall.com).

<sup>5</sup> Front Opening Unified Pod

## Food and Beverage Industry



### Applications

Liquid bottling: filling, packaging, shipping

Food packaging: processing, packaging, shipping

### Media Requirements

- Clean media
- Easily die cut and sealed
- Food contact certification
- Good mechanical strength
- Good repellency
- High permeability
- Clean media
- Good chemical resistance
- High temperature resistance
- Food contact regulation compliance
- Easily customized for unusual shapes

### Benefits of venting

- Contamination control
- Controlled air/gas exchange rate
- Cost savings
- Design flexibility
- High permeability rates
- Temperature stabilization
- Pressure equalization
- Higher throughput; increased fill rates

## Transportation Industry



### Applications

Antilock braking systems (ABS)

Fuel tanks; roll-over valve protection

Fuel tank pressure sensors

Headlights; tail lights

### Media Requirements

- High permeability
- High mechanical strength
- Highly repellent to automotive fluids
- Good chemical resistance
- High repellency to gasoline
- High vapor transmission rate
- Clean media
- Easily die cut and sealed
- Good chemical resistance
- Low back pressure
- Able to pass tests mandated by government and OEMs
- Easily die cut and sealed
- High mechanical strength
- High vapor transmission rate
- Highly repellent to automotive fluids

### Benefits of venting

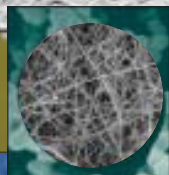
- Cost savings
- Contamination control
- Design flexibility
- High permeability rates
- Increased system reliability
- Parts remain free of corrosion
- Short circuits are prevented
- Pressure equalization
- Temperature stabilization

# PERFORMANCE OF VENTING MATERIALS

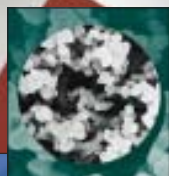
Emflon PTFE membrane



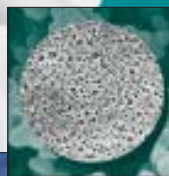
Pallflex media



Supor R membrane



Versapor R membrane



The information provided below relates to product performance. This data represents the range of capabilities within each product family. For additional information about any of the media, refer to the corresponding Industrial Materials data sheet on the Pall Website at [www.pall.com](http://www.pall.com).

## Membrane and Media Performance

	Emflon PTFE Membranes	Pallflex Media	Supor R (Treated PES) Membranes	Versapor R (Treated Acrylic Copolymer) Membranes
Pore size (µm)	0.2 - 1.0	0.3 - 60.0	0.2 - 0.45	0.2 - 10.0
Maximum airflow (sccm/cm <sup>2</sup> /psi) (Lpm/cm <sup>2</sup> /bar)	430 - 750 6.2 - 10.9	100 - 5200 1.5 - 75.4	160 - 570 2.3 - 8.3	160 - 9300 2.3 - 134.9
Water intrusion pressure (psi) (mbar)	35.0 - >90.0 2413 - >6205	0.25 - 28.0 17 - 193	24.0 - 49.0 1655 - 3378	0.5 - 34.0 34 - 2344
Average thickness (mil) (µm)	3.6 - 4.9 91 - 124	4.0 - 22.0 102 - 559	3.0 - 8.5 76 - 216	6.0 - 12.0 152 - 305
Oil repellency rating <sup>6</sup>	1 - 8	1 - 8	8	8
Sealing <sup>7</sup>	Compatible with heat, insert molding, compression fitting, radio frequency, and adhesives	Compatible with heat, insert molding, compression fitting, radio frequency, ultrasonic, and adhesives	Compatible with heat, insert molding, compression fitting, radio frequency, ultrasonic, and adhesives	Compatible with heat, insert molding, compression fitting, radio frequency, ultrasonic, and adhesives
Chemical resistance <sup>7</sup>	Highly resistant to almost all chemicals	Resistant to acids, bases, and many organic chemicals	Resistant to acids, bases, and many organic chemicals	Resistant to bases and many organic chemicals
Thermal stability <sup>8</sup>	Maximum temperature= 149°C (300°F)	Maximum temperature= 230°C (450°F)	Maximum temperature= 121°C (250°F)	Maximum temperature= 121°C (250°F)

<sup>6</sup> Based on results of testing using AATCC (American Association of Textile Chemists and Colorists) Test Method 118-1989

<sup>7</sup> Refer to the Sealing Guide and the Chemical Compatibility Matrix at [www.pall.com/industrialmaterials.asp](http://www.pall.com/industrialmaterials.asp)

<sup>8</sup> Temperature performance applies to compatible fluids only.

## ACHIEVE YOUR GOALS WITH MEDIA FROM PALL

Enhancing the efficiency of manufacturing processes and extending equipment life lowers operating and maintenance costs. Improving product durability, functioning, and usability preserves brand equity and reduces customer service expenses. To achieve these goals, vent your processes and products using high quality venting media.

Developed for strength and endurance, Pall venting media are suitable for challenging venting applications. We offer hydrophobic and oleophobic media of various dimensions and chemical compositions. This flexibility enables us to address different venting requirements across a wide range of applications. Whatever your venting requirements, we'll work with you to select media—whether standard or custom—that will produce the best results.

*Note: The information in this brochure is intended to serve as a guide. Users should verify the conditions appropriate to their specific use.*



**You trust Pall as your equipment supplier.**

**Trust us to be your materials provider.**





## Pall Corporation

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For more information about our products and services, please contact the Pall Industrial Materials representative for your region, or email us at [industrialmaterials@pall.com](mailto:industrialmaterials@pall.com)

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**Visit us on the Web at [www.pall.com](http://www.pall.com)**

**Pall Corporation has offices and plants throughout the world.**

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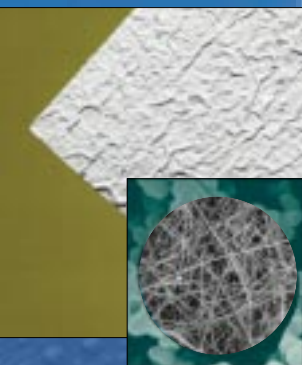


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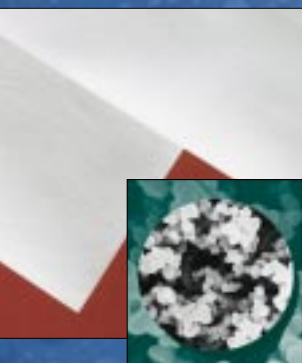
Emflon PTFE membrane



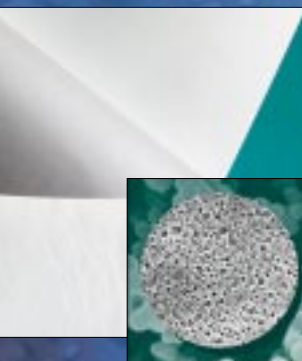
Pallflex media



Supor R membrane



Versapor R membrane



## CHECKLIST FOR MATERIALS SELECTION

### BASIC VENTING REQUIREMENTS

1. Is the rate of gas transport important? ☐ Yes ☐ No
2. What is the required liquid intrusion pressure? (Circle one.)  
psi                  bar                  kPa                  in. of water column
3. Which contaminants can adversely affect device performance?
4. What are the characteristics of the liquid contaminants? Of the solid contaminants?  
(For solids, include size.)

### PHYSICAL PROPERTY REQUIREMENTS

1. What temperature range is anticipated in the assembly phase? In the application phase?
2. What is the typical chemical environment? What other chemicals may be present and at what concentrations?
3. What burst pressure is anticipated?
4. Are there tensile strength and/or processability requirements? ☐ Yes ☐ No
5. What are the chemical cleanliness or biosafety requirements for the membrane?
6. What are your sealing requirements? (Circle as many as apply.)  
Heat    Insert molding    Compression fitting    Radio frequency    Ultrasonic    Adhesives



## FORMAT REQUIREMENTS

### 1. Does your application require media in a standard format?

Slit roll? Describe your slitting specifications. (Pall's standard slitting specifications range from 0.4375 in/11.11 mm to 30 in/762 mm, in multiples of 0.031 in/0.788 mm.)

Disc? Describe your disc specifications. (Pall's standard disc diameters range from 0.32 in/8 mm to 11.5 in/293 mm, in circular format.)

Sheet? Describe your sheet specifications. (Pall's standard sheet widths range from 0.5 in/12.7 mm x 0.5 in/12.7 mm to 30.0 in/762 mm x 30.0/762 mm.)

### 2. Does your application require media in a custom size or shape? Please specify.



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