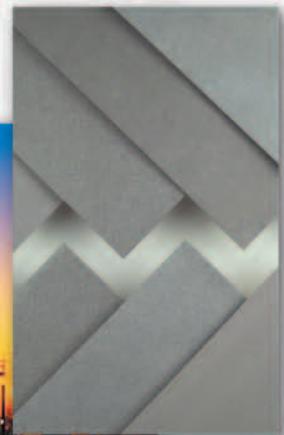
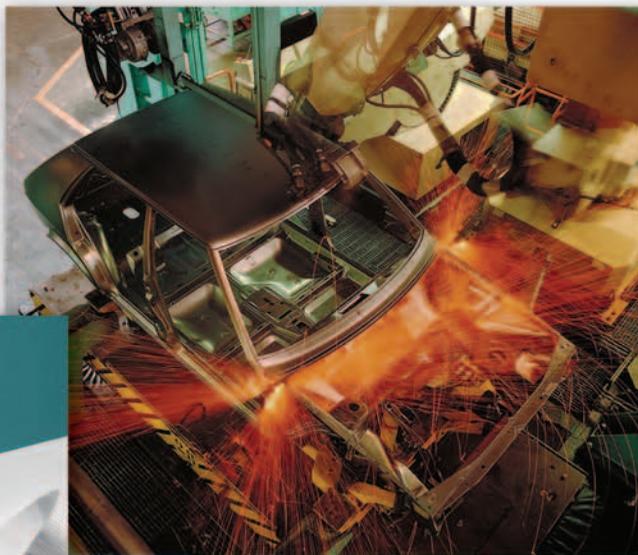




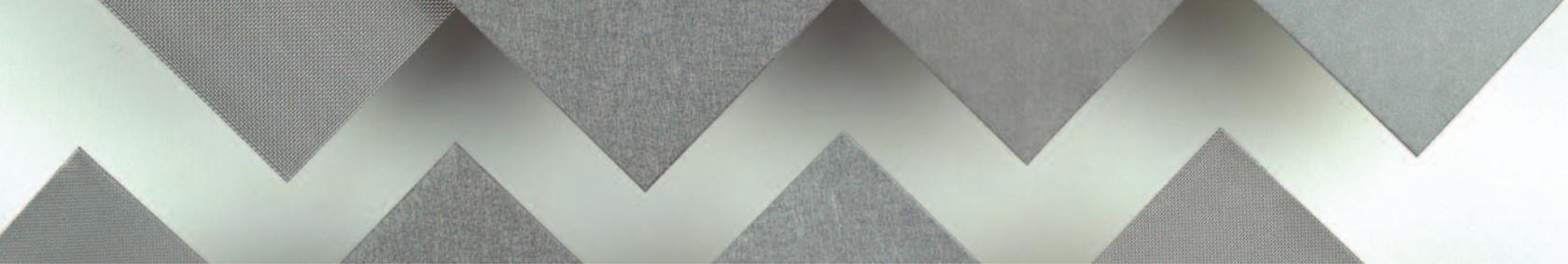
Pall Corporation

# Industrial Materials — Applications, Products, and Technologies

Technologically advanced, materials-based solutions for a wide variety of applications



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



*We deliver innovative, dependable, and customized material solutions to meet the unique needs of diverse markets.*

## PALL CORPORATION – A LEADER IN MEDIA DEVELOPMENT

Design engineers are continually faced with the difficult task of creating a superior product that can be priced to compete in today's demanding marketplace. Achieving this goal requires exceptional materials with proven performance, reliability, and consistency. All of Pall's proprietary filtration, separation, venting, and protection media are designed, developed, and manufactured under the strictest quality controls.

Materials must be carefully selected for their effectiveness in particular applications. Each application is unique, and media selection is an art as well as a science. We work in partnership with our customers to assess their specific needs and help them select materials that will enhance their products.

Pall understands your challenges, and we have solutions. Our innovative media can help optimize product performance and improve development and manufacturing processes through reduced costs and greater efficiency. Regardless of the type of product or application, our large selection of high-quality media and our extensive experience in the field enable us to provide you with unique, practical, and effective solutions.

### **How can our industrial material solutions benefit you?**

Our position at the forefront of media development has been hard earned. Pall's technical specialists, scientists, and engineers have advanced training and years of experience in materials science and manufacturing processes. Ongoing and effective communication among our R&D scientists, field engineers, and sales professionals ensures that our customers benefit from the most recent developments in membrane, fibrous, and sintered materials.

We keep our finger on the pulse of media technology, tracking trends and identifying new opportunities, which are both cause and effect of our technological advances. Our innovative media enable customers to develop or manufacture new products, or manufacture existing products in a new way, and as a result, expand into new markets and grow their businesses.

### ***Why Pall?***

Established more than 60 years ago, Pall Corporation has grown to be the largest and most diverse filtration, separations, and purification company in the world. Our global presence is far-reaching, and our product portfolio and technical expertise are extensive.

Pall offers a variety of products and services to help you position yourself at the top of your industry. Our staff scientists and engineers provide services and conduct research and development, with intensive, broad-based assistance from Pall's worldwide technical support network. Our experts work directly with you to determine how Pall products and technologies can benefit your processes. As part of your customized Total Fluid Management<sup>SM</sup> solution, Pall products and services are recommended to streamline your operations and help you gain an edge in this increasingly competitive marketplace.

### ***What is Total Fluid Management?***

Total Fluid Management (TFM) is the integration of properly selected filtration and separation equipment and services into a production process to yield the highest efficiency at the lowest cost. Pall's Total Fluid Management program consists of a wide range of filtration products, advanced technologies, and services to improve system operation and increase productivity.

## APPLICATIONS

The challenges customers face depend upon the specific applications or products involved and are frequently quite different. That's why Pall's material solutions are customized for each application and the individual requirements of each customer. With our extensive filtration and separation experience in traditional process systems and nontraditional applications, customers from a wide range of markets turn to us for innovative and dependable material solutions.

### Functional materials

- Acoustical/thermal
- Bleeder cloths
- Gaskets and seals
- Moisture/vapor barriers
- Specialty textiles
- Test medium
- Venting — hydrophobic
- Venting — oleophobic
- Vibration control

### Environmental

- Wastewater — aeration
- Wastewater — processing
- Well screens — extraction
- Well screens — remediation

### Industrial process

- Biological and catalytic porous substrates
- Bulk materials fluidization and fluidizing beds
- Bulk materials handling and storage
- Combustion/burner pads
- Drum filters
- Homogenization/mixing
- Hot gas surface filters for particle separation
- Ink jet
- Polymer filtration
- Silencers/mufflers

### Energy

- Fuel cells
- Gas separation



## ENGINEERED SOLUTIONS

When applications are highly unique, engineered solutions are often necessary. At Pall, we have the ability to customize media for performance, format, and configuration.

### *Surface modification*

Using surface modification, we can produce media that meets your specific performance requirements. Our specialty is the optimization of chemical compatibility, temperature stability, wettability, particle removal efficiency, and flow rates.

### *Conversion capabilities*

We have the capability—both independently and through partnerships—to convert the format of our material to accommodate your unique design needs.

### *Sealing methods*

Our sealing experience, unmatched in the industry, enables us to address your unique configuration requirements. We can integrate Pall products into a wide variety of configurations such as cartridges, capsules, patches, high-volume molded parts, and sealed electronic enclosures.

## Material customizations

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Surface modifications	Hydrophilic Oleophobic/hydrophobic Surface charge Surface chemistry
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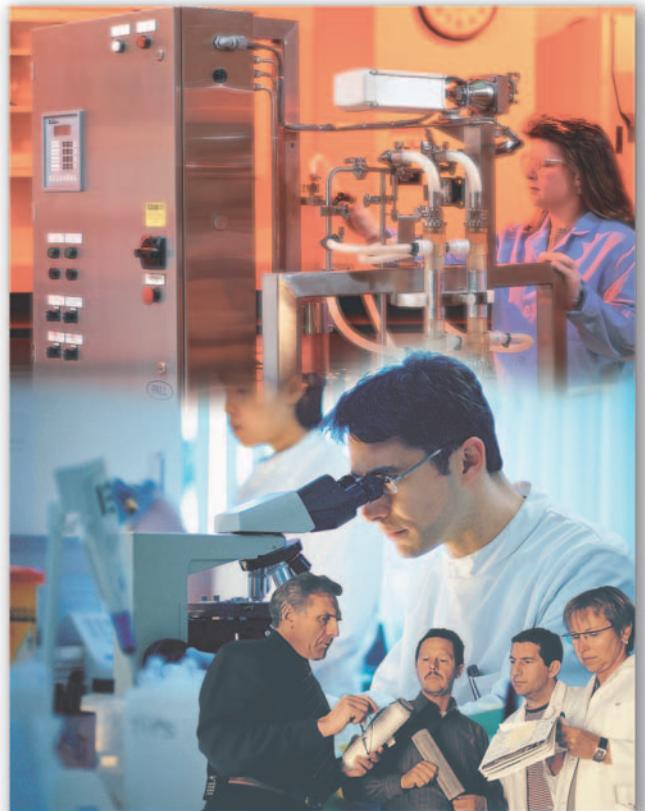
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Conversion capabilities	Calendaring Die cutting Lamination Slitting Specialty converting
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Sealing methods	Adhesive sealing Heated dies Insert molding Mechanical sealing Radio frequency Ultrasonic
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## MEDIA

To develop superior products, design engineers require exceptional materials with proven performance, reliability, and consistency. Pall offers a variety of innovative, customized solutions to facilitate product development across a broad range of applications and industries. Our media conforms to the strictest quality standards, and can be engineered to exact specifications and manufactured in various sizes and formats.

Product	Technology	Characteristics
Versapor® R membranes	Cast membrane	<ul style="list-style-type: none"> <li>• Durable</li> <li>• Oleophobic/hydrophobic</li> <li>• Unlimited processing options</li> </ul>
Supor® R membranes	Cast membrane	<ul style="list-style-type: none"> <li>• Highly uniform porosity</li> <li>• Oleophobic/hydrophobic</li> <li>• Wide chemical compatibility</li> </ul>
Emflon® PTFE membranes	Expanded membrane	<ul style="list-style-type: none"> <li>• Hydrophobic</li> <li>• Wide chemical compatibility</li> <li>• Wide temperature compatibility</li> </ul>



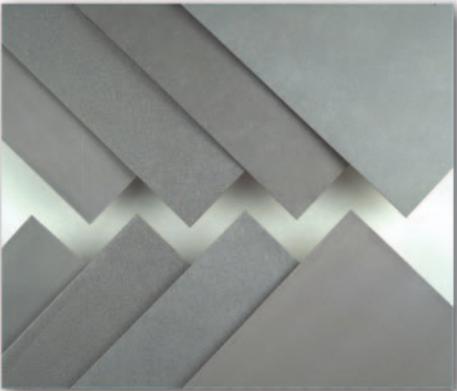
Supor R cast membrane  
(in sheet and disc formats)



Emflon PTFE expanded membrane



Pallflex wetlaid fibrous media



Fibermet airlaid fibrous metallic media



Brandol sintered ceramic media  
(in cylinder and disc formats)

Product	Technology	Characteristics
Pallflex® hydrophobic media	Wetlaid fibrous media	<ul style="list-style-type: none"> <li>• Excellent strength</li> <li>• Excellent permeability</li> <li>• Oleophobic/hydrophobic</li> </ul>
Fibermet™ filtration media	Airlaid fibrous metallic media	<ul style="list-style-type: none"> <li>• Extended onstream life</li> <li>• High operating pressures and temperatures</li> <li>• Low pressure drop</li> </ul>
Schumasoil® HDPE products	Sintered media	<ul style="list-style-type: none"> <li>• High chemical resistance</li> <li>• High permeability for water, soil vapor, and solvent phases</li> <li>• Highly porous, with a homogeneous and uniform pore structure</li> </ul>
Schumapor B ceramic products	Porous ceramic sintered media	<ul style="list-style-type: none"> <li>• Abrasion resistant</li> <li>• Highly porous</li> <li>• Wide temperature compatibility</li> </ul>
Brandol® ceramic products	Sintered media	<ul style="list-style-type: none"> <li>• Excellent oxygen capacity (OC) and oxygen efficiency (OE)</li> <li>• Long life</li> <li>• Low pressure drop</li> </ul>
Accusep® filter elements	Sintered media	<ul style="list-style-type: none"> <li>• High permeability</li> <li>• High strength</li> <li>• Seamless, tubular format</li> </ul>



Schumapor sintered ceramic media



Accusep sintered metal media



## TECHNOLOGY PLATFORMS

Pall manufactures media using the widest range of technologies in the industry. To provide you with the optimal material solution, we carefully select the best manufacturing technology and material for your specific application. We hold patents on materials, and continue to explore patent coverage for new materials that demonstrate unique functionality.

### **Membrane manufacturing**

Membrane manufacturing technology plays a critical role in the production of high-quality, high-performance materials. At Pall, we optimize our process control techniques so that our cast and expanded membranes meet or exceed your expectations for quality and performance. Our membrane manufacturing platforms enable us to continually innovate and improve our materials.

Choosing Pall as your materials development partner can help you:

- expand capabilities
- reduce development time
- save money
- increase profitability
- deliver enhanced product performance

### **Fibrous media manufacturing**

State-of-the-art equipment and statistical process control techniques ensure our customers fibrous media of the highest quality. Our distinguished fibrous materials portfolio includes multiple polymer offerings with excellent permeabilities, and media with wide porosity ranges produced using meltblown, wetlaid, airlaid, and other technologies.

#### **Meltblown process**

Pall's method of fiberizing, protected as a trade secret, produces continuously graded flat sheet and depth media. We fiberize a variety of polymers to produce our meltblown media, and we offer several porosities and support material configurations within each polymer type.

#### **Wetlaid process**

With a wide variety of fibers and resins available, and the capability to blend them into hundreds of combinations, we can produce filter media with unique performance characteristics.

#### **Airlaid process**

Our airlaid process produces highly uniform metallic depth media for use in aggressive environments. Using our proprietary high-temperature sintering process, we can produce highly durable media with a specific efficiency rating and permeability, ensuring superior performance and extended service life in a variety of aggressive applications.

## Sintered media manufacturing

Within the materials industry, Pall is uniquely capable of producing sintered powder media and sintered fiber media. As a result, we have additional options to offer customers who face product or process development and improvement challenges. Our manufacture of ceramics, metallics, and composite media enables us to offer solutions for depth filtration, surface filtration, and crossflow filtration for liquid-liquid, gas-gas, and liquid-gas applications. With our diverse materials portfolio, we can offer numerous flexible options for design, prototyping, and full scale-up.

## Benefits of Pall Technologies

Technology	Platform	Benefit
Membranes	Cast	<ul style="list-style-type: none"><li>• Micron efficiency ratings from 100 <math>\mu\text{m}</math> down to ultrafiltration levels in liquids, with fast flow rates resulting from highly porous and asymmetric structures.</li><li>• Wide variety of polymer offerings to provide excellent chemical resistance, thermal characteristics, and surface treatments.</li></ul>
	Expanded	
Fibrous media	Meltblown	<ul style="list-style-type: none"><li>• Pore sizes ranging from 200 <math>\mu\text{m}</math> down to 0.3 <math>\mu\text{m}</math>, and void volumes of 40%-95%.</li><li>• Continuous and multiple fiber medium for ultraclean downstream fluids/gases and nonfiber shedding performance.</li></ul>
	Wetlaid	<ul style="list-style-type: none"><li>• Pore sizes ranging from 50 <math>\mu\text{m}</math> down to 0.1 <math>\mu\text{m}</math>, with excellent air flow, chemical resistance, and thermal characteristics.</li><li>• High dirt-holding capacity for long service life.</li></ul>
	Airlaid	<ul style="list-style-type: none"><li>• Micron efficiency ratings of 80 <math>\mu\text{m}</math> down to 3 <math>\mu\text{m}</math> in liquids, with high permeability.</li><li>• Wide selection of metal alloys and advanced alloys.</li></ul>
Sintered media	Formed and sintered Wetlaid and sintered	<ul style="list-style-type: none"><li>• Used in low-pressure chemical process industries, gas applications with blowback, biological and catalytic substrates, and high-pressure polymer filtration.</li><li>• Composite media formats available for resin bonded, glass fiber/resin, quartz/resin, high-density polyethylene (HDPE), metal fiber/powder, ceramic, and woven mesh.</li></ul>



## ANALYTICAL AND CONSULTING SERVICES

Against a backdrop of tougher competition and stricter environmental regulations, operating and production costs continue to rise. To control expenses, maximum efficiency is necessary and can be achieved by ensuring that your system and processes operate without a glitch. If they fail, downtime costs will mount quickly, and there may be significant product loss. At Pall, we are committed to providing real solutions to your system and process problems.

### Capabilities

Our scientists, engineers, and technical experts work with you to determine how our products, technologies, and services can improve your processes. Whether you need assistance with filter selection, troubleshooting, or process improvement, we can help. When our locally based technical specialists need additional resources, teams of Pall engineers and scientists, located around the globe, provide assistance.

Our consulting resources include:

- a global network of scientists and engineers, most with advanced degrees, representing a broad range of disciplines.
- state-of-the-art equipment such as scanning electron microscopes, mass spectrometers, and Fourier Transform Infrared (FTIR) spectrometers.
- laboratories, located worldwide, offering analytical services for a wide range of fluids.
- high-tech communication tools (software and intranet) for fast, efficient, 24/7 global information sharing.

### Offerings

Pall offers a variety of services to help you improve efficiency and lower costs.

- Academic community support
- Contamination reduction in final product
- Control sensor design
- Documentation
- Environmental consultation
- EPA compliance
- Filter steaming process validation
- Filtration system improvements (economy and efficiency)
- Grant proposal development
- Integrity test methodology evaluation
- Particle size analysis
- Plant filtration surveys
- Process improvement
- Process scale-up
- Product development
- Separation efficiency evaluation
- Steam-in-place procedure enhancement
- System troubleshooting
- Variable product analysis

## **MATERIALS AND SERVICES TO MEET YOUR NEEDS**

At Pall, our goal is to provide you with materials that meet your precise specifications, and services to help you optimize the performance of your products. We work with you to define your requirements by evaluating your processes, applications, and system. In addition to offering an extensive line of standard Pall media, we can create and manufacture media that is customized to your specifications for performance, format, and configuration. With a wide range of technologies available for materials manufacturing, we can develop the media you need to increase process efficiency, reduce development time, improve economics, and enhance your product.

Contact Pall today to find out about materials solutions customized for your applications.



***You trust Pall as your equipment supplier.  
Trust us to be your materials provider.***



## Pall Corporation

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

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