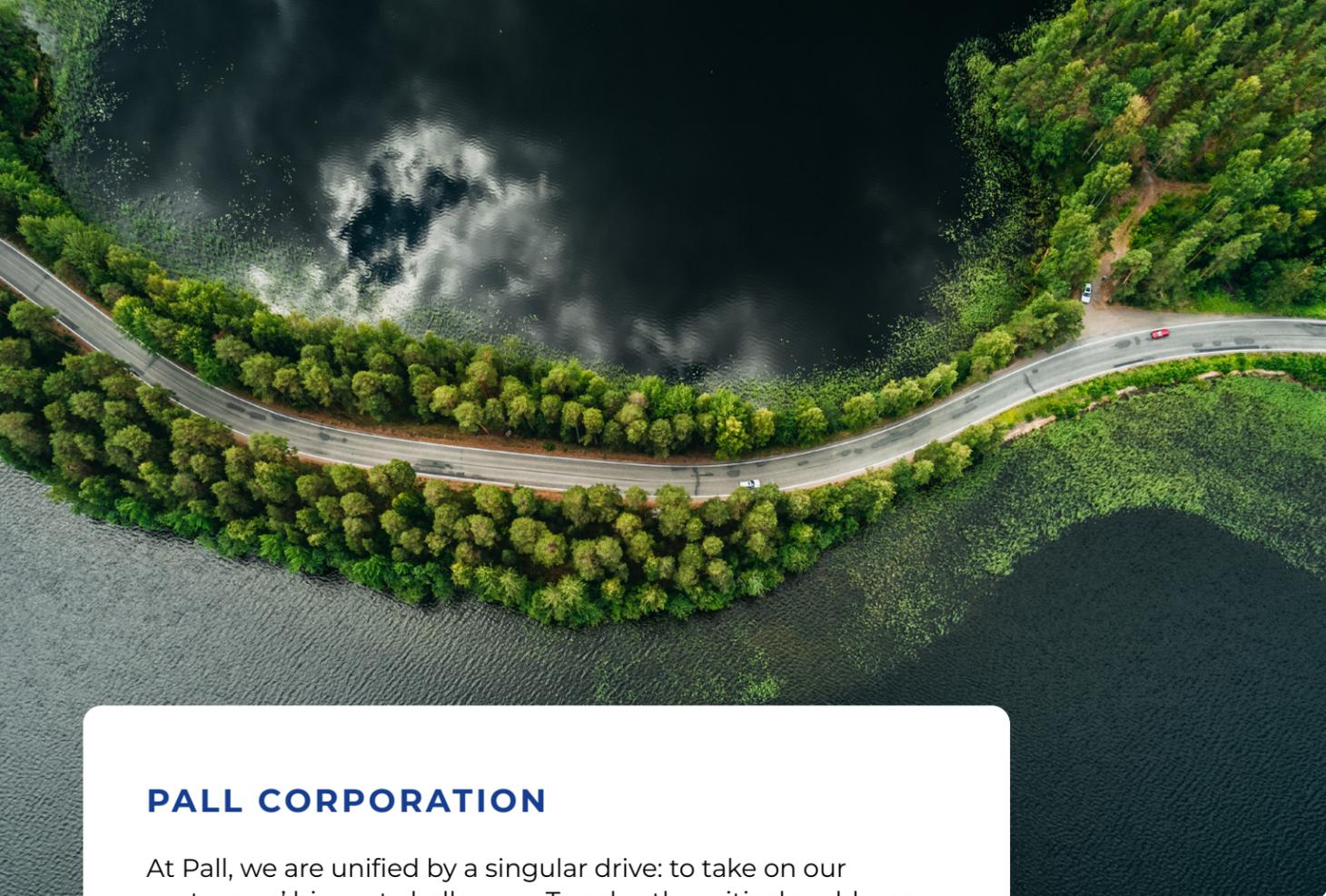




**The  
unsolvable,  
solved.**

**PALL** PALL CORPORATION



## PALL CORPORATION

At Pall, we are unified by a singular drive: to take on our customers' biggest challenges. To solve the critical problems that stand in the way of advancing health, safety and the environment.

Where others see something that can't be done, we jump in fully committed to do it. We push the limits of science and technology. We redefine partnership through deeper, more meaningful collaboration.

It's how we've approached our calling since 1946. And why today you'll find our filtration, separation and purification solutions at work in so many places.

**From airplane engines to hydraulic systems. Scotch. Smartphones. OLED screens. Paper.**

Every day Pall is there, helping protect critical operating assets, improve product quality, minimize emissions and waste, and safeguard health.

No matter what, no matter where, we innovate and collaborate to deliver the one thing our customers need most:

The unsolvable, **solved**.

## HISTORY

Pall Corporation is a global leader in high-tech filtration, separation, and purification, serving the diverse needs of customers across a broad spectrum of industrial applications.

Pall was founded in 1946 to develop and market one of Dr. David B. Pall's early inventions, a porous stainless-steel filter. In the fifties and sixties, Pall was a supplier of filters principally for aircraft and chemical process industry use. These products increased aircraft safety and made new chemical innovations possible.

## TIMELINE OF INNOVATION



**1947**

Dr. Pall invents porous stainless steel and founds the company that will become Pall Corporation.



**1959**

Rigimesh® filter media is developed by Pall for the protection of Boeing 707 hydraulic systems.



**1971**

Blood filters based on the Pall Ultipor® filter media are introduced to protect cardiac patients from microemboli, improving post-operative outcomes.

**1958**

Pall's filters provide protection for hydraulic systems on Jupiter C booster.



**1969**

Pall develops a spacesuit heat exchanger and lunar module filtration for the Apollo 11 mission.



**1979**

PMM® filter media is developed as a clean-up solution for Three Mile Island Nuclear Power Plant site.



# PALL CORPORATION

## EXPONENTIAL GROWTH

Pall underwent an expansion in the seventies to service electronic, power generation and food processing industries.

## PALL'S IMPACT

More than just a filtration, separation and purification company, Pall is a trusted partner to organizations who are committed to advancing safety, improving quality and enabling people to a live healthier life in a cleaner environment.

Pall's innovative portfolio of products and solutions are key to the reliability of industrial equipment.

Pall is a key supplier to the innovative and demanding semiconductor and consumer electronics industries and provides filtration products used in critical applications on commercial and military aerospace vehicles.

Pall's engineered solutions help industrial customers address mounting water quality, scarcity and demand issues, and help energy companies maximize production and develop commercially successful next-generation fuels. Additionally Pall's food and beverage products enable production of cost effective, consumer-safe, shelf stable products.

# SOLVING CUSTOMER'S MOST COMPLEX CHALLENGES

## FOCUSED EXPERTISE

We have deep knowledge, application experience, and are passionate about solving demanding problems that are critical to the success of your business.

We are relentlessly innovating to stay at the forefront of the market.

## END-TO-END APPROACH

We provide a complete set of technologies from consumables to customizations to new inventions, have an end-to-end view of our customer's entire process for a right fit, optimized, and sustainable solution, and are able to apply our acumen and products across many demanding industries.

## COMMITTED ALLY

We are invested in our customer and partner relationships, consulting and collaborating the relationship from any number of our global locations through our SLS and technical sales organizations from initial consultation through support.

Additionally, we provide reliable performance and value, and have a long, stable legacy with global reach.



**1988**  
Pall introduces its leukoreduction filters to combat post-transfusion fever and allergic reactions.



**1990**  
Dr. Pall is awarded the National Medal of Technology.



**1993**  
The BB25 breathing circuit filter is launched to prevent contamination of ventilating equipment. It becomes critically important in fighting the spread of SARS and Avian Flu.



**1995**  
Pall Corporation introduces the DV50, the first validated virus-retention cartridge filter for the pharmaceutical industry.



**2020**  
To combat the global pandemic, Pall Corporation joins a consortium to rapidly develop a COVID-19 vaccine.

**1989**  
Pall's Scientific and Laboratory Services develops filtration and maintenance standards for hydraulics systems on the Eurotunnel boring machines, ensuring reliable operation under challenging environmental conditions.



**1991**  
Pall's engine air intake vortex system provides protection for the military's helicopters and vehicles in harsh conditions during operation Desert Storm.



**2006**  
Pall's Acrodose™ PL System is introduced to increase the safety and availability of life-saving platelets.



**2021**  
Pall innovates to support sustainability in all aspects of business, from electric vehicles to more efficient production lines.



## KEY MARKETS

### MICROELECTRONICS TECHNOLOGIES

Microelectronics filtration solutions reduce operating and maintenance costs, drastically improve overall equipment effectiveness (OEE) and availability, extend chemical life, reduce defects and maximize product quality and yields. Pall filtration systems have successfully integrated their proven systems in microelectronics to reduce the cost, increase the reliability and maximize the efficiency of electronic manufacturing processes. Solving these challenges directly impacts operation uptime, maintenance frequency, product quality, the life of capital equipment and overall business performance.

### FOOD & BEVERAGE

Product quality is critical for the food and beverage industry, and while the requirements vary across each market segment, the commitment to safety is constant. From producing dairy products to ensuring the integrity of each unique bouquet and flavor intensity in a bottle of wine, every day Pall is there, helping customers improve product quality, maximize yield, reduce operating costs, and safeguard health.

# 1,100+

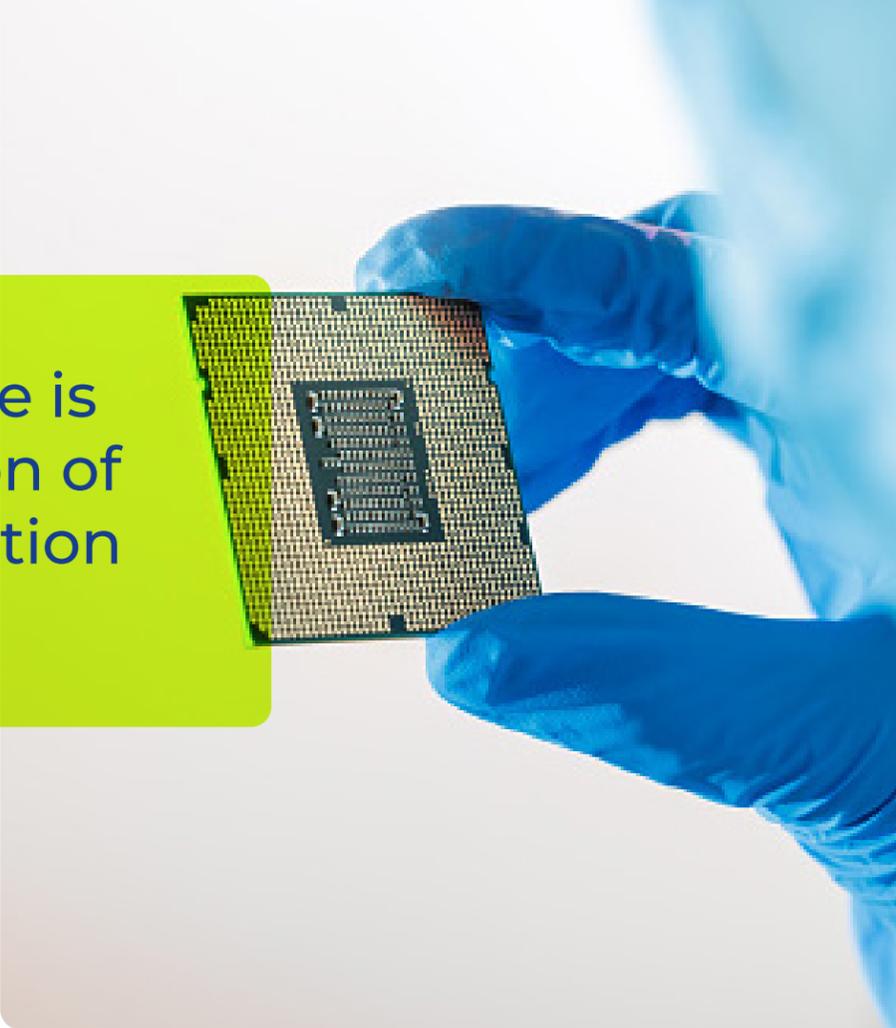
U.S. patents since our founder Dr. David B. Pall's first application in 1945. Pall's commitment to technology leadership is evidenced by our state-of-the-art manufacturing processes, ground-breaking product offerings, unique SLS global technical support group, and our enviable patent portfolio.

### AEROSPACE & MARINE

We provide filtration, separation and purification solutions to meet the needs of a broad spectrum of aerospace, defense and marine customers around the globe. Our industry-leading contamination control technologies are at work in countless aerospace and defense applications, protecting critical operating systems, improving component reliability, and safeguarding health through air and drinking water purification.

### ENERGY

The energy market spans a wide array of applications and processes which present a variety of unique challenges. Proper filtration, separation and purification methods are essential in order to achieve the highest productivity and quality. Within the oil & gas industry, our products deliver premium filtration and fluid separation performance to ensure high-quality results from extraction, to pipeline, to refining. Users of manufacturing equipment depend on us to keep their oils, lubricants and fuels clean to achieve continuous and reliable operation. And while asset protection is a key part of all industries, the power generation industry relies on Pall to maximize the equipment reliability and power output in order to minimize costly outages.



Materials science is at the foundation of filtration, separation and purification

#### Filtration Evolution

Filtration technology has evolved from a straightforward sieve process.

Pall's unique approach to media design and membrane technologies drives innovation in the industrial space.

#### Media Expertise

Essential to providing the filtration, separation and purification technologies that are part of complex manufacturing processes.

Pall has developed leading-edge computation to design filters tailored to specific customer needs.

#### High Performance

Pall's high-performance media aligns to a broad range of customer processes and applications.

Purification is growing increasingly important as the demand for higher performing semiconductor chips are needed to fuel global technology.

#### Custom Media

Custom media characteristics are becoming increasingly important for advanced applications.

Our proprietary 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.



## PALL SOLUTIONS FOR MICROELECTRONICS

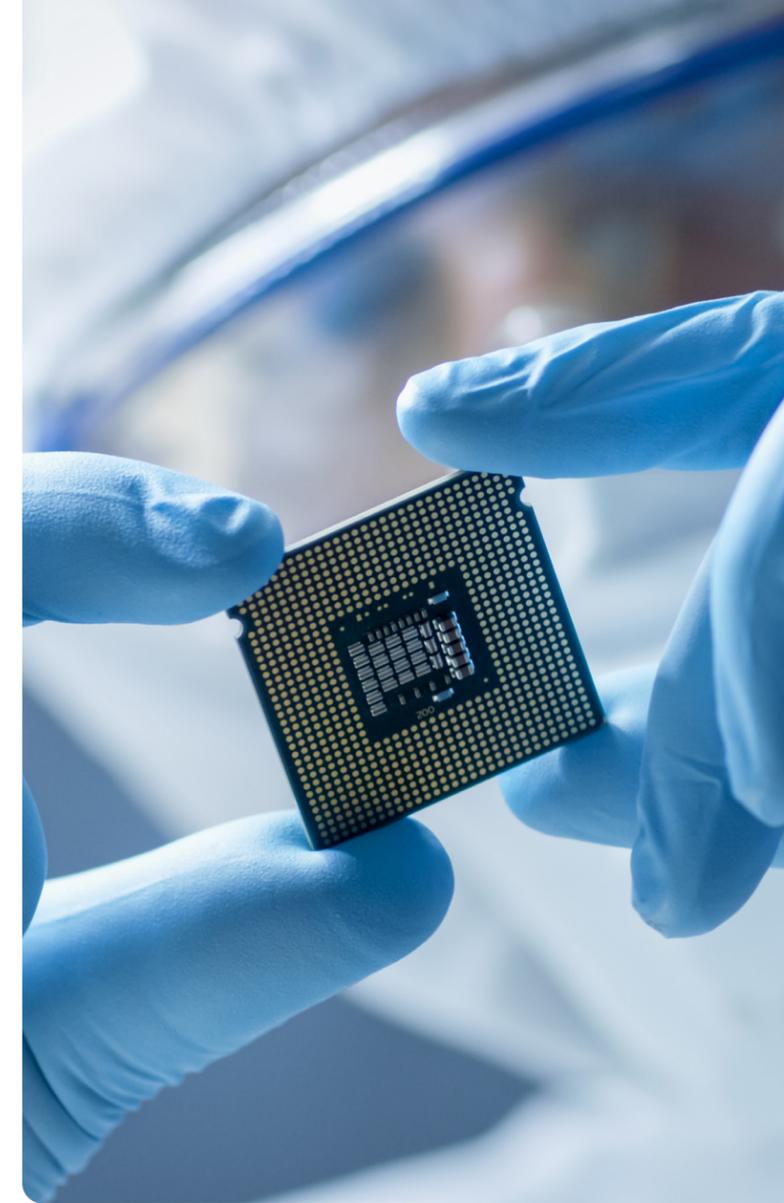
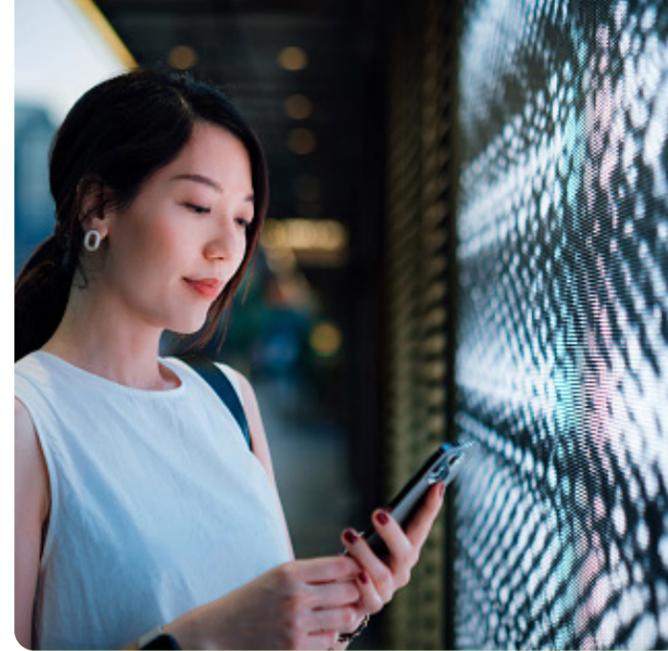
Semiconductor device yields have long been impacted by impurities in fluid and gas streams. As process nodes continue to shrink and feature sizes and geometries become more complex, sensitivity to contamination during the manufacturing process has increased significantly. Impurities such as metal, particulates and hydrocarbons directly impact each step of the process thereby resulting in higher process rinse up volumes, more chemical usage, costly downtime, and significant reduction in line yield.

Advanced Node semiconductor manufacturing requires extremely clean fluid streams, thereby driving need for high-end filtration and purification solutions. Tighter contamination control can significantly improve yield; a marginal improvement in yield means millions in net profit for the fab.

Manufacturing of semiconductors is a highly interdisciplinary process involving physics, chemistry, electricity, electronics, metallurgy and more. For advanced nodes, the purity of silicon used for semiconductors can be as high as 99.999999999% (eleven nines).

Pall's microelectronics business serves filtration and purification needs for photochemical resists, ultrapure water, slurries, wet etch chemicals, inks, solvents, gases used in semiconductors and electronic components manufacturing. Pall filters and purifiers provide a line of defense to prevent defect-causing impurities from reaching the wafers and substrates. Our microelectronics products provide filtration, purification and separation solutions across a broad range of applications and industries:

- Semiconductors
- Wet etch & cleans
- Lithography
- CMP
- Ultrapure water
- Gas
- Electronic Components
- Data Storage
- Displays
- Graphic Arts



## PTFE 1 nm

### XpressKleen™ 1 nm filters

Novel membrane design with PTFE media enables next-generation retention performance, optimized flow and significantly improved cleanliness to reduce start-up time.



#### Ultipleat® SP DR Filters

provide advanced 2 nm retention in critical surface preparation chemical baths such as HF and BOE. The asymmetric pore design, developed using Pall's proprietary membrane modeling technology, reduces flow resistance and provides longer service life.



#### The PhotoKleen™ EZD filter

assembly is designed for clean, simple, safe and fast filter change-outs in point-of-use photochemical dispense applications.



#### Gaskleen® filters and purifiers

remove unwanted particles and moisture from bulk and specialty gases used in the manufacture of high-tech devices.



#### XpressKleen™ 1nm PTFE filters

remove contaminants from harsh processing chemicals that are required in semiconductor manufacturing processes.

## FEATURED PRODUCTS

## PALL SOLUTIONS IN ENERGY TRANSITION

We are committed to helping advance the production of green hydrogen, biofuels, energy storage and plastics recycling, utilizing a wide range of separation and purification solutions. While these and more established renewable and low-carbon energy resources such as wind, nuclear and solar present a long-term path to achieving our net-zero targets, the on-going effect of fossil fuel emissions remains a critical problem for the world to resolve. Pall supports the carbon capture, utilization and storage (CCUS) sector where each approach has unique filtration and separation needs that can be addressed using Pall technologies.

### OIL AND GAS

From upstream solids removal and fluid separation, to midstream compressor reliability, to the precision downstream refining processes – oil and gas filtration requirements are incredibly diverse. Coalescer systems deliver superior solids removal and fluid separation in the up- and midstream segment that aids in preventing contaminants from damaging pipelines and process equipment. Filtration for lubricant oil systems ensure midstream compressor reliability in LNG processes to minimize down-time as well as preserve the life of capital equipment. Phase separation and particulate removal in the downstream segment promotes high efficiency refinery processes that maximize production output

### CHEMICALS AND POLYMERS

Effective and reliable separation and filtration of feedstocks, intermediate products and recycled process fluids at various points in chemical and polymer processes are paramount to improving end-product quality as well as extending the life of capital equipment and reducing costly downtime. From the purification of feedstocks and final product to the removal of contaminants during intermediate steps of polymer production, we offer premium filtration and separation solutions specifically designed to streamline process efficiency and improve business performance.

### INDUSTRIAL MANUFACTURING

We offer a variety of solutions across the industrial manufacturing sector. Our products allow customers using hydraulic and lubrication systems to achieve cost-effective, efficient operations while maintaining the strict quality standards, high volumes, equipment reliability and tight production deadlines required for these industries.

### POWER GENERATION

Power plant customers worldwide rely on Pall's products to purify water, oils and gases at every stage of the power cycle, maximizing equipment reliability

and power output while reducing outage times and operational costs. For gas turbine operators, Pall's turbine filter solutions are proven to reduce mechanical wear and extend bearing life. Nuclear plants use specialized Pall filters to reduce the impact of out-of-core radiation and improve operator safety while maintaining the highest cleanliness standards.

### PRODUCT IMPROVEMENTS AND PLATFORM ENHANCEMENTS

Pall offers a wide range of solutions addressing applications across the energy, oil & gas, chemicals & polymer, power generation, and industrial manufacturing industries

- Global offices with over 600 Energy<sup>+</sup>-focused associates in 34 countries
- Industry-leading direct sales team with deep application knowledge partnered with a vast distribution network to ensure product availability
- Specialized design engineering capabilities to support custom solutions

Unique service offerings including:

- Rentals
- Lab Services
- Field Pilot Testing
- Clean Element Solutions



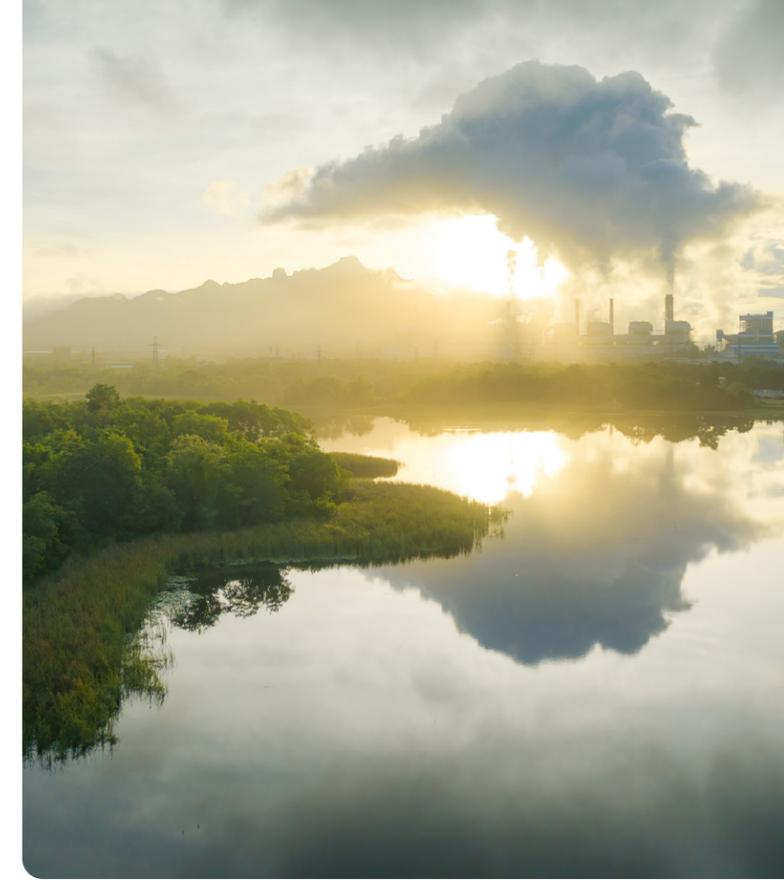
#### SepraLYTE™ Liquid Gas Coalescers

SepraLYTE™ liquid/gas coalescers have been specifically designed for Green Hydrogen production processes, to separate electrolyte aerosols from hydrogen gas at minimal pressure drop and in a small footprint.



#### Ultipleat® High Flow Technology

The Ultipleat filter's unique crescent-shaped pleat geometry, combined with its large diameter and proprietary range of available Pall filter media, allows you to use significantly fewer filters and smaller housings for particulate removal in high flow-rate applications.



## FEATURED PRODUCTS

- Coreless large diameter cartridge, synthetic construction, minimizes waste disposal
- High flow rate per filter cartridge
- Up to 40 times fewer cartridges to change out
- Up to 50% smaller filter system possible
- Absolute-rated filter medium for reproducible performance
- Features proprietary unique crescent-shaped pleat geometry and handle for easy cartridge replacement

## PALL SOLUTIONS FOR AEROSPACE

No one knows aerospace filtration technology the way we do. With expertise in protecting every critical piece of fluid equipment on an aircraft and experience with virtually every aerospace and defense program that requires fluid filtration and separation, Pall's aerospace business has consistently evolved along with the industry, and the group proudly stands as the world's largest aerospace and defense filtration solutions provider.

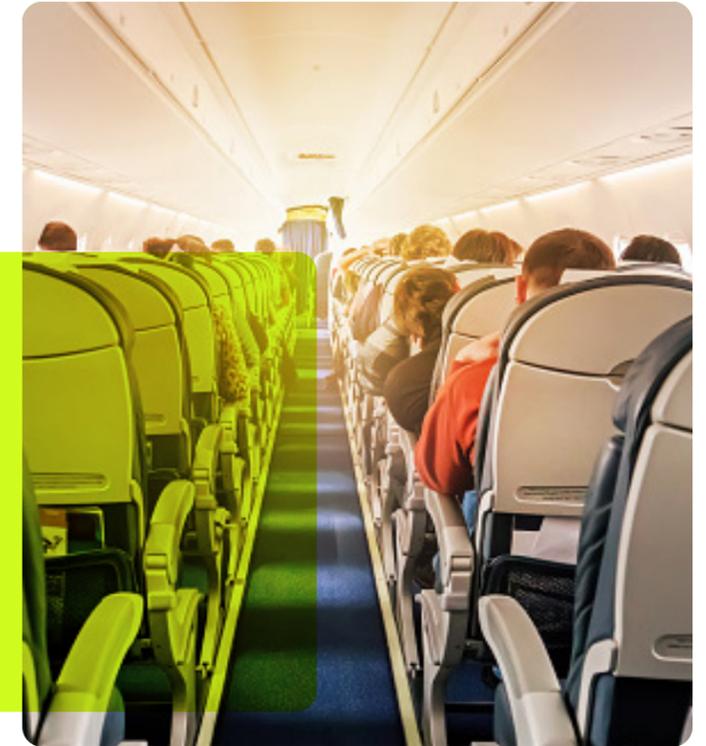
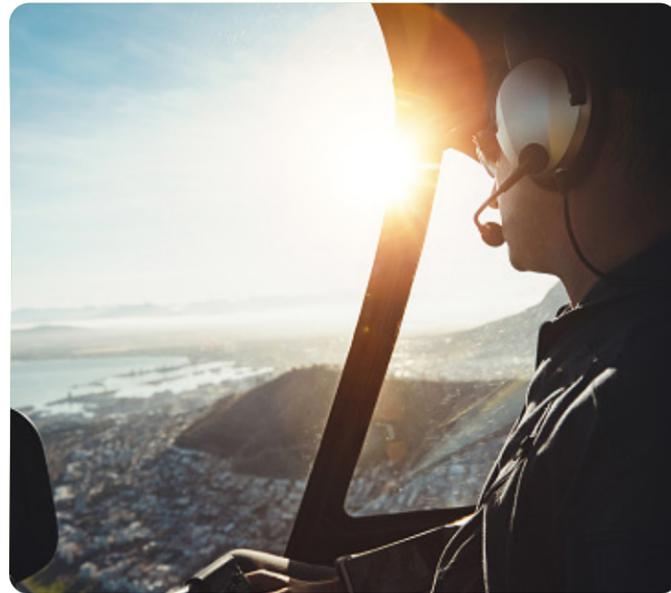
We have been designing, testing and writing industry standards and solving aerospace filtration challenges since 1968. Pall's integrated organization, including design, manufacturing and testing allow us to offer unique solutions and technical consultation based on generations of experience. As the aerospace industry adapts to meet net zero emission targets, we at Pall are innovating to ensure new technologies have the same level of protection, reliability and performance as traditional applications have relied upon for decades.

We are dedicated to applying innovative technologies to solve complex filtration problems at sea.

Pall filters protect the fluid systems of naval ships from damaging contamination, ensuring mission readiness and increased reliability, maximum performance with minimum maintenance and safety. These systems are vulnerable to contamination that can cause wear and

corrosion of equipment, leading to malfunctions and in some cases mission critical failures. Crew and marine missions are also significantly reliant on access to fresh water, and utilize Pall's innovative Membrane Filtration Freshwater Generators - which enable production of fresh water from a wide variety of raw water sources.

Our next-generation technologies are suited for a wide range of applications within the aerospace, defense and marine industries, bringing robust contamination removal solutions wherever needed.



# 99.993%

virus and bacteria removal rate of Pall's state-of-the-art **Advanced Cabin Air Filters (ACAF)**, which combine HEPA filtration with HPAC (High Performance Activated Carbon), further increasing cabin air quality.

We provide filtration and separation solutions for a broad range of industries:

- Commercial aircraft
- Military aircraft
- Helicopters
- Military vehicles
- Marine platforms
- Hybrid and Electric vehicles

To protect a wide range of systems including:

- Engine Air intakes
- Avionics (E/E) Cooling
- Cabin Air
- Fuel
- Hydraulic
- Lubrication
- Transmission
- Water purification

## FEATURED PRODUCTS



**Aerospace Filter Elements** are designed specifically to meet the needs of each application. Our long life, high performance elements improve operating reliability and system performance by providing effective contamination control for hydraulic, fuel, lubrication and cooling systems.



**MFRO (Membrane Filtration Reverse Osmosis)** solutions produce safe drinking water for various commercial and military platforms from a variety of water sources with high levels of contamination.



**Commercial and Military Mobile Hydraulic Fluid Purifiers** are a breakthrough in preventive maintenance, saving operators money and time by ensuring operation of aircraft without downtime caused by fluid contamination.



**Aerospace Engine Air Inlet Filters** help address the main reasons for premature helicopter engine failure by minimizing the impact of engine erosion, corrosion and FOD (Foreign Object Damage).

## PALL SOLUTIONS FOR FOOD & BEVERAGE

From enabling longer shelf-stability of beer and wine to recovering valuable proteins from food and dairy waste streams, our food and beverage mission is to help our customers produce consumer-safe, food and beverage products at the highest efficiency. While the requirements vary across each market segment, our commitment to safety is constant. Every day Pall is there, helping customers improve product quality, reduce operating costs and safeguard health.

With our unique breadth and depth of application knowledge and a diverse product offering in critical applications, Pall leverages our strong global network to apply learnings and innovation in one industry to accelerate innovation in others.

Additionally, with consumers shifting their spending towards more sustainable products and companies, food and beverage manufacturers now look to reduce CO2 emissions, water consumption, product loss and waste streams. As a forward-looking company, Pall has solutions that benefit the environment and help customers achieve their sustainability targets, leveraging digitalization and internet of things (IoT) to improve performance.

To support a global focus on food safety and stricter regulations, Pall has qualified a specific range of food contact compliant products to cover a broad range of applications from coarse clarification to sterilizing filtration with documentation readily available on our website.



## FOOD & BEVERAGE SYSTEMS

As customers increase their production volumes, they often look towards more automated solutions to improve product quality, efficiency, consistency and yield.

Pall systems for clarification, stabilization and microorganism removal allow food and beverage producers to optimize their processes at the lowest total cost of ownership.



Our new **Oenoflow™ PRO system** takes wine clarification digital. In addition to providing predictive analytics and remote operation, our first IoT-enabled system is equipped with our proprietary algorithms based on years of operating experience to maximize run time and cost.

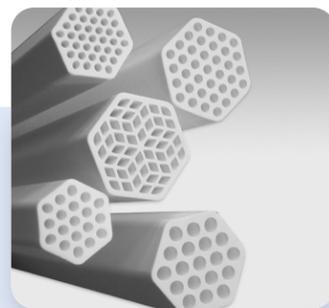


The new **Continuous Beer Stabilization (CBS) System** is a flexible polyphenol stabilization solution from batch to continuous operation, providing precise stabilization effectiveness at the lowest cost and with negligible beer losses.

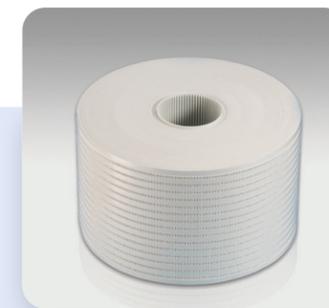


Pall's **PROFi membrane systems** are modern and sustainable, DE-free filtration systems for beer clarification that minimize operational costs, waste, water usage and energy consumption.

## FEATURED PRODUCTS



**Membralox® Ceramic Modules** for treatment of large volumes with high throughput for dairy products, sweeteners, food ingredients and beverages.



**SUPRApak™ Modules** are a cost-effective alternative to flat sheet filtration for distilled spirits, beer and food ingredients.



**Fuente II filter cartridges** utilize laid over pleat technology as a final filter for bottled water to give longer filter life and lower filtration costs.



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