



Pall Corporation

# Total Cleanliness Management

for the Automotive,  
Industrial Manufacturing,  
and Aerospace Industries



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

# Total Cleanliness Management

## A Program for Process Improvement

Automotive, industrial, and aerospace manufacturers are under constant pressure to reduce costs and improve operations and profits. To accomplish this, manufacturers must regularly seek new ways to improve efficiency, while continuing to deliver high-quality products at profitable prices.

Pall can play a key role in this continuous improvement process. The Total Cleanliness Management (TCM) program is designed to offer our customers products and services that optimize productivity, reliability, quality, safety, and environmental protection, while reducing overall operating costs.

Pall has more than 60 years of industry and application experience to identify process inefficiencies and provide solutions that directly address them. Our strength comes from our ability to design, manufacture, install, and service integrated systems that can improve efficiency by treating incoming, process, and waste streams.

Through TCM, Pall can help you improve your processes and gain a stronger competitive edge.

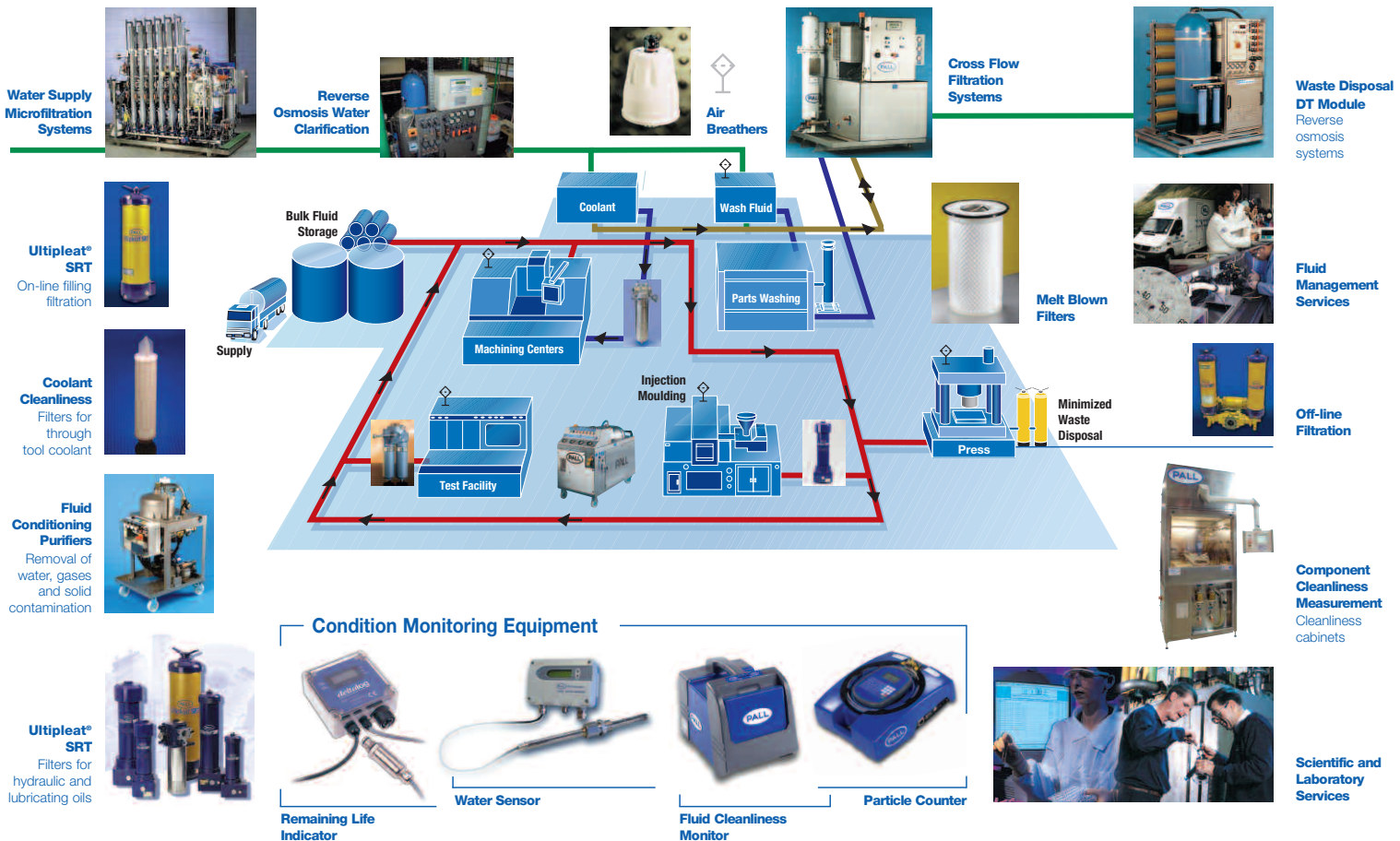
## The Goals of Total Cleanliness Management

Maintaining specified levels of fluid and component cleanliness is at the heart of the Total Cleanliness Management program. Fluid and component cleanliness can have a major effect on the reliability of the components and systems involved, ultimately impacting the overall efficiency of the operation. To this end, Pall has developed a comprehensive program that applies our expertise in cleanliness management and provides true value to our customers.

Pall's Total Cleanliness Management program offers:

- Improved **profitability** of customer processes
- Enhanced product **quality**
- Improved **cleanliness** and service life of fluids
- Effective identification of problems and **solutions**
- Reduced downtime through improved equipment **reliability**
- Environmental protection through **reduction of waste**
- **Education** in cleanliness and filtration techniques
- Effective **supply chain management**
- **Reduced total cost of filtration** through process improvements and standardization
- **Reduced warranty costs**

## Total Cleanliness Management in Practice



# A Modular Program Designed to Meet Our Customers' Requirements

Work with Pall to select the best module or modules to meet your specific needs.



## **MODULE 1: Evaluation and Assessment**

The first step in the Total Cleanliness Management program is a thorough evaluation and assessment of the target processes. This provides a benchmark to begin the program.

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## **MODULE 2: Component Cleanliness**

In relation to the cleanliness of produced and bought in parts, Pall can provide Audits, Consultancy, Training, and a range of Cleanliness Measurement Equipment.

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## **MODULE 3: Service**

Pall offers a variety of standard services and customized services to enhance equipment reliability and improve process performance. Contact a Pall representative for a complete list of service offerings.

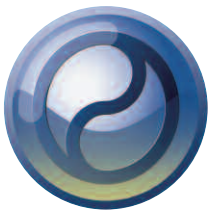
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## **MODULE 4: Training/Seminars**

Regular training of personnel is critical for efficient operation, profitability, and regulatory compliance. Training is conveniently offered on-site or at one of Pall's specialized training facilities.

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## **MODULE 5: Solution Implementation**

Filtration solutions and process optimization is at the core of the Total Cleanliness Management program. Our experts understand fluids and processes and the critical role they play in operations. They are trained to uncover inefficiencies and recommend cost-effective solutions.

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## **MODULE 6: Integrated Supply**

Pall has developed an advanced integrated supply program which provides cost benefits through optimization of logistics and purchasing of filter materials. Our partnerships within the filtration industry make this possible, allowing us to supply 100% of our customers' filtration and separation needs.

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## MODULE 1: Evaluation and Assessment

This critical first step includes:

- Complete fluid analysis
- Equipment survey
- Review of current cleanliness standards
- Documentation of existing filtration practices
- Costs and replacement frequency of the filtration elements and other related equipment

Following evaluation, Pall will provide a list of recommendations that can be implemented under the Total Cleanliness Management program. These recommendations become the basis of the overall program, which typically includes:

- Establishing/improving cleanliness standards
- Product rationalization
- Monitoring and measurement protocols
- Projected cost savings



## MODULE 6: Integrated Supply

- Reduced spending on filter buys
- Fewer part numbers to manage through standardization of products
- Fewer stock items and smaller stock volumes
- Single contact/partner for all filtration needs
- Easier purchasing process
- Improved inventory management



## MODULE 5: Solution Implementation

Pall can help you implement the process improvements and cost-savings that you desire. Together, working as a team, we are able to provide and implement real solutions and clear improvements. The benefits of our customized solutions include:

- Formulating and executing process improvements
- Developing, validating, and achieving cleanliness specifications
- Providing laboratory services and expertise through our global support network
- Increasing the overall quality of products
- Developing consistent and reliable processes
- Supplying and commissioning cost-effective filtration solutions
- Identifying training needs and establishing suitable training solutions



**Reduce total process costs!**



## MODULE 4: Training/Seminars

Training seminars and workshops are offered in the following disciplines:

- Filtration fundamentals
- Best practices in filtration and maintenance procedures
- Fluid cleanliness standards
- The influence of fluid cleanliness in lube & hydraulic applications
- The influence of fluid cleanliness in process applications
- Cost-savings opportunities through TCM
- Cleanliness control
- Customized training programs



Pall's Total Cleanliness Management provides cost-saving benefits by traditional integrated solutions.



## MODULE 2: Component Cleanliness

### 1. Contaminant Extraction

Key to managing component cleanliness is the measurement and analysis of contaminants in production parts. Pall's Cleanliness Cabinets (PCC) are self-contained units designed to provide accurate and repeatable measurements of contaminants on manufactured parts. PCC's can provide a comprehensive assessment of product cleanliness.

### 2. Analysis Services

Contamination analysis is critical to understanding the source and the root cause of component failure. Options for evaluation include:

- Scanning electron microscopy (SEM)
- Image analysis
- Particle counting
- Gravimetric analysis

### 3. Workshops

Pall workshops educate participants on contamination fundamentals, analysis methods and procedures, contamination control solutions, and much more. Pall's workshops cover important topics including:

- Component cleanliness fundamentals
- Extraction and measurement methods
- Effects of component cleanliness on product quality and warranty costs
- ISO standards, specifications, etc.
- The role filtration plays in CCM

### 4. Cleanliness Consultancy Services

As part of these services, Pall provides:

- Process analysis/assessment and interpretation
- Qualification analysis
- Formulation of expertise and supplier ratings
- Laboratory and service capabilities
- Process improvement suggestions and execution of those suggestions



PCC041-NG Cleanliness Cabinet

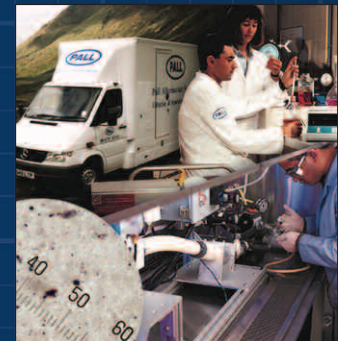


management (TCM) program  
fits beyond those offered  
supply programs.



## MODULE 3: Service

- Commissioning/start-ups
- Fluid condition monitoring
- System upgrades
- Flushing operations
- R&D
- Field testing
- Rental services
- Corrective maintenance
- Troubleshooting
- Preventative maintenance



Fluid Conditioning Monitoring – fluid analysis services



# Product-Based Solutions



Through TCM, our experts may recommend the use of Pall's products, as part of an overall, broad-based solution. The consistent, reproducible field performance of Pall's products, coupled with Pall's experience in applying their products to specific applications, is often a critical component in achieving the anticipated gains in customer processes and profitability. A sampling of these products includes:



## Melt Blown Filter Technologies

Recommended for industrial applications to treat water, fuels, aqueous solutions, and low viscosity process fluids. Pall's melt blown filters are available in depth, fan-pleated, and patented laid over pleat (Ultipleat®) designs.

**Products:** Profile® II filters, Nexis® A and T Series filters, Profile filters with Ultipleat construction, Poly-Fine® ARD filters, Claris® filters, Poly-Fine XLD filters, Marksman™ XLD filters, Ultipleat High Flow filters, Profile Star filters

## Pleated Filter Technologies

Pall's high surface area pleated cartridges offer excellent retention characteristics and high contaminant-holding capacity at low differential pressures. Pleated filter technologies are available in ranges from 0.2 to 150 micron and beyond. In many applications these cartridges provide customers with ease of use and the lowest operating cost.

**Products:** Duo-Fine® II, P, and E Series filters, Poly-Fine II filters, Marksman PFT and DFN Series filters, Ultipor® GF Plus filters, Micropak™ PF, CF, and DF Series filters



## Marksman Filter Cartridges

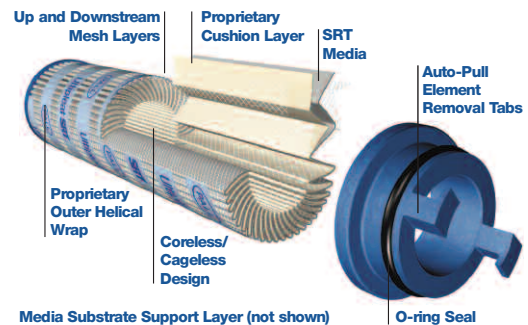
Marksman filters provide high-performance cartridge filtration with the ease of use offered by a filter bag. Marksman filters offer easy conversion and a dramatically increased surface area for extended filter life. Implementing the Marksman filter within the targeted application can assist with improved part and fluid cleanliness, extended time between filter change-outs, and increased time between fluid disposal, for lower overall costs and improved cleanliness. Marksman filters are available in a variety of grades ranging from 1 to 150 micron.

**Products:** Marksman DFN, PFT, XLD, and NXA Series filters

## Ultipleat SRT Filters

Ultipleat SRT filters offer revolutionary filter technology for hydraulic and lube applications. Their features include smaller size, increased resistance to system stresses, high flow capability, and an ISO code filter rating based on SAE ARP4205. Customer benefits include improved cleanliness control and increased equipment protection.

**Products:** Ultipleat SRT family of filters





## Purifiers

Pall's fluid conditioning purifiers remove 100% of free water and entrained gases, and up to 90% of dissolved water and gases from hydraulic and lube oils, dielectric fluids, phosphate esters, and quenching fluids. Flow rates for Pall's purifiers range from 4.5 to 165 lpm (1.2 to 45 gpm).

**Products: HNP and HVP Series purifiers**



## Monitoring and Measurement Equipment

Obtaining accurate and reliable fluid cleanliness data quickly in order to detect abnormal contamination is a key factor in ensuring the efficiency of industrial processes and reducing downtime. Pall offers a variety of products to accomplish this.

**Products: PCM400W Portable Cleanliness Monitors, PFC400W Portable Particle Counters, WS04 and WS08 Water sensors**

## Breathers

Breather filters are used to protect reservoirs from airborne particulate contamination. Breathers can also be used to remove incoming water with a desiccant-filled PFD vent filter/dryer that uses an isolation valve to only dehydrate incoming air, resulting in longer life.

**Products: 0293 Breather filters, PFD Series Vent filters/dryers**



## Membrane Technologies

Pall offers a variety of membrane filtration technologies. Ceramic membrane filters span micro- and ultra-filtration applications. Ceramic elements have excellent filtration efficiency at high flux values (good for oil/water separation). In addition, their high-temperature resistance enables them to be used in a wide range of applications. Hollow fiber membrane systems are also used in a variety of micro- and ultra-filtration applications. These systems are known for their mechanical strength, are oxidant resistant, and are highly permeable.

**Products: Microza\* hollow fiber membranes, Schumasiv™ ceramic filter elements, Clarisep™ oily wastewater separators**

## Metallic Filters

Pall's metallic product portfolio includes state-of-the-art fiber metal media, powder metal media, wire mesh, and composites of metal powder and wire mesh. All of our metallic media products are highly regarded for quality and performance.

**Products: Dynalloy® filters, Dynamesh™ filters, PMF™ filters, PMM® filters, PSS® filters, Rigimesh® filters**



\*Microza is a registered trademark of Asahi Kasei Corporation.

## About Pall Corporation

For more than 60 years, Pall Corporation has been solving complex contamination problems for diverse customers around the world. With revenues of more than \$2 billion, Pall is the largest and most diverse filtration, separations, and purifications company in the world. Our products and services allow customers to meet regulatory requirements and increase output while reducing total cost of ownership. Our enabling technologies help make customers' products better, safer and even possible.

With offices in more than 30 countries, we are well-positioned to provide assistance to customers on the local level, as well as offer broad-based, worldwide support when needed. At the core of our support network is our Scientific and Laboratory Services (SLS) department, an extensive global network of scientists and engineers who are experts in their field.

We invite you to learn more about Pall's wide array of products and services.

For more information contact your Pall representative or visit us on the web at: [www.pall.com](http://www.pall.com).

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