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LUBRICANT CHEMISTRY MANAGEMENT

TEACHING THE WORLD A BETTER WAY.

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LUBRICANT CHEMISTRY MANAGEMENT

Eliminate lubricant-related failures with our Lubricant Chemistry Management solutions.

LUBRICANT CHEMISTRY MANAGEMENT

ASSET AVAILABILITY, PREDICTABILITY AND RELIABILITY ARE CRITICAL

Uptime and availability are key performance indicators for critical turbomachinery. These critical assets must be available at a moment's notice 100% of the time. What is missing from this equation is that turbine lubricant maintenance focuses on particulate removal only, leaving oil chemistry in an unmanaged state.

ELIMINATE LUBRICANT-RELATED FAILURES

From the first day a lubricant is put into service, it begins to chemically break down, impairing its physical properties and performance. EPT Clean Oil partners with you to address the root cause of lubricant breakdown, applying science and solutions to transform the way industrial lubricants are used and maintained. We call this Lubricant Chemistry Management.

MANAGE UPTIME

Lubricant Chemistry Management places a protective shield over your critical assets. Going beyond particulate removal, we apply technology that actively eliminates chemical breakdown products including varnish precursors and oxidation materials, managing the oil chemistry in your system on a permanent basis and eliminating lubricant-related failures.

DELIVER UNMATCHED RESULTS AND ASSET PERFORMANCE

Lubricant Chemistry Management delivers unmatched economic and environmental returns, mitigating failure costs and lubricant-related carbon emissions. Target the root cause of oil breakdown and failure, and take your maintenance program to the next level.

Maintaining high-quality lubricants ensures that equipment operates smoothly and efficiently, protecting against costly and unexpected downtime.

Effective and proactive Lubricant Chemistry Management is key to preventing oil degradation, significantly extending the lifespan of essential fluids and ensuring optimal performance.

Lubricant Chemistry Management is your smart choice for cutting maintenance costs and reducing the need for frequent lubricant replacements, ensuring more efficient and economical operations.

Lubricant Chemistry Management significantly reduces waste and emissions by extending the lifespan of lubricants, paving the way for more sustainable operations.

SPECIALIZED OIL ANALYSIS AND EVALUATION

Our Fluid Technical Center is your answer center, providing in-depth evaluations and root cause analysis specific to your application.

Effective maintenance programs for critical rotating equipment and hydraulic systems start with performing the right tests at the appropriate times, following relevant ASTM standards. By partnering with EPT Clean Oil and utilizing our Fluid Technical Center, you can establish a solid foundation that enhances the certainty and predictability of your maintenance strategy.

Our state-of-the-art Fluid Technical Center is staffed by professional and Ph.D. chemists who thoroughly assess the condition and remaining lifespan of your oil. In addition to oil analysis, we identify issues and offer tailored solutions through our proprietary ACE™ Assessment. With a strong focus on the performance of your critical production equipment, we provide a comprehensive overview of your fluid condition, along with in-depth evaluations and root cause analyses.

Whether you are working with rust and oxidation turbine oils, phosphate ester fluids, aeroderivative turbine oils, or anti-wear hydraulic oils, our team's expertise ensures that your fluids are optimized for maximum efficiency and reliability.

SEEING IS BELIEVING

At EPT Clean Oil, we don't just claim we can solve your oil-condition-related problems; we demonstrate our capabilities!

Our ACE assessment process identifies potential oil-related issues and demonstrates the impact that EPT Clean Oil technologies could have if implemented on-site. To achieve this, we have developed advanced lab-scale versions of our filtration skids, which enable us to clean your oil sample in the same manner we would your oil reservoir. Each in-service oil presents unique challenges, and our approach ensures that you can trust our recommended solutions will be effective for your specific application.

Optimize, extend, and align the lifecycle of your lubricant assets with maintenance schedules by collaborating with our power-generation-focused, ISO 17025 compliant Fluid Technical Center team.

PATENTED ICB® ION-EXCHANGE TECHNOLOGY

With thousands of installations worldwide and documented contaminant-removal results, patented ICB® ion-exchange technology combines best-in-class chemistry and materials to deliver the most robust filter available since 1992.

Patented ICB ion-exchange filters are specifically designed to eliminate dissolved oxidation molecules that can accumulate and cause mechanical issues in bearings, seals, and servo valves. These filters are highly effective, significantly improving oil performance and ensuring system reliability and production. They provide benefits that extend beyond simple acid and particle removal.

Originally developed in 1992 for phosphate ester fluids, EPT Clean Oil has since expanded the capabilities of ICB filters to accommodate a diverse range of lubricants and fluids. This includes Rust and Oxidation Turbine Oil, Phosphate Ester Fluid, Aeroderivative Turbine Oil, and Anti-Wear Hydraulic Oil.

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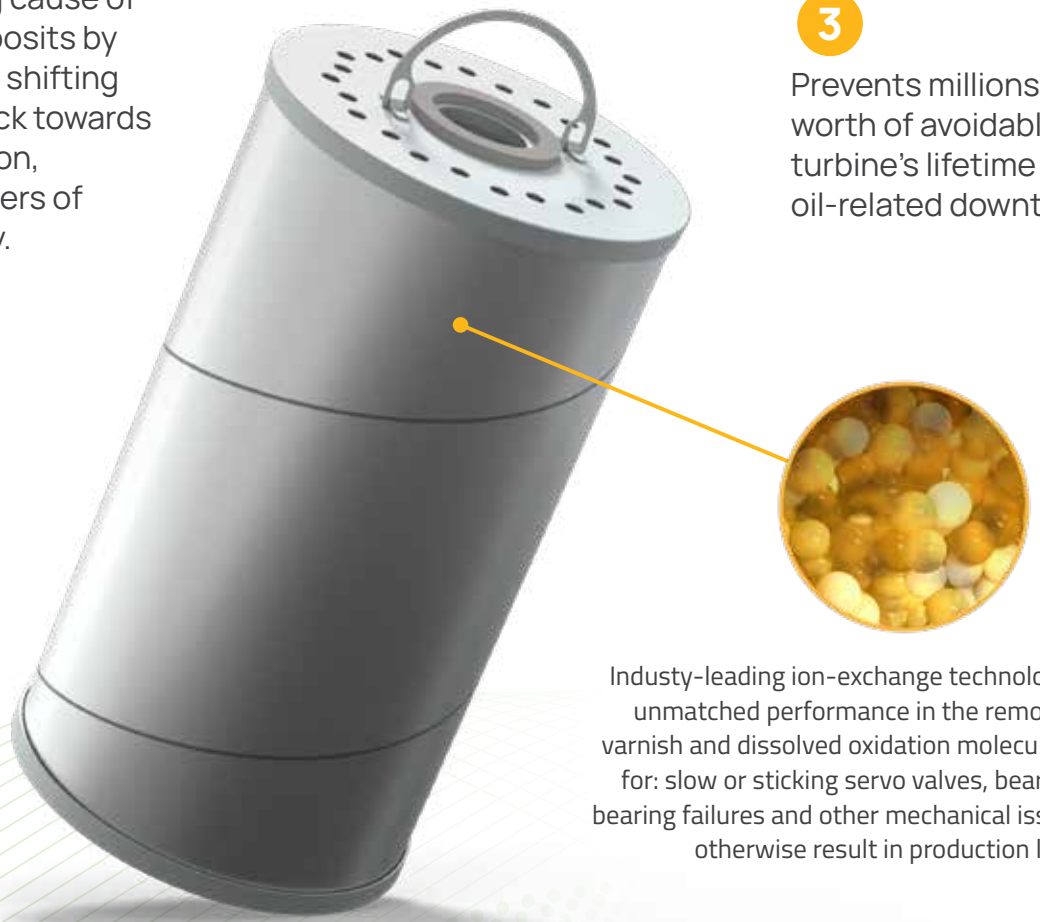
1

Removes the underlying cause of varnish and existing deposits by restoring fluid solubility, shifting chemical equilibrium back towards the original fluid condition, eliminating millions of liters of lubricant waste annually.

2

100% effective under normal turbine operating conditions when varnish tends to be dissolved in the oil, creating stability within lubrication and fluid systems, mitigating the risk of premature deterioration.



3

Prevents millions of dollars-worth of avoidable losses over a turbine's lifetime and eliminates oil-related downtime.

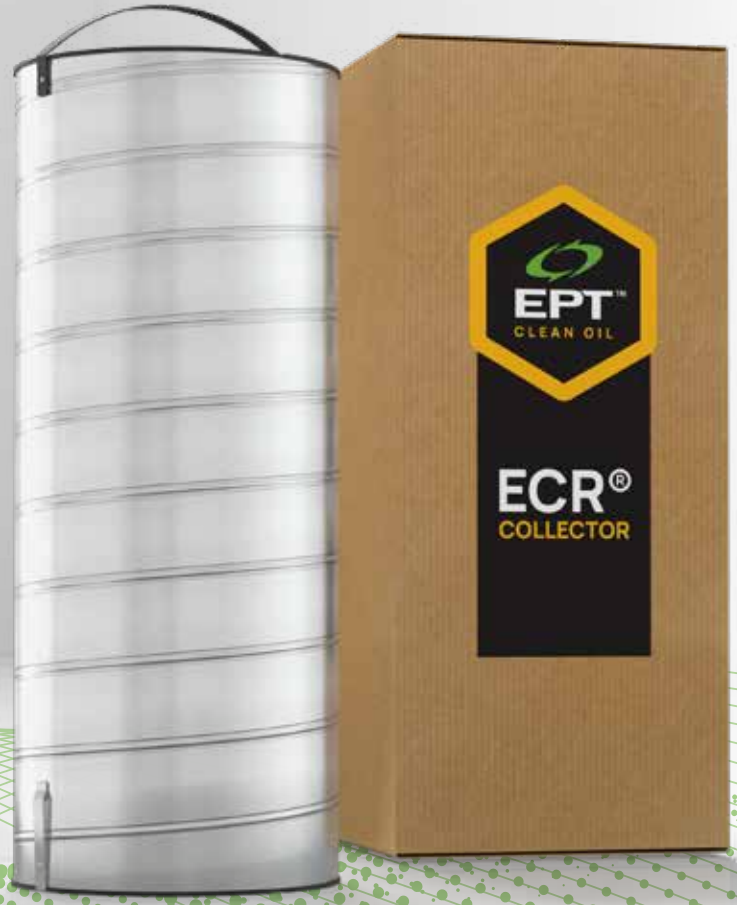
Industy-leading ion-exchange technology that offers unmatched performance in the removal of acids, varnish and dissolved oxidation molecules responsible for: slow or sticking servo valves, bearing deposits, bearing failures and other mechanical issues that would otherwise result in production losses.

ECR®
COLLECTOR

ECR® Collector elements are specifically designed for ECR electrostatic oil cleaners, offering an effective EHC filtration solution that targets sub-micron particulate removal.

ECR Collector elements are an industry-leading solution for the filtration of EHC fluids, designed to remove particles based on their weight rather than their physical size. This innovative approach effectively targets harmful contaminants that fall below the threshold of ISO 4406 particle counts.

For complete Lubricant Chemistry Management, ECR Collectors should be used along with patented ICB® ion-exchange filters. By utilizing both solutions within a filtration skid, such as our ECR 10000 and ECR 12000, you can achieve a robust and multifaceted approach to ensuring fluid cleanliness and enhancing system performance, reliability and longevity.



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CLEAN OIL

1

Up to 5x the capacity to remove harmful sub-micron solids like soot and insoluble varnish that traditional filters cannot capture, minimizing the potential for fluid degradation and varnish formation.

2

Enhanced fluid stability through continuous contaminant removal, maintaining the fluid's chemical properties and ensuring consistent performance.

Proprietary media prevents ultrafine contaminants from reaching critical, low-clearance components, like servo valves and bearings.

3

Robust design and construction guarantee optimal performance, even in the most challenging operating conditions.

TMR®
AQUAPURGE COALESCER

TMR® AquaPurge Coalescer is an innovative, integrated coalescence and separation technology that rapidly and efficiently removes two forms of water: emulsified and free.

The TMR AquaPurge Coalescer features advanced technology that delivers exceptional efficiency and enhanced water-removal capability, thereby extending equipment lifespan, reducing downtime, and improving safety.

Integrating emulsion-reducing ICB® ion-exchange and TMR AquaPurge Coalescer technologies creates a synergistic effect. ICB ion exchange removes the dissolved contaminants that stabilize oil-water emulsions, and TMR AquaPurge Coalescer removes the remaining free water and less stable emulsions, enhancing the overall efficiency of water removal in lubricating oil systems.

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1

Multi-chamber coalescer offers a proprietary flow path that achieves single-pass water-removal efficiencies of up to 90%, allowing for multi-pass water-removal to < 200 ppm.

2

Utilizes synthetic hydrophobic membranes to repel water, while allowing oil to pass through.

3

Deliver significant energy savings, using only 15% of the energy required for traditional water-removal technologies.

Proprietary media removes two forms of water: emulsified and free, and particulates from lubricating oils.

ECR® 10000

ECR® 10000 unites four leading filtration technologies in one lubricant chemistry management solution to maintain the quality, life and reliability of EHC fluids.

ECR 10000 is an integrated, skid-mounted kidney-loop filtration system designed for phosphate ester fluid, primarily used in electro-hydraulic control (EHC) applications. ECR 10000 is equipped with four proprietary filtration technologies to achieve the fluid conditions recommended by ASTM D8323-24. The four filtration technologies are:

- ECR electrostatics
- Patented ICB® ion-exchange
- High-efficiency particulate removal
- TMR® N2 water removal

When used as directed and as part of proper fluid maintenance programs, ECR 10000 improves fluid colour, increases resistivity and removes acid and varnish. These actions are integral in effectively managing phosphate ester condition, and ensuring EHC system performance and reliability.

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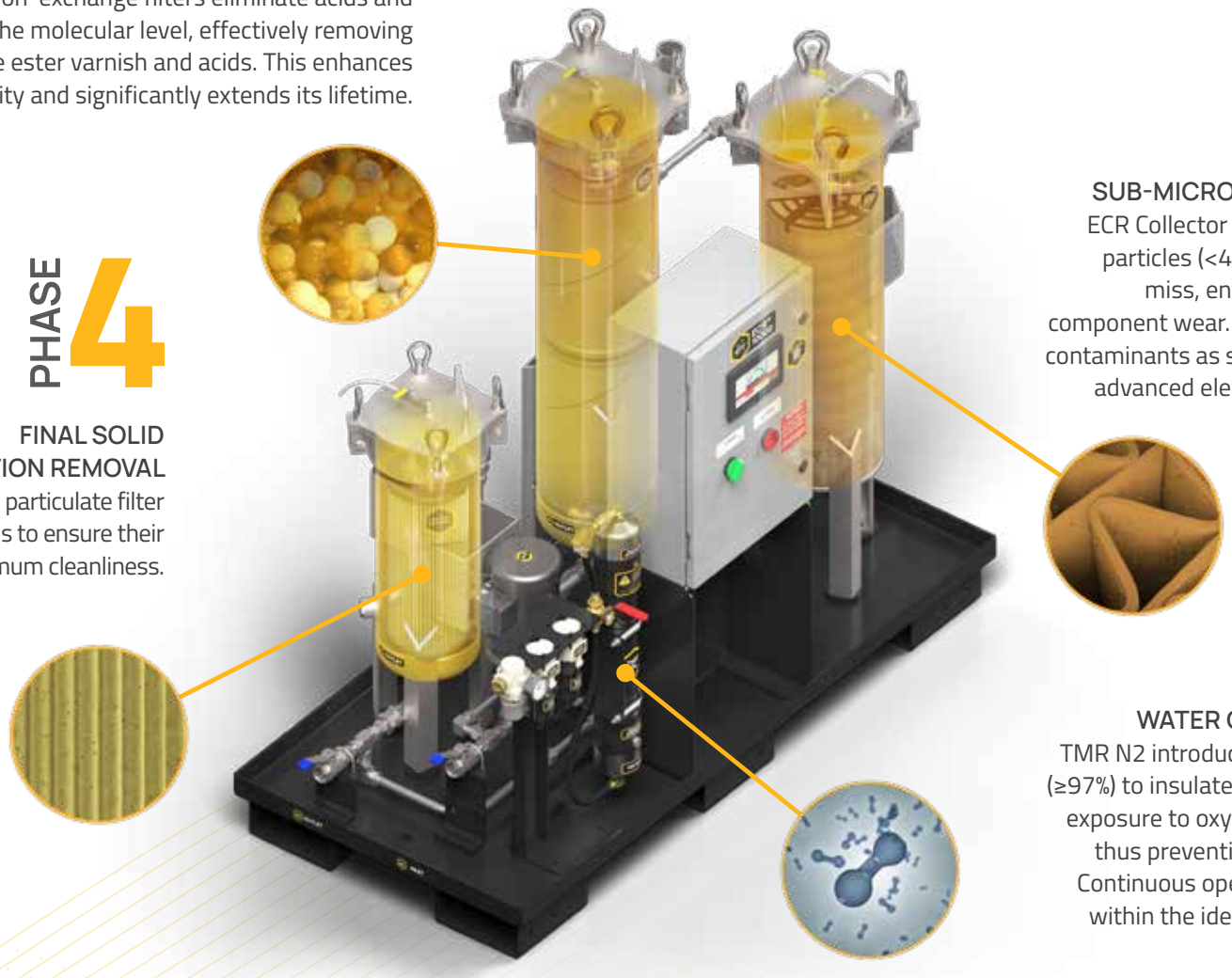
PHASE 3

DISSOLVED CONTAMINATION REMOVAL

Patented ICB® ion-exchange filters eliminate acids and soluble varnish at the molecular level, effectively removing harmful phosphate ester varnish and acids. This enhances EHC fluid stability and significantly extends its lifetime.



PHASE 4

FINAL SOLID CONTAMINATION REMOVAL

A high-efficiency particulate filter polishes EHC fluids to ensure their maximum cleanliness.

PHASE 2

SUB-MICRON PARTICULATE REMOVAL

ECR Collector elements remove sub-micron particles (<4 microns) that standard filters miss, enhancing fluid life and reducing component wear. ECR Collector media captures contaminants as small as 0.01 microns through advanced electrostatic filtration processes.

PHASE 1

WATER CONTENT MANAGEMENT

TMR N2 introduces high-purity, dry nitrogen (≥97%) to insulate the reservoir, reducing fluid exposure to oxygen and atmospheric water, thus preventing oxidation and hydrolysis. Continuous operation keeps water content within the ideal range of 200 to 500 ppm.

ECR® 12000

ECR® 12000 unites four leading filtration technologies and sensing capabilities in one lubricant chemistry management solution to monitor and maintain the quality, life and reliability of EHC fluids.

The ECR 12000 is an enhanced capability, integrated, skid-based filtration system designed for phosphate ester fluid, primarily used in electro-hydraulic control (EHC) applications. ECR 12000 is equipped with four proprietary filtration technologies, and inline sensing capabilities to achieve fluid standards as defined in ASTM D8323-24. The four filtration technologies are:

- ECR electrostatics
- Patented ICB® ion-exchange
- High-efficiency particulate removal
- TMR® N2 water removal

During system operation, the ECR 12000 also monitors the following fluid properties:

- Temperature
- ISO Particle Count
- Water Content

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PHASE 3

DISSOLVED CONTAMINATION REMOVAL

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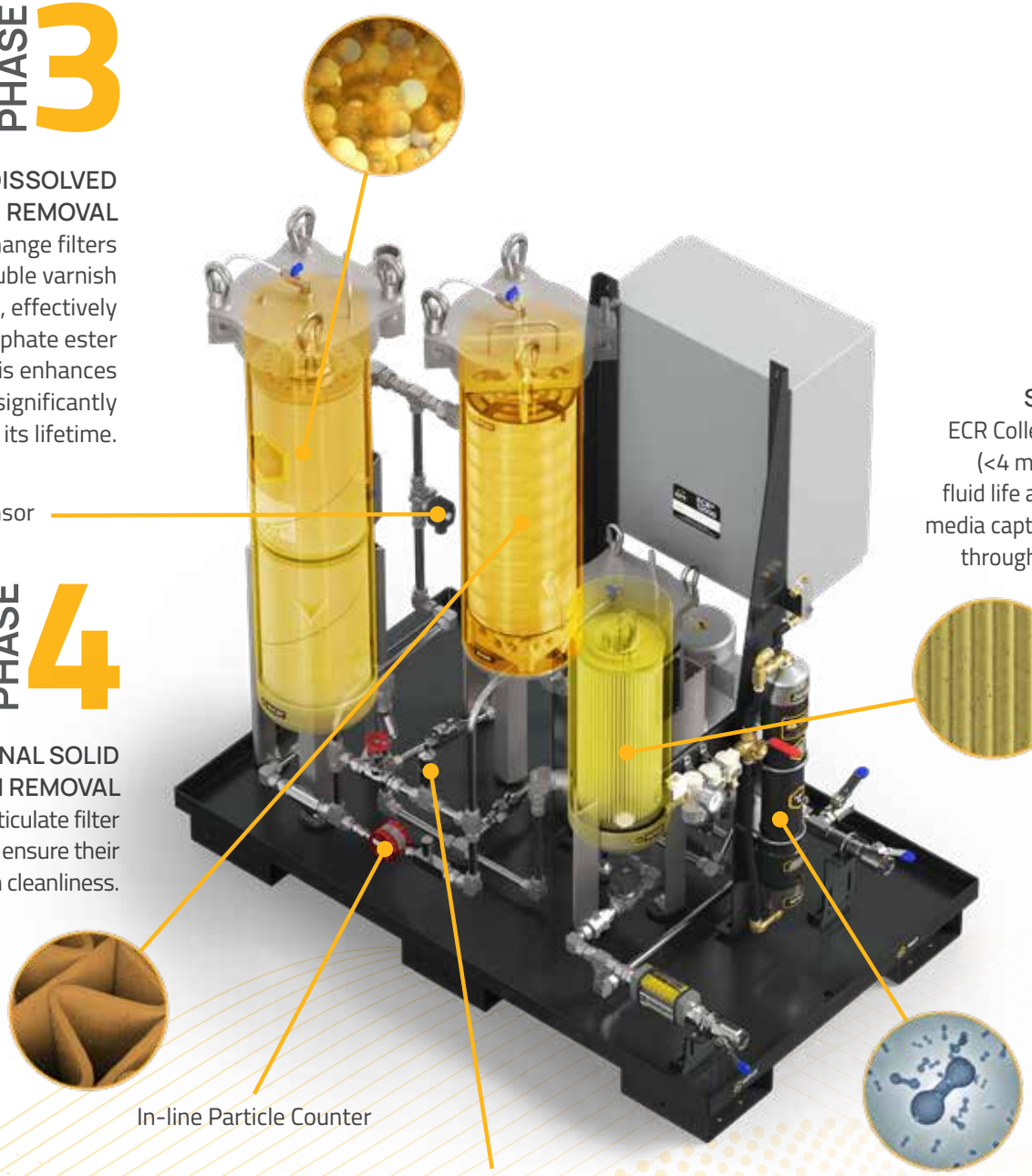

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WATER CONTENT MANAGEMENT

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SVR® VARNISH REMOVAL SYSTEM

SVR® is a skid-mounted lubricant conditioning system that works 100% of the time, targeting the underlying cause of lubricant failure: chemical breakdown.

The SVR varnish removal system restores lubricant chemistry full-time, offering the unique advantage of removing harmful contaminants during regular turbine operation when they are typically dissolved in the oil. As a result, saturation cannot occur under any lubricant condition, and varnish formation is eliminated.

Utilizing patented ICB® ion-exchange technology, the SVR varnish removal system eliminates chemical breakdown products and varnish at the molecular level. This restores the MPC varnish potential, acid number and demulsibility of lubricants, maintaining them in optimal condition. With full-time continuous treatment, SVR stops the contamination and breakdown cycles in their tracks, managing the lubricant's chemistry every time it cycles through the dialysis-style circuit. This allows SVR to ensure the performance and reliability of critical lubricated assets.

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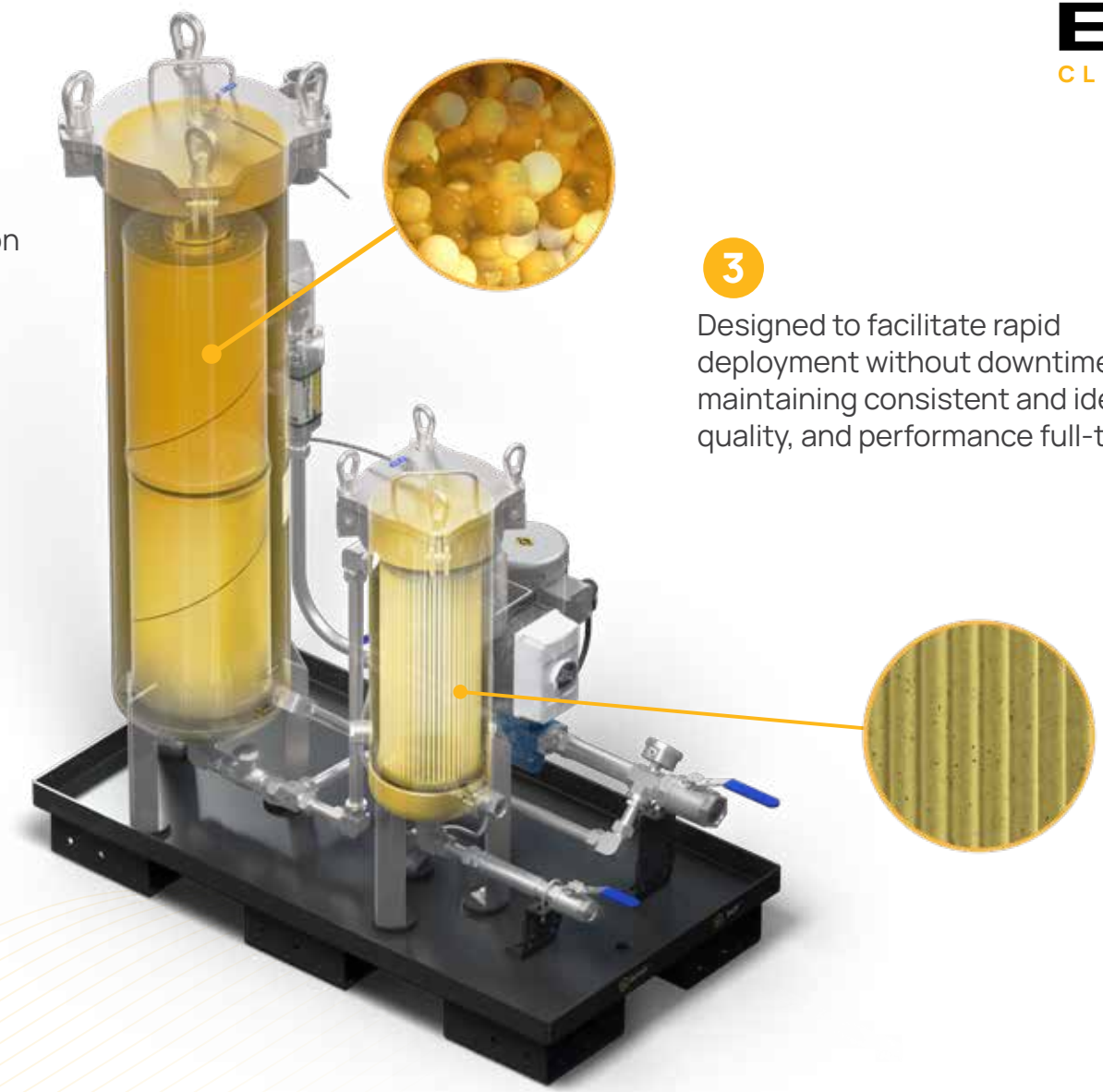
1

The SVR uses patented ICB ion-exchange technology to provide **a chemistry solution for a chemistry problem™**: oil breakdown. SVR has been tested and proven worldwide on thousands of critical assets.



2

Extends lubricant life 2-3x by removing and preventing the accumulation of chemical breakdown materials. In doing so, SVR mitigates the risk of costly failures and avoidable production losses.

3

Designed to facilitate rapid deployment without downtime, maintaining consistent and ideal fluid quality, and performance full-time.

SVR® HYDRO

SVR® HYDRO coalescence system boasts three technologies in one advanced, skid-mounted kidney loop filtration system.

The SVR HYDRO eliminates breakdown products that previously limited the effectiveness of water separation technologies, including coalescers. It uses Lubricant Chemistry Management to enhance and improve demulsibility so that water can be removed from your lubricant more effectively.

Through advanced filtration technologies, including molecular contamination adsorption with patented ICB® ion-exchange filtration, proprietary mechanical coalescing and micro-filtration, SVR HYDRO restores and protects lubricants from acid, varnish, particulate, and free and emulsified water, in a more energy-efficient and expedient manner.

SVR HYDRO offers a golden triangle focused on:

- Varnish and Acid Control
- Water Separation and Removal
- Particulate Removal

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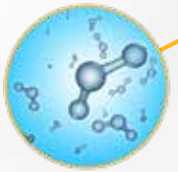
1

Addresses the root cause of poor oil-water separation, knocking down oxidative material to break and prevent emulsion formation.

Patented ICB® ion-exchange technology targets acid, varnish and demulsibility.



TMR® AquaPurge Coalescer targets free water and emulsions.

High-Efficiency Particulate Filtration targets insolubles.

2

Simple, sophisticated, easy to operate system that marries three phases of filtration into one advanced lube oil conditioning system to deliver reduced lifecycle costs, extend oil service intervals, and increase performance and uptime.

3

Automatic water leg drain, leg counter tracking cycles and redundant fail-safes, offering worry-free operations.

TMR®
N2

The security your reservoir needs to stay safe.

The most harmful and damaging contaminants found in many hydraulic and lubricating systems are water and oxygen. These can originate from mechanical processes or atmospheric ingression. In systems vented to the atmosphere, humid air above the lubricant transfers water via condensation and mass transfer. Although breather elements offer some mitigation, they cannot prevent atmospheric water ingression and provide no protection from oxidation.

The TMR N2 water removal system provides unlimited capacity to remove water and eliminate atmospheric water ingression. High-purity, dry nitrogen introduced into the reservoir headspace above the lubricant surface forms a protective nitrogen blanket that shields your critical lubricant from the two most common causes of oil breakdown: oxygen and water. With these contaminants eliminated, oil lifetimes can be significantly extended and asset performance and reliability are optimized.

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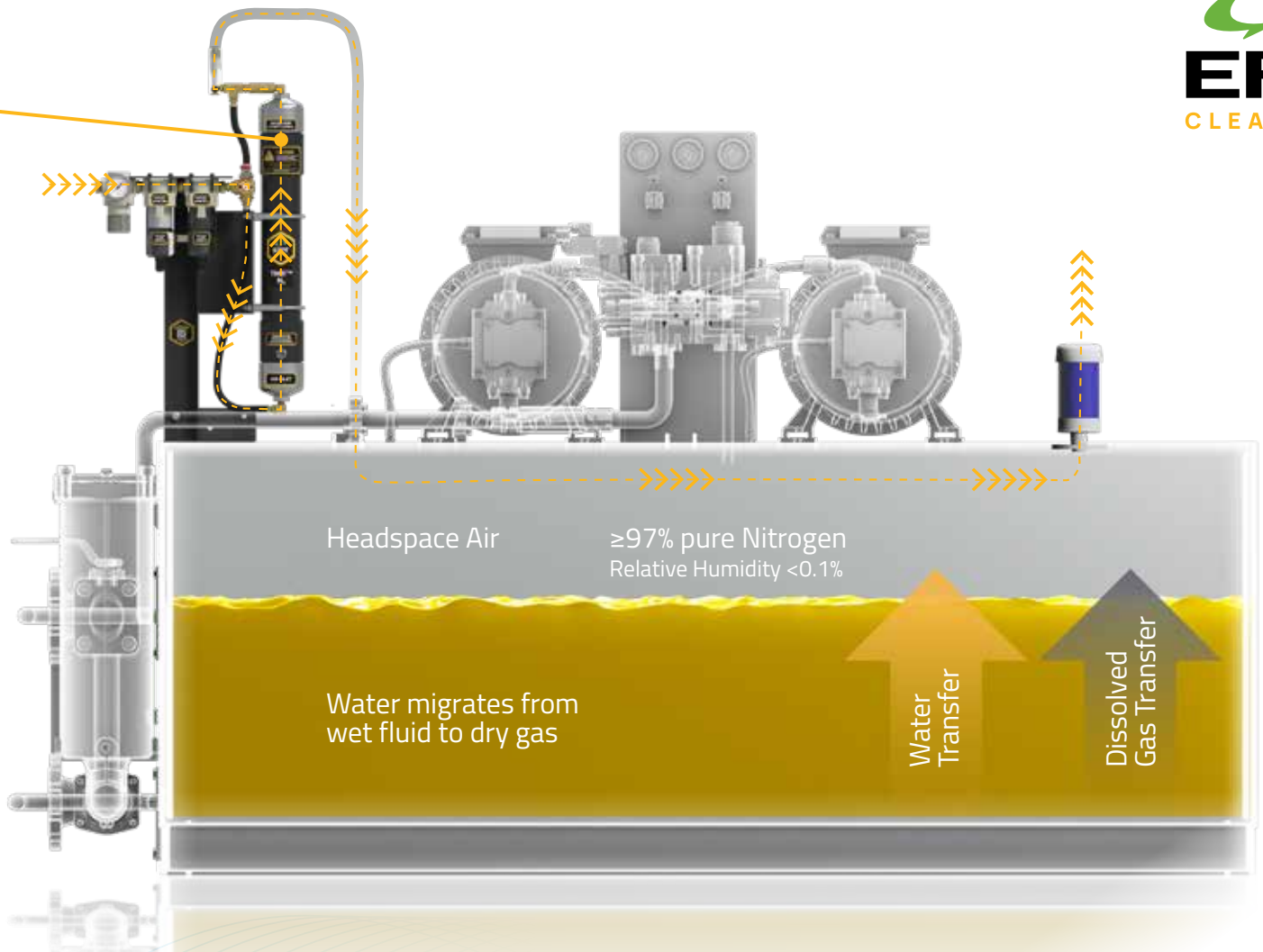
Unlimited capacity to remove water and eliminate atmospheric water ingression.



1

The TMR N2 water removal system utilizes high-purity, dry nitrogen (≥97%) to create a protective blanket over the lubricant in the reservoir.

2

Maintains water and oxygen content at very low levels, reducing the rate of lubricant breakdown, extending fluid life.

3

By continuously sweeping the reservoir with clean, dry nitrogen, the TMR N2 system prevents water ingress and manages factors that contribute to oxidation and oil breakdown.

Eliminate lubricant-related failures with
Lubricant Chemistry Management.

Trust EPT Clean Oil—experts in
'**Teaching the World a Better Way**' since 1994.

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