



INNOVATION & INDUSTRIAL TECHNOLOGY

We stand by our customer's side



We operate in the industrial sector, in particular in the field of supply of goods (materials, technical articles, equipment and software) and services (engineering, construction, plant engineering, maintenance and training).

We make use of professionalism and extremely qualified workers with a consolidated and proven know-how in the specific fields of intervention, to guarantee quality and reliability of the service offered. We use customized contractual forms and offer our administrative and technological advice to always satisfy the customer, with "turn-key" solutions. We guarantee full support in all phases of the project, from pre-analysis to final implementation, ensuring qualified after-sales assistance.



MISSION

We believe in the value of every single person and the positive contribution they can make in every relationship or project development. Whether it's a customer, a supplier or a collaborator. We want to be sincerely at the side of our customer and support him in the realization of his project. Guaranteeing safety, protection of health and the environment, quality of processes and products, competence and punctuality in the provision of services.

Mina Service is part of
Consorzio Industriale Lucano
and of Rete Era (RERA)



VISION

Always employ innovative and at the same time sustainable and environmentally friendly resources, at all stages of our work.





OUR CERTIFICATIONS

We are committed to ensuring a complete and high-level performance with the essential objective of full customer satisfaction and respect for people and the environment. We pursue this policy through the provision of services in continuous improvement and with high quality standards.

This is why we choose to subject our activities to a recurring and certified control.



OUR SERVICES

Mina Service offers a wide range of services, in order to satisfy the various demands of companies. From the design phases, to the construction and maintenance, all aspects are studied in detail and attention, to make sure that our customer's every need is met.

ENGINEERING



INDUSTRIAL
SUPPLIES



QUALITY AND
ANALYSIS



ELECTRO
INSTRUMENTAL
SYSTEMS



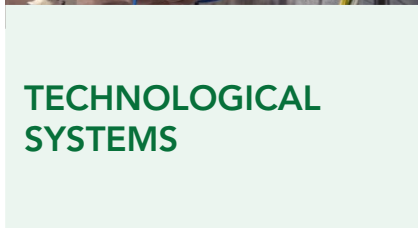
INDUSTRIAL
MAINTENANCE



ANTI-COVID
CONDITIONING



TECHNOLOGICAL
SYSTEMS



HYDRAULIC OIL
FILTRATION
SYSTEM



IMPIANTI DI
ASPIRAZIONE



SYSTEM
INTEGRATION



ISO CONSULTING



TRAINING
COURSES



HYDRAULIC OIL FILTRATION

Oil filtration is useful to prevent damage to automation components and preserve systems.

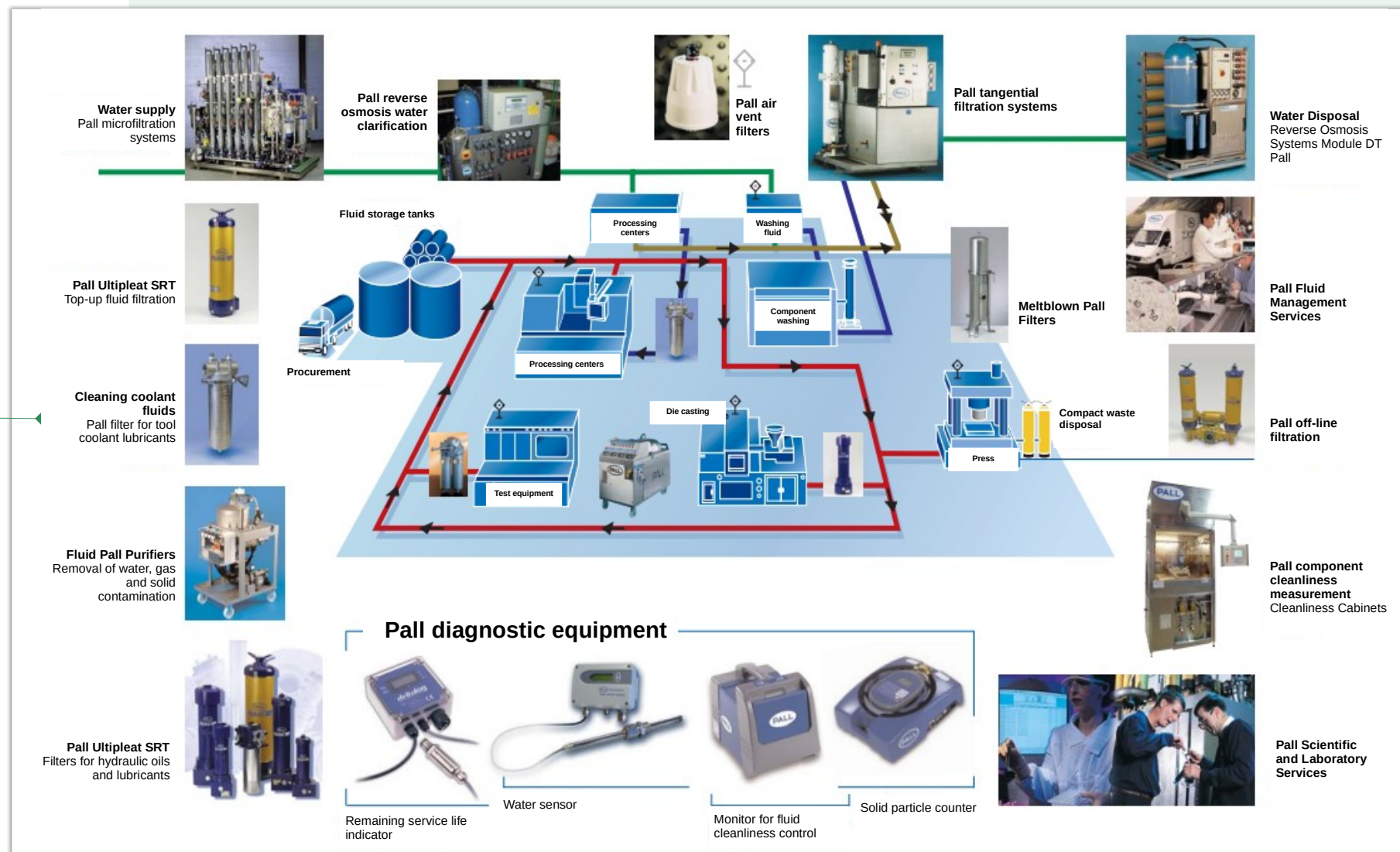
Thanks to the partnership with Pall International, the service is offered promptly, H24, with experienced staff and state-of-the-art machinery.

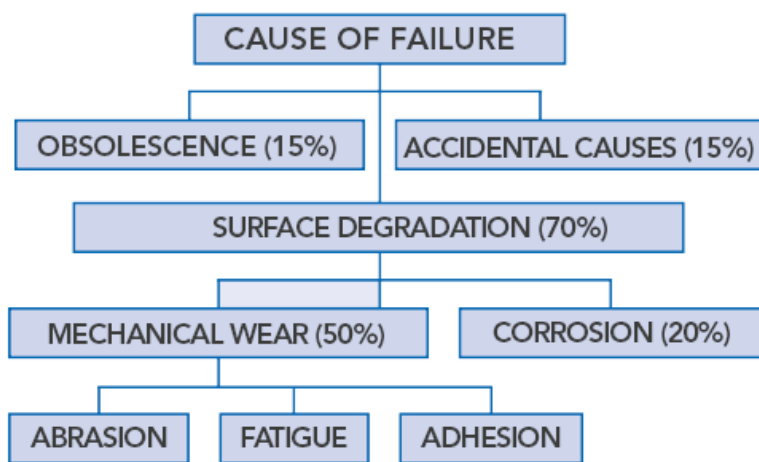


The service is offered **directly in the field** (construction site, factory, plant, etc.) even **without stopping operating machinery**.

This avoids plant downtime for maintenance, with **significant economic benefits to the customer** who does not suffer production losses due to downtime.

Pall concept of Total Cleanliness Management





HYDRAULIC OIL FILTRATION

Durability of components

A study performed at M.I.T. in Boston by Dr. E Rabinowicz shows that 70 percent of the causes of component failure or drop in performance can be attributed to surface degradation, and that these failures originate from mechanical wear (50 percent) and corrosion (20 percent).

Sources of contamination

Contamination in components new ("built in"):

- ✓ Cylinders, fluids, hydraulic motors, flexible and rigid pipes, pumps, tanks, valves, etc.

Contamination generated by the system in the stages of:

- ✓ Assembly
- ✓ Operation
- ✓ Break-in
- ✓ Fluid degradation

Ingressiveness from outside:

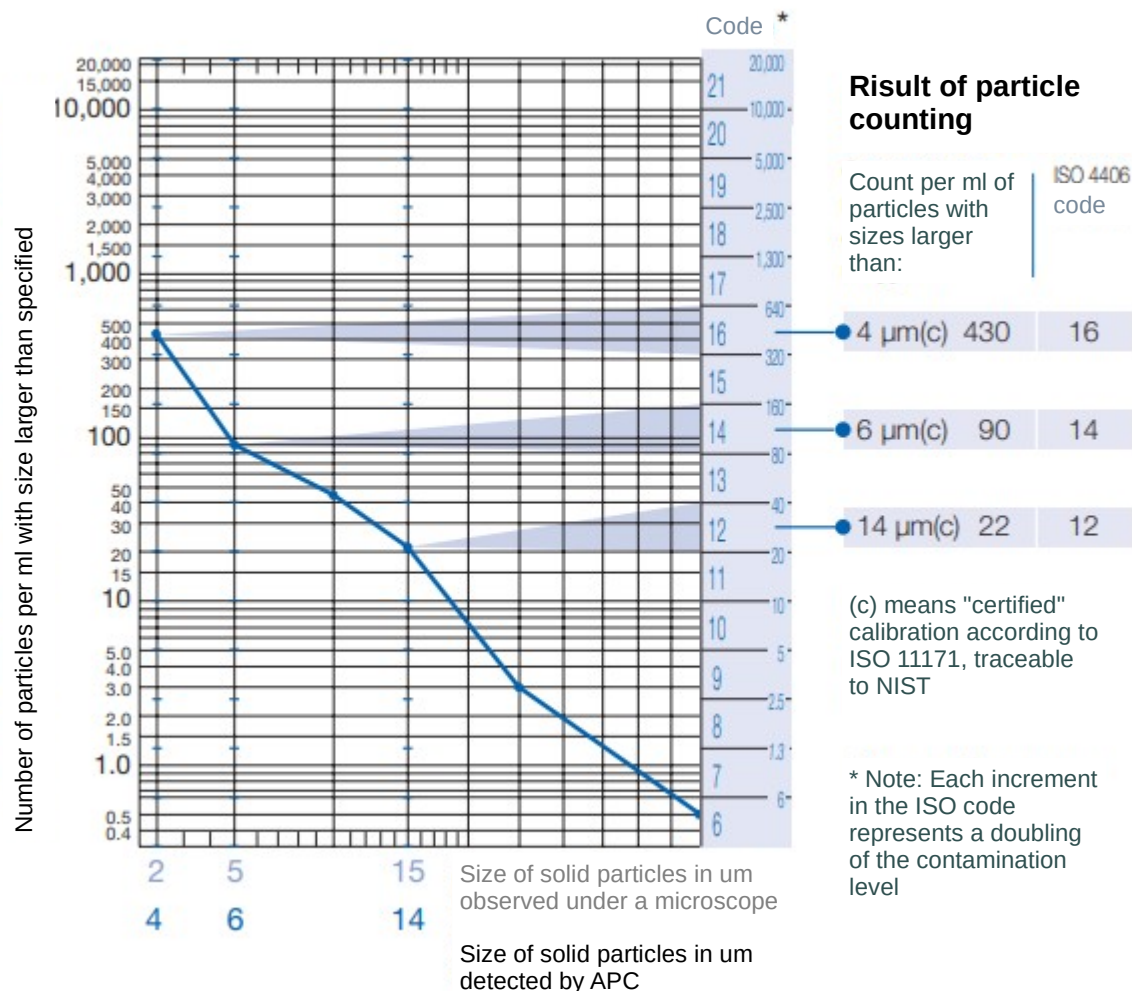
- ✓ "Breathing" of the tank
- ✓ Cylinder rod seals
- ✓ Bearing seals
- ✓ Component seals

Contamination introduced during maintenance:

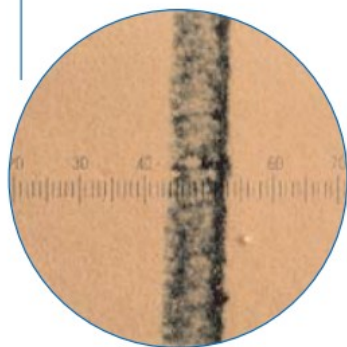
- ✓ Disassembly/assembly
- ✓ Refilling

Explanation of ISO cleaning code

The ISO code represents the number of solid particles with sizes greater than 4, 6 and 14 $\mu\text{m(c)}$ in one milliliter of fluid sample. To determine the ISO cleanliness code of a fluid, the results of solid particle counts are plotted on a graph. The corresponding ISO code, shown on the right side of the graph, provides the cleanliness code number for each of the three solid particle sizes.



ISO 4406 Cleaning code 13/12/10



Sample volume: 100 ml
Enlargement: 100x
Scale: 1 division = 10 µm

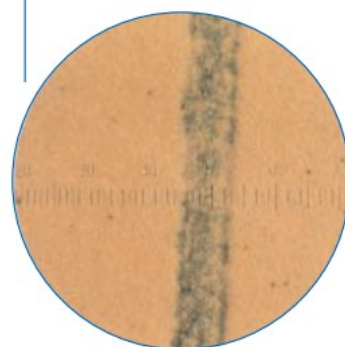
Particle count result

Particle size	Number of particles per ml > of the specified size	Code ISO 4406	NAS1638 (SAE AS4059)
>4 µm(c)	40 - 80	13	4
>6 µm(c)	20 - 40	12	4
>14 µm(c)	5 - 10	10	4

Analysis of photography

Very little contamination.
Visible solid contamination is silica.

ISO 4406 Cleaning code 17/15/13



Sample volume: 100 ml
Enlargement: 100x
Scale: 1 division = 10 µm

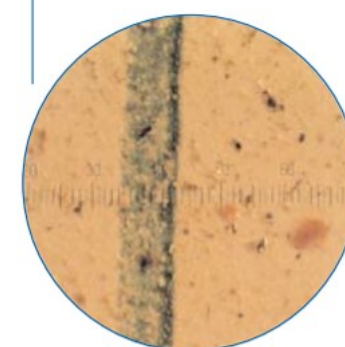
Particle count result

Particle size	Number of particles per ml > of the specified size	Code ISO 4406	NAS1638 (SAE AS4059)
>4 µm(c)	640 - 1,300	17	7
>6 µm(c)	160 - 320	15	7
>14 µm(c)	40 - 80	13	7

Analysis of photography

Very little contamination.
The visible solid particle is dark metal.

ISO 4406 Cleaning code 20/19/16



Sample volume: 100 ml
Enlargement: 100x
Scale: 1 division = 10 µm

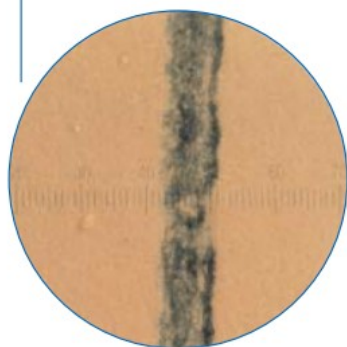
Particle count result

Particle size	Number of particles per ml > of the specified size	Code ISO 4406	NAS1638 (SAE AS4059)
>4 µm(c)	5,000 - 10,000	20	11
>6 µm(c)	2,500 - 5,000	19	11
>14 µm(c)	640 - 1,300	16	11

Analysis of photography

Visible contamination consists mainly of silica and some solid metal particles and rust.

Cleaning code ISO 4406 15/14/12



Sample volume: 100 ml
Enlargement: 100x
Scale: 1 division = 10 µm

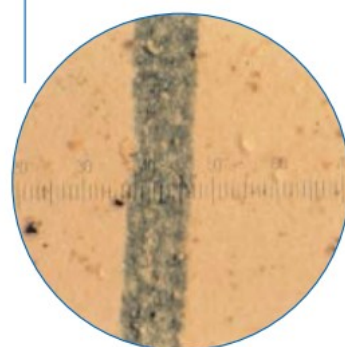
Particle count result

Particle size	Number of particles per ml > of the specified size	Code ISO 4406	NAS1638 (SAE AS4059)
>4 µm(c)	160 - 320	15	6
>6 µm(c)	80 - 160	14	6
>14 µm(c)	20 - 40	12	6

Analysis of photography

Low contamination.
Visible contamination is silicon.

ISO 4406 Cleaning code 20/17/15



Sample volume: 100 ml
Enlargement: 100x
Scale: 1 division = 10 µm

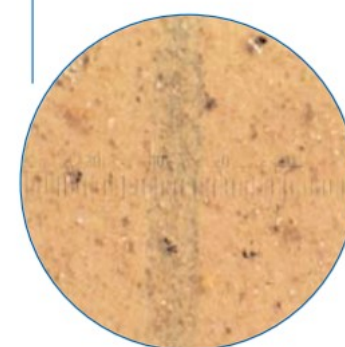
Particle count result

Particle size	Number of particles per ml > of the specified size	Code ISO 4406	NAS1638 (SAE AS4059)
>4 µm(c)	5,000 - 10,000	20	10
>6 µm(c)	640 - 1,300	17	9
>14 µm(c)	160 - 320	15	9

Analysis of photography

Low contamination.
Visible contamination is silica and dark metal

ISO 4406 Cleaning code 21/20/18



Sample volume: 100 ml
Enlargement: 100x
Scale: 1 division = 10 µm

Particle count result

Particle size	Number of particles per ml > of the specified size	Code ISO 4406	NAS1638 (SAE AS4059)
>4 µm(c)	10,000 - 20,000	21	12
>6 µm(c)	5,000 - 10,000	20	12
>14 µm(c)	1,300 - 2,500	18	12

Analysis of photography

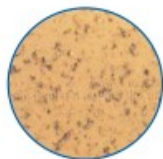
Visible contamination consists mainly of silica and some solid metal particles and rust.

Types of contaminant



Water supply

Hard, translucent solid particles, often associated with atmospheric and environmental contamination, e.g., sand or dust.



Brilliant metal

Shiny metallic solid particles, usually silver or gold in color, originating within the system. These contaminants are produced by wear and often cause additional component wear and faster fluid degradation.



Dark metal

Oxidized ferrous metal typical of most hydraulic and lubrication systems; contaminant inherent in the system and generated by wear and tear.



Rust

Orange/brown solid particles often observed in oil in systems in which water may be present, e.g., in oil storage tanks.



Fibers

Contaminants commonly generated from paper and textiles, e.g., industrial cleaning rags.



Fine particle aggregates

High concentrations of very fine particles coat the analysis membrane and accumulate into an aggregate. The accumulation makes larger particles on the membrane invisible, making contamination assessment impossible.

HYDRAULIC OIL FILTRATION

Changing hydraulic oil in hydraulic systems is not always necessary. Often it is sufficient to filter it to clean it of impurities, factors that risk serious damage to automation components, such as valves and pumps, and thus preserve the system components.

We are able to prevent damage by analyzing the chemical and physical state of the hydraulic oil or lubrication and then, if necessary, proceed with oil microfiltration and dehydration service.

The **Athalon Pall filter cart** treats hydraulic fluids and lubricants, removing solid and particulate contamination. The trolley mounts filter elements with variable removal power as needed.



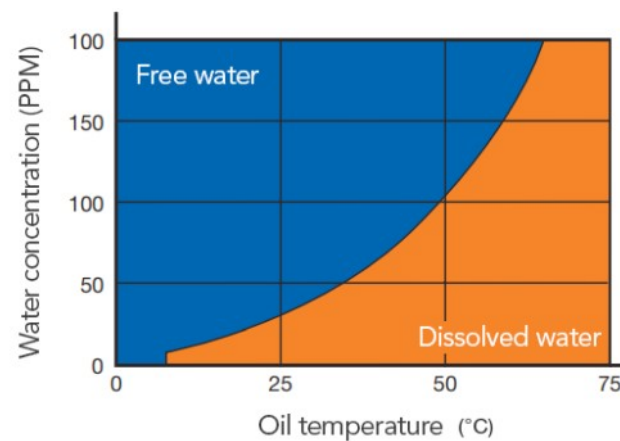
Contamination of water in oil

Water contamination in hydraulic systems causes:

- Oil degradation, such as precipitation of additives and oxidation of the oil itself.
- Reduction in the thickness of the lubricating film
- Acceleration of surface fatigue phenomena of metal parts
- Corrosion

Sources of water contamination

- Leakage from the heat exchanger
- Leakage from seals
- Condensation of moist air
- Unsuitable tank lids
- Temperature reduction causes dissolved water to turn into free water



To make the harmful effects of free water minimal, the concentration of water in the oil should be kept as far below the saturation point as possible.

10.000 PPM	1%
1,000 PPM	0.1%
100 PPM	0.01%



Typical applications

- Hydraulic oils
- Lubrication oils
- Dielectric fluids
- Phosphoric esters
- Hardening oils

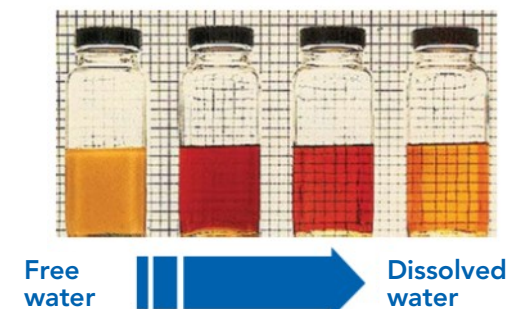
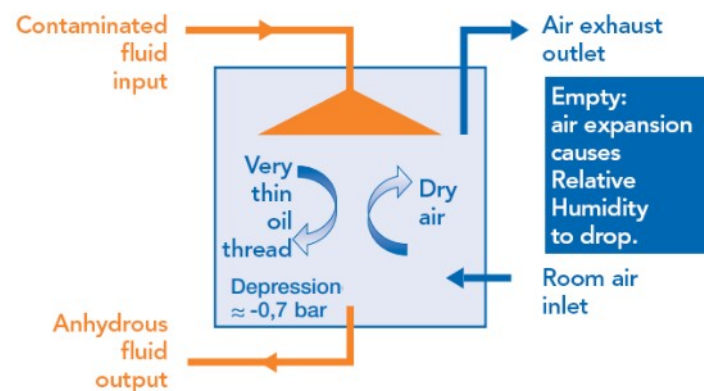
HYDRAULIC OIL FILTRATION

The **Pall purifier** is designed for use with small and medium-sized oil systems, particularly where high-viscosity fluids are used, and can effectively remove 26 liters of water per day from oil.

In addition to water, it is also capable (under boundary conditions) of removing any gas and solid contamination, in particular:

- **WATER:** 100% free water and most of the water dissolved
- **GAS:** 100% free gas and up to 90% dissolved gas
- **SOLID CONTAMINATION:** including sludge and other solid or particulate contaminants.

Principle: Mass transfer by vacuum evaporation



Methods of analysis for water content

Method	Unit	Benefits	Limits
Crackle Test	None	Rapid indication of the presence of free water	Does not allow detection below saturation
Chemical (Calcium hydride)	Percentage or PPM	Simple method of measuring water content	Not very accurate for dissolved water
Distillation	Percentage	Relatively unaffected by oil additives	Limited accuracy on anhydrous oils
FTIR	Percentage or PPM	Quick and inexpensive	Accuracy does not allow detection below 0.1% or 1,000 PPM
Karl Fischer	Percentage or PPM	Accurate for detection of low water content (10 - 1,000 PPM)	Not suitable for high water levels. Sensitive to the presence of additives.
Capacitive sensors (Waters Sensors)	Saturation percentage or PPM	Very accurate in detecting dissolved water, 0 -100% saturation	Does not measure water levels above saturation (100%)



HYDRAULIC OIL FILTRATION

When varnish forms in the lubrication and control systems of combustion turbines, the effects can be devastating. Significant varnish accumulation leads to:

- Problems with slow control and/or equipment reliability
- Unscheduled maintenance operations/excessive replacement of parts
- Problematic startups and/or shutdowns
- Forced equipment outages and lost production time

PALL introduces a very efficient, simple and proven system for varnish removal. The **Pall trolley with Varnish Removal Filter (VRF)** dramatically reduces the potential for residue formation in the fluid, ensuring long and healthy operation and control of gas turbines.

④ HYDRAULIC OIL FILTRATION



The **PCM500 monitor** is a portable diagnostic device that measures system fluid cleanliness, using proven network blocking technology.

This technology can accurately and reliably report 3-series ISO 4406 cleanliness codes for most fluid types and in multiple fields.

HYDRAULIC OIL FILTRATION

SAMPLING AND ANALYSIS

Before starting a filtration job, in order to have a good understanding of the existing problems and thus perform a workmanship in a workmanlike manner, **we take oil samples and have them analyzed in the Pall laboratory.**

This allows us to offer the best solutions available.

The analysis is also carried out at the end of the activity, as a test and counter-evidence of having achieved the intended results.

WHERE WE ARE / CONTACTS



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OUR MAIN CUSTOMERS

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by our customer's side



Member of CISQ Federation



MINA

SERVICE



High flexibility
and availability



Time
saving



Standard of
excellence



Personalized
services

