Klarwin® Scientific & Laboratory

Contamination control & analysis for improved system performance and reliability

Manage the cleanliness of your components and fluids

www.klarwin.com

Klarwin®

Fluid Perfection®

LET KLARWIN® HELP YOU IMPROVE YOUR PROCESS TO MAXIMIZE YOUR EFFICIENCY

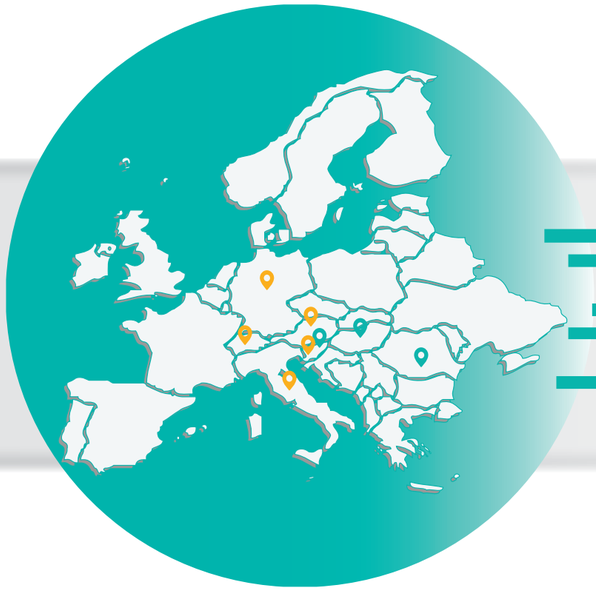
Klarwin® is the emerging **European company** specialised in **technical consultancy**, **systems** and **services** in the field of applied **engineering for filtration**, **separation** and **purification** of **fluids** and **treatment of water.**

- **Complete** range of products manufactured by world leading technological **partners**
- **On-site** services and support
- **Top** engineers
- More than 10 years of **experience**
- Cross-industry **expertise** and **know-how**

Klarwin® represents a technical partner, present on-site, offering:

- Fluid filtration/separation/purification equipment and spare parts
- Reliable laboratory cleanliness analysis of fluids and components
- Process optimization recommendations
- Equipment rental services
- Customized trainings

Klarwin® provides technical solutions and trustworthy services to ***more than 250 clients*** in more than ***9 countries***, with **offices** in **Romania**, **Hungary** and **Slovenia**.



Engineering
the perfect process

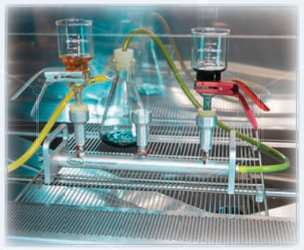
Klarwin®, as a solid provider of fluid filtration, separation and purification technologies, offers also laboratory products and services to measure and monitor component and fluid cleanliness.

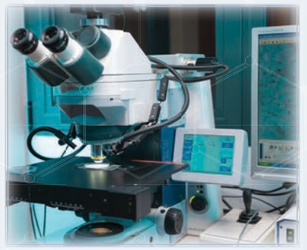
- **Top measuring equipment**
- **Local competence**
- **Trusty expertise**
- **Quick and precise results**
- **Result interpretations and recommendations**
- **Corrective action plan proposal**

Contamination is usually undetectable by naked eye.

Klarwin® Scientific & Laboratory can test the cleanliness of your fluid or components, with high-tech equipment, in a clean and controlled environment.

LABORATORY EQUIPMENT



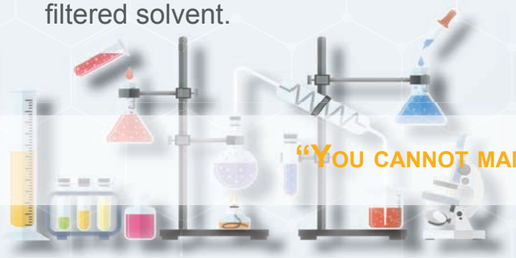


CLEANLINESS CABINET

Pall PCC ensures the **proper analysis environment** by **preventing** the **ingression** of contaminants from the surrounding area and by using a previously filtered solvent.

OPTICAL MICROSCOPE

Particles from a fluid or component's surface, collected on a membrane, are investigated with ***Jomesa and Zeiss microscopes***, which **identify and count**, with **high accuracy**, **all** the **particles** greater than just a few microns.



Klarwin® Scientific & Laboratory

"YOU CANNOT MANAGE WHAT YOU DON'T MEASURE"

LABORATORY EQUIPMENT

AUTOMATIC PARTICLE COUNTER

Pall APC uses **laser technology** to detect
and count the particles in a liquid. It is **suitable for all oil-based fluids** that are not opaque or highly contaminated, **with a viscosity greater than 2 cSt**: hydraulic fluids and lubricants, dielectric oils, transmission fluids, fuels etc. and can **also measure dissolved water content**.

FLUID CLEANLINESS MONITOR

Pall PCM measures **solid particle contamination** using pressure **drop sensors** on successive meshes to correlate the cleanliness of the fluid with the amount of clogging of the mesh. It is **suitable for a wide range of fluids** (viscosity 1.5 - 450 cSt): washing fluids, synthetic and mineral oils, hydraulic fluids and lubricating oils and fuels. The **oil analysis** is **unaffected** by the **presence of water or air**. It **can measure** also **kinematic viscosity** and d**issolved water content.**

WATER SENSOR

Dissolved water in oil can lead to corrosion, decrease of lubricating properties, oil degradation, wear acceleration and forming precipitants. ***Pall WS*** monitors **dissolved water content in oil** (expressed as % saturation or PPM) and **temperature**. It is **suitable for synthetic oils and mineral oils, cutting oils, organophosphates, lubricants** etc.

PORTABLE FILTRATION KIT

The ***portable filtration kit*** gives a visual evaluation of the level of contamination (for samples with high contamination) and can be used also to simulate the filtration process with visible results, on-site.

USE FLUID CLEANLINESS ANALYSIS AS AN INDICATOR FOR PROCESS PERFORMANCE AND EQUIPMENT RELIABILITY

- Contamination with solid particles and water of hydraulic & lubrication oils can cause mechanical wear and corrosion.
- High contamination of process fluids impacts manufacturing process performance and product quality.

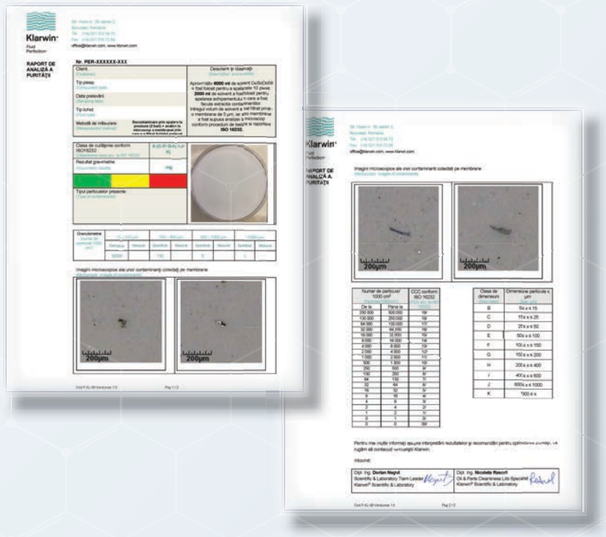
Laboratory cleanliness analysis

The unmatched scientific and technical expertise of our cleanliness laboratory ensures precise and reliable results

FLUID CLEANLINESS ANALYSIS

Klarwin® Scientific & Laboratory performs full cleanliness analysis of hydraulic and lubricating fluids or testing fluids, in accordance with ***ISO 4405, ISO 4406, ISO 4407*** standards.

- Gravimetric measurement;
- Particle counting and cleanliness code classification according to ISO 4406;
- Representative microscope images of contaminants, classified by their nature in metals, non-metals, fibres;
- Water content in oils measurement.



Report of fluid cleanliness analysis

THE END GOAL OF THE ANALYSIS IS NOT THE REPORT ITSELF

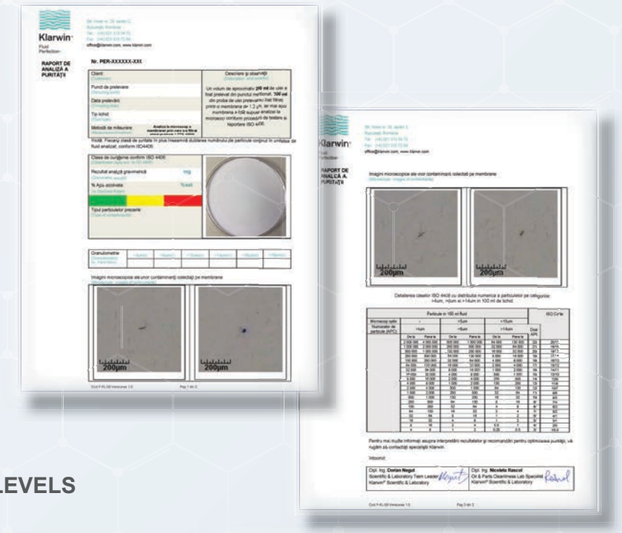
The **added value** comes from **combining our laboratory services** with ***diagnosis, interpretation of analysis results and suggestions*** for an intervention plan in filtration and separation of fluids from the process.

COMPONENT CLEANLINESS ANALYSIS

Particles deposits on the surfaces of the components can introduce contaminants into the assembly where they will be integrated.
Contaminants can generate more particles, producing wear of components, blocking nozzles or destroying seals.

Klarwin® Scientific & Laboratory uses **up-to-date techniques** and **procedures** for the analysis and monitoring of contaminants, in accordance with **ISO 16232** and **VDA 19 international standards.**

- Gravimetric measurement;
- Granulometry (particle counting and cleanliness code classification according to ISO 16232);
- Representative microscope images of contaminants, classified by their nature in metals, non-metals, fibres.



Report of component cleanliness analysis

UNDERSTANDING CONTAMINATION LEVELS

OPTIMIZING EQUIPMENT RELIABILITY

INCREASE PROCESS PERFORMANCE

DRIVE COST CONTROL

On-site services

Across all industries, **Klarwin® Scientific & Laboratory** is searching for solutions to improve performance and productivity

- Measurement of fluid cleanliness with a **particle counter;**
- Assessment of fluid contamination with **portable filtration kit** and comparison with the patch test;
- Water content measurement with a **portable water sensor**.

A Fluid cleanliness evaluation

- Contamination **control and monitoring**;
- Filtration and separation **principles and technology;**
- **Current standards**.

B Technical assistance for the commissioning of the technologies available

- Start-up, calibration, maintenance and operator training services for extraction cabinets (**Pall PCC**);
- **Tangential flow filtration** systems: operation, calibration, maintenance, repair and new operator training;
- **Purifier** (systems that remove free and dissolved water from oil) **installation** and maintenance;
- **Varnish removal unit** installation and maintenance.

C Filtration audit

- **Assessment** of cleanliness specifications, filtration and separation solutions and working procedures;
- **Analysis** of fluid/parts cleanliness;
- **Evaluation** of possible equipment malfunctions or process abnormalities;
- **Determination** of root source of contamination;
- **Recommendations** for process improvement.

D Trainings

Main products and technologies for fluid testing and monitoring

Our portfolio includes the latest laboratory equipment

RENTAL EQUIPMENT

Contact us for rental of various types of filtration improvement equipment:

Purifiers (water separation in oil)
Flushing trolleys (mobile filtration unit)
Pressure drop inspection equipment.

Cleanliness cabinets

For customers who need on-site cleanliness analysis, we provide cleanliness cabinets of various sizes

The ***new generation of cabinets*** are made of stainless steel and carbon steel with a super mirror interior finishing (max R_a=0.02 µm) and ***are equipped*** with pressure dispersing and recirculation solvent circuits.

Extraction of contaminants can be done on nylon membranes available in different ratings 0.2 µm, 0.45 µm, 1 µm (nominal), 1.2 µm and 5 µm.
Optionally, it can be ***equipped with a self-cleaning routine*** that decreases external contamination and ensures a fast blank.
Some models are ***equipped with an ultrasonic bath***.

Fluid cleanliness monitor

The fluid cleanliness monitor measures solid particle contamination using pressure drop sensors on successive meshes to correlate the cleanliness of the fluid with the amount of clogging of the mesh.

- **Used** for both **mineral oil and aqueous solutions** (washing fluids, cutting fluids, aqueous solutions, cooling, water glycols, oils, synthetic oils and minerals, hydraulic fluids and lubricating oils, fuels);
- **Continuous monitoring capability**, remote control and data acquisition via PC, PLC or optional portable display;
- **Analysis unaffected** by the **presence of water or air**;
- Can **measure kinematic viscosity** (1.5 - 450 cSt) and **dissolved water content** (% saturation or PPM);
- **Measuring range**: 11/9/7 to 23/21/17, accuracy ± 1/2 ISO4406 code (size 4,6,14 µm).

Water sensor

The portable water sensor is an economical and easy to use tool to monitor dissolved water content in oils.

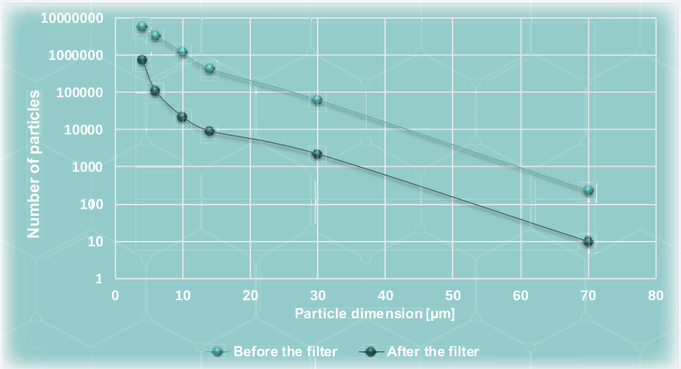
- **Display directly** on the instrument display and d**ata acquisition via PC**;
- **Use** of **synthetic oils and mineral oils**, **cutting fluids, organophosphates, lubricants** etc.
- **Range**: 2-95% with accuracy of ± 2%;
- Contains **constants** for **transformation %** of **oil** saturation **to PPM**;
- Measures the temperature in **°C or °F**;

Case studies

Comparing oil cleanliness results to improve processes and reduce costs

Analysis reports on oil filtration solution implementation

Laboratory analyses are a clear proof of a correct use of a filtration solution.
The analysis of the ***oil sampled before*** and ***after*** a ***Pall filter*** with a retention ***rating of 22µm*** shows a ***decrease*** of ***gravimetric measurements*** of the contamination ***from*** 17.7mg/100ml oil ***to*** 5.1mg/100ml oil improving the ***ISO cleanliness*** code ***from*** 23/22/19 ***to*** 20/17/14



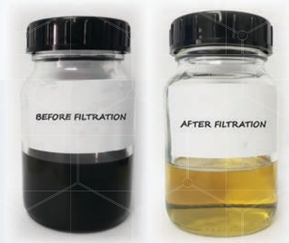
Filtration simulation of oil

A ***sample of oil*** was ***filtered*** using the ***portable filtration kit*** in ***3 steps***

Filtration through a membrane of 5 µm

Filtration through membranes of 1.2 µm

The degree of contamination of each membrane helps establishing the filtration steps necessary in an industrial process.



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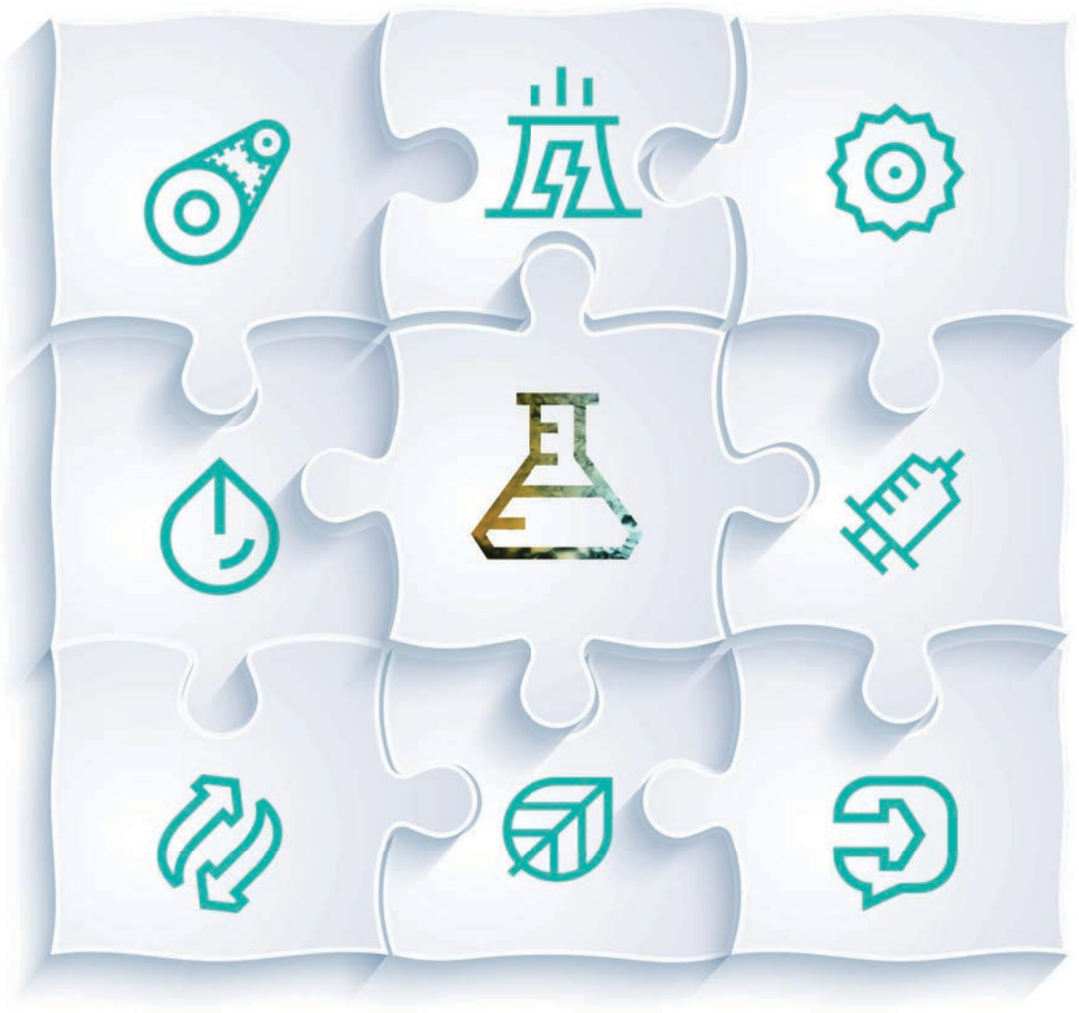

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