Cetim's services

EXPERTISE AND FAILURE ANALYSIS ON HEAT EXCHANGERS

Heat exchangers are high value-added components used in many industrial sectors and are strategic for the energy transition.

Your expectations

As a manufacturer or operator of heat exchangers (heat pumps, plate and flat-plate exchangers, shell-and-tube units, cooling towers, evaporators, boiler exchangers, waste-heat recovery systems, air-conditioning installations, etc.), you are faced with failures (leaks, corrosion, perforation, cracking, seal aging, efficiency loss, fouling, clogging, wear, …).

Apart from certain component failures or ageing (seals, fan blades, etc.), other faults are difficult to identify (localised or non-localised leaks, regular fluid refilling, fluid contamination or mixing, blockages, sediment buildup, localised ageing, ...).

You are looking for solutions for:

- Leak detection (tracer gas, ultrasound, dye-penetrant and other non-destructive testing methods),
- Investigating the causes of these problems that neutralise or render your thermo-fluid installations/equipment unusable.
- Prevent recurrence.

You want to guarantee the performance, availability and durability of your heat exchangers by:

- Ensuring their tightness
- Preventing corrosion,
- Mastering operating conditions (flow rate, pressure, fluid aggressiveness, etc.)
- Optimising manufacturing processes (welding/brazing, choice of surface treatment, etc.).

Our solutions

Cetim offers you its multidisciplinary expertise to conduct a factual and pragmatic investigation to meet your needs:

- **On-site Expertise** in France and Internationally: Our COFREND-certified teams in dye-penetrant and gas/liquid leak detection guide you in defining sealing criteria, selecting non-destructive testing methods (tracer gas, ultrasound, etc.) and carrying out on-site diagnostics, all while accounting for your exchanger’s history, operating conditions and surrounding environment.
- **Laboratory Failure Analysis:** Leak detection, corrosion assessment, materials characterization (steel, stainless steel, copper, aluminium, titanium, etc.) and deposit analysis.

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- **Identification and Validation of Damage Scenarios:** CFD simulations to reveal cavitation, erosion, water hammer, overpressure, fouling and clogging phenomena; structural simulations to assess mechanical performance (loads, stresses, pressures, differential expansion, etc.).
- **Advice and Support:** Recommendations for repair or design improvements, plus assistance in maintaining operational readiness through tailored maintenance procedures and best practices.
- **Corrosion and Anti-Corrosion Protection:** Diagnosis of corrosion mechanisms (erosion, pitting, cavitation, etc.) via laboratory tests (morphology, thickness measurement, chemistry, metallography), root-cause investigation (contaminants, water analysis) and guidance on material selection, surface treatments, operating parameters and design.
- **Welding and Brazing:** Expert advice on fabrication, repair and inspection processes to ensure the quality, tightness and durability of your equipment.

Your benefits

Cetim, independent and neutral technical centre, offers heat exchanger manufacturers 60 years of R&D and experience based on more than 1,500 expert assessments per year. Cetim covers every aspect of your thermo-fluid investigations.

This means you benefit from:

- **Comprehensive support that goes beyond laboratory testing** (metallurgical testing, water chemistry, advanced leak detection, etc.).
- **Our recognised know-how and expertise give you credibility and confidence:** our established track record provides you with authoritative findings that strengthen your position with both suppliers and customers
- **Help in preventing and avoiding future failures:** by understanding corrosion, erosion, fatigue mechanisms,etc, Cetim helps your implement corrective actions that enhance energy efficiency and system reliability
- **Cost Reduction and Extended Service Life:** optimised thermal performance, streamlined manufacturing processes and targeted material recommendations lower maintenance costs and prolong equipment lifespan
- **High-Level Failure Analysis and Robust Solutions:** benefit from precise diagnostics and enduring recommendations backed by thousands of case histories in mechanical and thermo-fluid systems
- **Access to Cutting-Edge Technologies and Simulation:** leverage the latest CFD, structural and multi-physics simulation tools to boost efficiency, ensure durability and maintain the availability of your heat exchangers

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