

Vibration Analysis

Vibration analysis is used to detect the early warning signs of mechanical fatigue which, if left unaddressed, could lead to a potentially expensive machine or component failure. In addition, this can lead to disastrous knock-on effects to other equipment which could result in costly and lengthy downtime.

All rotating equipment vibrates to some degree, but the older the components get, the greater the increase in vibration and the greater risk of an unforeseen machine or component failure.

Some of the common faults that can lead to mechanical failure include:

- Unbalanced or damaged fan rotors
- Shaft misalignment
- Bearing defects or wear
- Drive belt & pulley wear
- Motor and gearbox defects

Implementing periodic vibration analysis either a stand-alone service or as part of one of our Planned Preventative Maintenance plans will enable you to diagnose faults early and allow repairs to take place before a catastrophic failure occurs. This will not only minimise your overall maintenance and repair costs and maximise your plant uptime, but also extend the usable service life of the equipment.

Thermal imaging

Thermal imaging surveys are a highly effective non-contact diagnostic technique for checking the condition of machinery and components without the need to shut down operations. Thermal imaging “sees” infra-red wavelengths emitted from objects and then converts the temperature information into an image. Hot spots, shown as red, indicate temperature rises which highlight problems or potential future failure points.

Thermal imaging can detect issues in both electrical and mechanical components such as overloaded circuits, overheating motors, bearings, pumps and fans. Early diagnosis of such issues can avert fires or major failure which could result in a costly and unexpected failure or even complete operational shut down. Results from a thermal imaging survey can be used to schedule emergency repairs or bring forward any planned maintenance work leading to a rapid return on investment.

Some of the benefits of a thermal imaging survey include:

- Identifying future failure points before an incident occurs
- Reducing potential capex requirements
- Increasing energy efficiency
- Increasing productivity
- Reducing risk to employees
- Enhanced business continuity

Thermal imaging surveys are available from us as either a stand-alone service or as part of a Planned Preventative Maintenance plan.

ClimaCheck Efficiency Analysis

To measure is to know. Know the performance, maximise efficiency, lower your costs.

The energy and operational efficiency of any temperature control equipment has a direct impact on its environmental and financial performance. Enhancing energy efficiency will help lower CO2 emissions and the impact of your operations on the environment and, by ensuring that all equipment is operating efficiently, you can minimise your running costs and extend the working life of the assets at the same time.

Aqua's ClimaCheck process analyses up to ten specific measuring points to collect key operational data. This data is then recorded and presented in the form of flow charts, tables and graphs for easy interpretation. When fully utilised, Aqua's ClimaCheck can increase energy efficiency considerably and often lead to energy savings of between 10%-30%.

Some of the key measurement's available include:

- Heating, cooling capacity and power input (volts, amps & power factor)
- Energy consumption
- Superheat and subcool
- Compressor efficiency
- Evaporator efficiency
- Condenser efficiency
- Cycle efficiency

- System Efficiency Index (SEI)

You can undertake a ClimaCheck Efficiency Analysis either as a stand-alone service or as part of one of our Planned Preventative Maintenance plans. Alternatively, ClimaCheck can be integrated into your plant to provide continuous web-based monitoring of its efficiency and performance. If a compressor or heat exchanger performance falls, refrigerant leaks, or if the equipment's "energy profile" changes adversely, the system automatically sends us an alarm. The information is received via email or text message and we can then immediately log in from a computer or a phone for more detailed information about the problem.

Precision Laser Alignment

In rotating machinery, misaligned shafts are widely recognised as one of the key contributors to plant breakdowns. Poor shaft alignment can lead to increased vibration and stress, excessive friction and wear, higher energy consumption, damage to the shaft seal and ultimately, drive motor and compressor bearing failure.

Laser shaft alignment is fast, accurate and efficient and will help get your rotating machinery running at peak efficiency, extending the mean time between failures through increased reliability. Aqua will produce a full technical report on the findings, including the scope of any corrective actions, to allow timely and cost-effective decisions to be taken.

Precision Laser Alignment can be undertaken as either a stand-alone service or as part of one of our Planned Preventative Maintenance plans.

Oil Analysis

Air, gas and refrigeration compressors are critical components within many manufacturing operations. One of the primary causes of compressor failures is contamination of the oil itself. Lubricants serve several purposes in compressors from maintaining temperatures and lubricating moving parts to creating seals. Without regular sampling and analysis of compressor oil, there is an increased risk of system degradation and costly component failure.

Analysis of oil samples taken typically include:

- Appearance (visual inspection) – haziness or notable colour change is indicative of moisture ingress, suspended particles and/or oxidation
- ICP (Inductively Coupled Plasma Metal Analysis) – wear metals and lubricant characteristics
- Viscosity (measured at 40°C) – correct fluid use and degradation
- Particle count – contamination by particulates
- TAN (Total Acid Number) – oxidative degradation
- Water – moisture ingress

After conducting the analysis, Aqua will prepare a technical report summarising the results and outlining recommendations. If caught early enough, remedial action can extend the service life of the equipment, increase efficiency and prevent expensive component failures.

Oil Analysis can be undertaken as either a stand-alone service or as part of one of our Planned Preventative Maintenance plans.

Water Sampling and Treatment

Cooling systems, whether open-recirculating cooling towers or closed-loops systems are an essential component in many commercial, industrial and process environments where their primary purpose is to remove heat via a heat exchanger to water in a cooling system.

If a cooling system, or the water used within it, is poorly maintained or left untreated it can lead to several common problems that will affect cost, performance, reliability and safety. Without effective water treatment these issues can include:

- Corrosion – ferrous and non-ferrous decomposition
- Scale formulation – deposition of calcium and magnesium salts
- Fouling – deposition of particulate matter
- Microbiological activity – protozoa, pseudomonas, biofilms, legionella, etc.

A well-managed water sampling and treatment programme will prevent system degradation, increase system efficiency, reduce downtime, help optimise costs, increase plant reliability, improve safety and ensure regulatory compliance.

Water sampling and treatment can be undertaken as either a stand-alone service or as part of one of our Planned Preventative Maintenance plans.

Noise Impact Assessment and Monitoring

A noise impact assessment is necessary if you are planning to install, or already have installed, any noise generating equipment such as air conditioning units, process chillers or extraction systems to ensure you are not adversely impacting the surrounding environment such as nearby residents and other businesses.

At Aqua, all our noise impact assessments are carried out in accordance with the approved methods outlined under the national standard BS 4142:2014+a1:2019. This will require the installation of a noise monitor in a safe and secure location on your site for a suitable time period to ensure enough viable noise data is gathered during operational hours.

The output from the assessment will help determine whether your installation is likely to have an adverse effect on nearby communities as well as provide an insight into the range of noise mitigation measures that could be considered. These measures could include changing or modifying the proposed unit for installation, re-orientation or alignment of the unit to be installed, or installing acoustic noise-reducing barriers or enclosures as an example.

In addition to a full noise impact assessment, we also offer a manual noise survey using a handheld sound level meter to get instant feedback on the noise output from your plant to identify any changes as the plant ages over time.

Noise impact assessments and monitoring can be undertaken as either a stand-alone service or as part of one of our Planned Preventative Maintenance plans.