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The World's Leading Laboratory Network

Boiler Analysis

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Cover Photo: Broken pressure gauge

Introduction

Eurofins-ELS is one of New Zealand's leading experts in the areas of:

- Air quality monitoring
- Boiler water
- Environmental water
- Landfills
- Meat industry services
- Potable water for councils
- Sample Integrity
- Swimming pools
- Biological fluids
- Ceramicware and metal food containers
- Food and Dairy Products
- Legionella
- Metals
- Potable water for small communities
- Sewage and effluent
- Trade waste

The company has its origin as part of the Hutt City Council Laboratory and became a private enterprise in 1994. We grew through natural growth as well as the acquisition of local laboratories until in December 2012 we were acquired by Eurofins - the largest laboratory network in the world.

Eurofins Scientific is an international life sciences company which provides a unique range of analytical testing services to clients across multiple industries. The Group is the world leader in food and pharmaceutical products testing. It is also number one in the world in the field of environmental laboratory services, and one of the global market leaders in agroscience, genomics, pharmaceutical discovery and central laboratory services.

We are based in a purpose built facility of 1450 m^2 at 85 Port Road, Lower Hutt. Eurofins-ELS is comprised of four separate laboratory areas – Instrumental Chemistry, General Chemistry, Biological Fluids, and Microbiology. The latter is further split into three separate rooms with clean, cleaner and ultra clean capabilities. The ultra clean lab is used for pathogenic bacteria determinations.

In mid-2016 Eurofins-ELS opened satellite laboratories in Auckland and Christchurch. These laboratories offer full scope testing and sampling services.

Who should read this brochure?

In the draft "Code of practice for the design, safe operation, maintenance and servicing of boilers", a requirement is made for regular water-quality monitoring of both limited-attendance boilers and unattended boilers.

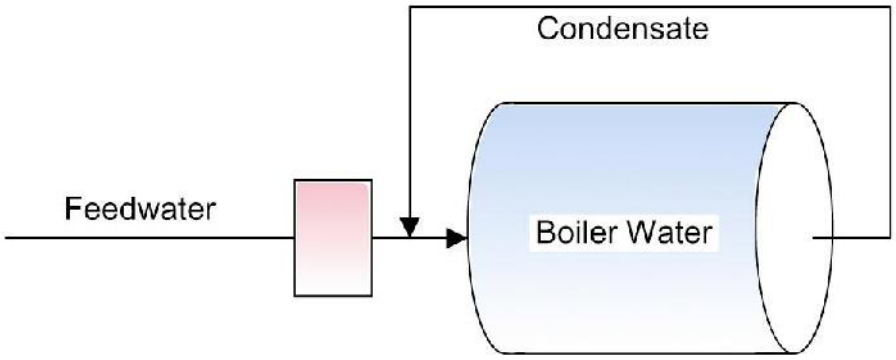
OSH requires monthly tests for these boiler types and stipulate that the testing be conducted by an IANZ accredited laboratory.

If you supervise a limited-attendance or unattended boiler then Eurofins-ELS can assist you with your water testing requirements.

Boiler water tests available

The specific method of chemical treatment used varies with the type of boiler and the specific properties of the water from which the boiler feed is derived. This is very site specific but we have the testing capability to cover all your requirements.

A boiler requires testing of three different water types as shown below:



Feedwater

Not all feed-water is created equally.

Boiler feedwater is sourced from many different places. Some supplies come from industry owned bores and treatment plants, while others come directly from a council supply, however all feedwater should be analysed in order to correctly determine dose rates of treatment chemicals.

Water quality can change as it passes through a delivery or reticulation system, so it is important to check for various parameters at point of use - ie where it enters the boiler or pre-treatment system.

Boiler feedwater is usually a combination of returned condensate plus pre-treated makeup water from a softener, reverse osmosis, or other purification system. Typical tests used for boiler feedwater include:

- Chloride or salinity
- Conductivity
- Dissolved Oxygen
- Hardness
- Iron and Manganese
- pH
- Silica
- Sulphite
- Suspended Solids
- Total Dissolved Solids
- Turbidity

Not all water supplies will require all the tests shown here, and if the supply is constant the tests will not need to be repeated very often.

Boiler Water

The boiler water itself must be dosed in order for the boiler to run efficiently and safely. A chemical imbalance can lead to corrosion and damage to the system and this damage can ultimately lead to boiler failure and injury.

Boiler water analyses are basically aimed at keeping the parameters within established limits.

Please remember that OSH require monthly tests for limited-attendance boilers and unattended boilers and stipulate that the testing be conducted by an IANZ accredited laboratory.

Alkalinity
One standard measurement is alkalinity, which can be determined and expressed in three ways, essentially identifying hydroxide, carbonate, and total alkaline components. We report alkalinity in several different ways following the British Standard method BS 1427: 1993.

- Hydroxide P2 Alkalinity
- Phenolphthalein P1 Alkalinity
- Total Alkalinity

pH
pH must be maintained at an alkaline state in order to reduce corrosion due to acidity.

Total Dissolved Solids
Total Dissolved Solids are controlled by blowdown. If boiler water gets too high in total dissolved solids, then it becomes inefficient and expensive to operate.

Sulphite
Sulphite is added to remove oxygen from within the boiler. Even at low concentrations, oxygen will become corrosive in a high pressure/temperature boiler.

We can report Sulphite in three ways.

- Sulphite
- Metabisulphite
- Sulphite as Na_2SO_3

Silica
Silica causes scale that is very hard and very difficult to remove. We use ICP-OES techniques to analyse this parameter.

Phosphate
Additives such as phosphate must be regularly monitored to ensure adequate levels are maintained. While simple colorimetry kits are available, we use IANZ accredited instrumental techniques in order to ensure accuracy.

Nitrate
Nitrates appear in boiler feedwater due to the oxidation of ammonium ions resulting from bacterial and organic surface contamination of pipelines. While simple colorimetry kits are available, we use IANZ accredited instrumental techniques in order to ensure accuracy.

Tannin
Tannin is added to boilers to assist treatment processes. Eurofins-ELS can analyse this parameter.

Iron
Elevated iron levels can indicate corrosion within the boiler, so iron becomes an important parameter to monitor.

Condensate

Good condensate is the best quality, least expensive water most systems can generate. You do not want to lose it, or contaminate it unnecessarily.

Steam condensate analysis should include

- ammonia
- conductivity
- copper
- iron
- pH
- silica
- sodium

Condensate analysis can indicate several possible problems. Iron and copper of course indicate corrosion, and the levels are an indication of the rate. If more than a few parts per billion of metals are found in a sample, it may indicate corrosion is occurring within the boiler.

Ammonia, especially in the presence of oxygen, can produce extreme copper corrosion.

How to arrange everything

After you have read this brochure and decided which suite you require, please give us a ring to arrange the delivery of bottles to you. Alternatively you could visit our website and order through there.

You will receive the bottles within a few days. Please fill them up following the instructions and then send back to us. Please include your cheque as payment. We will process the samples and deliver a report within a few days.

How to collect the samples

We will provide you with colour-coded bottles and clear instructions to make sampling easier. Each bottle corresponds to a particular preservative type and ensures the parameters under examination remain as constant as possible. Alternatively, we can collect the samples if you are nearby.

How to return the samples to us

All samples should be delivered to the laboratory as soon as possible but within 24 hours. Please follow the instructions we include. We operate 365 days a year and accepts samples from Monday to Saturday. Please remember that if you send samples on a Friday your courier may require a Saturday delivery ticket.

Analysis

We offer suites of tests that cover any chemistry analysis required. These suites cover all the common tests required.

Standard Boiler Suite

- pH
- Total Phosphate
- Total Dissolved Solids
- Sulphite

Please note that we perform TDS by both gravimetric and meter techniques, silica and phosphate by ICP-OES.

Additional Tests Available
Total, P1 and P2 Alkalinities
Silica, Iron, and Manganese
Nitrate by Ion Chromatography
Ammonia
Chloride

Many other tests are available. Please don’t hesitate to contact us for more information, and remember that we offer good discounts for volume work.

Contact Details

Please feel free to contact us by any one of the methods shown below.

Main Lines

Wellington	Main Telephone	(04) 576-5016
Christchurch	Main Telephone	(03) 343-5227
Auckland	Main Telephone	(09) 579-2669

Direct Lines

	Accounts	(04) 568-1205
Rob Deacon	General Manager	(04) 568-1203
Sunita Raju	Microbiology Lab Manager	(04) 568-1206
Tracy Morrison	Chemistry Lab Manager	(04) 568-1200
Sharon van Soest	Chemistry Lab Manager	(04) 568-1200
Deb Bottrill	Sample Logistics Manager	(04) 576-5016
Dan Westlake	Christchurch Lab Manager	021-242-2742
Ralph Veneracion	Auckland Lab Manager	021-242-2711

Email can be directed to staff using "first name last name"@eurofins.com

Courier

Wellington: 85 Port Road, Seaview, Lower Hutt, New Zealand 5010

Auckland: 35 O'Rorke Road, Penrose, Auckland 1061

Christchurch: 43 Detroit Drive, Rolleston 7675

Mail

P.O. Box 36-105, Wellington Mail Centre, Petone, New Zealand 5045.

Email

General Information: eurofinswellington@eurofins.com

WEB

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IANZ Accreditation Numbers:
Biological 639, Drinking Water 787,
Chemistry 414, RLP 1140