eurofins

The World's Leading Laboratory Network

# Water Potability

Water

www.eurofins.co.nz

# Table of Contents



**Summary of suites**: price includes bottle delivery on standard courier routes.

PLEASE NOTE: If you do not have an account with us, payment must be included with your samples. Please either include a cheque or arrange for internet banking to our account: 020528-0513672-00.

| Test Code | Purpose | Cost - exc GST | Inc GST | Page |
|---|---|---|---|---|
| DOM1 | Domestic water suite with E coli | $121.77 | $140 | 5 |
| DOM2 | Domestic water suite without E coli | $95.65 | $110 | 5 |
| NZS2 | NZDWS ground water suite | $262.00 | $301.30 | 5 |
| | Total Coliforms/E. coli | $31.50 | $36.20 | 5 |
| | Various Food Industry Water Tests | | | 10 |
| MWAT | Bottled water suite | $250.00 | $287.50 | 12 |
| | More though investigation options | Refer to pages 12-13 for options | | |

Cover Photo: A glass of pure NZ water

## 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 use this brochure?

This brochure has been developed to assist operators of small water systems, schools, dairy farmers, food premises owners, tankered water providers, ice manufacturers, and bottled water producers. The brochure shows you how to arrange the testing of your water and includes suite prices and useful information.

Small water supplies are supplies that serve fewer than 500 people. Most are privately owned, but a significant number are publicly owned ie owned by a local authority.

## Why do we need safe water?

*Excerpts from Dr Michael Taylor's excellent Ministry of Health presentation of the same name. Copies are available on request.*

New Zealanders drink water with varied water qualities from many different places, such as:

- Bottled water
- Farmhouses with bore water sources
- Holiday homes using roof water collection
- Ice
- Rural supplies receiving tankered water
- Urban reticulation systems
- Workplaces

Comparison with many other countries shows that New Zealand has some of the best drinking-water quality in the world. One of the reasons for this is that New Zealand has comparatively little industry that uses processes, which generate chemical wastes.

However, there is some complacency in New Zealand about how much waterborne illness exists. This brochure details some of the ways in which you can test a water supply for a wide range of important parameters.

It is very important to point out that New Zealand has one of the highest rates of gastro-enteritis due to Campylobacter and the protozoa Cryptosporidium and Giardia in the developed world. But the actual numbers are not reliably known because only a fraction of the cases are notified. Most outbreaks of gastro-enteritis are usually blamed on food, but water is often implicated. Cases of waterborne disease may often be missed because the first suspicion usually falls upon food poisoning and adequate epidemiological studies are often not done.

Another reason for safeguarding the quality of our drinking-water supplies is the risk from emerging pathogens. New pathogens are emerging steadily. Humans may not have developed immunity to these if they have not been in contact with these organisms before.

We offers packages of tests we call suites, designed specifically around the needs of water producers and water consumers. These range from extensive suites for manufacturers of bottled water right down to farm and householder water supplies.

We can assist you with any analytical water quality need, so please do not hesitate to contact us.

# Small Community and Individual Drinking Water Supplies

Many New Zealanders rely on untreated water sources such as bores, springs, streams and roof supplies to meet our drinking, washing and food preparation needs. 22% of New Zealanders are currently drinking water that is either contaminated by faecal matter (4%) or of unknown quality (18%).

There are three main types of source water used for drinking:

- surface water – streams, rivers, lakes and shallow springs and bores
- groundwater – particularly deep bores not affected by surface changes
- roof water – rainwater that is stored for future use

While any test that we perform is a snapshot of the moment of sampling, we are still able to provide you with an indication of the water quality you may have at that particular time. Our test suites are based on the various requirements of the New Zealand Drinking Water Standards (NZDWS).

Domestic Water Suite  Price for the suite = $121.77 + GST

This suite of tests is one which homeowners can use to determine the quality of their water supply - surface, ground or roof water. The suite measures a wide range of likely contaminants including:

- E. coli (and Total Coliforms)
- Chloride, Sulphate and Nitrate
- Arsenic, Boron, Calcium, Copper, Iron, Magnesium, Manganese, Potassium, Silica, Sodium, Zinc and Total Hardness
- pH, Conductivity, Turbidity and Alkalinity

The suite can be tested without E. coli for $95.65 + GST

E. coli only  Price = $31.50 + GST and courier costs

We do not recommend testing drinking water sources such as creeks, springs, or roof supplies for E. coli. Our reasoning is that the source could become contaminated at any time and that homeowners should consider their water to be contaminated and take the necessary precautions.

Should you wish to check your water for E. coli we are happy to do so given the above considerations.

Sample Bottles

The fastest way to get a sample to us is to purchase a bottle of water of 600mL or larger volume (plastic bottle, any brand). Tip the water into a cup, and refill the bottle with the water you want tested. Make sure you collect the water from the tap you drink from after flushing for 2 minutes.

Courier the sample to our address on the back page.

Lead from your taps

The Ministry of Health has identified that New Zealand has naturally acidic water that can dissolve metals such as lead out of your taps while sitting for long periods of time. The Ministry therefore has recommended everybody to flush a cup full of water each morning before collecting your first drink of water. This also applies if you are filling kettles.

Ensuring good quality water from your tanks

There are many ways of treating water supplied from tanks:

Budget brand, unscented Bleach is a chlorine-based disinfectant. As a water disinfectant, it is very effective and killing a wide range of bacteria, but not Cryptosporidium. Bleach works quickly and when dosed and mixed well at the correct level is virtually tasteless. However, it is worth noting that chlorine can react with organic matter in the tank to form a strong tasting compound, so it is important that the tank is maintained and kept clear of sludge build-up.

To determine how much is needed to sterilise a tank, multiply the volume in litres by 0.033 to get the amount of bleach to use in mL. eg: a 38,000L tank will require 1,254mL of bleach to achieve a chlorine level of 1g/m3.

Please note that: Budget brand unscented bleaches are recommended by Civil Defence and that because it contains detergents, Janola is not recommended.

For more information: http://www.getthru.govt.nz/how-to-get-ready/how-to-store-water/

Ultra-Violet treatment is becoming popular and is being used in water supplies serving increasingly large populations such as town and cities. Models are available for domestic supplies.

Filters are being sold as a way to treat tank-water, but please read the fine print if you are considering this option. Most filters will only remove bad tastes and will not remove harmful bacteria. In fact – some filters can make the problem worse, by allowing the build-up of the bugs you are trying to remove.

A recent Massey University study showed that 71% of rural homes on a tank supply and using filters were contaminated with E. coli.

Distillers are devices that boil the water and condense the steam. The resulting water will be free of bacteria, solids and metals. It won't however remove chlorine by-products if you have added bleach to your tank.

Other options include boiling your water, buying bottled water, or collecting water from your workplace. Whichever option you choose, please remember your decision will protect your family from a range of potential microbiological contaminants.

Detailed Water Quality Suite  Price for the suite = $262 + GST

This suite of tests has been designed for two purposes. First of all, it gives a very detailed breakdown of your water quality.

Secondly, because the suite has been established by laboratory and water treatment experts, it provides information that will allow you to set-up a treatment system. If you are testing for this reason it is important to sample at a time that the water is at its worst quality – after heavy rainfall. It may also pay to repeat the tests several times to ensure your water quality is measured under varying conditions.

| **Test** | **Notes** |
|---|---|
| Arsenic | Associated with geothermal areas, mining or timer treatment areas, and can appear in other groundwaters. |
| Boron | Associated with geothermal areas. |
| Bromide | Forms bromate when oxidised by ozone. |
| Calcium | Is required in order to calculate the calcium hardness |
| Calcium hardness | Determination of the calcium component of the water hardness. Is required for the saturation index. |
| Chloride | High levels indicate seawater intrusion, and will also affect taste and corrosiveness of the water. |
| Conductivity | Useful water quality parameter, and is used in the calculation of saturation index. |
| E.coli | Indicator of faecal contamination |
| Fluoride | Common in some water sources, is good for health at low levels, but not so good at elevated levels. |
| Iron (Dissolved) | Common in many water sources and can cause taste and staining problems. |
| Iron (Total) | Total iron is included for treatment information. |
| Magnesium | Is required in order to calculate the total hardness |
| Manganese (Dissolved) | Common in many water sources and can cause taste and staining problems. |
| Manganese (Total) | Total manganese is included for treatment information. |
| Nitrate | Elevated levels can affect the health of infants |
| Nitrite | Indicator of the likely contamination by human or animal waste. |
| pH | Useful water quality parameter, and is used in the calculation of saturation index. |
| Potassium | Dairy effluent contamination indicator. |
| Suspended solids | Needs to be below 5 mg/L for UV lamps. |
| $T_{254}$ | Transmission of UV light at 254nm. Useful for determining suitability of UV treatment. |
| Total alkalinity | Useful water quality parameter, and is used in the calculation of saturation index. |
| Total hardness | Calculated from the calcium and magnesium tests. This is an indicator of likely scale formation in pipes. |
| Turbidity | Low turbidity needed for clarity and UV treatment. |

The tests can be used on all common water sources which are defined and summarised below:

Roof Water

Contrary to popular opinion, roof water supplies have caused many illnesses due to micro-organisms. Here are a few tips for reducing the risk of getting sick.

- Keep the roof and gutters clean.
- Install a first-flush diverter.
- Don't bury the storage tank or pipework.
- Ensure the tank is securely covered, and that birds or animals (or their wastes) can't get in. The cover should always be locked.

Because roof water may contain micro organisms it usually needs to be disinfected before you can drink it. If you can, arrange for the storage tanks to be in series (one after the other). Then drinking water should be drawn from the last tank, because it will be much cleaner (have fewer micro organisms) than water in the first tank.

There are more micro organisms in the sludge in the bottom of the tank than near the surface, so you should de-sludge your storage tanks regularly.

People with roof water collection systems should avoid burning oil, wood or coal because poisonous chemicals from the smoke can deposit on the roof. This is particularly likely if the fuel is burned in a slow burner (not an open fire). Also, the smoke is often acidic so it can dissolve lead from lead flashing, which can result in lead getting into your drinking water.

If you think there may have been pesticide spray drift around your house, you should rinse the roof off, and make sure the rinsed water goes into your wastewater. We can arrange for pesticide testing if you require it.

Surface Water

All surface waters contain bugs (which we call micro-organisms), although some water is more often and more badly contaminated than other water. A catchment is the surface run-off area for the local rainfall. Water flowing over the ground can become contaminated with various things. You find more micro-organisms in catchments where there are human wastes (from septic tanks and wastewater treatment plants) and animal wastes.

Human and animal wastes can contain bacteria and viruses that are bad for humans (pathogenic), but animals can be more of a problem because they distribute their wastes so widely. Cattle are the most likely source of *Cryptosporidium*. Basically, the closer they get to the water source, the higher the numbers of *Cryptosporidium* in the water.

Groundwater

Care must be taken when defining a groundwater source. While springs are often described as a groundwater the source of the spring may be only a few metres away and above ground. Wherever you are unsure of the source of your groundwater, always treat it as though it is surface water and therefore likely to be contaminated. Most groundwater supplies are not secure and cannot be considered safe to drink unless proven by laboratory analysis.

Secure bores have historically been microbiologically the safest water supply and if they are properly secured and well away from septic tanks then they are difficult to contaminate.

If you use groundwater for your water source, and you live near hydrothermal or geothermal areas, your water may contain above-average concentrations of boron, fluoride, and arsenic. Although fluoride helps to prevent tooth decay, generally drinking water levels should be as low as possible.

Groundwater from areas that have a lot of farming, orchards and market gardens, or where waste water is disposed into the ground, may contain levels of nitrate higher than the maximum acceptable value (or MAV). This usually only affects infants.

Some shallow groundwaters may contain traces of pesticides if these are used heavily in your district, but so far these have hardly ever been found at levels that could make people sick, so we don’t routinely test for them.

## Food Premises Process Water

The New Zealand Food Safety Authority (NZFSA) requires food processing and export premises to conduct testing on the water used in their processes. The type and frequency of testing is dictated by NZFSA for the particular premises, depending on the premises type and volume of water used. It is critical for premises to conduct their water testing on an ongoing basis, as without the necessary testing a premise can be closed by NZFSA.

Eurofins ELS is IANZ and LAS (formerly MILAB) accredited to perform a full range of water testing on food premises supplies.

Please contact us for further information.

Some specific industries have sets of tests already predetermined for that industry. Some examples include:

## Winery Production Water

Under the NZFSA scope of accreditation, we are able to test water used for wine production. The tests required are

- E.coli
- Turbidity

### Honey and Bee products Production Water

Under the NZFSA scope of accreditation, we are able to test water used for honey production. The tests are required to show if the water characteristics change after rain.

- Faecal Coliforms
- pH
- Turbidity

## Orchard Production Water

Orchards that use water to wash fruit are required to demonstrate that the water is free of E.coli.

## Egg Production Water

We are able to test water used for egg washing and production. The tests required are

- Faecal Coliforms
- pH
- Turbidity

## Water Tankers

The Ministry of Health has identified that a large number of New Zealanders receive their drinking water from tankered water suppliers. The operation of these services and quality of water they supply will be included in the NZ Drinking Water Standards.

While usually seasonal it is still an important part of the drinking water system within New Zealand. The regulations take effect from 1 January 2006. NZDWS recommends the following to all customers:

- Use a registered tankered water provider.
- The tanker operator is required to provide upon delivery a written statement stating the delivery date and volume of water as well as the source and class of that water.
- Avoid using water from creeks or streams that may be contaminated.
- Avoid using any non-registered operator that may have used his tank for other purposes (such as emptying a septic tank) before delivering your water.

Please note that when the water is emptied into your tank it will stir up all the sediment at the bottom. This may cause contamination to spread through your pipes and into your drinking water. Also, if there is chlorine present in the tankered water, this will react with the sediment and cause a bad taste.

For these reasons it is very important to stop anything other than water entering your water tank and for you to clean it out on a regular basis. Refer to the roof water section on page 9.

Following Ministry of Health guidelines, we can provide approved testing for water companies who use tankers to deliver water, as well as for their customers wishing to check the quality of water they have paid for.

## Ice

Ice is a water product that is not included in the drinking water standards because it is considered a food. However, no food standard yet specifically covers ice, so we offer a microbiological suite recommended by our own analysts.

- Total Coliforms
- E.coli
- Heterotrophic plate counts at 22°C and 35°C

# Mineral Water Used for Bottling

Standard 2.6.2 of the Food Standards Code for non-alcoholic and brewed soft drinks:http://www.foodstandards.gov.au/foodstandards/foodstandardscode.cfm, lists an extensive set of definitions and chemical test requirements. This code has been used to prepare the following suites of analyses offered.

In the code, mineral water or spring water has been defined as being a "ground water obtained from subterranean water-bearing strata that, in its natural state, contains soluble matter".

Non-Alcoholic and Brewed Soft Drinks  Price for the suite $250 + GST

The defined parameters in the above code are:

- Copper, Manganese, Zinc, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, and Selenium
- Borate as $H_3BO_4$ *(analysed as Boron)*
- Fluoride, Nitrate, Nitrite
- Organic Matter by permanganate (as $O_2$) - *(analysed as TOC)*
- Hydrogen Sulphide
- Cyanide (as $CN^-$)
- pH
- Total Dissolved Solids

Chromium is analysed directly and if significant amounts are found then a further sample should be tested for Chromium (VI).

All of the detection limits easily satisfy the guideline requirements. Please note that we require at least 2 litres of sample to complete these analyses.

| | | |
|---|---|---|
| A More Thorough Investigation | Price for the full suite | $ 1,400 + GST |
| | Price excluding organics | $ 510 +GST |

If you are serious about potential bottling or want to assess water which you are already bottling, a thorough investigation of the chemical quality of the water is warranted and the parameters listed below are recommended. The listed parameters are largely based on testing for a potable water supply. Hydrogen sulphide and organic matter have been added so that all of the parameters listed in the Food Regulations are also covered. Please provide us with at least 5 litres of sample for the analyses.

- pH, alkalinity, total alkalinity, acidity, turbidity, absorbance at 270 nm, colour, conductivity, total hardness
- Sulphate, soluble phosphate, chloride, fluoride, bromide, nitrate, nitrite, ammonia
- Total cyanide
- Hydrogen sulphide
- Total dissolved solids

- Total organic carbon (TOC)
- Sodium, silica, magnesium, potassium, calcium, arsenic, barium, boron, chromium, cadmium, copper, iron, manganese, lead, lithium, nickel, selenium, zinc, mercury
- Chlorophenols including pentachlorophenol
- Acid herbicides
- Semi Volatile Organic Contaminants
- Volatile Organic Contaminants


Market/Export Specific

If a specific market is intended, you should find the specific requirements for that market. The US for example has quite stringent requirements depending on the intended label (natural versus spring versus mineral waters etc).

Microbiological Analyses

The Ministry of Health in their Microbiological Reference Criteria for Food 1995 gives guidelines for microbiological testing of packaged waters. We require at least 1 litre of sample to complete these tests.

The tests required are:

- Total Coliforms
- *E. coli*
- Group D streptococci
- *Pseudomonas aeruginosa*

# Sampling and Delivery Details

*"The result of any test can be no better than the sample on which it is performed".*

The objective of sampling is to collect a portion of material small enough in volume to be transported conveniently and handled in the laboratory while still accurately representing the material being sampled.

Sampling is an often underestimated but very crucial step in the process of determining sample integrity. Many things can go wrong before the sample reaches a laboratory so we offer assistance to minimise risk associated with:

- Inappropriate sample types and locations
- Incorrect sampling technique
- Sample contamination
- Incorrect labelling
- Sample homogeneity
- Delivery timeframes

Our service provides clear and easy to follow sampling procedures using colour coded labels wherever possible. We have our own team of samplers so we know what is needed to ensure accurate and safe sampling under all types of conditions.

## Sampling

We provide you with colour-coded bottles to make sampling easier. Each bottle corresponds to a particular preservative type and ensures the parameters under examination remain as constant as possible.

For example ammonia is a very unstable chemical that requires either on-site acidifying or freezing depending on the sample type under examination.

We can advise the most appropriate way to accurately record the various parameters under examination.

## Sample Delivery

All samples should be delivered to the laboratory as soon as possible but within 24 hours. Microbiological activity continues even at 4°C so the sooner we receive samples the better. We include a temperature control bottle, and slikka pads with each chilly bin we send. Please follow the instructions we include.

Dedicated chilly bins are provided for contractual services. They are sterilised with Virkon upon receipt, reloaded with sampling equipment/bottles and returned on the same day. Virkon is an antiviral product that ensures all bacteria and viruses are destroyed, assuring staff safety at both ends.

A chain of custody should be included with all deliveries so that we can check the sampling time and sample details. The details included on the Chain of Custody will be used to prepare your report.

Our laboratory operates 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 sticker.

We are happy to assist with setting up scheduled courier pickups to ensure consistent sample delivery to ELS.

## Sending Packages of Samples to us

After you have read this brochure and decided which suite you require, please fill a new 500mL or larger water bottle such as Pump, and courier it to us. For more complex sampling please ring to arrange the delivery of bottles to you.

You will receive the bottles within a few days. Please fill them up following the instructions and then send back to us within 24 hours. Please include your cheque as payment. We will process the samples and deliver a report within 10 working days.

- Please freeze the ice pack prior to taking sample.
- At time of sampling, fill all sample bottles provided including ‘Temperature Control’ bottle if included.
- Complete the submission form and the bottle labels with permanent pen.
- Courier the completed kit to us, to be received within 24 hours of sampling

Payment must be included with samples – please refer to prices on page 2.

# 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

www.eurofins.co.nz



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