WHAT IS UNCERTAINTY OF A MEASUREMENT?

All laboratory measurements are subject to some level of uncertainty. This is calculated and reported as an estimated uncertainty of measurement (UM).

Laboratory accreditation requirements – ISO/IEC 17025

Test reports shall include information regarding an estimate of the uncertainty of measurement, when a customer instructs the facility to provide the information, when it is relevant to the application of test results, or when it affects compliance to a specification limit. This information may include a hyperlink to the UM calculated values for each parameter (see Table 1).

The laboratory shall not make a statement of conformity on a report, unless instructed by the client.

The detection of any *E.coli* regardless of number, in a drinking water sample shall be regarded as not complying with the NHMRC Drinking Water Quality Guidelines.

For more information

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What does this mean for your results?

Uncertainty of measurement must be calculated prior to the issuing of compliance statements to regulatory guidelines or licences; where the value detected is a whole number.

Where your results are close to a guideline limit, the application of the UM value may raise some doubt regarding whether the result shall pass or fail to comply.

- E.g. if your licence states you need to have a free chlorine of less than 3 mg/L and your result is 2.9mg/L, with a UM of ±10%. There is a 95% chance your true result may be between 2.6 mg/L and 3.2 mg/L.

By submitting samples to this laboratory, the end user accepts the responsibility (or risk) that the product may not meet a compliance specification.

Please contact the laboratory for assistance in applying the UM values to your results.

Microbiological analysis

Table 1

Parameter	Level of reporting (LOR)	Method of uncertainty ± Log 10
Clostridium perfringens	<1 cfu/100mL	Log 10 (0.13)
E. coli (membrane filtration)	<1 cfu/100mL	Log 10 (0.23)
E. coli (MPN)	<1 mpn/100mL	Log 10 (0.25)
E. coli (Rapid)	<1 cfu/100mL	Log 10 (0.33)
Enterococci	<1 cfu/100mL	Log 10 (0.19)
Enterococci (Rapid)	<1 cfu/100mL	Log 10 (0.26)
Legionella species (Direct)	<1 cfu/100mL	Log 10 (0.30)
Legionella species (membrane filtration)	<1 cfu/100mL	Log 10 (0.25)
Male-specific (F-RNA) coliphages	<1 ffu/100mL	Log 10 (0.17)
Pseudomonas aeruginosa	<1 cfu/100mL	Log 10 (0.54)
Somatic coliphages	<1 pfu/100mL	Log 10 (0.13)
Thermotolerant coliforms (faecal coliforms)	<1 cfu/100mL	Log 10 (0.57)
Total Coliforms (MPN)	<1 mpn100mL	Log 10 (0.34)
Total Plate Count (HPC) at 36°C (MF)	<1 cfu/1mL	Log 10 (0.57)
Total Plate Count (HPC) at 36°C (Pour plate)	<1 cfu/1mL	Log 10 1 (0.19)
Cryptosporidium oocysts	<1 oocyst/10L	Log 10 (0.21)
Giardia cysts	<1 cyst/10L	Log 10 (0.33)

Parameter	Level of reporting (LOR) (mg/L)	Method of uncertainty %	Parameter	Level of reporting (LOR) (mg/L)	Method of uncertainty %
General Chemistry			**Metals – water ICP-MS *= ICP-OES**		
Alkalinity (fresh)	10	10	Aluminium	0.006	7.3
BOD	3	20	Arsenic	0.001	5.9
Chloride	10	10	Barium	0.001	7.9
COD – high level	20	15	Beryllium	0.001	6.0
COD – low level	5	15	Boron	0.001	6.7
Chlorine (Colorimeter)	0.05	10	Cadmium	0.001	4.4
Chlorophyll-a (ug/L)	1	TBA	Calcium *	1.5	8
Colour (HU)	2	25	Cobalt	0.001	6.1
Conductivity (ms/cm)	0.001	2	Chromium	0.001	4.7
Dissolved Oxygen	0.1	1	Copper	0.001	4.5
Fluoride	0.1	10	Iron	0.02	8.1
Oil & Grease (liquid)	5	20	Lead	0.001	6.8
pH – Water	0.05	1	Lithium	0.001	9.9
Suspended Solids	2	20	Magnesium *	0.1	10
Total Solids %	1	20	Manganese	0.001	6.9
Total Dissolved Solids	15	10	Mercury	0.0001	14.9
Total Volatile solids %TS	2	10	Molybdenum	0.02	4.7
Suspended Solids Total Volatile %TS	2	TBA	Nickel	0.001	4.9
Salinity	0.02	2	Potassium *	0.5	20
Temperature (oC)	0.2	1	Silver	0.02	7.5
Turbidity (NTU)	1	25	Selenium	0.001	4.2
			Silica *	1	6.5
			Sodium *	0.5	7
Nutrients			Strontium	0.001	5.7
Ammonia – high level	0.01	10	Sulfur *	1	10.3
Ammonia – low level	0.005	15	Tin	0.001	4.3
Oxidised N – high	0.02	10	Uranium	0.001	9.9
Oxidised N – low	0.006	10	Vanadium	0.001	4.5
Nitrite	0.01	4	Zinc	0.001	6.6
Total N – high	0.1	10	Hardness	4	Calculated
Total N – low	0.05	17			
Orthophosphate – high	0.01	5			
Orthophosphate-low	0.003	20			
Total P – high	0.01	8			
Total P – low	0.005	15			
Metals – Solids ICP – MS mg/kg					
Aluminium	5	1	Lead	3	11
Arsenic	1	5	Mercury	0.1	5.2
Cadmium	1	4	Nickel	1	8.7
Chromium	1	6	Selenium	1	3.8
Copper	1	6	Zinc	1	7.0
Iron	5	TBA			

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