

2012 - 2013



BUSSELTON WATER

ANNUAL WATER QUALITY REPORT



Working together for our water future

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MESSAGE FROM THE CHIEF EXECUTIVE OFFICER

I am pleased to present the 2012-13 Water Quality Report on behalf of Busselton Water.

Busselton Water's commitment to provide safe, high quality drinking water that consistently meets or exceeds the Australian Drinking Water Guidelines is firmly established and is ensured through our Memorandum of Understanding (MoU) established with the Department of Health.

Busselton Water has achieved outstanding water quality results in 2012-13 as detailed in this report and summarised in the following table.

2012-13 Water Quality Results at a Glance

Health Related Characteristics	% Compliance with MoU
<i>Escherichia Coli</i>	100
<i>Naegleria</i>	100
Chemical	100
Pesticides	100
Radiological	100
Chlorine Disinfection	100
Non Health (Aesthetic)	100

In addition to presenting water quality results and performance against the Memorandum of Understanding, this report also describes the processes Busselton Water uses to collect, treat and distribute drinking water to our customers. It also provides some insight into the customer's perception in relation to the quality of their supplied water.

I wish to thank everyone who has made a contribution to these excellent results, particularly staff and representatives from Department of Health, Hunter Water Australia and Rockwater.

Chris Elliott



Chief Executive Officer

OUR COMMITMENT



DRINKING WATER QUALITY MANAGEMENT FRAMEWORK

Busselton Water's Drinking Water Quality Management System is based on the Australian Drinking Water Guidelines (ADWG) Framework for Management of Drinking Water Quality, endorsed by the National Health and Medical Research Council. The framework provides benchmark water quality guidelines and values for the design of a structured and systematic approach to drinking water quality management, ensuring a safe and reliable water supply.

There are 12 elements within the framework which are considered best practice. These elements are divided into four sections:

- Commitment to drinking water quality management
- System analysis and management
- Supporting requirements
- Review

Busselton Water will regularly assess its progress against implementation of the 12 elements of the Australian Drinking Water Guidelines Framework.

The Operating Licence issued by the Economic Regulation Authority, recognises our Memorandum of Understanding (MoU) with the Department of Health. The MoU describes the Department of Health Requirements for Compliance with the microbiological, health, chemical and radiological parameters.

Busselton Water provides the Department of Health with a quarterly water quality report, which outlines how the organisation has performed against the agreed requirements as specified in the MoU.

Busselton Water is a member of the Advisory Committee for the Purity of Water, which is chaired by the Department of Health WA. More information on the Advisory Committee for the Purity of Water can be found at www.public.health.wa.gov.au

Busselton Water provides raw water information to the Department of Water to ensure the long-term sustainability of the water supply for the Busselton region.

A copy of the MoU can be found on the Busselton Water website at www.busseltonwater.wa.gov.au

DRINKING WATER QUALITY POLICY

Policy W030 - Drinking Water Quality

Busselton Water is responsible for providing drinking water to its diverse customer base – comprising industrial, business and residential customers – throughout the licensed area.

Our management of the water supply system and water quality is given the highest priority to reflect public health considerations and community expectations.

Busselton Water's Board, staff and contractors are expected to recognise their responsibilities and required diligence in undertaking this most important and privileged role on behalf of the community.

Busselton Water is committed to supplying its customers with high quality drinking water that meets the ADWG (2004). We will utilise effective, efficient and innovative management and operational practices to reliably deliver safe and aesthetically acceptable drinking water. Our commitment to water quality will be maintained by:

- a. Complying with legislative and regulatory requirements regarding drinking water quality. Liaising and cooperating with the Department of Health, relevant regulators and key stakeholders
- b. Managing drinking water quality using a risk-based approach where all potential risks, from source to tap are identified and controlled to mitigate any threat to drinking water quality.
- c. Aerating, filtering and disinfecting drinking water to improve water quality and prevent contamination. Then routinely sampling the quality of drinking water at adopted sampling points for laboratory analysis.
- d. Tabling water sample test results in a central data base, analysing the data for trends in quality and by applying corrective action and procedures if required.
- e. Improving our awareness of customers' understanding and expectations regarding drinking water quality. Welcoming customer feedback on water quality issues and responding effectively to meet customers' concerns and needs.

- f. Providing publicly available information and reports on the quality of the drinking water supply and associated issues, thus gaining the confidence and respect of customers, regulators and the water industry.
- g. Keeping at the forefront of and contributing to drinking water quality standards, innovations and regulations aligned with industry best practice.
- h. Establishing and regularly reviewing appropriate contingency and incident response plans.
- i. Taking part in research and development programs and studies aimed at better understanding and improving drinking water quality.
- j. Having an effective and continuously improving water quality management system that is reviewed and audited routinely to assure a safe and acceptable water supply.
- k. Providing adequate training and communication to all employees to ensure that they are aware of and committed to Busselton Water's drinking water quality policy.

Last Reviewed: 21 November 2012

BOARD RES: BWB 544

WATER QUALITY OBJECTIVE

The Busselton Water Statement of Corporate Intent 2013-14 identifies Water Quality as one of its key objectives.

To achieve this we will:

- Deliver water meeting all agreed Standards
- Maintain a Memorandum of Understanding with the Department of Health

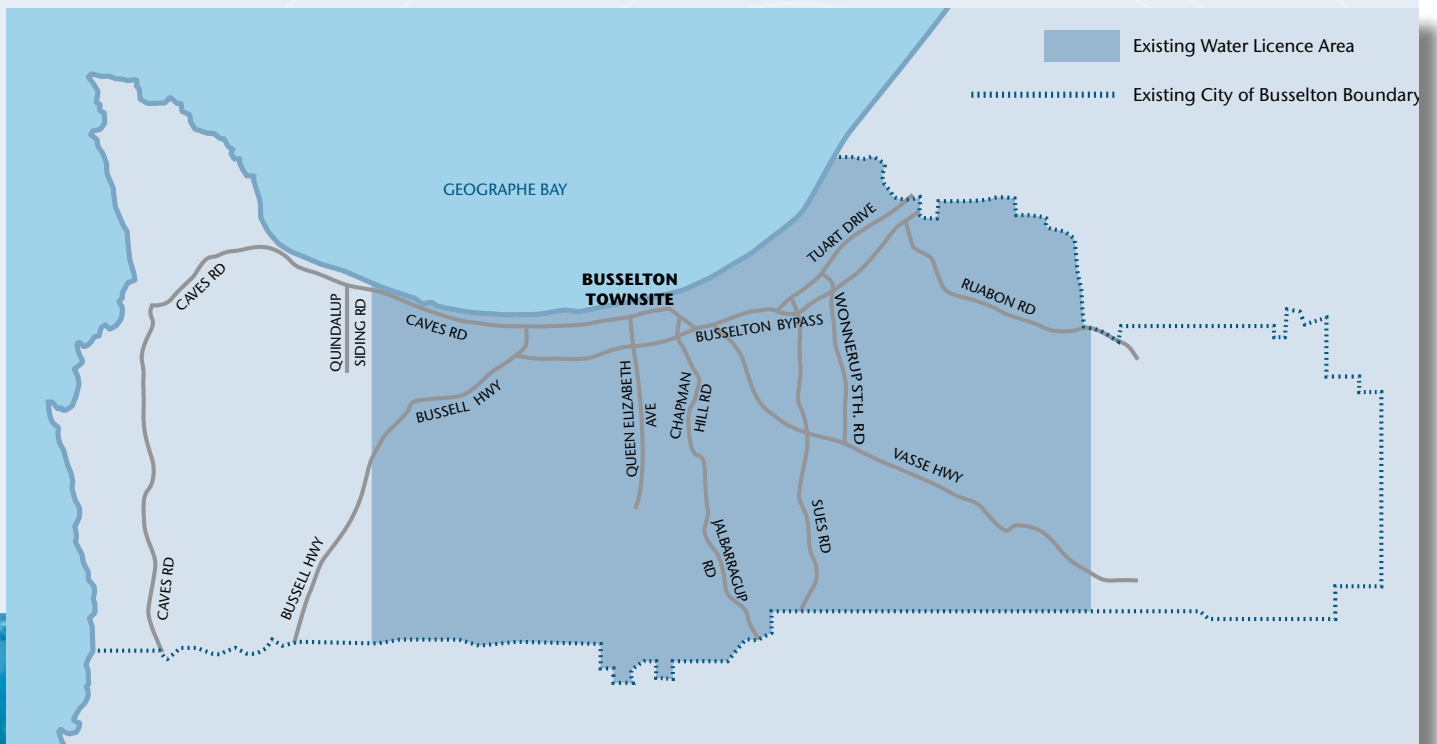
OUR LICENCE AREA

Busselton Water supplies drinking water to over 26,000 customers within the City of Busselton and close environs such as Port Geographe, Siesta Park, Vasse and Wonnerup.

As a sought-after sea-change destination, this figure can rise significantly during weekends and holiday periods.

Busselton Water also supplies bulk water to the Water Corporation for the Dunsborough Town Water Supply Scheme.

The licence area is illustrated in the Operating Licence area plan below.



SYSTEM ANALYSIS AND MANAGEMENT



OUR WATER SOURCE

Busselton Water sources water primarily from the deep Yarragadee aquifer. A small (less than 5%) amount of water is also sourced from the Leederville aquifer which extends from about 10 to 275 metres in depth. Below this the Yarragadee aquifer extends to over 800 metres in depth.

Busselton Water has an extraction licence issued by the Department of Water to extract water from the Yarragadee and Leederville aquifers. Busselton Water has eight production bores which have supplied the water that Busselton Water has produced in the last five years.

The Department of Water has created a Source Protection Plan (Report No. 108) for the Busselton Water Reserve which covers our eight bores located at Plant 1, Kent Street (BWB17 and BWB19), Plant 3, Hobson Street (BWB12, BWB16 and BWB20), Plant 2, Queen Elizabeth Avenue (BWB14) and Plant 5, Queen Elizabeth Avenue (BWB15 and BWB18).

This plan provides a risk assessment of current land use and also actions to secure and protect sources for the future.

Busselton Water uses Rockwater Pty Ltd (Hydro geologists) to review the plan along with current groundwater results and extraction, to ensure future operational strategies are sustainable in the long term.

Financial Year	Extraction(GL)
2008-2009	4.49
2009-2010	4.23
2010-2011	4.30
2011-2012	4.30
2012-2013	4.59

UNDERSTANDING WATER QUALITY

Turbidity	Turbidity is the cloudy appearance of water caused by the presence of suspended matter.	The Australian Drinking Water Guidelines specify an aesthetic guideline of 5 NTU. If disinfection is required, the turbidity of less than 1 NTU is desirable at the point of disinfection.
Colour	Colour in water originates mainly from natural drainage through soil and vegetation in a catchment.	The Australian Drinking Water Guidelines value for colour is based on the colour that is noticeable in a glass. This is generally accepted as 15 HU.
Iron	Iron occurs naturally in water as a result of contact with soil or rock in the catchment. Iron in the water does not present a health hazard.	The Australian Drinking Water Guidelines recommend that based on aesthetic consideration, the concentration of Iron should not exceed 0.3 mg/L.
Manganese	Manganese in water can come from contact with soil or rock in the catchment. Manganese is not considered a health concern unless the concentration exceeds 0.5mg/L.	The Australian Drinking Water Guidelines recommend that based on aesthetic considerations, the levels of Manganese should not exceed 0.1 mg/L.
Total Dissolved Solids	Total dissolved solids (TDS) consist of inorganic (natural) salts and small amounts of organic matter dissolved in water. Total dissolved solids comprise sodium, potassium, calcium, magnesium, chloride, sulphate, bicarbonate, carbonate, silicon, organic matter, fluoride, iron, manganese, nitrate and phosphate.	Treated water quality containing TDS levels of below 500mg/L is classified good.
Microbiological Pathogens and Disinfection	<p>Thermophilic <i>Naegleria</i> refers to a group of amoeba which includes <i>Naegleria fowleri</i>, the organism that causes the waterborne disease primary amoebic meningoencephalitis. <i>Naegleria fowleri</i> is an environmental pathogen which naturally lives in warm water.</p> <p>The most common and widespread health risk associated with drinking water is contamination by microorganisms. Organisms associated with the gut of humans and mammals cause the usual waterborne diseases. Tests are undertaken for <i>Escherichia coli</i> (E.Coli).</p>	<p>The Department of Health WA has notification protocols in place regarding <i>Naegleria</i>.</p> <p>The Australian Drinking Water Guidelines state that thermotolerant coliforms/<i>E.Coli</i> should not be present in a minimum 100mL sample.</p>
Radiological	There are natural levels of radiation within the environment, and groundwater sources such as that sourced from the Yarragadee aquifer can have higher background levels than that of surface water systems.	<p>Testing is undertaken for gross alpha and gross beta radioactivity, following which Radium 226 and Radium 228 can be determined.</p> <p>The Australian Drinking Water Guidelines 2004 recommend that levels should not exceed 0.5 Bq/L.</p>
pH	pH is the measure of the hydrogen ion concentration of water. pH is not measured in any units.	The suggested aesthetic pH target from the Australian Drinking Water Guidelines is 6.5 to 8.5.

WATER TREATMENT

Busselton Water uses a three step process to treat the raw water from the deep groundwater aquifers to produce safe drinking water to its customers.

Aeration

Raw water is aerated via spray aerators, which oxidise naturally occurring iron, turning it from soluble into small solids.



Filtration

The aerated water is then filtered through a sand filter to remove iron, turbidity and impurities. The filtered water is then collected in a clear well.



Disinfection

Chlorine is added to maintain the disinfection level required to preserve microbiological safety before it is pumped into the distribution system.

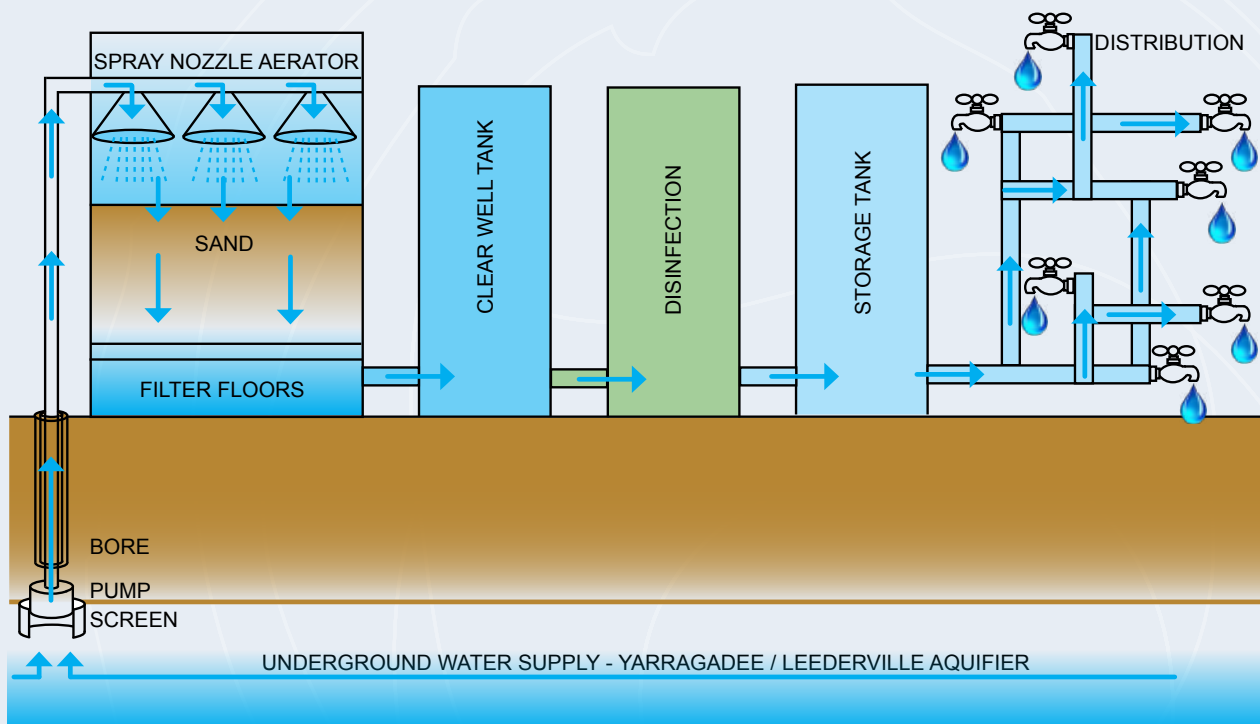


TREATMENT PLANTS

Busselton Water has three treatment plants:

- Plant 1 – Kent Street, Busselton
- Plant 2 – Queen Elizabeth Avenue, Busselton
- Plant 3 – Hobson Street, East Busselton

WATER TREATMENT AND SUPPLY PROCESS



DISTRIBUTION NETWORK

Busselton Water's distribution network delivers drinking water within the City of Busselton and close environs. The network operates as one large, interconnected system. The materials used in the reticulation network have been approved either under Australian Standard AS/NZS 4020: 2005 - (testing of procedures for use in contact with drinking water) or have been identified by the Department of Health as not requiring approval as per the Memorandum of Understanding with the Department of Health.

Strict protocols have been established by Busselton Water to assure the purity of the chlorine used and the safe handling of chlorine at the Treatment Plants.

The distribution network has the following components:

Estimated Population	Approximately 26,000
Total Number of Connections	11,619
Total Length of Pipes	302 km
Number of Storage Tanks	5
Chlorine Residual Target	0.5 mg/litre
Number of Distribution Water Quality Zones	1

MULTI BARRIER APPROACH

Preventing contamination and minimising potential hazards is an essential part of providing our customers with safe drinking water. The Australian Drinking Water Guidelines (2004) state that a multi barrier approach is the most effective to ensure the safety of drinking water.

Barriers include:

- Protection of Groundwater
- Treatment
- Chlorine disinfection
- Backflow Prevention

Busselton Water maintains and operates these multiple barriers, ensuring they are robust and that high quality water is delivered to its customers.

INCIDENT RESPONSES

While every effort is made to prevent water quality incidents from occurring, there will inevitably be times when things go wrong due to equipment failure, human error, extreme weather conditions or unforeseen events. Busselton Water has incident response plans to manage such events with the minimum possible impact on water quality.

In the event of a water quality incident, Busselton Water activates its Incident Response Plan, which is a comprehensive plan to handle water quality events and links to the binding protocols of the Memorandum of Understanding between Busselton Water and the Department of Health.

Busselton Water maintains a comprehensive Risk Register and Business Continuity Plan that are both reviewed and tested internally at regular intervals. During the reporting period managers, operational staff and stakeholders attended Water Quality Incident Management training. These sessions provided opportunities to embed new initiatives, which resulted in further improvements to our incident management process.

During the reporting period there were no incidents that required notification to the Department of Health.

WATER QUALITY PERFORMANCE

Water Quality Monitoring and Testing

Busselton Water has a comprehensive monitoring program which has been reviewed and endorsed by the Department of Health.

Key parameters monitored by Busselton Water include:

- Microbiological – this includes Thermophilic *Naegleria* and *Escherichia coli*.
- Chemical Health – this includes a large range of parameters with health related guideline values in the ADWG (2004).
- Chemical Non-Health (Aesthetic) – this includes a large range of parameters with Non-Health guideline values in the ADWG (2004).
- Radiological Health – monitoring and testing carried out on an annual basis.



Development, Training and Innovation

Busselton Water utilises training in accordance with the National Water Industry Training package. Water Quality operational staff now possess Certificate III in Water Industry Operations.

Staff regularly attend relevant training courses and/or conferences, such as the Australian Water Association – OzWater and the Water Industry Engineers and Operators Annual Conference.

Our Customers

We strive to deliver excellence in customer service and continue to improve our existing levels of customer satisfaction. Each year an independent survey is undertaken to assist with that improvement, along with a complaints handling process that has achieved exemplary audit results.

During the reporting period 207 water quality complaints were received, a decrease of 17% compared to the previous year. Of the complaints received 68% related to discoloured water with the remaining related to taste and odour.

Customer perceptions of water quality are measured in our annual survey. This year's survey was undertaken about 12 months post the introduction of a new disinfection system. The settling-in period of the new system influenced customer perceptions and a general decline in satisfaction was evident prompting further action in the area of education and stakeholder engagement, in particular a Communications and Engagement Strategy (5 years) has been developed and implemented and will commence in 2013-14.



Microbiological and Disinfection Health Results

Busselton Water collected a total of 3812 samples from the reticulation system during the reporting period and 100 per cent of these results were compliant with no detections of either *Escherichia coli* or Thermophilic *Naegleria*. A further 2535 samples were taken for chlorine levels.

Chemical Health Results

There are a large number of chemical parameters that have health-related guideline values in the Australian Drinking Water Guidelines 2004. The detailed report in the next section gives more detail on the individual parameters. Busselton Water achieved 100 per cent compliance with all the health-related requirements set out in the Australian Drinking Water Guidelines 2004 for chemical parameters.

Radiological Health Results

Groundwater radiological testing is carried out in accordance with parameters and frequencies based on the Australian Drinking Water Guidelines 2004 and in consultation with the Department of Health.

Graduates radiological testing is only required periodically. In April 2013, tests were undertaken for Gross Alpha, Gross Beta, Radium 226 and Radium 228 and results from these samples were 100 per cent compliant.

Non-Health (Aesthetic) Results

There are a large number of parameters with aesthetic guideline value in the Australian Drinking Water Guidelines parameters. The detailed report in the next section gives more detail on the individual parameters. Busselton Water achieved 100 % compliance except for chlorine in the distribution system.

Free chlorine concentrations exceeded aesthetic limits in some locations, however the Australian Drinking Water Guidelines 2004 state that "In some supplies it may be necessary to exceed the aesthetic guideline in order to maintain an effective residual throughout the system." Free chlorine concentrations in the distribution system have been optimised so that the target residual at the end of the network is achieved.

WATER QUALITY RESULTS



WATER QUALITY RESULTS

Memorandum of Understanding – Drinking Water Quality Report HEALTH – 1 July 2012 to 30 June 2013

CHARACTERISTIC	UNIT	ADWG (Health)	Non-Compliance (Health)	No. Samples	% Compliance (Health)	Max. Value
CHEMICAL						
Carbon Tetrachloride	mg/L	0.003	0	4	100	ND
Chlorine (Total)	mg/L	5	0	572	100	1.06
Fluoride	mg/L	1.5	0	70	100	0.7
Antimony	mg/L	0.003	0	10	100	<0.001
Cadmium	mg/L	0.002	0	10	100	ND
Chromium	mg/L	0.05	0	9	100	<0.002
Copper	mg/L	2.0	0	77	100	0.09
Lead	mg/L	0.01	0	17	100	<0.005
Manganese (Total)	mg/L	0.5	0	31	100	<0.005
Nickel	mg/L	0.02	0	10	100	0.012
Nitrate	mg/L	50	0	14	100	0.65
Nitrite	mg/L	3.0	0	14	100	<0.05
Total Trihalomethanes	mg/L	0.25	0	82	100	0.008
RADIOLOGICAL						
Radium 226	Bq/L	0.5	0	8	100	0.242 +- 0.071
Radium 228	Bq/L	0.5	0	8	100	0.0788 +- 0.0094
MICROBIOLOGICAL						
<i>Escherichia coli</i>	CFU/100mL	0	0	357	100	NA
Thermophilic <i>Naegleria</i>	org/250mL	ND	0	357	100	NA
<i>Naegleria fowleri</i>	org/250mL	ND	0	0	100	NA

Memorandum of Understanding – Drinking Water Quality Report NON HEALTH (AESTHETIC)– 1 July 2012 to 30 June 2013

CHARACTERISTIC	UNIT	ADWG (Aesthetic)	Non-Compliance (Aesthetic)	No. Samples	% Compliance (Aesthetic)	Max. Value
CHEMICAL						
Chloride	mg/L	250	0	7	100	87
Colour	HU	15	0	84	100	3
Hardness	mg/L	200	0	70	100	120
Iron (Total)	mg/L	0.3	0	115	100	0.13
Sodium	mg/L	180	0	7	100	55
Sulphate	mg/L	250	0	7	100	15
Ammonia	mg/L	0.5	0	76	100	0.04
Copper	mg/L	1.0	0	77	100	0.09
Hydrogen Sulphide	mg/L	0.05	0	3	100	<0.05
Manganese (Total)	mg/L	0.1	0	31	100	<0.0015
pH	pH	6.5 - 8.5	0	1041	100	8.3
Turbidity	NTU	5.0	0	1284	100	1.69
Zinc	mg/L	3.0	0	16	100	0.039

mg/L - Milligrams per litre

ND - Not Detected

NTU - Nephelometric turbidity units

NA - Not Applicable

Busselton Water collected 1660 free chlorine and total chlorine samples in the distribution network during 2012-13. The minimum, average and maximum levels are:

Type	Minimum mg/L	Average mg/L	Maximum mg/L
Distributed Chlorine (Free)	0.29	0.65	0.98
Distributed Chlorine (Total)	0.30	0.71	1.06

When chlorine is added to water it reacts with chemical components and biological lifeforms. The remaining chlorine left over after those reactions is called 'free' chlorine as it is 'free' to disinfect. The 'total' chlorine levels provide the amount of chlorine that has reacted and also the left over free chlorine.



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