

DRINKING WATER QUALITY ASSURANCE RULES 2022

Released 25 July 2022

This version does not include amendments made by the *Drinking Water Quality Assurance (Very Small to Medium Drinking Water Supplies) Amendment Rules 2024* that come into effect on 1 July 2025.
An updated version can be found on the Taumata Arowai website.

Foreword

Ko wai, Ko au, Ko tātou

Ko te wai ahau, ko ahau te wai.

He whakaaturanga tātou nō te wai.

Ko te ora te wai ko te ora o te tangata.

He taonga te wai me tiaki.

Ko wai tātou.

Ko wai tātou.

I am wai, wai is me.

We are reflections of our wai.

The health of te wai is the health of te tangata.

Wai is a taonga that must be protected.

Ko wai tātou.

We are wai. Wai is us.

New Zealanders have a special relationship with water, particularly valuing the fresh water that flows in our rivers, lakes and aquifers. Wai (water) in all its forms is also a taonga of particular significance to tangata whenua.

The importance of water and its link to our health is reflected in the main purpose of the Water Services Act 2021: to ensure that drinking water suppliers provide safe drinking water to consumers. This can't be achieved by focusing on the interests of people alone. The concept of Te Mana o te Wai requires a broader approach. Protecting the health and mauri of water is the first priority, followed by the health needs of people (including drinking water) and then other uses so long as these do not degrade the mauri of the wai.

The Water Services Act establishes a framework of high-level functions and duties for drinking water suppliers. Secondary legislation can be made with more detail about how these can be performed or satisfied. These Drinking Water Quality Assurance Rules, which are 'compliance rules' made under section 49 of the Act, are an example of this.

Drinking water supplies across Aotearoa New Zealand are very diverse. The Drinking Water Quality Assurance Rules consequently do not take a 'one size fits all' approach. Their design is modular, enabling application that is proportionate to the scale, complexity, and risk profile of each drinking water supply. They reflect the input and perspectives of technical and sector reference groups, along with feedback received from public consultation.

I am extremely pleased to make these Drinking Water Quality Assurance Rules, which are an important component of the regulatory framework guiding drinking water suppliers to supply safe drinking water every day, for everyone.

Bill Bayfield

Chief Executive

Taumata Arowai

Contents page

List of tables	6
1. Introduction.....	7
1.1 Rule objectives.....	7
1.2 Effective date of the Rules.....	7
1.3 General guidance.....	7
1.4 Components of a drinking water supply	8
1.5 Categories of drinking water supply.....	8
1.6 Structure of the Rules.....	10
2 Drinking water supply categories and Rule modules	12
3 Application of the Rule modules.....	14
3.1 Compliance and reporting	14
4 Compliance Rule Modules	17
4.1 G General Rules	17
4.2 VSC Very Small Communities Rules Module	22
4.3 S1 Source Water Rules Module	23
4.4 T1 Treatment Rules Module	25
4.5 D1 Distribution System Rules	27
4.6 S2 Source Water Rules.....	28
4.7 T2 Treatment Rules.....	30
4.7.1 T2 Treatment Monitoring Rules	30
4.7.2 T2 Filtration Rules	30
4.7.3 T2 UV Rules.....	31
4.7.4 T2 Chlorine Rules	32
4.7.5 T2 Chemical Rules.....	32
4.7.6 T2 Cyanotoxin Rules.....	33
4.8 D2 Distribution System Rules	34
4.9 S3 Source Water Rules.....	36
4.9.1 S3 Source Water Protozoa Log Credit Treatment Requirements.....	36
4.9.2 S3 Sanitary Bore Head Requirements.....	37
4.9.3 S3 Source Water Monitoring Rules.....	38
4.10 T3 Treatment Rules	41
4.10.1 T3 Bacterial Rules.....	41
4.10.2 T3 Protozoal Rules	47
4.10.3 Chemical Rules.....	64
4.10.4 T3 Cyanotoxin Rules.....	67

4.11	D3 Distribution System Rules.....	68
4.11.1	D3 Backflow Protection Rules.....	68
4.11.2	D3 New and Repaired Watermains Hygiene Procedures Rules	69
4.11.3	D3 Facilities Operation, Maintenance and Disinfection Rules	70
4.11.4	D3 Residual Disinfection, Disinfection By-product, and Plumbosolvent Metal Rules	71
4.11.5	D3 Microbiological Monitoring Rules	75
4.12	WC Water Carrier Service Rules	77
4.13	TDWS Temporary Drinking Water Supplies Rules	79
4.14	VP Rules for Supplies with Varying Population.....	80
5	Definitions	82

List of tables

Table 1. Rule Modules	11
Table 2. Categories of drinking water supply and Rules that apply to them.	12
Table 3. Reporting requirements for level 1 Rules.	20
Table 4. Reporting requirements for level 2 rules.	20
Table 5. Bacterial reporting requirements for level 3 Rules.	20
Table 6. Protozoal reporting requirements for level 3 Rules.	21
Table 7. Distribution zone reporting requirements for level 3 Rules.	21
Table 8. S1 Source water monitoring determinands for surface water and groundwater.....	23
Table 9. S1 Source water monitoring determinands for roof water.....	24
Table 10. T1 Treatment plant monitoring determinands.....	26
Table 11. D1 Distribution system monitoring determinands.	27
Table 12. S2 Source water monitoring determinands for surface water and groundwater.....	29
Table 13. S2 Source water monitoring determinands for roof water.....	29
Table 14. T2 Treated Water Monitoring Requirements	33
Table 15. D2 Distribution System Monitoring Determinands.....	35
Table 16. S3 Source Water Monitoring Determinands.....	39
Table 17. S3 Class 1, Class 2 and Class 3 Groundwater Source Monitoring Determinands.....	39
Table 18. S3 Raw Water Monitoring Parameters	40
Table 19. T3 Requirements for Drinking Water Disinfected with Chlorine.....	41
Table 20. T3 Requirements for Drinking Water Disinfected with Chlorine Dioxide	43
Table 21. T3 Requirements for Water Disinfected with Ozone	44
Table 22. T3 Requirements for UV Disinfection.....	46
Table 23. T3 Requirements for Coagulation, Flocculation and Sedimentation without Filtration	48
Table 24. T3 Requirements for Coagulation, Flocculation and Direct Filtration	50
Table 25. T3 Requirements for Coagulation, Flocculation, Sedimentation and Filtration.....	52
Table 26. T3 Requirements for Second Stage Filtration	53
Table 27. T3 Requirements for Slow Sand Filtration	54
Table 28. T3 Requirements for Cartridge Filtration.....	56
Table 29. T3 Requirements for Membrane Filtration	58
Table 30. T3 C.t values (min.mg/L) for Cryptosporidium inactivation by ozone	59
Table 31. T3 Requirements for Ozone Disinfection	60
Table 32. T3 Requirements for UV Disinfection.....	62
Table 33. T3 Treatment Chemical Determinand Minimum Sampling Frequencies	66
Table 34. T3 Possible Treatment Chemical Determinand Monitoring.....	66
Table 35. D3 FAC sampling frequency.....	73
Table 36. D3 Number of continuous monitoring analysers required in each zone.....	73
Table 37. D3 Disinfection by-product sampling frequency.....	74
Table 38. D3 Distribution zone for plumbosolvent metals	74
Table 39. D3 Minimum Microbiological Sampling Frequencies	76
Table 40. S2 Source Water Monitoring Determinands.....	79
Table 41. VP Increased monitoring requirements for treatment plants	81
Table 42. VP Increased monitoring requirements for distribution zones	81

1. Introduction

The Drinking Water Quality Assurance Rules have been prepared by Taumata Arowai in accordance with section 49 of the Water Services Act 2021, including the public consultation requirements set out in section 53 of the Act.

The Rules are secondary legislation and are disallowable by the House of Representatives under the Legislation Act 2019.

1.1 Rule objectives

These Rules primarily impose requirements relating to drinking water supplier duties to:

1. supply safe drinking water¹
2. ensure that drinking water complies with the Water Services (Drinking Water Standards for New Zealand) Regulations 2022.²

Aspects of the Rules also relate to drinking water supplier functions or duties, under other provisions in Part 2 of the Act.

1.2 Effective date of the Rules

The Rules come into force on 14 November 2022.

1.3 General guidance

This section provides some general guidance about the Rules.

The Rules set out minimum compliance requirements and drinking water suppliers may use or undertake additional measures, including the management of risks specifically identified in relation their supplies, to ensure that water provided to consumers is safe to drink.

Definitions of technical terms and abbreviations used in the Rules are set out in the Definitions section (Section 5). Unless otherwise defined in Section 5, terms defined in the Act that are used in the Rules have the same meaning as in the Act.

These Rules cover water quality operational requirements from source water abstraction to the point of supply to a consumer, typically at the boundary toby. In most situations, the Building Act 2004 regulates water supplies beyond this point.

Compliance with the Rules is intended to ensure that water provided by drinking water suppliers does not exceed the MAVs for key determinands, as set out in the Drinking Water Standards.

Where MAVs cannot be (or are not) used to measure compliance, treatment efficacy is used as the surrogate criteria for demonstrating compliance. When surrogate criteria are

¹ Water Services Act 2021, section 21.

² Water Services Act 2021, section 22.

used, the Rules specify operational requirements. Compliance with these provides confidence that a treatment barrier is working effectively.

FAC and compliance with filter performance parameters such as turbidity are examples of surrogate criteria. These surrogate criteria have the important benefit of being able to be measured frequently, and even continuously, on-site so that near-real time feedback about treatment performance is available.

The Rules do not set quality requirements for bottled water or water used solely for industrial or agricultural purposes as these are not covered by the Act.

For people with certain medical conditions, or for uses of water for purposes other than drinking (e.g., kidney dialysis), additional or other water quality criteria may apply.

1.4 Components of a drinking water supply

A drinking water supply comprises the infrastructure and processes used to abstract water from a source, and to store, treat, transmit, or transport drinking water to a point of supply for consumers or other drinking water suppliers. It will generally have one or more of each of the following components:

1. source water abstraction
2. water treatment plant
3. distribution system.

Through the registration process, Taumata Arowai allocates unique identifier numbers to registered water supplies, sources, treatment plants, and distribution zones.

1.5 Categories of drinking water supply

The Rules have been prepared for the following drinking water supply categories:

1. **Very Small Communities**

Drinking water supplies of any configuration or arrangement (excluding domestic self-supplies) that provide drinking water to a population of up to 25 people. In circumstances when the population supplied fluctuates, the population supplied may increase to up to 50 people for up to 60 days in any 12 month period.³

2. **Networked Supplies**

Drinking water supplies that provide drinking water via a distribution system at a pressure and volume to meet consumer demand, or at a restricted flow and volume.

These supplies may include storage facilities within the network to buffer demand.

³ If a registered Very Small Communities drinking water supply supplies drinking water to a planned event under section 33(2)(a) of the Act where the total population supplied exceeds 50 people, the General Module and the Temporary Drinking Water Supplies Module apply to the drinking water supply for the duration of the planned event.

The Rules have been prepared for Networked Supplies with the following population sizes:

- a) Small 26 – 100 people. Varying Population module requirements can apply to this drinking water supply category.
- b) Medium 101 – 500 people. Varying Population module requirements can apply to this drinking water supply category.
- c) Large >500 people.

3. **Self-supplied Buildings**

Self-supplied Buildings are water supplies (excluding domestic self-supplies) which provide drinking water to up to ten buildings on one site (within the boundaries of one property, or within the boundaries of two or more properties with common ownership arrangements) and provide water to more than 25 people.

The Rules have been prepared for Self-supplied Buildings with the following population sizes:

- a) Small 26 – 100 people. Varying Population module requirements can apply to this drinking water supply category.
- b) Medium 101 – 500 people. Varying Population module requirements can apply to this drinking water supply category.
- c) Large >500 people.

4. **Water Carrier Services**

Drinking water supplies that involve the transport of drinking water in a vehicle or vessel with a water tank (e.g., a truck, trailer, or rail wagon) and supply to consumers or other drinking water suppliers, often to a storage tank on a property. Typically, Water Carrier Services provide drinking water to houses that have their own supplies but need the quantity of stored water to be augmented. Water Carrier Services can also augment other drinking water supplies, particularly during droughts and emergencies and provide water to planned events.

Water Carrier Services that fill tankers from a supply that provides water specifically for Water Carrier Services, must ensure that supply is separately registered and complies with the Water Carrier Supplies Rules.

5. **Water Carrier Supplies**

Water Carrier Supplies are drinking water supplies that provide water specifically to fill tanker vehicles that are owned or operated by a Water Carrier Service.

6. **Community Drinking Water Stations**

Community Drinking Water Stations are drinking water supplies that provide drinking water from a single point of supply to a community who collect the water in containers.

Public taps or container filling stations that are connected to a Networked Supply (e.g., community taps that provide water which is chlorinated and then de-chlorinated) are not considered to be Community Drinking Water Stations.

7. Temporary Drinking Water Supplies

Planned short-term events where people gather and where a Temporary Drinking Water Supply is registered under section 33 of the Act for the duration of an event, which continues for a limited time. Typically, this category includes temporary drinking water supplies for events like music festivals, farm field days, civil defence operations, or military exercises.

Temporary Drinking Water Supplies must register with Taumata Arowai under section 33 the Act, and Taumata Arowai can make rules for them under section 49(1)(b) of the Act.

If a planned event is supplied with drinking water from a registered Very Small Communities drinking water supply:

1. the planned event does not need to be registered as a temporary drinking water supply under section 33 of the Act; but
2. the Very Small Communities drinking water supply must comply with the Temporary Drinking Water Supplies Module for the duration of the planned event.

Temporary Drinking Water Supplies are not unplanned emergency supplies, which are dealt with differently under section 34 of the Act.

1.6 Structure of the Rules

The Rules are structured as 'modules', with the main modules covering general rules, source water, treatment systems and distribution systems. Additional modules are provided for some specific drinking water supply categories.

The modules and module codes are:

1. **General Rules Module (G)** – including reporting of information to Taumata Arowai, sample collection and calibration of analytical instruments.
2. **Very Small Communities Module (VSC)** – includes microbiological monitoring requirements only.
3. **Source Water Modules (S1, S2, S3)** – three complexity levels dependant on the size of the supply, covering rules for source water sampling.
4. **Treatment System Modules (T1, T2, T3)** – three complexity levels dependant on the size of the supply, covering rules for bacterial compliance, protozoal compliance, chemical compliance and cyanotoxin compliance.
5. **Distribution System Modules (D1, D2, D3)** – three complexity levels dependant on the size of the supply, covering rules for backflow prevention, preventing recontamination of stored water, hygiene practices for maintenance and upgrades, monitoring FAC, disinfection by-products and microbial water quality.
6. **Water Carrier Services Module (WC)** – including Rules which cover the transport of drinking water.

7. **Varying Population Module (VP)** – covers additional monitoring requirements that must be met when the usual base population of a drinking water supply increases for limited periods of time.
8. **Temporary Drinking Water Supplies Module (TDWS)** – including Rules for source water testing, treatment and monitoring requirements.

The following table sets out the Rule modules and complexity levels. Subsequent sections set out which modules each supply category must demonstrate compliance against.

Table 1. Rule Modules

G		
VSC		
S1	S2	S3
T1	T2	T3
D1	D2	D3
WC		
VP		
TDWS		

2. Drinking water supply categories and Rule modules

Table 2 below outlines the drinking water supply categories, and the rules modules that drinking water suppliers must demonstrate compliance against.

Table 2. Categories of drinking water supply and Rules that apply to them.

Categories of drinking water supplies	Rule modules that compliance is demonstrated against
1. Very Small Communities	
Up to 25 people, or up to 50 people for up to 60 days in any 12 month period.	VSC
If supplying drinking water to a planned event which increases the total population to more than 50 people.	G + TDWS (for the duration of the planned event)
2. Networked Supplies	
Small (26 – 100 people)	G + S1 + T1 + D1
Medium (101 – 500 people)	G + S2 + T2 + D2
Large (>500 people)	G + S3 + T3 + D3
3. Self-supplied Buildings	
Small (26 – 100 people)	G + S1 + T1
Medium (101 – 500 people)	G + S2 + T2⁴
Large (>500 people)	G + S3 + T3⁵
4. Water Carrier Services	
Any population size	G + WC
5. Water Carrier Supplies	
Any population size	G + S1 + T1
6. Community Drinking Water Stations	
Any population size	G + S1 + T1

⁴ Chlorination and compliance with chlorine rules is not required for Self-supplied Buildings which provide water to a single building.

⁵ Where more than one building is supplied, chlorine must be used to demonstrate bacterial compliance.

Categories of drinking water supplies		Rule modules that compliance is demonstrated against
7. Supplies with Varying Population		
Small and Medium supplies (Networked Supplies or Self-supplied Buildings) for periods when the population exceeds 100 people but is less than 500 and for periods when population exceeds 500 people.		Required modules + VP
8. Temporary Drinking Water Supplies		
Any population size		G + TDWS

3. Application of the Rule modules

Drinking water suppliers must select the Rule modules that apply to each of their registered supplies based on the category that best fits their drinking water supply. Drinking water suppliers must demonstrate compliance against those Rule modules for each registered supply.

For example, if a Networked Supply serves 10,000 people, level 3 Rules must be used for all source, treatment, and distribution zone compliance, regardless of the number of people served by any single source, treatment plant, or distribution zone. If a distribution zone in a community of 10,000 people serves only 450 people, that zone must still demonstrate compliance against the level 3 Rules.

Where population thresholds are provided, the population supplied should be calculated on the base population, the population that is normally supplied drinking water regardless of any seasonal increases.

Any drinking water supplier can elect to demonstrate compliance with a higher level of source, treatment, or distribution zone Rules module if they choose. For example, a drinking water supply which is required to comply with the level 2 Rules modules for source, treatment, and distribution zone, may choose to demonstrate compliance against the level 2 Rule modules for source and distribution zone, but the level 3 Rule module for treatment if that is more suitable for them. In that case, the Rules that they would demonstrate compliance against would be **G + S2 + T3 + D2**.

If a drinking water supplier chooses to comply with a higher-level Rule module e.g., **T3**, they must comply with all of the Rules in that module. It is up to each water supplier to determine whether they will demonstrate compliance against a higher-level Rule module, and over which compliance periods.

3.1 Compliance and reporting

Drinking water suppliers only need to demonstrate compliance against the Rules for periods when a drinking water supply is operating. For example, a bore may only be used during the summer period when there is a high level of demand. The source water requirements for that bore would only need to be demonstrated for the period that the bore is in operation.

A treatment plant may be off-line for several reasons, compliance does not need to be demonstrated for the period that the plant is not operating. However, if a treatment plant operates for only part of a compliance period, data/information must be reported for that compliance period.

A distribution zone is expected to be in operation continually, even when a treatment plant is not, so demonstration of compliance for the distribution zone will be continual.

Drinking water suppliers must assess their compliance with the Rules and provide a report of compliance to Taumata Arowai, as set out in the General (G) Rules.

Reporting requirements

Reporting requirements are set out in the General (G) Rules and are based on the Rule modules that drinking water suppliers elect to demonstrate compliance against.

Sampling frequencies indicate the number of samples that need to be collected over a given time period. Compliance periods are the length of time over which compliance is assessed. For example, if two samples are collected each week and the compliance period is one month, compliance will be assessed for the month over which the samples were collected.

Reporting periods are the intervals over which reporting is required. For example:

1. Suppliers demonstrating compliance against the level 1 Rules have a reporting period of six months and must report a limited set of compliance data to Taumata Arowai every six months.
2. Suppliers demonstrating compliance against level 2 Rules have a reporting period of three months and must report a limited set of compliance data to Taumata Arowai every three months.
3. Suppliers demonstrating compliance against the level 3 Rules have a reporting period of 1 month and must report a limited set of compliance data to Taumata Arowai each month.

The rules that compliance must be reported against in the above timeframes are set out in the General Rules. Compliance against all other rules must be reported to Taumata Arowai annually.

Monitoring Rules

Monitoring Rules are the Rules that must be complied with to demonstrate compliance with the Drinking Water Standards. Monitoring Rules cover determinands and parameters that need to be either continuously monitored, or regularly sampled. They have compliance periods associated with them.

One day compliance periods

Any determinand that is continuously monitored or sampled daily, irrespective of the period of the day that the supply is operating has a compliance period of 24 hours (midnight to midnight). Each compliance report must indicate the number of compliant days in the reporting period. It must also provide a report for each non-compliant day, outlining the reasons for any non-compliance.

Compliance is assessed as the number of days that compliance was achieved during the previous reporting period.

One-month compliance periods

Rules that require weekly or monthly monitoring have a compliance period of one calendar month. Each compliance report must indicate, for the limited set of compliance data, the number of compliant months in the reporting period. It must also provide a report outlining any reasons for non-compliance.

Compliance is reported as the number of months that compliance was achieved during the previous reporting period.

One-year compliance periods

For all other determinands and parameters, compliance is reported annually, except for determinands that are only monitored once every three years or once every five years.

Assurance Rules

Assurance rules cover activities that water suppliers need to undertake, for example the preparation of a backflow prevention programme or a distribution zone sampling plan. Assurance rules are not used to demonstrate compliance with the Drinking Water Standards but indicate whether water suppliers undertake activities that contribute to the provision of safe drinking water. Assurance rules have a compliance period of one year. Compliance with assurance rules needs to be reported to Taumata Arowai within 40 days of the end of each calendar year.

4. Compliance Rule Modules

4.1 G General Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
G1.	Drinking water suppliers demonstrating compliance against level 1 Rules must report to Taumata Arowai the water quality monitoring information set out in table 3.	Monitoring	As set out in table 3
G2.	Drinking water suppliers demonstrating compliance against level 2 Rules must report to Taumata Arowai the water quality monitoring information set out in table 4.	Monitoring	As set out in table 4
G3.	Drinking water suppliers demonstrating compliance against level 3 Rules must report to Taumata Arowai the water quality monitoring information set out in tables 5, 6 and 7.	Monitoring	As set out in tables 5, 6 and 7
G4.	Reporting against Level 1, level 2 and level 3 monitoring rules that are not included in tables 3, 4, 5, 6, and 7 must be made to Taumata Arowai annually within 40 working days of the end of each calendar year.	Monitoring	As set out in the relevant rules
G5.	Drinking water suppliers demonstrating compliance with level 2 and level 3 Rules, must report to Taumata Arowai on their performance against all assurance rules annually within 40 days of the end of each calendar year. ⁶	Assurance	1 Year
G6.	All samples collected from drinking water supplies for monitoring that are analysed by laboratories, must be labelled with the unique source, treatment plant, distribution zone, or Water Carrier Service identifier allocated by Taumata Arowai, to show where the sample was collected from and the time and date that the sample was collected.	Assurance	1 Year
G7.	Drinking water suppliers must take reasonably practicable steps to ensure that samples for <i>E. coli</i> ,	Assurance	1 year

⁶ Water suppliers demonstrating compliance against VSC, level 1, WC, TDWS or VP rule modules are not required to report to Taumata Arowai their performance against the Rules but are still required to comply with any applicable Rules.

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
	total coliforms, or other microbiological contaminants are delivered to a laboratory within 24 hours of the sample being collected, and at a water temperature that is no higher than the water temperature at the time of sampling but above zero degrees Celsius.		
G8.	<p>All water samples that require laboratory analysis and are used to demonstrate compliance with these Rules must be:</p> <ol style="list-style-type: none"> 1. analysed by a laboratory accredited by IANZ for the type of analysis being undertaken; and 2. collected according to any instructions and specifications provided by the laboratory. 	Assurance	1 year
G9.	Equipment used for the analysis of single samples (grab samples) by drinking water suppliers, to demonstrate compliance with any rule, must be calibrated/verified in accordance with the instrument manufacturer's specified procedures and frequency.	Assurance	1 Year
G10.	All work (planned or unplanned) on a water supply must be completed by suitably trained or experienced personnel.	Assurance	1 Year
G11.	<p>Drinking water suppliers must prepare a hygiene code of practice for people working on a water supply which must include:</p> <ol style="list-style-type: none"> 1. maintenance of personal hygiene at all times; and 2. prohibition of people working on a water system who are experiencing any gastrointestinal illness; and 3. protection of the work site, materials, and tools from contamination; and 4. how all reasonable steps will be taken to minimise the entry of contamination into the water supply during any activity. 	Assurance	1 Year

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
G12.	Continuous on-line monitoring equipment used to demonstrate compliance with any rule must: <ol style="list-style-type: none"> 1. be calibrated in accordance with the instrument manufacturer's specified procedures and frequency; and 2. have calibration verified in accordance with the instrument manufacturer's specified procedures. 	Assurance	1 Year
G13.	For continuous monitoring equipment that is used to demonstrate compliance against treatment Rules (T1, T2, T3), the separation between data records must be no more than 1 minute. ⁷	Assurance	1 Year
G14.	Generation of continuous monitoring data that is used to demonstrate compliance against T3 treatment Rules or D3 Distribution Rules, must not be interrupted for a period of more than 15 consecutive minutes, or for a total of more than 72 minutes in any one-day compliance period, for compliance to be achieved.	Assurance	1 Year
G15.	For continuous monitoring equipment that is used to assess source water or to demonstrate compliance against distribution zone Rules, the separation between data records must be no more than 30 minutes.	Assurance	1 Year
G16.	Continuous monitoring equipment used to monitor FAC in distribution zones must be appropriately pH and temperature compensated.	Assurance	1 Year
G17.	Where continuous monitoring equipment that is used to demonstrate compliance (excludes source water monitoring) fails, or is not otherwise able to provide data, grab samples can be taken to substitute for continuous data if analyses of the parameters is undertaken for at least every 30-minute period that the continuous monitoring equipment is not operating.	Monitoring	Dependent on the parameter and circumstances

⁷ Separation between data records of up to five minutes is allowed for FAC analysers and fluoride analysers where the minimum cycle time specified by the analyser manufacturer exceeds 1 minute.

Table 3. Reporting requirements for level 1 Rules.

Rule Number	Parameter	Compliance period	Reporting period ⁸
T1.8	<i>E. coli</i> , total coliforms	3 Months	6 Months
T1.8	Turbidity	3 Months	6 Months
D1.1	<i>E. coli</i> , total coliforms	3 Months	6 Months

Table 4. Reporting requirements for level 2 rules.

Rule Number	Parameter	Compliance period	Reporting period ⁹
T2.2	<i>E. coli</i> , total coliforms	1 Month	3 Months
T2.9	Turbidity	1 Month	3 Months
T2.13	UV dose	1 Month	3 Months
T2.18	FAC	1 Month	3 Months
T2.19	pH	1 Month	3 Months
D2.1	<i>E. coli</i> , total coliforms	1 Month	3 Months
D2.5	FAC	1 Month	3 Months

Table 5. Bacterial reporting requirements for level 3 Rules.

Rule ¹⁰	Parameter	Compliance Period	Reporting period ¹¹
<i>If chlorine is the primary disinfectant</i>			
T3.2	Chlorine C.t	1 Day	1 Month
<i>If chlorine dioxide is the primary disinfectant</i>			
T3.8	Chlorine dioxide C.t	1 Day	1 Month
<i>If ozone is the primary disinfectant</i>			
T3.13	Ozone residual	1 Day	1 Month
<i>If UV is the primary disinfectant</i>			
T3.17	UV dose	1 Day	1 Month

⁸ Report must be provided to Taumata Arowai within 20 working days of the end of June and end of December.

⁹ Report must be provided to Taumata Arowai within 20 working days of the end of each quarter.

¹⁰ Reporting is only required against one of the rules in this column depending on whether chlorine, ozone or UV is used as the primary disinfectant.

¹¹ Report must be provided to Taumata Arowai within 10 working days of the end of each month.

Table 6. Protozoal reporting requirements for level 3 Rules.

Rule ¹²	Parameter	Compliance Period	Reporting period ¹³
<i>For Coagulation, Flocculation and Sedimentation without Filtration</i>			
T3.24	Turbidity	1 Day	1 Month
<i>For Coagulation, Flocculation and Sedimentation with Filtration, Second Stage Filtration, Slow Sand Filtration, Membrane Filtration or Cartridge Filtration</i>			
Depending on process used, either: (T3.27 and T3.28) (T3.31 and T3.32) (T3.35 and T3.36) (T3.39 and T3.40) (T3.43 and T3.44) (T3.47 and T3.48) (T3.51 and T3.52) (T3.60 and T3.61) (T3.65 and T3.66) (T3.76 and T3.77)	Turbidity	1 Day	1 Month
<i>For ozone</i>			
T3.81	Ozone C.t	1 Day	1 Month
<i>If UV is the primary disinfectant</i>			
T3.86	UV dose	1 Day	1 Month

Table 7. Distribution zone reporting requirements for level 3 Rules.

Rule Number	Parameter	Compliance period	Reporting period ¹⁴
D3.19	FAC	1 Month	1 Month
D3.29	<i>E. coli</i> , total coliforms	1 Month	1 Month

¹² Reporting is only required against one pair (in brackets) of the rules in this column depending on the process that is used to demonstrate an effective protozoa barrier.

¹³ Report must be provided to Taumata Arowai within 10 working days of the end of each month.

¹⁴ Report must be provided to Taumata Arowai within 10 working days of the end of each month.

4.2 VSC Very Small Communities Rules Module

Rule Number	Requirement	Assurance/ Monitoring	Compliance Period
VSC.1	A sample of water collected from the distribution system of the supply must be analysed for <i>E. coli</i> and total coliforms every 6 months. There must be a period of at least 5 months between sample collection dates.	Monitoring	1 Year
VSC.2	All water samples analysed for <i>E. coli</i> and total coliforms must be analysed by a laboratory accredited by IANZ for those tests and samples must be collected according to the requirements provided by the laboratory.	Assurance	1 Year
VSC.3	The results of the samples collected and analysed under Rule VSC.1, must be promptly made available to the owners/occupiers of all properties connected to the supply.	Assurance	1 Year

4.3 S1 Source Water Rules Module

Rule number	Requirement	Assurance/ Monitoring	Compliance period
S1.1	Surface and groundwater sources must be monitored for the determinands and at the frequency set out in Table 8.	Monitoring	N/A
S1.2	Roof water sources must be monitored for the determinands and at the frequency set out in Table 9.	Monitoring	N/A
S1.3	Consumer taste or odour complaints, which have the potential to relate to cyanotoxins, must be recorded and investigated to determine the cause.	Assurance	1 Year
S1.4	Each month between October and May (inclusive), the water and area within 50 metres of a surface water intake, must be visually inspected for the presence of benthic cyanobacteria mats and planktonic cyanobacterial growth. If there is evidence of cyanobacterial growth, steps must be taken to evaluate the cyanotoxin risk to consumers. If there is a risk of supplying water with cyanotoxins that exceed MAVs, abstraction of water must be discontinued until the risk is no longer present.	Assurance	1 Year
S1.5	Samples must be collected at the source abstraction point or treatment plant (prior to treatment) for surface or groundwater supplies, and at the raw water storage tank outlet for roof water supplies.	Assurance	1 Year

Table 8. S1 Source water monitoring determinands for surface water and groundwater

Determinand group	Determinands	Sampling frequency
Bacterial	<i>E. coli</i> and total coliforms.	Every 3 months

Chemical	Arsenic, boron, nitrate, iron, manganese.	Every 3 years ¹⁵
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Table 9. S1 Source water monitoring determinands for roof water

Determinand group	Determinands	Sampling frequency
Bacterial	<i>E. coli</i> and total coliforms.	Every 3 months
Chemical	Cadmium, copper, zinc, lead, benzo [a] pyrene (collected in winter – June, July, or August).	Every 3 years

¹⁵ Monitoring must be three monthly for any result that exceeds 50% of the MAV. Can reduce to three yearly when 6 consecutive results are less than 50% of the MAV.

4.4 T1 Treatment Rules Module

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T1.1	Water abstracted from a river or stream or other source that has intermittently elevated turbidity, must be either filtered by a back-washable media filter, selectively abstracted, or provided to a raw water tank (minimum 10,000 litres) with a calmed bottom inlet and floating off take, to ensure turbidity is reduced so that it is suitable for further treatment.	Assurance	1 Year
T1.2	All water passing through the treatment plant (excluding groundwater abstracted from a depth of >30 metres) must be filtered by a cartridge filter system that includes a 5 micron or smaller pore size.	Assurance	1 Year
T1.3	The flow through any filters must be within the manufacturers design specifications for the treatment processes 100% of the time.	Assurance	1 Year
T1.4	Pumps must not be connected directly to the discharge side of a cartridge filter. After filtration, the filtrate must pass directly to a tank prior to any subsequent pumping.	Assurance	1 Year
T1.5	All water passing through the treatment plant must be disinfected with UV light.	Assurance	1 Year
T1.6	UV units must be maintained and operated according to the manufacturer's instructions and must be suitable for the inactivation of bacteria and protozoa.	Assurance	1 Year
T1.7	UV units must be certified to (and operate within the specifications of) at least one of the following standards: ¹⁶ <ol style="list-style-type: none"> 1. NSF/ANSI 55 Class A (NSF, ANSI n.d); 2. Ultraviolet Disinfection Guidance Manual (USEPA 2006b); 	Assurance	1 Year

¹⁶ UV disinfection units purchased before 1 August 2022 are not required to meet the requirements of this Rule.

	3. DVGW Technical Standard W294 (DVGW 2006); 4. ÖNORM M 5873-1: 2020 01 01. ¹⁷		
T1.8	Water leaving the treatment plant must be monitored for the determinands and at the frequencies set out in Table 10.	Monitoring	6 months

Table 10. T1 Treatment plant monitoring determinands.

Determinands	Sampling frequency	Compliance period
<i>E. coli</i> ¹⁸	Every 3 months	6 months
Total coliforms	Every 3 months	6 months
Turbidity	Every 3 months	6 months

¹⁷ UV reactors installed before 1 January 2020 can be certified to öNORM M5873 (Österreichisches Normungsinstitut 2001).

¹⁸ Analysis for both *E. coli* and total coliforms can be undertaken by a laboratory on one water sample.

4.5 D1 Distribution System Rules

Rule number	Requirement	Assurance/ Monitoring	Compliance period
D1.1	Water in the distribution system must be monitored for the determinands and at the frequencies set out in Table 11 and any other determinands identified in the supply's Drinking Water Safety Plan (including its Source Water Risk Management Plan).	Monitoring	3 Months
D1.2	<p>The drinking water supplier must assess the distribution system for backflow risk at least every 2 years and:</p> <ol style="list-style-type: none"> 1. any point of supply connections, fittings or other places found to be at risk for backflow must be recorded along with the potential hazard(s); and 2. any point of supply connections found to be at risk for backflow must have a suitable backflow prevention device fitted; and 3. any cross connections that are identified must be removed. 	Assurance	1 Year

Table 11. D1 Distribution system monitoring determinands.

Determinands	Sampling Frequency	Compliance period
<i>E. coli</i> ¹⁹	Every 3 months	3 months
Total coliforms	Every 3 months	3 months

¹⁹ Analysis for both *E. coli* and total coliforms can be undertaken by a laboratory on one water sample.

4.6 S2 Source Water Rules

Rule number	Requirement	Assurance/ Monitoring	Compliance period
S2.1	Surface water and groundwater sources must be monitored for the determinands and at the frequency set out in Table 12.	Monitoring	N/A
S2.2	Roof water sources must be monitored for the determinands and at the frequency set out in Table 13.	Monitoring	N/A
S2.3	Additional monitoring of source water must be undertaken for any determinands which exceed 50% of the MAVs set out in the Drinking Water Standards.	Monitoring	N/A
S2.4	Water sources must be categorised as either low-risk, medium-risk or high-risk for the presence of cyanobacteria.	Assurance	1 Year
S2.5	When a water supply source is categorised as medium or high-risk under Rule S2.S2.4, a cyanobacteria/cyanotoxin response plan must be prepared which includes vigilance levels for assessing the presence of cyanobacteria, alert levels related to the presence of cyanotoxins and monitoring for cyanotoxins and the action that will be taken to protect consumers.	Assurance	1 Year
S2.6	If a drinking water supplier becomes aware of the presence of cyanobacteria in source water, monitoring to determine or level of cyanobacteria and/or level (or presence/absence) of cyanotoxins must be considered.	Monitoring	1 Month
S2.7	Samples must be collected at the source abstraction point or treatment plant (prior to treatment) for surface water or groundwater supplies and at the raw water storage tank outlet for roof water supplies.	Assurance	1 Year

Table 12. S2 Source water monitoring determinands for surface water and groundwater.

Determinand Group	Determinands	Sampling Frequency
Bacterial	<i>E. coli</i> and total coliforms.	Monthly
Physico-chemical	pH, turbidity.	6 Monthly
	Iron, manganese, nitrate. ²⁰	Annually
	Arsenic, boron.	Every 3 years ²¹

Table 13. S2 Source water monitoring determinands for roof water.

Determinand group	Determinands	Sampling frequency
Bacterial	<i>E. coli</i> and total coliforms.	Monthly
Chemical	cadmium, copper, zinc, lead, benzo [a] pyrene (In winter – June, July, or August).	Every three years

²⁰ Monitoring must be quarterly if a result exceeds 50% of the MAV, returning to annually after 6 consecutive samples are less than 50% of the MAV.

²¹ Monitoring must be monthly if any result exceeds 50% of the MAV, returning to 3 yearly after 12 consecutive results are less than 50% of the MAV.

4.7 T2 Treatment Rules

4.7.1 T2 Treatment Monitoring Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T2.1	Water leaving the treatment plant must be monitored for the determinands and at the frequencies set out in Table 14.	Monitoring	As set out in Table 14
T2.2	Water leaving the treatment plant must be tested for <i>E. coli</i> and total coliforms each month.	Monitoring	1 Month

4.7.2 T2 Filtration Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T2.3	All water passing through the treatment plant must be filtered by either a media, membrane, or cartridge filter system.	Assurance	1 Year
T2.4	If a cartridge filter or filters are used, the downstream cartridge must have a pore size of 5 microns (nominal) or less.	Assurance	1 Year
T2.5	Rapid pressure fluctuations on either side of the cartridges must be avoided.	Assurance	1 Year
T2.6	Pumps must not be connected directly to the discharge side of a cartridge filter. After filtration, the filtrate must pass directly to a tank prior to any subsequent pumping.	Assurance	1 Year
T2.7	Differential pressure must be measured across each cartridge filter and must not exceed the cartridge filter manufacturer's specifications.	Assurance	1 Year
T2.8	The flow through the cartridge filters must always be within the cartridge filter manufacturer's design specifications.	Assurance	1 Year
T2.9	Turbidity of water leaving the treatment plant must not exceed 5 NTU.	Monitoring	1 Month

4.7.3 T2 UV Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance Period
T2.10	All water passing through the treatment plant must be disinfected with UV light.	Assurance	1 Year
T2.11	UV units must be certified (and operate within the specifications of) at least one of the following standards: <ol style="list-style-type: none"> 1. NSF/ANSI 55 Class A (NSF, ANSI n.d.); 2. Ultraviolet Disinfection Guidance Manual (USEPA 2006b); 3. DVGW Technical Standard W294 (DVGW 2006); 4. ÖNORM M 5873-1: 2020 01 01.²² 	Assurance	1 Year
T2.12	UV intensity (UVI) or UV dose must be monitored continuously and alarmed to indicate if the UVI or dose is outside of the limits specified by the manufacturer.	Monitoring	1 Month
T2.13	UV transmittance (UVT) of water at the UV unit must not be less than the level specified by the manufacturer.	Monitoring	1 Month
T2.14	The flow of water through the UV unit must be restricted or monitored so that it does not exceed the flow rate specified by the manufacturer.	Monitoring	1 Month
T2.15	Lamp usage must be recorded and manufacturer's recommendations not exceeded.	Assurance	1 Year
T2.16	Lamp outage must be alarmed if the UV unit uses more than one lamp.	Assurance	1 Year
T2.17	The UVI sensor must be referenced against a new sensor annually and should be replaced if it reads levels different to the new sensor that are outside the manufacturer's recommendation.	Assurance	1 Year

²² UV reactors installed before 1 January 2020 can be certified to öNORM M5873 (Österreichisches Normungsinstitut 2001).

4.7.4 T2 Chlorine Rules²³

Rule Number	Requirement	Assurance/ Monitoring	Compliance Period
T2.18	FAC of water leaving the treatment plant must be monitored.	Monitoring	1 Month
T2.19	Water leaving the treatment plant must have a FAC of at least 0.5 mg/L.	Monitoring	1 Month
T2.20	pH of water leaving the treatment plant must be monitored.	Monitoring	1 Month
T2.21	Water leaving the treatment plant must have a pH of between 6.5 and 8.	Monitoring	1 Month

4.7.5 T2 Chemical Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance Period
T2.22	Water leaving the treatment plant must be monitored for any chemical or surrogate (does not include chemicals used for cleaning) that is added to water as part of a treatment process.	Monitoring	1 Month
T2.23	Should the water supplier become aware of an event that may rapidly introduce high concentrations of chemicals into the water at the source or at the treatment plant, the water supplier must carry out event-based monitoring to assess the risk to the water supply.	Monitoring	In response to the event
T2.24	All chemical samples for physico-chemical determinands must be taken from a point as close as practicable after the final treatment process.	Assurance	1 Year

²³ Chlorination and compliance with rules T2.18 to T2.21 is not required for Self-supplied Buildings which provide water to a single building.

4.7.6 T2 Cyanotoxin Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance Period
T2.25	If cyanotoxin levels in the source water exceed 50% of the MAV, water leaving the treatment plant must be monitored for the presence of cyanotoxins.	Monitoring	In response to an event

Table 14. T2 Treated Water Monitoring Requirements

Determinands/Parameters	Sampling Frequency	Duration Between Samples ²⁴	Compliance Period
Turbidity (water leaving the treatment plant)	2 per Week	At least 2 Days	1 Month
UVI or UV dose (at the reactor)	2 per Week ²⁵	At least 2 Days	1 Month
Flow ²⁶ (at the reactor)	2 per Week	At least 2 Days	1 Month
FAC (in water leaving the treatment plant)	2 per Week	At least 2 Days	1 Month
pH (in water leaving the treatment plant)	2 per Week	At least 2 Days	1 Month
<i>E. coli</i> (in water leaving the treatment plant)	Monthly	At least 12 Days	1 Month
Total coliforms (in water leaving the treatment plant)	Monthly	At least 12 Days	1 Month
Any chemical used in the treatment process (excluding FAC and Fluoride)	Monthly	At least 12 Days	1 Month
Fluoride (if added, in water leaving the treatment plant)	2 per Week	At least 2 Days	1 Month
UVT	Every 3 Months	At least 70 Days	1 Year
Chlorate ²⁷ (if sodium hypochlorite is used, in water leaving the treatment plant)	Every 3 Months	At least 70 Days	1 Year

²⁴ Over a year, at least 4 different days of the week must be used as sample days, i.e., not all samples should be collected on a Monday.

²⁵ May be monitored continuously.

²⁶ Not required if flow is restricted according to manufacturer's requirements.

²⁷ Testing for chlorate is only required if sodium hypochlorite is used as a disinfectant. This requirement does not apply if sodium hypochlorite is generated on-site from a salt brine solution.

4.8 D2 Distribution System Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
D2.1	Water in the distribution system must be monitored for the determinands and at the frequencies set out in Table 15.	Monitoring	As set out in Table 15
D2.2	Consecutive samples for <i>E. coli</i> and total coliforms must not be taken on the same weekday.	Assurance	1 Year
D2.3	Over a year, five different days of the week must be used as sampling days for <i>E. coli</i> and total coliforms sample collection.	Assurance	1 Year
D2.4	Samples for FAC, <i>E. coli</i> and total coliforms must be taken at regular sampling points that are representative of the geographical coverage of the distribution system, including some storage reservoirs/tanks and the end points of the system.	Assurance	1 Year
D2.5	A FAC of at least 0.2 mg/L must be maintained in the distribution system in at least 4 of every 5 samples. No sample should be less than 0.1 mg/L.	Monitoring	1 Month
D2.6	Samples for metals must be collected from a sampling point near the end point of the system. Sampling taps must be flushed before samples are collected.	Assurance	1 Year

D2.7	<p>An assessment of the distribution system for backflow risk must be performed annually by the drinking water supplier and:</p> <ol style="list-style-type: none"> 1. any point of supply connections, fittings or other places found to be at risk for backflow must be recorded along with the potential hazard(s); and 2. any point of supply connections found to be at risk for backflow must have a suitable backflow prevention device fitted; and 3. all point of supply testable backflow prevention devices installed to protect the distribution system must be inspected and tested annually by a suitably trained and qualified person and remediated if found to be faulty; and 4. any cross connections that are identified must be removed. 	Assurance	1 Year
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Table 15. D2 Distribution System Monitoring Determinands

Determinand	Sampling Frequency	Duration Between Samples	Compliance period
<i>E. coli</i>	Monthly	At least 12 Days	1 Month
Total coliforms	Monthly	At least 12 Days	1 Month
FAC	2 per Week	At least 2 Days	1 Month
antimony, cadmium, chromium, copper, lead, mercury, nickel, zinc	Annually ²⁸	At least 150 Days	1 year

²⁸ Must be sampled monthly if the determinand exceeds 50% of its MAV, returning to annually after 12 consecutive results are <50% of the MAV.

4.9 S3 Source Water Rules

4.9.1 S3 Source Water Protozoa Log Credit Treatment Requirements

Drinking water suppliers must determine the level of protozoa treatment required for a drinking water supply based on the requirements set out in the source class classifications below. Treatment systems must provide a protozoa barrier equal to or exceeding the source water, log credit treatment requirements for the applicable source water class.

Class 1 – Protozoa barrier not required.

Criteria

Groundwater sources (bore water) that draw water from a depth of more than 30 metres below ground level (with depth measured from ground level to the top of the upper most screen) and via a sanitary bore head in which *E. coli* and total coliforms have not been detected over a period of three years²⁹ (monthly samples with a maximum of 45 days between samples).

If a groundwater source has demonstrated Class 1 status but any result for *E. coli* or total coliforms is positive, the groundwater source must assume Interim Class 1 status.

Interim Class 1

If a drinking water supplier intends to demonstrate Class 1 status for a groundwater source (bore water) but does not have the required *E. coli* or total coliforms data, they may demonstrate Interim Class 1 status by monitoring *E. coli* and total coliforms in bore water³⁰ daily for 36 days, and then weekly until 52 weeks of data has accrued with no *E. coli* or total coliforms detected. If any sample for *E. coli* or total coliforms is positive, the process must begin again until 52 weeks of data has accrued with negative results.

If Class 1 category cannot be established within 24 months of beginning sampling, the water source must be classified as Class 2.

Class 2 – Protozoa barrier – 3 log

Criteria

Groundwater sources that draw water from a depth of between 30 metres and 10 metres below ground level (with depth measured from ground level to the top of the upper most screen).

²⁹ Samples can be from individual bores or water combined from up to six bores if the water is from the same aquifer and has similar characteristics.

³⁰ Samples can be from individual bores or water combined from up to six bores if the water is from the same aquifer and has similar characteristics.

Class 3 – Protozoa Barrier – 4 log

Criteria

Groundwater sources that draw water from a depth of less than 10 metres below ground level (with depth measured from ground level to the top of the upper most screen), groundwater sources that draw water from a depth of 10 or more metres below ground level without a sanitary bore head, spring water sources and surface water sources.

Class 4 – Protozoa Barrier – 3 log

Criteria

Drinking water supplies that require a minimum protozoa treatment barrier of 4-log may reduce the level of protozoa treatment to a minimum of 3-log if the source water risk management plan for the supply provides evidence that the source water has a low risk of protozoa contamination.

4.9.2 S3 Sanitary Bore Head Requirements

A bore head is considered a sanitary bore head if it meets all of the following criteria:

1. The bore head is installed above ground.
2. The bore is installed in an area of ground that is not below the surrounding ground level such that ponding could occur around the bore head during rainfall.
3. The annulus of the casing is sealed taking account of the formation that the bore has been installed in, to prevent the ingress of surface water via the outside of the casing and the bore is grouted below ground to an appropriate depth.
4. A concrete apron is installed around the bore head, extending a minimum of one metre in all directions from the casing and sloping away from the casing so that any water on the ground surface is carried away from the bore.
5. All apertures into the bore (for cables etc) are sealed and watertight to prevent access from water and vermin-proofed to prevent access by small animals etc.
6. All air vents and any other apertures that are not watertight must be screened to prevent access by small animals, face downwards, and be elevated at least 0.5 metres above the surrounding ground level.
7. Reasonable security measures are in place to protect the bore head from unauthorised access or interference.
8. If the bore head is in an area where farm animals are present, it must be fenced to exclude those animals from an area extending at least five metres in all directions from the bore head.
9. A mechanism prevents backflow at the bore head.
10. The bore head is inspected monthly for damage or defects and records kept of all inspections for at least five years.

4.9.3 S3 Source Water Monitoring Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
S3.1	Water suppliers must determine the class of source water for each of the source waters that are used, based on the Source Water Protozoa Log Credit Treatment Requirements.	Assurance	1 Year
S3.2	A drinking water supplier demonstrating Class 1 or Interim Class 1 groundwater must document whether or not the bore meets the requirements of a sanitary bore head.	Assurance	1 Year
S3.3	All source waters must be monitored for the determinands and at the frequencies set out in Table 16 and Table 18.	Monitoring	N/A
S3.4	All groundwaters must be monitored for the radiological determinands set out in Table 17.	Monitoring	N/A
S3.5	Additional monitoring of Class 2, Class 3 and Class 4 source waters must be undertaken either during or immediately after a severe or extreme weather event or other events which could adversely affect source water quality. ^{31 32}	Monitoring	N/A
S3.6	Monitoring of source water must be undertaken for any determinand additional to those set out in Table 16 and 18 if the determinand has been identified in the drinking water supply Source Water Risk Management Plan as presenting a potential risk to the drinking water supply.	Monitoring	As determined by the Source Water Risk Management Plan
S3.7	Water sources must be categorised as either low-risk, medium-risk or high-risk for the presence of cyanobacteria.	Assurance	1 Year
S3.8	When a water supply is categorised as medium or high-risk under rule S3.7, a cyanobacteria / cyanotoxin response plan must be prepared which includes vigilance levels for assessing the presence of cyanobacteria and alert levels related to the presence	Assurance	1 Year

³¹ Samples of raw water may be collected at the treatment plant for this purpose.

³² Samples should not be collected if there are health and safety risks to people collecting samples that are not appropriately eliminated or minimised.

	of cyanotoxins, monitoring for cyanobacteria/cyanotoxins and the action that will be taken to protect consumers.		
S3.9	If a water supplier becomes aware of the presence of cyanobacteria in source water, monitoring to determine the level of cyanobacteria and/or cyanotoxin levels must be considered in accordance with the cyanobacteria/cyanotoxin response plan.	Assurance	1 Year

Table 16. S3 Source Water Monitoring Determinands

Determinand Group	Determinands monitored at each abstraction point ^{33 34}	Sampling Frequency
Bacterial	<i>E. coli</i> and total coliforms	2 per Month
Physico-chemical	Iron, manganese, colour, nitrate	Monthly
	Alkalinity, antimony, arsenic, barium, cadmium, calcium, chloride, chromium, copper, lead, magnesium, mercury, nickel, sodium, sulphate.	Annually ³⁵

Table 17. S3 Class 1, Class 2 and Class 3 Groundwater Source Monitoring Determinands

Determinand Group	Determinands monitored at each source ^{36 37}	Sampling Frequency
Radiological	Gross alpha activity Gross beta activity	Every ten years
Chemical	Potassium ³⁸	Every ten years

³³ Samples may be collected either at the source abstraction point or at the treatment plant before any form of treatment, if water is from a single source. If multiple sources are used, samples must be collected from each source at points before any mixing of source water occurs.

³⁴ Where multiple bores access the same aquifer, one bore can be sampled to provide results that are representative of a number of bores if the water supplier can demonstrate that the bore that is sampled is representative of the bores that are not sampled. The representative nature of the sampled bore must be re-established every five years or after significant seismic activity.

³⁵ Must be sampled monthly if the determinand exceeds 50% of its MAV. Sampling may return to annually after 12 consecutive samples are less than 50% of the MAV.

³⁶ Samples may be collected either at the source abstraction point or at the treatment plant before any form of treatment, if water is from a single source. If multiple sources are used, samples must be collected from each source at points before any mixing of source water occurs.

³⁷ Where multiple bores access the same aquifer, one bore can be sampled to provide results that are representative of a number of bores if the water supplier can demonstrate that the bore that is sampled is representative of the bores that are not sampled.

³⁸ When samples are analysed for alpha and beta emitting particles a sample for potassium must also be analysed so that the potassium 40 contribution to beta emitting particles can be determined.

Table 18. S3 Raw Water Monitoring Parameters

Parameters monitored in raw water from each source or combined sources ³⁹		Sampling Frequency
<i>Class 1 and Interim Class 1</i>		
Physico-chemical	Conductivity, pH, Turbidity	Monthly for 12 months Every 6 months if there is no significant variation in the initial 12 months of samples ⁴⁰
<i>Classes 2, 3 and 4</i>		
Physico-chemical	Conductivity, pH, Turbidity	Continuous ⁴¹

³⁹ If water is abstracted from more than one source and combined at the treatment plant, only the combined water needs to be analysed and this can be done at the treatment plant before any form of treatment.

⁴⁰ If a six monthly sample varies significantly from previous samples, sampling should return to monthly for 12 months.

⁴¹ Where continuous monitoring analysers fail or require maintenance, daily grab samples can be taken until the continuous monitoring equipment can be brought back into service.

4.10 T3 Treatment Rules

4.10.1 T3 Bacterial Rules

One or more of the following options must be used to demonstrate bacterial compliance:

1. Disinfection with chlorine⁴²
2. Disinfection with chlorine dioxide
3. Disinfection with ozone
4. Disinfection with UV light

4.10.1.1 T3 Bacterial Rules for Water Disinfected with Chlorine

Rule Number	Requirement	Assurance /Monitoring	Compliance period
T3.1	All water passing through the treatment plant must be treated with chlorine and must be monitored in accordance with Table 19.	Monitoring	1 Day
T3.2	Treated water must achieve a chlorine C.t value of at least 15 min.mg/L for at least 95 % of each day.	Monitoring	1 Day
T3.3	Treated water must have a FACE of no less than 0.2 mg/L.	Monitoring	1 Day
T3.4	T ₁₀ contact time of at least 5 minutes must be demonstrated.	Monitoring	1 Day
T3.5	Turbidity of water leaving the treatment plant must be less than 1.0 NTU for at least 95% of each day. ⁴³	Monitoring	1 Day
T3.6	Turbidity must not exceed 2.0 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day

Table 19. T3 Requirements for Drinking Water Disinfected with Chlorine

Parameters that need to be continuously monitored and where they need to be monitored:	<i>Parameters:</i> FAC <i>Where it needs to be monitored:</i> Water at a point after the prescribed disinfection contact time has elapsed.
	<i>Parameters:</i> pH

⁴² For Self-supplied Buildings supplies that provide water to more than a single building chlorine must be used to demonstrate bacterial compliance.

⁴³ Where lime is used for post-treatment pH adjustment, analysis may be undertaken before the lime is dosed.

	<i>Where it needs to be monitored:</i> Water at a point after the prescribed disinfection contact time has elapsed.
	<i>Parameters:</i> Turbidity <i>Where it needs to be monitored:</i> Water at a point after the prescribed disinfection contact time has elapsed.
	<i>Parameters:</i> Flow <i>Where it needs to be monitored:</i> Water leaving the contact tank unless there is a high-level outlet weir in which case water entering the contact tank is acceptable. A calculated outlet flow based on inlet flow and contact level change is also an acceptable approach.
	Water level in the contact tank (if used).
Values that need to be continuously monitored:	FACE.
	T ₁₀ Contact Time.
	C.t

4.10.1.2 T3 Bacterial Rules for Water Disinfected with Chlorine Dioxide

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.7	All water passing through the treatment plant must be treated with chlorine dioxide and must be monitored in accordance with Table 19.	Monitoring	1 Day
T3.8	Treated water must achieve a chlorine C.t value of at least 15 min.mg/L for at least 95 % of each day.	Monitoring	1 Day
T3.9	T ₁₀ contact time of at least 5 minutes must be demonstrated.	Monitoring	1 Day
T3.10	Turbidity of water leaving the treatment plant must be less than 1.0 NTU for at least 95% of each day. ⁴⁴	Monitoring	1 Day
T3.11	Turbidity must not exceed 2.0 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day

Table 20. T3 Requirements for Drinking Water Disinfected with Chlorine Dioxide

Parameters that need to be continuously monitored and where they need to be monitored:	<i>Parameters:</i> Chlorine dioxide <i>Where it needs to be monitored:</i> Water at a point after the prescribed disinfection contact time has elapsed.
	<i>Parameters:</i> FAC if used in combination with chlorine dioxide <i>Where it needs to be monitored:</i> Water at a point after the prescribed disinfection contact time has elapsed.
	<i>Parameters:</i> pH <i>Where it needs to be monitored:</i> Water at a point after the prescribed disinfection contact time has elapsed.
	<i>Parameters:</i> Turbidity <i>Where it needs to be monitored:</i> Water at a point after the prescribed disinfection contact time has elapsed.
	<i>Parameters:</i> Flow <i>Where it needs to be monitored:</i> Water leaving the contact tank unless there is a high-level outlet weir in which case water entering the contact tank is acceptable. A calculated outlet flow based on inlet flow and contact level change is also an acceptable approach.
	Water level in the contact tank (if used)

⁴⁴ Where lime is used for pH adjustment, samples may be taken before the lime is dosed.

Values that need to be continuously monitored:	FACE if chlorine is used in combination with chlorine dioxide.
	Total disinfectant
	T ₁₀ Contact Time.
	C.t

4.10.1.3 T3 Bacterial Rules for Water Disinfected with Ozone

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.12	All water passing through the treatment plant must pass through the ozone contactor and must be monitored in accordance with Table 21.	Monitoring	1 Day
T3.13	C.t of at least 1.2 mg.min/L for more than 95% of each day must be achieved.	Monitoring	1 Day
T3.14	Turbidity must not exceed 5.0 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day

Table 21. T3 Requirements for Water Disinfected with Ozone

Parameters that need to be continuously monitored and where they need to be monitored:	<i>Parameters:</i> Ozone Residual <i>Where it needs to be monitored:</i> Water leaving the contact tank. ⁴⁵
	<i>Parameters:</i> Turbidity <i>Where it needs to be monitored:</i> Water at a point immediately before or after the contact tank.
	<i>Parameters:</i> Flow <i>Where it needs to be monitored:</i> Water leaving the contact tank unless there is a high-level outlet weir in which case water entering the contact tank is acceptable. A calculated outlet flow based on inlet flow and contact level change is also an acceptable approach.
	Level of water in the contact tank (if used).
Values that need to be continuously monitored:	T ₁₀ Contact Time.
	C.t (Ozone x T ₁₀ Contact Time).

⁴⁵ Additional monitoring sites may be used in addition to the contact tank exit point if the water supplier can demonstrate that they improve the accuracy of the monitoring information.

4.10.1.4 T3 Bacterial Rules for Water Disinfected with Ultraviolet Light

Rule Number	Requirement	Monitoring/ Assurance	Compliance period
T3.15	All water passing through the treatment plant must pass through the UV reactor(s) and be within the reactor's certified flow range and must be monitored in accordance with Table 22.	Monitoring	1 Day
T3.16	A reduction equivalent dose (RED) of not less than 40 mJ/cm ² (or equivalent) must be achieved for not less than 95 % of each day.	Monitoring	1 Day
T3.17	The RED UV dose must be not less than 40 mJ/cm ² for any consecutive 15-minute period.	Monitoring	1 Day
T3.18	Turbidity must not exceed 5.0 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.19	For UV units certified to <i>Ultraviolet Disinfection Guidance Manual (USEPA 2006b)</i> monitored UVI, UVT and flow must be used to calculate dose.	Assurance	1 Year
T3.20	For UV units certified to <i>DVGW Technical Standard W294 (DVGW 2006)</i> or <i>ÖNORM M 5873-1: 2020 01 01</i> ⁴⁶ monitored flow must be used for UVI control or the reactor run at full power. UVI and UVT must be more than the validated value for the respective flow.	Assurance	1 Year
T3.21	For UV units certified to NSF/ANSI 55 Class A (NSF, ANSI n.d.); <i>(for populations of up to 5000) – 3-log</i> a fault must be generated when any parameter exceeds the certified value.	Assurance	1 Year

⁴⁶ Or UV reactors certified to ÖNORM M5873 (Österreichisches Normungsinstitut 2001)

Table 22. T3 Requirements for UV Disinfection

Parameters that need to be continuously monitored and where they need to be monitored:	<p><i>Parameters:</i> UVT</p> <p><i>Where it needs to be monitored:</i> Water entering or leaving the UV reactor(s).⁴⁷</p>
	<p><i>Parameters:</i> Turbidity</p> <p><i>Where it needs to be monitored:</i> Water entering or leaving the UV reactor(s). Can include upstream filter monitoring if there is no other process between the filters and the UV reactors.</p>
	<p><i>Parameters:</i> UVI or dose</p> <p><i>Where it needs to be monitored:</i> The same point in the reactor as that used for certification/validation.</p>
	<p><i>Parameters:</i> Flow</p> <p><i>Where it needs to be monitored:</i> At a point representative of water entering or leaving the reactor(s).</p>
UVI sensor checking and standardisation:	<p>Duty UVI sensors must be checked at least monthly against the reference sensor. If the difference between the two readings exceeds the manufacturer's specified limits, then the Duty UVI sensor must be replaced.</p> <p>The reference UVI sensor must be standardised at least annually in accordance with Ultraviolet Disinfection Guidance Manual (USEPA 2006b) or other traceable procedure. Alternatively, after 12 months the drinking water supplier can use the reference sensor as a duty sensor and purchase a new standardised sensor for use as a reference sensor.</p>
UV certification/validation:	<p>The equipment must be certified and operated to meet the RED dose of 40 mJ/cm² (or equivalent) using at least one of the:</p> <p><i>Ultraviolet Disinfection Guidance Manual (USEPA 2006b).</i></p> <p><i>DVGW Technical Standard W294 (DVGW 2006)</i></p> <p><i>ÖNORM M 5873-1: 2020 01 01.</i>⁴⁸</p> <p><i>NSF/ANSI 55 (NSF, ANSI nd) for Class A systems (for populations of up to 5000) – 3-log.</i></p>

⁴⁷ Does not apply to UV units certified to *NSF/ANSI 55 (NSF, ANSI nd) for Class A systems (for populations of up to 5000) – 3-log.*

⁴⁸ UV reactors installed before 1 January 2020 can be certified to *öNORM M5873 (Österreichisches Normungsinstitut 2001).*

4.10.2 T3 Protozoal Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.22	Drinking water supplies must have a protozoa barrier that provides treatment equal to or exceeding the log level of the water class identified by the Source Water Protozoa Log Credit Treatment Requirements.	Assurance	1 Year

Treatment processes and log credit allocations

The processes that can be used for protozoal treatment, and the log credits that can be achieved are:

1. Coagulation, flocculation and sedimentation process without filtration [0.5-Log]
2. Coagulation, flocculation and direct filtration [2.5-3.5-Log]
3. Coagulation, flocculation, sedimentation, and filtration [3-4-Log]
4. Second stage filtration [0.5-Log]
5. Slow sand filtration [2.5-Log]
6. Membrane filtration [up to 4.0-Log]
7. Cartridge filtration [2.0-Log]
8. Ozone [0.25 to 3.0-Log]
9. Ultraviolet light [up to 4-Log]

The cumulative log credits of a process that includes filtration or sedimentation and a disinfection process can be calculated by adding the log credits of the qualifying processes that are used.

If two filtration processes are used, the second filtration process is considered to be second stage filtration and can add only 0.5-Log to the cumulative log credits.

Water suppliers must comply with the rules set out below that apply to the treatment process(es) they are using.

4.10.2.1 T3 Protozoal Rules for Coagulation, Flocculation and Sedimentation without Filtration [0.5-Log].

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.23	All water passing through the treatment plant must pass through the coagulation, flocculation and sedimentation process.	Assurance	1 Year
T3.24	The sedimentation process must achieve at least a 70% reduction in raw water turbidity each day, based on the arithmetic mean of the turbidity of the raw water and the water leaving the sedimentation process.	Monitoring	1 Day
T3.25	All of the monitoring requirements in Table 23 must be met.	Monitoring	1 Day

Table 23. T3 Requirements for Coagulation, Flocculation and Sedimentation without Filtration

Parameters that need to be continuously monitored and where they need to be monitored:	<p><i>Parameter:</i> Turbidity.</p> <p><i>Where it needs to be monitored:</i> On the inlet and outlet of sedimentation process.</p>
Process Limitations:	<p>Sedimentation includes dissolved air flotation.</p> <p>Water from any treatment processes must not be added to the raw water and recycled through the plant.</p>

4.10.2.2 T3 Protozoal Rules for Coagulation, Flocculation, and Direct Filtration [2.5-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.26	All water passing through the treatment plant must pass through the coagulation, flocculation, and filtration process.	Assurance	1 Year
T3.27	Turbidity must not exceed 0.3 NTU for more than 5% of each day.	Monitoring	1 Day
T3.28	Turbidity must not exceed 0.5 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.29	All of the requirements in Table 24 must be met.	Assurance	1 Year

4.10.2.3 T3 Protozoal Rules for Coagulation, Flocculation, and Direct Filtration [3.0-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.30	All water passing through the treatment plant must pass through the coagulation, flocculation, and filtration process.	Assurance	1 Year
T3.31	Turbidity must not exceed 0.15 NTU for more than 5% of each day.	Monitoring	1 Day
T3.32	Turbidity must not exceed 0.5 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.33	All of the requirements in Table 24 must be met.	Assurance	1 Year

4.10.2.4 T3 Protozoal Rules for Coagulation, Flocculation, and Direct Filtration [3.5-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.34	All water passing through the treatment plant must pass through the coagulation, flocculation and filtration process.	Assurance	1 Year
T3.35	Turbidity must not exceed 0.1 NTU for more than 5% of each day.	Monitoring	1 Day
T3.36	Turbidity must not exceed 0.3 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.37	All of the monitoring requirements in Table 24 must be met.	Monitoring	1 Day

Table 24. T3 Requirements for Coagulation, Flocculation and Direct Filtration

Parameters that need to be continuously monitored and where they need to be monitored:	<p><i>Parameter:</i> Turbidity</p> <p><i>Where it needs to be monitored:</i> On the outlet of each filter. Monitored when the filter is in service to supply, on any recycle streams to the plant inlet (if present).</p>
	<p><i>Parameter:</i> Service State.</p> <p><i>Where it needs to be monitored:</i> Each filter.</p>
Process Limitations:	<p>Filtration is of a rapid media design (pressure or gravity equivalent).</p> <p>Water treatment plants that recycle waste streams (excluding water from rapid media filters being diverted during restart after backwash, often called 'filter to waste') must return the recycle stream so that it undergoes the full treatment process and provide flow equalisation such that the instantaneous total return rate does not exceed 10% of the plant inflow.</p> <p>Turbidity monitoring is required to demonstrate that the recycle water has received effective solids/liquid separation. If instantaneous total return rate flows of greater than 10% of the plant inflow are recycled, separate treatment of the recycled stream is required to inactivate or kill protozoa and bacteria before the waste stream is returned to the plant inlet.</p>

4.10.2.5 T3 Protozoal Rules for Coagulation, Flocculation, Sedimentation, and Filtration [3-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.38	All water passing through the treatment plant must pass through the coagulation, flocculation, sedimentation, and filtration process.	Assurance	1 Year
T3.39	Turbidity must not exceed 0.3 NTU for more than 5% of each day.	Monitoring	1 Day
T3.40	Turbidity must not exceed 0.5 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.41	All of the monitoring in Table 25 must be met.	Monitoring	1 Day

4.10.2.6 T3 Protozoal Rules for Coagulation, Flocculation, Sedimentation, and Filtration [3.5-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.42	All water passing through the treatment plant must pass through the coagulation, flocculation, sedimentation, and filtration process.	Assurance	1 Year
T3.43	Turbidity must not exceed 0.15 NTU for more than 5% of each day.	Monitoring	1 Day
T3.44	Turbidity must not exceed 0.5 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.45	All of the monitoring requirements in Table 25 must be met.	Monitoring	1 Day

4.10.2.7 T3 Protozoal Rules for Coagulation, Flocculation, Sedimentation, and Filtration [4-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.46	All water passing through the treatment plant must pass through the coagulation, flocculation, sedimentation, and filtration process.	Assurance	1 Year
T3.47	Turbidity must not exceed 0.1 NTU for more than 5% of each day.	Monitoring	1 Day
T3.48	Turbidity must not exceed 0.3 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.49	All of the monitoring requirements in Table 25 must be met.	Monitoring	1 Day

Table 25. T3 Requirements for Coagulation, Flocculation, Sedimentation and Filtration

Parameters that need to be continuously monitored and where they need to be monitored:	<p><i>Parameters:</i> Turbidity.</p> <p><i>Where it needs to be monitored:</i> On the outlet of each filter. Monitored when the filter is in service to supply, on any recycle streams to the plant inlet (if present).</p>
	<p><i>Parameters:</i> Service State.</p> <p><i>Where it needs to be monitored:</i> Each filter.</p>
Process Limitations:	<p>Sedimentation includes dissolved air flotation.</p> <p>Filtration is of a rapid media design (pressure or gravity equivalent).</p> <p>Water treatment plants that recycle waste streams (excluding water from rapid media filters being diverted during restart after backwash, often called 'filter to waste') must return the recycle stream so that it undergoes the full treatment process and provide flow equalisation such that the instantaneous total return rate does not exceed 10% of the plant inflow.</p> <p>Turbidity monitoring is required to demonstrate that the recycle water has received effective solids/liquid separation. If flows of greater than 10% are recycled, separate treatment of the recycled stream is required to inactivate or kill protozoa and bacteria before the waste stream is returned to the plant inlet.</p>

4.10.2.8 T3 Protozoal Rules for Second Stage Filtration [0.5-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.50	All water passing through the treatment plant must pass through the second stage filtration process.	Assurance	1 Year
T3.51	Turbidity must not exceed 0.1 NTU for more than 5% of each day.	Monitoring	1 Day
T3.52	Turbidity must not exceed 0.3 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.53	All of the monitoring requirements in Table 26 must be met.	Monitoring	1 Day

Table 26. T3 Requirements for Second Stage Filtration

Parameters that need to be continuously monitored and where they need to be monitored:	<p><i>Parameters:</i> Turbidity.</p> <p><i>Where it needs to be monitored:</i> On the outlet of each filter, monitored when the filter is in service to supply.</p>
	<p><i>Parameters:</i> Service State.</p> <p>Each filter.</p>
Process Limitations:	A second filtration stage consists of media or granular activated carbon, other fine grain media in a separate stage after granular media filtration with preceding coagulation.

4.10.2.9 T3 Protozoal Rules for Slow Sand Filtration [2.5-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.54	All water passing through the treatment plant must pass through the slow sand filtration process.	Assurance	1 Year
T3.55	The filter must not dry out.	Assurance	1 Year
T3.56	Disinfecting chemicals must not be dosed so that they leave a residual disinfectant upstream of the filter beds.	Assurance	1 Year
T3.57	Following filter maintenance, when a filter is brought back into operation, water must be discharged to waste until the filtration process has been demonstrated to be effective.	Assurance	1 Year
T3.58	The filters must be operated at a surface loading rate of less than 0.35 m ³ /m ² /h.	Assurance	1 Year
T3.59	The temperature of the water entering the filter must not drop below 6°C at any time.	Monitoring	1 Day
T3.60	Turbidity must not exceed 0.5 NTU for more than 5% of each day.	Monitoring	1 Day
T3.61	Turbidity must not exceed 1.0 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.62	All of the monitoring requirements in Table 27 must be met.	Monitoring	1 Day

Table 27. T3 Requirements for Slow Sand Filtration

Parameters that need to be continuously monitored and where they need to be monitored:	<i>Parameters:</i> Temperature. <i>Where it needs to be monitored:</i> Water entering the filtration stage.
	<i>Parameters:</i> Turbidity. <i>Where it needs to be monitored:</i> On the outlet of each filter, monitored when the filter is in service to supply.
	<i>Parameters:</i> Flow. <i>Where it needs to be monitored:</i> On the outlet of each filter.
Values that need to be continuously monitored:	Surface loading rate.
Process Limitations:	Water treatment plants that recycle waste streams must return the recycle stream so that it undergoes the full treatment process and

	<p>provide flow equalisation such that the instantaneous total return rate does not exceed 10% of the plant inflow.</p> <p>Turbidity monitoring is required to demonstrate that the recycle water has received effective solids/liquid separation. If flows of greater than 10% are recycled, separate treatment of the recycled stream is required to inactivate or kill protozoa and bacteria before the waste stream is returned to the plant inlet.</p>
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4.10.2.10 T3 Protozoal Rules for Cartridge Filtration [2.0-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.63	All water passing through the treatment plant must pass through the cartridge filtration process.	Assurance	1 Year
T3.64	Rapid pressure fluctuations on either side of the cartridges must be avoided. Pumps must not be connected directly to the discharge side of a cartridge filter. After filtration, the filtrate must pass to a tank if there is subsequent pumping.	Assurance	1 Year
T3.65	Filtered water turbidity does not exceed 1.0 NTU for more than 5% of each day.	Monitoring	1 Day
T3.66	Filtered water turbidity does not exceed 1.0 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.67	The filtrate turbidity from each filter housing must not exceed the turbidity of the cartridge feed water for the duration of any consecutive 15-minute period. ⁴⁹	Monitoring	1 Day
T3.68	The equipment is operated within the flow range for which it was certified at all times.	Assurance	1 Year
T3.69	Differential pressure across cartridges must be measured and kept within the manufacturer's recommendations at all times.	Assurance	1 Year
T3.70	The minimum differential pressure must always exceed the differential pressure established at commissioning with a new cartridge and must be kept within the manufacturer's recommendations.	Assurance	1 Year
T3.71	Individual cartridges must be able to be clearly identified in relation to the manufacturer and the	Assurance	1 Year

⁴⁹ Exceedances of not more than 2% are allowable to take account of measurement accuracy.

	part number that relates to the validation/certification.		
T3.72	All of the monitoring requirements in Table 28 must be met.	Monitoring	1 Day

Table 28. T3 Requirements for Cartridge Filtration

Parameters that need to be continuously monitored and where they need to be monitored:	<p><i>Parameters:</i> Turbidity.</p> <p>Where it needs to be monitored: On the combined inlet to the process. On the outlet of each filtration housing.</p>
	<p><i>Parameters:</i> Differential Pressure.</p> <p>Where it needs to be monitored: Across each filtration housing.</p>
	<p><i>Parameters:</i> Flow.</p> <p>Where it needs to be monitored: On the inlet or outlet of each filtration housing.</p>
	<p><i>Parameters:</i> Service State.</p> <p>Where it needs to be monitored: Each filtration unit.</p>
Cartridge Validation/ Certification:	<p>Each cartridge must have a certified <i>Cryptosporidium</i> (oo)cyst removal efficiency of at least 3-log and be certified to one of the following:</p> <ol style="list-style-type: none"> 1. the USEPA (2010)'s Long Term 2 Enhanced Surface Water Treatment Rule: Toolbox Guidance Manual Part 8: Bag and Cartridge Filters. 2. the (oo)cyst reduction conditions of Drinking Water Treatment Units: Health effects, NSF/ANSI 53 (NSF, ANSI 2002). 3. The (oo)cyst removal requirements of a standard recognised by Taumata Arowai as being equivalent (e.g., AS/NZS 4348:1995 in conjunction with AS/NZS 3497:1998 (updated 2001)).

4.10.2.11 T3 Protozoal Rules for Membrane Filtration [up to 4.0-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.73	All water passing through the treatment plant must pass through the membrane filtration process.	Assurance	1 Year
T3.74	Direct integrity tests must be performed on each membrane filtration unit at least daily (midnight to midnight) if the membrane filtration unit has been in service at any point during the day.	Assurance	1 Day
T3.75	No membrane unit may be used while it has failed its direct integrity test.	Assurance	1 Year
T3.76	If the turbidity of the membrane filtrate exceeds 0.1 NTU for more than 15 consecutive minutes the membrane unit must be run to waste and not returned to supply until it has passed a direct integrity test.	Monitoring	1 Day
T3.77	Filtrate turbidity must not exceed 1 NTU at any time.	Monitoring	1 Day
T3.78	If the membrane unit has been out of service for maintenance or any other reason for more than 6 hours, a direct integrity test must be completed before the unit is returned to service.	Assurance	1 Year
T3.79	All of the monitoring requirements in Table 29 must be met.	Monitoring	1 Day

Table 29. T3 Requirements for Membrane Filtration

Parameters that need to be continuously monitored and where they need to be monitored:	<p><i>Parameters:</i> Turbidity.</p> <p><i>Where it needs to be monitored:</i> On the combined inlet to the membrane process,⁵⁰ and on the outlet of each membrane filtration unit (rack, train, or cell) when in service to supply and on any recycle streams to the plant inlet (if present).</p>
	<p><i>Parameters:</i> Service State.</p> <p><i>Where it needs to be monitored:</i> Each membrane filtration unit.</p>
Parameters that need to be non-continuously monitored and where they need to be monitored:	<p><i>Parameters:</i> Membrane Integrity.</p> <p><i>Where it needs to be monitored:</i> Each membrane filtration unit.</p>
Process Limitations:	<p>Membrane filtration includes microfiltration and ultrafiltration. Water treatment plants that recycle waste streams must return the recycle stream so that it is treated by the membrane filtration process and provide flow equalisation such that the instantaneous total return rate does not exceed 10% of the plant inflow.</p> <p>Turbidity monitoring is required to demonstrate that the recycle water has received effective solids/liquid separation. If flows of greater than 10% are recycled, separate treatment of the recycled stream is required to inactivate or kill protozoa and bacteria before the waste stream is returned to the plant upstream of the membranes.</p>
Membrane Validation/Certification:	<p>Membranes must be certified to comply with <i>NSF/ANSI 61: Drinking Water System Components – Health Effects and NSF/ANSI 419 Public Drinking Water Equipment Performance – Filtration or equivalent</i>. The maximum number of log credits (up to a maximum of 4.0) that a membrane filtration process is eligible to receive for protozoa removal depends on third party certification of the log removal that the filter plant can deliver. The manufacturer's certificate (or validation) must specify the operational requirements under which the membrane units must be operated to meet the specification and the integrity testing procedure that the water supplier must carry out to demonstrate that the plant is operating at the claimed log credit rating at 3-micron resolution.</p>
Direct Integrity test requirements:	<p>The test is applied in such a manner that a 3 µm hole affects the response from the test.</p> <p>The test can verify the log removal value claimed for the membrane process.</p>

⁵⁰ This may be source water turbidity before coagulation when membrane filtration is the only process. It may be the average of turbidity from in-service pre-treatment units.

4.10.2.12 T3 Protozoal Rules for Ozone Disinfection [0.25 to 3.0-Log]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.80	All water passing through the treatment plant must pass through the ozone process.	Assurance	1 Year
T3.81	The C.t and water temperature required for the log credit claimed (Table 30) must be achieved for more than 95% of each day.	Monitoring	1 Day
T3.82	The C.t and water temperature must not be less than 80% of the values required for the log credit claimed (Table 30) for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.83	Turbidity must not exceed 5.0 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.84	All of the monitoring requirements in Table 31 must be met.	Monitoring	1 Day

Table 30. T3 C.t values⁵¹ (min.mg/L) for *Cryptosporidium* inactivation by ozone

Log Credit	Water Temperature (°C) ⁵²					
	1	5	10	15	20	25
0.25	5.8	4.0	2.5	1.6	1.0	0.6
0.5	12	7.9	4.9	3.1	2.0	1.2
1.0	23	16	9.9	6.2	3.9	2.5
1.5	35	24	15	9.3	5.9	3.7
2.0	46	32	20	12	7.8	4.9
2.5	58	40	25	16	9.8	6.2
3.0	69	47	30	19	12	7.4

⁵¹ The C.t data in this table are valid for ozone concentrations in the range 0.2-5.0mg/L.⁵² C.t values between the indicated temperatures may be determined by interpolation.

Table 31. T3 Requirements for Ozone Disinfection

Parameters that need to be continuously monitored and where they need to be monitored:	<p><i>Parameters:</i> Ozone residual.</p> <p><i>Where it needs to be monitored:</i> Water immediately before or after the contact tank.⁵³</p>
	<p><i>Parameters:</i> Temperature.</p> <p><i>Where it needs to be monitored:</i> Water leaving the contact tank.</p>
	<p><i>Parameters:</i> Turbidity.</p> <p><i>Where it needs to be monitored:</i> Water leaving the contact tank.</p>
	<p><i>Parameters:</i> Flow.</p> <p><i>Where it needs to be monitored:</i> Water leaving the contact tank unless there is a high-level outlet weir in which case water entering the contact tank is acceptable. A calculated outlet flow based on inlet flow and contact level change is also an acceptable approach.</p>
	Water level in the contact tank (if used).
Values that need to be continuously monitored:	T ₁₀ Contact Time.
	C.t (Ozone x T ₁₀ Contact Time).

⁵³ Additional monitoring sites may be used in addition to the contact tank entry or exit point if the water supplier can demonstrate that they improve the accuracy of the monitoring information.

4.10.2.13 T3 Protozoal Rules for Ultraviolet Light Disinfection [up to 4-Log as determined by the validation/certification of the reactor]

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.85	All water passing through the treatment plant must pass through the UV reactor(s) and be within the reactor's certified flow range for at least 95% of each day.	Assurance	1 Year
T3.86	The UV dose must meet or exceed that required to achieve the claimed log credit for at least 95% of each day.	Monitoring	1 Day
T3.87	The UV dose must not be less than that required to achieve the claimed log credit for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.88	Turbidity must not exceed 5.0 NTU for the duration of any consecutive 15-minute period.	Monitoring	1 Day
T3.89	UVT must meet or exceed 95% of the UVT for which the reactor has been certified for at least 95% of each day. ⁵⁴	Monitoring	1 Day
T3.90	UVT must not be less than 80% of the lowest UVT for which the reactor has been certified for the duration of any consecutive 15-minute period. ⁵⁵	Monitoring	1 Day
T3.91	All of the monitoring requirements in Table 32 must be met.	Monitoring	1 Day

⁵⁴ These requirements do not apply to UV disinfection systems that automatically adjust the UV dose as the UVT of the water flowing through the reactor varies.

⁵⁵ These requirements do not apply to UV disinfection systems that automatically adjust the UV dose as the UVT of the water flowing through the reactor varies.

Table 32. T3 Requirements for UV Disinfection

Parameters that need to be continuously monitored and where they need to be monitored:	<p><i>Parameters:</i> UVT.</p> <p><i>Where it needs to be monitored:</i> Water entering or leaving the UV reactor(s).⁵⁶</p>
	<p><i>Parameters:</i> Turbidity.</p> <p><i>Where it needs to be monitored:</i> Water entering or leaving the UV reactor(s). Can include upstream filter monitoring if there is no other process between the filters and the UV reactors.</p>
	<p><i>Parameters:</i> UVI or UV dose.</p> <p>For UV units certified to <i>Ultraviolet Disinfection Guidance Manual (USEPA 2006b)</i> monitored UVI, UVT and flow must be used to calculate dose.</p> <p>For UV units certified to <i>DVGW Technical Standard W294 (DVGW 2006)</i> or <i>ÖNORM M 5873-1: 2020 01 01</i>⁵⁷ monitored flow must be used for UVI control or the reactor run at full power. UVI and UVT must be more than the validated value for the respective flow.</p> <p>For UV units certified to NSF/ANSI 55 Class A (NSF, ANSI n.d.); (for populations of up to 5000) – 3-log a fault must be generated when any parameter exceeds the certified value.</p> <p><i>Where it needs to be monitored:</i> The same point in the reactor as that used for certification/validation.</p>
	<p><i>Parameters:</i> Flow.</p> <p><i>Where it needs to be monitored:</i> At a point representative of water entering or leaving the reactor(s).</p>
UVI sensor checking and standardisation:	<p>Duty UVI sensors must be checked at least monthly against the reference sensor. If the difference between the two readings exceeds the manufacturer's specified limits, then the duty UVI sensor must be replaced.</p> <p>Reference UVI sensor must be standardised at least annually in accordance with the <i>Ultraviolet Disinfection Guidance Manual (USEPA 2006b)</i> or other traceable procedure. Alternatively, after 12 months the supplier can use the reference sensor as a duty sensor and purchase a new standardised sensor for use as a reference sensor.</p> <p>Other instrumentation must be calibrated in accordance with the instrument manufacturer's specified procedures and frequency.</p>

⁵⁶ These requirements do not apply to UV disinfection systems that automatically adjust the UV dose as the UVT of the water flowing through the reactor varies.

⁵⁷ Or UV reactors certified to ÖNORM M5873 (Österreichisches Normungsinstitut 2001).

UV certification/validation:	<p>The equipment must be certified to meet the required log credit using at least one of:</p> <ol style="list-style-type: none">1. the <i>Ultraviolet Disinfection Guidance Manual (USEPA 2006b)</i> – variable log credits.2. <i>DVGW Technical Standard W294 (DVGW 2006)</i>.3. <i>ÖNORM M 5873-1: 2020 01 01</i>.⁵⁸4. <i>NSF/ANSI 55 (2019) for Class A systems (for populations of up to 5,000) – 3 log</i>.
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⁵⁸ UV reactors installed before 1 January 2020 can be certified to *öNORM M5873 (Österreichisches Normungsinstitut 2001)*.

4.10.3 Chemical Rules

Typical Value Range

A drinking water supplier must sample the water leaving a treatment plant to determine the typical value range for specified chemical determinands to identify if any values exceed the MAV in the Drinking Water Standards and to determine the on-going monitoring frequency for those determinands.

Standard typical range refers to a determinand for which sample results are always less than 50% of the MAV.

Elevated typical range refers to a determinand for which any sample exceeds 50% of the MAV but does not exceed 100% of the MAV.

In the first 12 months of monitoring,⁵⁹ 15 samples must be taken over a 12-month period (with no more than two samples collected in any calendar month) to determine the range of values for determinands in water leaving a treatment plant.

Values must be identified for determinands in the water leaving the treatment plant if:

1. the determinand has a MAV; *and*
2. the determinand is:
 - a) present in the source water at a concentration more than 50% of its MAV (as determined by the supply source water risk management plan); *and/or*
 - b) a chemical added during treatment, or a possible contaminant in a treatment chemical; *and/or*
 - c) formed as the result of a treatment process and is *not* expected to change in concentration beyond the treatment plant.

Following collection of the first 15 samples to establish the typical range of a determinand, the determinand must be monitored at the frequencies set out in Table 33.

Some of the determinands that may arise from treatment chemicals are listed in Table 34. Drinking water suppliers must test for determinands resulting from any other treatment chemicals that they use.

If sodium hypochlorite is used, chlorate must be monitored weekly, regardless of the levels determined by sampling.

⁵⁹ Where coagulants are used intermittently, the water supplier must undertake an appropriate sampling programme to determine the range of values for determinands in water leaving the treatment plant.

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.92	Values for determinands in treated water that: <ol style="list-style-type: none"> 1. exceed 50% of their MAV in the source water, or 2. are added or formed in the treatment process (as well as impurities in treatment chemicals), must be identified by the collection and analyses of 15 samples over a 12-month period (with no more than two samples collected in any calendar month).	Assurance	1 year
T3.93	Determinands identified by the sampling programme outlined in rule T3.92 must be categorised as either standard typical range or elevated typical range and must be sampled at the frequency set out in Table 33.	Monitoring	1 month
T3.94	Samples must be taken from a point directly after the final treatment process (including chlorine contact tanks as they are part of the treatment process).	Assurance	1 year
T3.95	Containers used for collecting samples must be obtained from a laboratory and appropriate for the target determinand.	Assurance	1 year
T3.96	Event based monitoring (determined by the water supplier) must be undertaken for any event that may rapidly introduce high concentrations of health-significant chemical determinands into the water at the source or at the treatment plant.	Monitoring	As determined by the water supplier

Table 33. T3 Treatment Chemical Determinand Minimum Sampling Frequencies

Minimum sampling frequency			
Standard typical range determinands (Typical value < 50% MAV)	Elevated typical range determinands (Value range 50% - 100% MAV)	Chlorate ⁶⁰	FAC, Fluoride ⁶¹
Annually	Monthly	Weekly ⁶²	Continuous

Table 34. T3 Possible Treatment Chemical Determinand Monitoring

Treatment Chemical	Determinand to monitor ⁶³
Aluminium based coagulants/flocculants	Aluminium, antimony, cadmium, copper, chromium, lead, mercury, nickel
Iron based coagulants/flocculants	Antimony, cadmium, copper, chromium, lead, mercury, nickel
Polyacrylamide (polyelectrolyte)	Acrylamide
EP-DMA (polyelectrolyte)	Epichlorohydrin
Sodium hypochlorite	Chlorate, Bromate
Ozone	Bromate
Permanganate	Manganese

⁶⁰ If sodium hypochlorite is used for disinfection.

⁶¹ If fluoride is added as part of the treatment process.

⁶² Sampling may reduce to monthly if 12 consecutive samples are below 50% of the MAV. If a sample exceeds 50% of the MAV, sampling must return to weekly.

⁶³ Monitoring is only required for treatment chemicals that are used or formed in a treatment process.

4.10.4 T3 Cyanotoxin Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
T3.97	If cyanotoxins are identified in treated water, cyanotoxin testing must be undertaken in accordance with the supply cyanobacteria/cyanotoxin response plan or at least twice weekly (whichever is more frequent) until cyanotoxins are not present.	Monitoring	1 Month

4.11 D3 Distribution System Rules

4.11.1 D3 Backflow Protection Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
D3.1	Drinking water suppliers must prepare and implement a backflow prevention programme to protect their distribution system against the risk of backflow.	Assurance	1 Year
D3.2	Periodic surveys of backflow risks to a distribution system to determine medium and high-risk sites must be undertaken by the drinking water supplier at least once every five years to assess the adequacy of backflow protection across the distribution system.	Assurance	1 Year
D3.3	Where backflow requirements at a point of supply are deemed inadequate, the drinking water supplier must notify the local authority with details of the situation and risk, determine the backflow device that should be installed at the point of supply and ensure that it is installed in a timeframe commensurate with the risk but as soon as reasonably practicable.	Assurance	1 Year
D3.4	Testing of all testable backflow prevention devices installed at a point of supply specifically to protect the network (generally boundary devices) ⁶⁴ must be undertaken, at least annually.	Assurance	1 Year
D3.5	A drinking water supplier must maintain a register of the location of all point of supply testable backflow protection devices, device types, assessed risk level and the results of testing of all devices.	Assurance	1 Year

⁶⁴ Does not include devices that are installed downstream of the point of supply and/or within buildings that have the primary purpose of protecting building users.

D3.6	Access to a water network through use of a standpipe is not permitted except by Fire and Emergency New Zealand, other emergency services, the drinking water supplier, or authorised contractors to the drinking water supplier where it is reasonably necessary to access the network for the operation of the drinking water supply.	Assurance	1 Year
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4.11.2 D3 New and Repaired Watermains Hygiene Procedures Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
D3.7	Before carrying out or commissioning repairs to pipes in a water distribution system, a drinking water supplier must undertake and keep records of a risk assessment to determine the risk of contamination of the network and the procedures required to minimise that risk.	Assurance	1 Year
D3.8	All materials used in construction and repairs must be free of visible contamination and remain protected from contamination until installation.	Assurance	1 Year
D3.9	All tools contacting the water supply or its parts, particularly cutting surfaces, must be adequately disinfected prior to commencing work and subsequently as necessary when tools contact soil or backfill material.	Assurance	1 Year
D3.10	Disinfection of mains (when required) must follow best management practices including but not limited to methods such as tablet, slug, spray chlorination, or equivalent as appropriate.	Assurance	1 Year
D3.11	Drinking water suppliers must develop and document standard operating procedures for planned, unplanned and emergency repairs.	Assurance	1 Year

4.11.3 D3 Facilities Operation, Maintenance and Disinfection Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
D3.12	Drinking water suppliers that have storage facilities within a distribution system must prepare a water storage management plan for the operation of storage facilities which includes the minimum and maximum operating levels, target turnover rates, inspection, and cleaning.	Assurance	1 year
D3.13	All storage facilities must be subject to an annual security and contamination inspection and assessment by the drinking water supplier.	Assurance	1 Year
D3.14	Drinking water suppliers must prepare and use written disinfection procedures for storage facilities that are consistent with industry best management practices.	Assurance	1 Year
D3.15	All new storage facilities, and existing storage facilities that have been drained for maintenance purposes, must be cleaned and disinfected and tested for <i>E. coli</i> prior to being brought (back) into use.	Assurance	1 Year
D3.16	Divers' suits, rafts, remotely operated vehicles (ROVs) and other materials used during inspection, maintenance or other activities within storage facility interiors must be made from materials acceptable for contact with drinking water and suitable for disinfection.	Assurance	1 Year
D3.17	All equipment and materials entering storage facilities must be disinfected immediately prior to entry according to industry best management practices.	Assurance	1 Year

4.11.4 D3 Residual Disinfection, Disinfection By-product, and Plumbosolvent Metal Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
D3.18	A written sampling plan for determinands to be sampled in relation to disinfection, disinfection by-products and plumbosolvent metals must be prepared including a system map indicating sampling locations and response procedures to be followed when sample results do not meet prescribed levels.	Assurance	1 Year
D3.19	A FAC of at least 0.2 mg/L must be maintained in 85% of samples (or 85% of the time if continuously monitored). Up to 15% of samples (or 15% of the time if continuously monitored) may have a FAC of less than 0.2 mg/L but must be greater than 0.1 mg/L.	Monitoring	1 Month
D3.20	Samples must be collected for FAC at the frequencies outlined in table 35. ⁶⁵	Monitoring	1 Monthly
D3.21	Routine sampling sites must be located to adequately represent the distribution system and areas associated with higher risk of deterioration in drinking water quality and population exposure. ⁶⁶	Assurance	1 Year
D3.22	Analyses must be undertaken in each distribution zone according to the frequencies set out in Table 37 for the following disinfection by-products: <ol style="list-style-type: none"> 1. trihalomethanes: chloroform, bromodichloromethane, dibromochloromethane, and bromoform; and 2. haloacetic acids: dichloroacetic acid and trichloroacetic acid. 	Monitoring	1 Year

⁶⁵ Demonstrating compliance with this rule (D3.20) is not required if FAC is continuously monitored according to rules D3.25 to D3.27.

⁶⁶ Demonstrating compliance with this rule (D3.21) is not required if FAC is continuously monitored according to rules D3.25 to D3.27.

D3.23	Sample sites for disinfection by-products must represent both peripheral and central locations in the distribution system.	Assurance	1 Year
D3.24	Analyses must be undertaken in each distribution zone for the plumbosolvent metals outlined in Table 38.	Monitoring	1 Year

Alternative FAC Continuous Monitoring Rules for Distribution Systems

Water suppliers may continuously monitor FAC in a distribution zone in accordance with rules D3.25 to D3.27 as an alternative to demonstrating compliance against rules D3.20 and D3.21.

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
D3.25	Continuous monitoring analysers for FAC must be installed in each distribution zone at the following locations: <ol style="list-style-type: none"> 1. At a point where water is provided to a distribution zone, e.g. a reservoir outlet or bulk point of supply. 2. At a supply main within the zone near to the centre or near to the extremity of the distribution zone. 	Monitoring	1 Month
D3.26	Continuous monitoring analysers for FAC in each distribution zone must meet the requirements set out in Table 36.	Assurance	1 Year
D3.27	Confirmation of the representative nature of the continuous monitoring results must be undertaken by the collection and analysis of four FAC and pH grab samples (at least five days between samples) each month from within the distribution zone. Samples should be taken from the outer extent of the distribution zone at times of normal demand.	Assurance	1 Year ⁶⁷

⁶⁷ Results from confirmation sampling do not need to be reported or notified for compliance purposes.

Table 35. D3 FAC sampling frequency

Distribution zone population	Number of samples per week	Maximum interval between samples (days)	Minimum number of days of the week used
<25,000	3	4	5
25,001 – 50,000	4	3	6
50,001 – 100,000	5	2	6 (at least two Saturdays and two Sundays sampled each year)
>100,000	6	2	7 (at least four Saturdays and four Sundays sampled each year)

Table 36. D3 Number of continuous monitoring analysers required in each zone

Zone population	Number of analysers
Up to 25,000	2
25,001 – 100,000	3
>100,000	4

Table 37. D3 Disinfection by-product sampling frequency⁶⁸

Disinfection by- products sampling requirements	Frequency
Each distribution zone.	1 per quarter ⁶⁹

Table 38. D3 Distribution zone for plumbosolvent metals

Plumbosolvent metals	Frequency
Antimony, cadmium, chromium, copper, lead, mercury, nickel, zinc.	Every 6 months ⁷⁰

⁶⁸ Additional targeted sampling should be undertaken in accordance with the sampling programme to understand the conditions and circumstances that lead to DBP formation.

⁶⁹ After 2 years if consecutive samples are less than 50% of the MAV sampling may reduce to 1 per year. If any annual sample exceeds 50% of a MAV, sampling must return to quarterly.

⁷⁰ Must be sampled monthly if the determinand exceeds 50% of its MAV. Sampling can return to 6 monthly after 12 samples are less than 50% of the MAV.

4.11.5 D3 Microbiological Monitoring Rules

Rule Number	Requirement	Assurance/Monitoring	Compliance period
D3.28	A written sampling plan for monitoring total coliforms, <i>E. coli</i> and any other determinands deemed necessary by the water supplier must be prepared, including a system map indicating sampling locations and a response plan for positive results.	Assurance	1 Year
D3.29	<i>E. coli</i> and total coliforms must be monitored in each zone of the distribution system according to the frequencies set out in Table 39.	Reporting	1 Month
D3.30	Routine sampling sites must be located to adequately represent water in the distribution system, including water leaving storage facilities, and entry points for water from another water supplier.	Assurance	1 Year
D3.31	Samples must be collected according to written sampling protocols prepared by the drinking water supplier or the laboratory undertaking the sample analysis.	Assurance	1 Year

Table 39. D3 Minimum Microbiological Sampling Frequencies

Distribution zone population	Number of samples per week	Maximum interval between samples (days)	Minimum number of days of the week used
<25,000	1	9	5
25,001–50,000	1	9	6 (at least two Saturdays and two Sundays sampled each year)
50,001–100,000	2	5	7 (at least three Saturdays and three Sundays sampled each year)
>100,001	3	3	7 (at least four Saturdays and four Sundays sampled each year)

4.12 WC Water Carrier Service Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
WC.1	<p>All water to be transported must be sourced from a registered drinking water supply where the water is:</p> <ol style="list-style-type: none"> 1. safe to drink; and 2. complies with the Drinking Water Standards; and 3. complies with the rules relevant to the supply. 	Assurance	1 Year
WC.2	The water carrier must only take water from a point in a distribution system prescribed by the drinking water supplier.	Assurance	1 Year
WC.3	If water is sourced from a supply that provides water specifically for water carrier services, that supply must be registered and comply with the rules for Water Carrier Supplies.	Assurance	1 Year
WC.4	The operator of any vehicle used to transport water must ensure all tanks, and the equipment used for loading or unloading water, are only used for drinking water.	Assurance	1 Year
WC.5	The operator of any vehicle used to transport water must ensure all tanks, and the equipment used for loading and unloading water, are made from material that light cannot pass through, are kept clean and clear of any possible contaminants at all times, with all openings and connections sealed to protect them from possible contamination. The drinking water must be protected from contamination at all times during its loading, transit and delivery.	Assurance	1 Year
WC.6	<p>If tanks and the equipment and fittings used for loading and unloading water are not used for the transport of drinking water for a period of 30 or more days, then before next being used to transport drinking water:</p> <ol style="list-style-type: none"> 1. the tank must be disinfected by filling with drinking water containing at least 5 mg/L FAC for not less than 30 minutes before discharging safely to waste; and 	Assurance	1 Year

	2. equipment and fittings should be washed in water containing 5mg/L FAC.		
WC.7	The water carrier must ensure there is backflow prevention or an adequate air gap in place when discharging drinking water from their tank.	Assurance	1 Year
WC.8	<p>When drinking water is delivered, a written statement must be supplied to the customer/consumer stating the:</p> <ol style="list-style-type: none"> 1. Fill date and time. 2. Registered drinking water supply from which the tanker was loaded. 3. Delivery date, time, location and volume of water delivered. 4. Name and registration number of water carrier. 5. Name and signature of delivery person. <p>The water carrier needs to keep records of this information for a period of 3 years.</p>	Assurance	1 Year

4.13 TDWS Temporary Drinking Water Supplies Rules

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
TDWS.1	Source waters being proposed for use as drinking water must be tested for the parameters set out in Table 40 before being used as a drinking water source.	Assurance	Determined by event length
TDWS.2	Any proposed surface water source must be assessed for the risk of cyanobacteria and cyanotoxins and must not be used if the source is assessed as being at medium or high risk for cyanotoxins during the planned event.	Assurance	Determined by event length
TDWS.3	All water supplied as drinking water must be filtered.	Monitoring	Determined by event length
TDWS.4	All water supplied as drinking water must be disinfected with chlorine.	Monitoring	Determined by event length
TDWS.5	All water provided as drinking water must be monitored for FAC residual, pH and turbidity.	Monitoring	Determined by event length

Table 40. S2 Source Water Monitoring Determinands

Determinands
<i>E. coli</i> , total coliforms, pH, turbidity, arsenic, boron, iron, manganese, nitrate

4.14 VP Rules for Supplies with Varying Population

Rule Number	Requirement	Assurance/ Monitoring	Compliance period
VP.1	For drinking water supplies demonstrating compliance with level 1 treatment and level 1 distribution zone rules, when the population exceeds 100 people, a sample for <i>E. coli</i> and total coliforms must be taken from water leaving the treatment plant and from the distribution zone ⁷¹ in the week prior to the population exceeding 100 people and then weekly (5 days between samples) until the population reduces to below 100 people.	Monitoring	1 Month
VP.2	For drinking water supplies demonstrating compliance with level 1 treatment and level 1 distribution zone rules, when the population exceeds 500 people, samples for <i>E. coli</i> and total coliforms must be taken from water leaving the treatment plant and from the distribution zone ⁷² twice each week (3 days between samples) until the population reduces to below 100 people.	Monitoring	1 Month
VP.3	For drinking water supplies demonstrating compliance with level 2 rules, when the population exceeds 500 people, monitoring must be undertaken at the frequencies set out in tables 41 and 42.	Monitoring	As set out in table 41 and table 42

⁷¹ Sampling is only required from water leaving the treatment plant if the supply does not have a distribution zone.

⁷² Sampling is only required from water leaving the treatment plant if the supply does not have a distribution zone.

Table 41. VP Increased monitoring requirements for treatment plants

Parameter	Sampling Frequency	Duration Between Samples	Compliance period
Turbidity of water leaving the treatment plant	Daily	12 hours	1 Day
FAC of water leaving the treatment plant	Daily	12 hours	1 Day
pH of water leaving the treatment plant	Daily	12 hours	1 Day
<i>E. coli</i> in water leaving the treatment plant	Weekly	4 Days	1 Month
Total coliforms in water leaving the treatment plant	Weekly	4 Days	1 Month

Table 42. VP Increased monitoring requirements for distribution zones

Parameter	Sampling Frequency	Duration Between Samples	Compliance period
FAC ⁷³	Daily	12 hours	1 Day
<i>E. coli</i>	Weekly	4 Days	1 Month
Total coliforms	Weekly	4 Days	1 Month

⁷³ From a range of sites across the distribution zone.

5. Definitions

Term	Definition
abstraction point	See section 5 of the Water Services Act 2021.
annulus	The void between a bore hole and the bore casing.
apron (bore)	An impervious ground covering, typically concrete, which prevents ingress of surface water into the bore.
backflow	See section 5 of the Water Services Act 2021.
backflow prevention device	See section 5 of the Water Services Act 2021.
backwash	The process of cleaning a filter by reversing a flow of fluid which may contain air through it.
barrier	A process or infrastructure which prevents or reduces the likelihood of contamination of a drinking water supply.
benthic cyanobacterial mat	A collective mass of cyanobacteria that forms on the bottom surface of a water body.
bore	A piped or encased hole constructed to access groundwater.
bore head	A part of a bore infrastructure located above ground or within the accessible part of an underground access or inspection chamber.
building	As defined by sections 8 and 9 of the Building Act 2004.
C.t value	The product of the concentration (C) of a disinfectant and the contact time (t) required to control micro-organisms.
calibration	Comparing the accuracy of a measuring device to a known standard (which may be a reference device) and adjusting it appropriately.
calmed bottom inlet	A tank inlet pipe on the floor of a tank which is designed to prevent disturbance of sediment as water enters the tank.
cartridge	The removable component of a cartridge filter which is used to entrap particulate material.
cartridge filtration	A treatment which uses a disposable cartridge to remove particulate material from water.
certification	Written confirmation, usually by a manufacturer, that certain requirements or standards have been met.
coagulation	A chemical process to neutralise matter in water and which leads to floc formation.
consumer	See section 5 of the Water Services Act 2021.

contact time	The hydraulic residence time of a disinfection process.
T₁₀ (contact time)	The effective contact time, which is the time it takes 10% of the volume of a unit to pass through a tank.
cross connection	Any actual or potential connection between a drinking water supply and stormwater, wastewater, or other infrastructure.
cyanobacteria	A major group of micro-organisms capable of photosynthesis, sometimes referred to as blue-green algae.
cyanotoxin	A toxin produced by cyanobacteria.
determinand	See the Drinking Water Standards for New Zealand 2022.
differential pressure	The difference in pressure between two given points, e.g., on the inlet and outlet of a filter.
direct filtration	A treatment process which consists of coagulation, flocculation, and filtration, without a sedimentation process before filtration.
direct integrity test	A physical test applied to a membrane unit to identify and isolate one or more leaks that could result in contamination of the filtrate.
disinfection	The process used to kill or inactivate micro-organisms.
disinfection by-product or DBP	A substance formed in drinking water as a result of a disinfection process.
dissolved air flotation	A clarification process in which the flocs formed during coagulation and flocculation are floated to the surface by air bubbles.
distribution system	All components (e.g. buildings, storage tanks, electrical equipment, reticulation, pumps, instrumentation, etc) of a drinking water supply used to transmit drinking water to consumers or other drinking water suppliers.
distribution zone	All or part of a distribution system which contains water of a similar character, often defined as a bounded geographic area. Every drinking water supply with a distribution system has at least one distribution zone.
domestic self-supply / domestic self-supplier	See section 10 of the Water Services Act 2021.
drinking water	See section 6 of the Water Services Act 2021.
Drinking Water Quality Assurance Rules (2022) or Rules	See section 49 of the Water Services Act 2021.

Drinking Water Standards or Standards	See the Water Services (Drinking Water Standards for New Zealand) Regulations 2022. Also see regulations made under section 47 of the Water Services Act 2021.
drinking water supplier	See section 8 of the Water Services Act 2021.
drinking water supply	As defined by section 9 of the Water Services Act 2021.
duty (UVI) sensor	The duty (on-line) UV sensor installed in a UV reactor that monitors UV intensity during UV equipment operations.
<i>Escherichia coli</i> or <i>E. coli</i>	A bacteria species used as an indicator of faecal contamination of water. The presence of <i>E. coli</i> almost certainly indicates pathogens harmful to human health are present.
event based monitoring	Monitoring of a drinking water supply to understand the effects of a specific event on its operation and the safety of drinking water.
filtrate	Water, other than wash water, leaving a filter.
filtration	A treatment process that physically removes particles from water by passing it through a medium such as sand or other suitable material.
filtration housing	The casing containing a cartridge filter or filter material.
floating off take	A device designed to extract water from the top of water storage infrastructure using a flotation device.
flocculation	A process that promotes the formation and growth of floc, which are loosely clumped masses of fine particles.
free available chlorine or FAC	The chlorine present in chlorinated water in the form of hypochlorous acid and hypochlorite ion.
free available chlorine equivalent or FACE	The free available chlorine equivalent, which is the FAC concentration that would have the same disinfecting power as the chlorine solution would have at pH 8.
groundwater	Water contained beneath the land surface.
inactivate	A mechanism which inhibits the reproduction of a micro-organism.
instantaneous total return rate	The amount of recycled water flow being returned to, and entering, the treatment system at a given point in time.
log credit	A method for determining a treatment level based on a log-scale control of the target micro-organism.
maximum acceptable value or MAV	See the Drinking Water Standards 2022.

media filter	A filtration process which uses a media, e.g., sand, for the removal of particulate matter.
membrane filtration	A pressure or vacuum driven separation process in which particulate matter is rejected by an engineered barrier (membrane).
microfiltration	A filtration process, usually membrane filtration, with pore sizes in the range of 0.1-10 microns (100 - 10,000 nm).
nephelometric turbidity unit (NTU)	A unit of measurement for turbidity.
(oo)cysts	Collective term for oocysts and cysts. A <i>Cryptosporidium</i> oocyst is a thick-walled structure within which <i>Cryptosporidium</i> zygotes develop and that serves to transfer the organism to new hosts.
operator	See section 11 of the Water Services Act 2021.
ozone contactor	A vessel which facilitates the dissolution of ozone into water and provides sufficient contact time for disinfection.
ozone residual	Ozone remaining after disinfection has been achieved.
pH adjustment	The process of changing the pH of water using acidic or basic compounds.
planktonic cyanobacteria	Cyanobacteria which are freely floating in a body of water.
point of supply	See section 13 of the Water Services Act 2021.
pore size	The nominal or absolute size of the holes or apertures in a thin layer of continuous medium, e.g., a membrane filter.
property	Separate rating unit as defined by the Rating Valuations Act 1998 or a separate rating area under the Local Government (Rating) Act 2002.
rapid media filter	A media filter which can be pressure or gravity fed and is regularly backwashed.
raw water	See section 5 of the Water Services Act 2021.
recycled water	Water, usually discharged from a treatment process which that is returned to the start of the treatment process (i.e., recycled).
reduction equivalent dose or RED	A dose value for UV systems derived from a UV-dose response curve determined during UV reactor validation.
reference (UVI) sensor	A calibrated sensor used to check the validation of the duty sensor.
registered water supply	See subpart 7 of Part 2 of the Water Services Act 2021.

residual disinfection	A disinfectant, typically chlorine, remaining in the water after it leaves a treatment plant to act as a barrier to recontamination of water in a distribution system.
roof water	The rain water collected from the roof off a structure.
safe drinking water	See section 7 of the Water Services Act 2021.
sampling point / site	A location / tap for the collection of water samples.
sedimentation	A treatment process in which solid particles settle to and are removed from the bottom of a clarifier or settling tank.
slow sand filtration	A filtration process that consists of a bed of fine sand, which is not backwashed and relies on a biologically active layer on top of the sand to remove and degrade particles.
slug (disinfection)	A disinfection method consisting of placing chlorine liquid in the main to achieve a target concentration when the main is full, completely filling the main to remove all air pockets and flushing the main.
source and source water	See section 5 of the Water Services Act 2021.
source water risk management plan	See section 5 of the Water Services Act 2021.
spray chlorination (disinfection)	A process of spraying chlorine solution to disinfect materials, equipment and fittings used in repairs and construction of water drinking supplies.
spring	A location where groundwater naturally emerges from the ground surface.
surface loading rate	The flow of water through a settling tank or clarifier, divided by the effective surface area of the clarifier.
surface water	A body of water that is open to atmosphere, whether running (streams and rivers) or quiescent (lakes, reservoirs, impoundments and ponds).
tablet (disinfection)	Disinfection of a pipe using chlorine tablets placed inside the pipe during construction to disinfect the mains once installed.
target turnover rate	The ideal amount of time that it takes for the volume of the water in a tank to be completely replaced.
total coliforms	Genera in the family Enterobacteriaceae that will grow on a specific selective medium when incubated at 35°C ± 0.2°C.
turbidity	A measure of the suspended particles in a sample that cause loss of clarity by scattering light.

ultrafiltration	A filtration process, usually membrane filtration, with pore sizes in the range of 0.01-0.1 microns (10 - 100 nm).
UV dose	The amount of UV radiation emitted into water within a UV reactor calculated by the UV intensity multiplied by the exposure time, usually measured in mJ/cm ² .
UV intensity or UVI	The intensity of UV radiation, usually measured in mW/cm ² .
UV transmittance or UVT	A measure of the amount of ultraviolet light (typically measured at 254 nm) that passes through water.
validation	Confirmation that equipment or a process meets, or will meet, certain performance requirements or standards, typically referring to UV reactors or membrane filters
verification	Checking the accuracy of a measuring device against a known standard (which may be a reference device).
waste stream	A flow of water from a drinking water treatment plant that is not intended for further treatment or use as drinking water.
water carrier	See section 5 of the Water Services Act 2021.
Water Services Act 2021 or Act	See the Water Services Act 2021.