
GUIDELINES FOR DRINKING-WATER QUALITY MANAGEMENT FOR NEW ZEALAND

APPENDIX 1: THE WATER QUALITY STANDARDS

(a) MAXIMUM ACCEPTABLE VALUES (MAVs)

(b) GUIDELINE VALUES (GVs)

Abbreviations used in the following tables:

ATO	Concentrations of the substance at or below the health-based guideline value that may affect the water's appearance, taste or odour.
ADDA	3-amino-9-methoxy-2,6,8-trimethyl-10-phenyldeca-4,6-dienoic acid
DBP	Disinfection by-product. Any difficulty meeting a DBP MAV must never be a reason to compromise adequate disinfection. Trihalomethanes and haloacids are DBPs. Some DBPs may also have other sources.
ELISA	Enzyme linked immunosorbent assay.
FLD	Fluorescence detection.
HPLC	High performance liquid chromatography.
MAV	Maximum acceptable value.
MC-LR	Microcystin-LR
PMAV	Provisional MAV (because it is provisional in the WHO Guidelines (2004) or WHO has no guideline value but the DWSNZ has retained a MAV or developed its own).
STX-eq	Saxitoxin-equivalent.
THM	Trihalomethane, of which there are four: bromoform, bromodichloromethane, chloroform and dibromochloromethane.
WHO	World Health Organization.

See Volume 2, Appendix 6, of the *Guidelines* for an index of compound abbreviations and synonyms. See Datasheets for a list of chemicals of possible health concern but no MAV.

Maximum acceptable values (MAV) for microbial determinands

Micro-organism	MAV ¹
<i>Escherichia coli</i> (<i>E. coli</i>) ²	Less than 1 in 100 mL of sample
viruses	No value has been set due to lack of reliable evidence
total pathogenic protozoa	Less than 1 (oo)cyst per 100 L of sample

Notes

- 1 These are maximum acceptable values (MAVs) for regulatory purposes. They do not represent a dose/response relationship that can be used as the basis for determining acceptable concentrations of pathogens in drinking-water.
- 2 Indicator organism.

Maximum acceptable values (MAVs) in mg/L for inorganic determinands of health significance

Name	MAV	Remarks
antimony	0.02	
arsenic	0.01	For excess lifetime skin cancer risk of 6×10^{-4} . PMAV, because of analytical difficulties
barium	0.7	
beryllium ¹	0.004	PMAV
boron ²	1.4	
bromate	0.01	For excess lifetime cancer risk of 7×10^{-5} . PMAV
cadmium	0.004	
chlorate	0.8	PMAV. Disinfection must never be compromised. DBP (chlorine dioxide)
chlorine	5	Free available chlorine expressed in mg/L as Cl ₂ . ATO. Disinfection must never be compromised
chlorite	0.8	Expressed in mg/L as ClO ₂ . PMAV. Disinfection must never be compromised. DBP (chlorine dioxide)
chromium	0.05	PMAV. Total. Limited information on health effects
copper	2	ATO
cyanide	0.08	Total cyanides
cyanogen chloride	0.08	Expressed in mg/L as CN. Total. DBP (chloramination)
fluoride ³	1.5	
lead	0.01	
lithium ¹	1	PMAV
manganese	0.4	ATO
mercury	0.002	Total
molybdenum	0.07	
monochloramine	3	DBP (chlorination)
nickel	0.02	PMAV
nitrate, short term ⁴	50	Expressed in mg/L as NO ₃ . The sum of the ratio of the concentrations of nitrate and nitrite to each of their respective MAVs should not exceed one
nitrite, long term	0.2	Expressed in mg/L as NO ₂ . PMAV (long term)
nitrite, short term ⁴	3	Expressed in mg/L as NO ₂ . The sum of the ratio of the concentrations of nitrate and nitrite to each of their respective MAVs should not exceed one
selenium	0.01	
silver	0.1	PMAV
uranium	0.02	PMAV

Notes: Where WHO Guideline values are based on 60 kg bodyweight, the DWSNZ uses 70 kg bodyweight. See the datasheets for calculations (WHO 2004).

- 1 MAV retained despite no WHO guideline value.
- 2 WHO guideline PMAV is 0.5 mg/L.
- 3 For oral health reasons the Ministry of Health recommends that the fluoride content for drinking-water in New Zealand be in the range of 0.7–1.0 mg/L. This is *not* a MAV.
- 4 Now short term only. The short-term exposure MAVs for nitrate and nitrite have been established to protect against methaemoglobinaemia in bottle-fed infants.

Maximum acceptable values (MAVs) in mg/L for organic determinands of health significance (including cyanotoxins and pesticides)

Name	MAV	Remarks
acrylamide	0.0005	For excess lifetime cancer risk of 10^{-5}
alachlor	0.02	Pesticide. For excess lifetime cancer risk of 10^{-5}
aldicarb	0.01	Pesticide
aldrin + dieldrin	0.00004	Pesticide. The sum of, not each
anatoxin-a	0.006	Cyanotoxin. PMAV
anatoxin-a(s)	0.001	Cyanotoxin. PMAV
atrazine	0.002	Pesticide. Cumulative for atrazine and congeners DEA, DIA, and DACT
azinthos methyl	0.004	Pesticide. PMAV
bentazone	0.4	Pesticide. PMAV
benzene	0.01	For excess lifetime cancer risk of 10^{-5}
benzo(a)pyrene	0.0007	For excess lifetime cancer risk of 10^{-5}
bromacil	0.4	Pesticide. PMAV.
bromodichloromethane	0.06	For excess lifetime cancer risk of 10^{-5} . THM
bromoform	0.1	THM
carbofuran	0.008	Pesticide
carbon tetrachloride	0.005	
chlordane	0.0002	Pesticide
chloroform	0.2	THM
chlorotoluron	0.04	Pesticide
chlorpyrifos	0.04	Pesticide
cyanazine	0.0007	Pesticide
cylindrospermopsin	0.001	Cyanotoxin. PMAV
2,4-D	0.04	Pesticide
2,4-DB	0.1	Pesticide
DDT + isomers	0.001	Pesticide. Sum of all isomers
di(2-ethylhexyl)adipate	0.1	PMAV
di(2-ethylhexyl)phthalate	0.009	
diazinon	0.01	Pesticide. PMAV
1,2-dibromo-3-chloropropane	0.001	Pesticide. For excess lifetime cancer risk of 10^{-5}
dibromoacetonitrile	0.08	DBP (chlorination)
dibromochloromethane	0.15	THM
1,2-dibromoethane	0.0004	PMAV. For excess lifetime cancer risk of 10^{-5}
dichloroacetic acid	0.05	PMAV. DBP (chlorination)

Name	MAV	Remarks
dichloroacetonitrile	0.02	PMAV. DBP (chlorination)
1,2-dichlorobenzene	1.5	ATO
1,4-dichlorobenzene	0.4	ATO
1,2-dichloroethane	0.03	For excess lifetime cancer risk of 10 ⁻⁵
1,1-dichloroethene	0.03	
1,2-dichloroethene	0.06	Total of cis and trans isomers
dichloromethane	0.02	
1,2-dichloropropane	0.05	Pesticide. PMAV
1,3-dichloropropene	0.02	Pesticide. Total of cis and trans isomers. For excess lifetime cancer risk of 10 ⁻⁵
dichlorprop	0.1	Pesticide
dimethoate	0.008	Pesticide
diquat	0.01	Pesticide. PMAV
diuron	0.02	Pesticide. PMAV
EDTA (editic acid)	0.7	
endosulfan	0.02	PMAV
endrin	0.001	Pesticide
epichlorohydrin	0.0005	PMAV
ethylbenzene	0.3	ATO
fenoprop	0.01	Pesticide
fluoranthene	0.004	PMAV
formaldehyde	1	DBP
heptachlor and its epoxide	0.00004	Pesticide. PMAV. Mainly occurs as the epoxide
hexachlorobenzene	0.0001	Pesticide. PMAV.
hexachlorobutadiene	0.0007	
hexazinone	0.4	Pesticide. PMAV
homoanatoxin-a	0.002	Cyanotoxin. PMAV
isoproturon	0.01	Pesticide
lindane	0.002	Pesticide
malathion	1	Pesticide. PMAV
MCPA	0.002	Pesticide
MCPB ¹	0.03	Pesticide. PMAV
mecoprop	0.01	Pesticide
metalaxyl	0.1	Pesticide. PMAV
methoxychlor	0.02	Pesticide
methyl parathion	0.01	Pesticide. PMAV
metolachlor	0.01	Pesticide
metribuzin	0.07	Pesticide. PMAV
microcystins	0.001	Cyanotoxin. PMAV Expressed as MC-LR toxicity equivalents)
molinate	0.007	Pesticide
monochloroacetic acid	0.02	DBP (chlorination)
monochlorobenzene	0.3	PMAV. ATO
nitrilotriacetic acid (NTA)	0.2	
nodularin	0.001	Cyanotoxin. PMAV

Name	MAV	Remarks
oryzalin	0.4	Pesticide. PMAV
oxadiazon	0.2	Pesticide. PMAV
pendimethalin	0.02	Pesticide
pentachlorophenol	0.009	Pesticide. PMAV
permethrin	0.02	Pesticide. PMAV
phenylphenol	1.4	Pesticide. PMAV
picloram	0.2	Pesticide. PMAV
pirimiphos methyl	0.1	Pesticide. PMAV
primisulfuron methyl	0.9	Pesticide. PMAV
procymidone	0.7	Pesticide. PMAV
propanil	0.02	Pesticide. PMAV. Some degradation products may be toxic
propazine	0.07	Pesticide. PMAV
pyridate	0.1	Pesticide. PMAV
pyriproxifen	0.4	Pesticide
saxitoxins	0.003	Cyanotoxin. Expressed as STX equivalent. PMAV
simazine	0.002	Pesticide
styrene	0.03	ATO
2,4,5-T	0.01	Pesticide
terbacil ¹	0.04	PMAV.
terbuthylazine	0.008	Pesticide
tetrachloroethene	0.05	
thiabendazole	0.4	Pesticide. PMAV
toluene	0.8	ATO
tributyltin oxide	0.002	PMAV
trichloroacetaldehyde	0.01	PMAV
trichloroacetic acid	0.2	DBP (chlorination)
trichlorobenzenes	0.03	PMAV. Total concentration of all isomers. ATO
1,1,1-trichloroethane	2	PMAV
trichloroethene	0.08	PMAV
2,4,6-trichlorophenol	0.2	For excess lifetime cancer risk of 10 ⁻⁵ . ATO
triclopyr	0.1	Pesticide. PMAV
trifluralin	0.03	Pesticide. Technical grade may contain carcinogens
trihalomethanes (THMs)		The sum of the ratio of the concentration of each THM to its respective MAV should not exceed one. The individual members of this group are indicated in the table as THM
vinyl chloride	0.0003	For excess lifetime cancer risk of 10 ⁻⁵
xylenes (total) ¹	0.6	ATO
1080	0.0035	Pesticide. PMAV

Notes:

- DBP indicates a disinfection by-product. Any difficulty in meeting a MAV must never be a reason to compromise adequate disinfection. Trihalomethanes are DBPs. Some DBPs may also have other sources.
- Where WHO Guideline values are based on 60 kg bodyweight, the DWSNZ uses 70 kg bodyweight. See datasheets for calculations (WHO 2004).

1 Institute of Environmental Science and Research report Gallagher LM and Fowles JF 22.03.05.

Maximum acceptable values (MAVs) in Bq/L for radiological determinands

Radioactive constituents	MAV	Unit
total alpha activity	0.10	Bq/L excluding radon
total beta activity	0.50	Bq/L excluding potassium-40
radon	100	Bq/L

Guideline Values for aesthetic determinands

Determinand	GV	Units	Comments
aluminium	0.10	mg/L	Above this, complaints may arise due to depositions or discoloration.
ammonia	1.5 0.3	mg/L	Odour threshold in alkaline conditions. For control of chloramine formation in chlorinated water.
calcium			See hardness.
chloride	250	mg/L	Taste, corrosion.
chlorine	0.6–1.0	mg/L	Taste and odour threshold (MAV 5 mg/L)
2-chlorophenol	0.0001 0.01	mg/L	Taste threshold. Odour threshold.
colour	10	TCU	Appearance.
copper	1	mg/L	Staining of laundry and sanitary ware (PMAV 2 mg/L)
1,2-dichlorobenzene	0.001 0.002	mg/L	Taste threshold. Odour threshold (MAV 1.0 mg/L)
1,4-dichlorobenzene	0.0003 0.006	mg/L	Odour threshold. Taste threshold (MAV 0.4 mg/L)
2,4-dichlorophenol	0.0003 0.04	mg/L	Taste threshold. Odour threshold.
ethylbenzene	0.002 0.08	mg/L	Odour threshold. Taste threshold (MAV 0.3 mg/L)
hardness (total) (Ca + Mg) as CaCO ₃	200 100–300	mg/L	High hardness causes scale deposition, scum formation. Low hardness (<100) may be more corrosive. Taste threshold.
hydrogen sulphide	0.05	mg/L	Taste and odour threshold.
iron	0.2	mg/L	Staining of laundry and sanitary ware.
magnesium			See hardness.
manganese	0.04 0.10	mg/L	Staining of laundry. Taste threshold (MAV 0.4 mg/L)
monochlorobenzene	0.01	mg/L	Taste and odour threshold (MAV 0.3 mg/L)
odour (threshold odour number)	3		Odour should be acceptable.
pH	7.0–8.5		Should be between 7.0 and 8.0. Most waters with a low pH have a high plumbosolvency. Waters with a high pH: have a soapy taste and feel. Preferably pH <8 for effective disinfection with chlorine.
sodium	200	mg/L	Taste threshold.
styrene	0.004	mg/L	Odour threshold (MAV 0.03 mg/L)
sulphate	250	mg/L	Taste threshold.

Determinand	GV	Units	Comments
taste			Should be acceptable to most consumers.
temperature			Should be acceptable to most consumers, preferably cool.
toluene	0.03 0.04	mg/L	Odour. Taste threshold (MAV 0.8 mg/L)
total dissolved solids	1000	mg/L	Taste may become unacceptable from 600–1200 mg/L.
trichlorobenzenes (total)	see below		(MAV 0.03 mg/L)
1,2,3-trichlorobenzene	0.01	mg/L	Odour threshold.
1,2,4-trichlorobenzene	0.005	mg/L	Odour threshold.
1,3,5-trichlorobenzene	0.05	mg/L	Odour threshold.
2,4,6-trichlorophenol	0.002 0.3	mg/L	Taste threshold. Odour threshold (MAV 0.2 mg/L)
turbidity	2.5	NTU	Appearance. For effective terminal disinfection, median turbidity <1 NTU, single sample <5 NTU.
xylene	0.02	mg/L	Odour threshold (MAV 0.6 mg/L)
zinc	1.5	mg/L	Taste threshold. May affect appearance from 3 mg/L.