

5 Radiological Compliance

5.1 Purpose

To avoid concentrations of radioactive determinands of health significance being present in drinking-water at levels which present a significant risk to public health.

5.2 Rationale for radiological MAVs

All living organisms are exposed to radiation from natural sources including cosmic radiation from outer space; external radiation from natural radionuclides (uranium and thorium and their decay products, and potassium-40) present in soils, rocks and building materials; and internal radiation due to potassium-40 and inhaled radionuclides, particularly radon decay products. Natural radiation exposure varies regionally as the compositions of soils and rocks change and increases with altitude as cosmic radiation intensity increases, and nothing can be done to prevent exposure.

In terms of health significance, radioactive materials in drinking-water can be divided into two categories: alpha-particle emitters and beta-particle emitters. The ingestion of either results in internal radiation exposure but alpha-particle emitting radionuclides are the more hazardous because of the greater energies of alpha particles. For this reason the Standards consider the two types of materials separately.

The *Drinking-Water Standards for New Zealand 2000* adopt MAVs for total concentrations of alpha-emitting and beta-emitting radionuclides, excluding radon-222 and potassium-40, which would limit the annual radiation dose resulting from the consumption of 2L of water per day to less than 5 percent of the average annual radiation dose due to all natural sources.

The MAVs are deliberately conservative, such that if the natural radionuclides uranium-238, uranium-234, radium-226 and radium-228 were all present in drinking-water at the MAV level, the annual radiation dose would still be less than 5 percent of the total annual natural dose.

5.3 Radiological compliance criteria

The MAVs given in Table 14.5 for radiological determinands shall not be exceeded.

The MAVs for alpha-emitting and beta-emitting radionuclides are:

- total alpha concentration: 0.10 becquerel per litre, excluding radon-222
- total beta concentration: 0.50 becquerel per litre, excluding potassium-40
- radon-222 concentration: 100 becquerels per litre.

5.4 Radiological monitoring requirements

A nationwide survey of radioactivity in drinking-water conducted by the National Radiation Laboratory (NRL) in 1980 indicated that radioactivity levels in all drinking-water supplies serving population groups of 5,000 or more were below 50 percent of the MAVs for alpha- and beta-radioactivity and radon-222. Drinking-water radioactivity is thus classed as Priority 3 so regular routine testing of public drinking-water supplies is not required.

Water from new underground sources shall be tested before connection to public drinking-water supplies.

If radiological sampling of water is contemplated, the NRL should be consulted.

5.5 Transgression of a radiological MAV

If the radioactivity of a drinking-water supply exceeds 50 percent of the MAV, the supply is to be analysed for contributing radioactive materials and an assessment should be made of their radiological significance by the NRL.

NRL provides both analytical and radiological advisory services appropriate for water-testing. If the alpha-radioactivity exceeds 0.1 becquerel per litre (excluding radon-222), the water should be analysed for uranium-238, uranium-234 and radium-226 and a radiological assessment should be undertaken. If the beta-radioactivity exceeds 0.5 becquerel per litre (excluding potassium-40), the water should be analysed for radium-228 and any other beta-emitting radionuclides which may be present, and a radiological assessment should be undertaken.

If the radiological MAV is transgressed, the NRL will advise the Medical Officer of Health and the water supplier of the remedial action to be taken.

6 Records

Records should be kept of the results of monitoring drinking-water determinands.

The records are necessary to demonstrate that the Drinking-Water Standards for New Zealand are being complied with. They are an essential requirement for the public health grading of drinking-water supplies.

The records should include the following information.

1. The name of the supply, treatment plant(s) and distribution zone(s) to which the information relates. The unique site code listed in the *Register of Community Drinking-Water Supplies in New Zealand* shall be included with every record. If the water supply has not been assigned site codes, these should be obtained from the Ministry of Health.
2. The treatment processes in operation at the beginning of the year being reported, and any modifications that changed the process during the year.
3. Anything that could affect water quality that has occurred in the drinking-water supply system or catchment.
4. The determinands monitored during the year, and the reasons for the omission of those Priority 1 and Priority 2 determinands not being monitored, with corroborating data where appropriate.
5. The sampling frequency for each determinand, the dates and times on which the measurements were made, the sampling site location and site code and the analytical results.
6. Any corrective action taken, either as a result of the level of a determinand exceeding the MAV or because it was considered necessary by the water supplier.
7. The name of the laboratory used for the analyses, as listed in the Ministry of Health *Register of Approved Laboratories*.
8. Any re-evaluation of the operational programme undertaken, and the reasons for this being done. Notes concerning treatment modification are included above, but changes in the operation or the materials used in the reticulation should also be noted where appropriate.
9. Operational records, including process changes and operational monitoring.

10. Staff supervisors and operators, together with details of their relevant qualifications and experience.

Proper internal documentation of the monitoring programme, as detailed in the *Guidelines for Drinking-Water Quality Management for New Zealand*, will enable suppliers to collate this information easily. Use of WINZ (the Water Information New Zealand information base operated by the Ministry of Health) will assist in maintaining the necessary records in the correct format. Records must be kept for a minimum of 10 years and must be made available to Ministry of Health designated officers as required.

7 Definitions

Acceptable Daily Intake (ADI)	The intake level in the human which is confidently believed to be without significant adverse health effects.
acute level	The dose of a determinand which causes an effect after a single or short-term exposure.
aesthetic determinand	A constituent or property of the water that can adversely affect the taste, odour, colour, clarity or general appearance of the water. These include substances such as manganese and iron compounds that can stain washing and utensils.
aggressiveness	The tendency of a water to corrode water supply pipes and fittings causing heavy metal concentrations to rise to above 50 percent of their MAVs.
alkalinity	Alkalinity is a measure of buffering capacity. A buffer limits the change in pH that occurs when water comes into contact with acidic or alkaline substances. The principle causes of alkalinity in most drinking-waters include at least one of bicarbonate, carbonate, and hydroxide. Alkalinity is measured by titrating with a standard acid to a designated pH.
analyte	See determinand .
becquerel	Radioactive activity of 1 nuclear transformation per second.
C.t value	The product of the concentration, C, of the disinfectant (in mg/L) and the contact time, (in minutes), t, required to cause a specified level of inactivation in a micro-organism. This is a measure of the exposure to the disinfectant.
chemical coagulation	The use of metallic salts (eg aluminium or iron) or organic polyelectrolytes (polyamines or polydadmacs) to destabilise fine suspended particles, causing them to clump together into larger particles.

chloramines	Compounds that may form through the reaction of free available chlorine (FAC) with nitrogen compounds. Chloramines formed from the reaction of FAC with ammonia are monochloramine, dichloramine or trichloramine.
chlorinated supplies	Supplies that are chlorinated but have not been demonstrated to consistently have a FAC concentration equivalent to at least 0.2mg/L of FAC at pH 8.0. See fully chlorinated water .
chronic level	The dose of a determinand that causes an effect after long-term exposure.
coliform organisms	The bacteria used as indicators that organic, possibly faecal, contamination of the water may have occurred. Sometimes referred to as total or presumptive coliforms.
committed effective dose (radioactivity)	The lifetime sum of the effective dose (50 years for adults: 70 years intake to age 70 for children).
community drinking-water supply	A publicly or privately owned drinking-water supply which serves more than 25 people for at least 60 days per year.
compliance	A drinking-water supply is said to be in compliance with the Standards when the results of monitoring of Priority 1 and 2 determinands show that the water supply satisfies the requirements of DWSNZ 2000.
compliance criterion	A condition that must be satisfied in order to achieve compliance.
compliance monitoring	Any monitoring conducted to test whether a drinking-water supply complies with DWSNZ 2000.
confidence interval	An interval which has a prescribed probability of containing the true value of an unknown parameter.
confidence level	The probability that an assertion about the value of a population parameter is correct.
confidence limits	The upper and lower boundaries of the confidence interval.

contaminant	A substance or organism in the water which can cause undesirable public health or aesthetic effects.
data sheets	The section in the <i>Guidelines for Drinking-Water Quality Management for New Zealand</i> which lists the sources, occurrence, removal process, analysis, health effects, and derivation of the MAVs of determinands.
designated officer	A Health Protection Officer or Medical Officer of Health designated by the Director-General of Health, pursuant to Section 7A(4) of the Health Act 1956 (as inserted by the Health Amendment Act 1993).
detection limit	See method detection limit .
determinand	A constituent or property of the water which is determined, or estimated, in a sample, for example, microbiological determinand–total coliforms; chemical determinand–chloride; physical determinand–pH, turbidity, colour; radiological determinand–radon.
disinfectant C.t value	See C.t value .
disinfection	The process used to inactivate micro-organisms in a drinking-water supply. The most common methods of disinfection are chlorination, ozonation, ultraviolet irradiation and boiling.
disinfection by-products	Contaminants produced in the drinking-water supply as by-products of the disinfection process.
disinfection residual	The amount of disinfectant that is still present in the water at any time. After disinfectant is added to drinking-water it is used up by the disinfection process and other chemical reactions. More disinfectant is usually added than is initially needed, so that enough disinfectant remains to guard against post-treatment contamination.
distribution system	All the trunk main, storage, and distribution system components which follow a treatment plant and any post-treatment storage facility at the treatment plant. See network reticulation .
distribution zone	The part of the drinking-water supply network within which all consumers receive drinking-water of identical quality, from the same or similar sources, with the same treatment

and usually at the same pressure. It is part of the supply network which is clearly separated from other parts of the network, generally by location, but in some cases by the layout of the pipe network

For example, in a large city, the central city area may form one zone, with outlying suburbs forming separate zones or, in a small town, the system may be divided into two distinct areas. The main purpose of assigning zones is to separately grade parts of the system with distinctly different characteristics.

down-time The length of time for which a process or monitoring equipment in the treatment plant is out of action.

drinking-water Water intended to be used for human consumption, food preparation, utensil washing, oral hygiene or personal hygiene.

Drinking-Water Standards

A yardstick to assess the quality of drinking-water. The Standards define the MAVs of health significant determinands and specify methods for determining whether a drinking-water supply complies with the Standards.

E. coli (Escherichia coli) A bacterium used as an indicator that faecal contamination of the water has almost certainly occurred and that, therefore, there is a possibility that pathogens are present.

effective dose (radioactivity)

The effective dose is the equivalent, uniform, wholebody dose having the same radiation health detriment as the actual dose distributed among the various organs of the body, with the unit sievert or millisievert (mSv). See **committed effective dose**.

enteric viruses Viruses occurring in the digestive system and found in faeces of human or animal origin.

exceedence The occurrence of a determinand in a sample at a concentration greater than the MAV.

faecal coliforms (thermotolerant coliforms)

A sub-group of total coliforms which will grow on a specific selective medium when incubated at $44.5^{\circ} \pm 0.2^{\circ}\text{C}$. The presence of faecal coliforms indicates that faecal

contamination has probably occurred and that steps need to be taken to ensure pathogens are not present. Included as faecal coliforms are: *Klebsiella* and *Escherichia*. Also referred to as thermotolerant. See also *E. coli*, **presumptive coliforms** and **total coliforms**.

free available chlorine (FAC)

The chlorine present in a chlorinated water in the form of hypochlorous acid and hypochlorite ion.

fully chlorinated water Water in which the FAC concentration exceeds the equivalent of 0.2mg/L free available chlorine at pH 8.0.

guideline A preferred course of action, process or procedure.

guideline value The value for an aesthetic determinand which, if exceeded, will render the water unattractive to consumers.

[the] Guidelines The *Guidelines for Drinking-Water Quality Management for New Zealand* published by the Ministry of Health.

health detriment An adverse effect on health.

indicator organism A determinand, for example *E. coli* or faecal coliforms, that is monitored to indicate the presence of faecal contamination.

Langelier Saturation Index

The Langelier Saturation Index (SI) is a measure of the corrosive or scale forming nature of a water, depending on whether it will dissolve or precipitate calcium carbonate. The Langelier Saturation Index is defined as the actual pH of the water minus the pH at which the water will be in equilibrium with solid calcium carbonate. It is measured on a positive/negative scale with waters of a SI of -0.5 or lower considered to be corrosive, waters with a SI of +0.5 or more considered to be scale forming and waters between -0.5 +0.5 considered to be well balanced. The SI is calculated using the calcium hardness, alkalinity, total dissolved solids and pH of the water. It does not always correlate well with aggressiveness in New Zealand waters and is therefore not used to define aggressiveness in DWSNZ 2000.

limit of detection See **method detection limit**.

Lowest Observed Adverse Effect Level (LOAEL)

The lowest dose of a contaminant at which a statistically significant adverse effect has been observed in a group of test animals. Such a value would only be used to establish a

human TDI when an appropriate **No Observed Adverse Effect Level (NOAEL)** was not able to be determined. In the event that a LOAEL (rather than a NOAEL) is used as the basis for a TDI, it is likely that a higher uncertainty factor would be employed.

Maximum Acceptable Value (MAV)

The concentration of a determinand below which the presence of the determinand does not result in any significant risk to a consumer over a lifetime of consumption. For carcinogenic chemicals, the MAVs set in these Standards generally represent a risk of one additional incidence of cancer per 100,000 people ingesting the water at the concentration of the MAV for 70 years.

MDL

Method detection limit.

Medical Officer of Health

The Medical Officer of Health appointed for a health district under the Health Act 1956, and includes any Deputy Medical Officer of Health; and, for the purposes of Part IV of the Act, includes any medical practitioner acting under the direction of the Medical Officer of Health.

method detection limit (MDL)

The constituent concentration which, when processed through the complete analytical method, produces a signal with a 99 percent probability that it is different from the blank. Seven replicate measurements of a solution containing the determinand of interest at a concentration near to the estimated MDL are used to calculate the standard deviation(s). The MDL is $3.14 \times s$.

micro-organism

A very small (microscopic) organism. Includes viruses, bacteria, protozoa, algae and helminths.

MOH

Medical Officer of Health.

monitoring

The sampling and analysis of a drinking-water supply to test for compliance with the Standards or for process control, by detecting changes in the concentrations of its constituent determinands or deviations of these from target values. In New Zealand monitoring is the responsibility of the water supplier.

network reticulation	A network under the control of a network utility operator, that is, all parts of the drinking-water distribution system including pipes, treated water reservoirs, etc.
network utility operator	A person who undertakes the piped distribution of a drinking water supply. See also water supplier .
No Observed Adverse Effect Level (NOAEL)	The dose of a contaminant at which no adverse effect has been observed on a test animal.
parameter	A coefficient or factor in an expression or equation used to process data.
parasites	Refers to <i>Giardia</i> and <i>Cryptosporidium</i> in this document.
pathogen	An organism capable of inducing illness.
pesticides	A substance or mixture of substances used for the eradication or control of any pest. This includes behavioural and developmental modifiers, for example plant growth regulators, desiccants or defoliants, but not fertilisers or animal remedies.
pH	A measure of the concentration of hydrogen ions in water. It is the negative logarithm to base 10 of the concentration of H ⁺ in the water. A low pH indicates an acidic water, a high pH shows that the water is alkaline. A pH of 7 is neutral. The pH of water is particularly important in water treatment processes such as coagulation and disinfection.
potable water	Drinking-water which does not contain any determinands which exceed the Maximum Acceptable Values (MAVs) given in the DWSNZ 2000. See also wholesome drinking water .
presumptive coliforms	Bacteria whose identification in the early stages of bacteriological examination highlight the need for further identification of coliform organisms. If absent it is not necessary to proceed with further identification of coliform organisms. See also <i>E. coli</i> , faecal coliforms and total coliforms .
Priority class	One of the four classes of determinands defined in the <i>Drinking-Water Standards for New Zealand 2000</i> . The priority classes are ranked according to the potential impact of the determinand on public health if present in excess of

its Maximum Acceptable Value in drinking-water and the quantity of the determinand present in the water supply.

protozoa The Priority 1 protozoa are currently *Giardia* and *Cryptosporidium*.

public drinking-water supply See **community drinking-water supply**.

raw water Water which has not received any treatment to make it suitable for drinking.

referee method The referee methods specified in these Standards will be regarded as the definitive methods. Alternative methods may be used, but these must provide results comparable to those obtained by the referee methods. In the event of any dispute about differences in analytical results, results obtained using the referee method will be deemed to be correct.

Register of Community Drinking-Water Supplies in New Zealand

A list of community drinking-water supplies in New Zealand published by the Ministry of Health. It contains details of the water sources, treatment plants, distribution zones, site identification codes, Priority 2 determinands and public health grading of each drinking-water supply.

renal dialysis A method of treatment of patients who have a kidney disorder. Dialysis involves the diffusion of unwanted body electrolytes out of the patient across a semi-permeable membrane into dialysis water on the other side of the membrane. The dialysis water must be high quality to avoid the risk of any contaminants in the dialysis water diffusing back across the membrane and accumulating in the patient. The DWSNZ do not guarantee that water which meets these Standards is suitable for renal dialysis.

reticulation The network of pipes, pumps and service reservoirs that delivers the drinking-water from the water treatment plant to the consumers' boundary. See **network reticulation**.

sanitary survey A survey and analysis of the physical environment for the purpose of identifying the existence and hazard posed by existing and potential sources of health hazards and environmental contamination.

secure groundwater	<p>Water contained beneath the land surface which is abstracted via a secure well head or similarly proven structure. It must not be under the direct influence of surface water or demonstrate any significant and rapid shifts in characteristics such as turbidity, temperature, conductivity or pH which closely correlate to any climatological conditions, surface water conditions or land use practices, as demonstrated by:</p> <ul style="list-style-type: none"> • less than 0.005 percent of the water having been present in the aquifer for less than one year (demonstrated by the tritium and CFC methods) <p>and/or</p> <ul style="list-style-type: none"> • variations in the groundwater characteristics not exceeding a coefficient of variation of more than: <ul style="list-style-type: none"> – 3.0 percent in conductivity – 4.0 percent in chloride concentration – 2.5 percent in nitrate concentration (standardised variance). <p>There must also be no insects, other macro-organisms such as algae, organic debris, large diameter pathogens, or <i>E. coli</i> in 12 successive monthly samples.</p>
secure well head	<p>A well head that incorporates appropriate measures to prevent or minimise the risk of groundwater contamination. Measures include:</p> <ul style="list-style-type: none"> • a sealed pumping and piping system including backflow prevention devices • seals between the well casing, pipework and surrounding ground • restrictions on any potentially contaminating land use or activity in the vicinity of the well head.
service reservoir	<p>A reservoir present in the network reticulation for the purpose of managing water flow and pressure.</p>
short-term excursion	<p>The exceedence of the MAV of a contaminant for a short time which does not represent a public health risk.</p>
SI Units	<p>A system of coherent metric units (Système Internationale d'Unités) adopted by the General Conference on Weights and Measures, the international authority on units.</p>

slow sand filtration	Filter which consists of a bed of fine sand and relies on a biologically active layer on top of sand, called the <i>Schmutzdecke</i> , to filter out suspended particles. Loading rate is typically 0.2m ³ /m ² /hr (eg, m/hr).
surface water	The water on the land surface. It can be running, such as in streams and rivers or quiescent as in lakes, reservoirs, impoundments and ponds. Surface water is produced by runoff of precipitation and by groundwater seeping through the top layers of soil. Surface water can also be defined as all water open to the atmosphere and subject to surface runoff.
surrogate	A determinand used to assess the likely presence or concentration of another determinand which is difficult to determine directly. For example, <i>E. coli</i> is used to assess the likely presence of specific pathogenic organisms, as they are good indicator organisms and are easier to test for than the pathogens themselves.
surveillance	The process of checking that the monitoring of drinking-water supplies conforms to the specifications set in the Standards. Surveillance is usually conducted by the public health agency.
thermotolerant coliforms	See faecal coliforms .
Tolerable Daily Intake (TDI)	The intake level in humans which is confidently believed to be without significant adverse health effects. Essentially the same as ADI (Acceptable Daily Intake), except that the latter tends to refer to a level which has been formally established by the World Health Organization or some other authority.
total coliforms	Genera in the family <i>Enterobacteriaceae</i> , the total coliforms are bacteria which will grow on a specific selective medium when incubated at 35°C ±0.2°C. They are used to indicate the probable contamination of water by organic material, and that the possibility of faecal contamination needs to be checked. Total coliforms include the genera: <i>Erwinia</i> , <i>Klebsiella</i> , <i>Escherichia</i> , <i>Citrobacter</i> and <i>Enterobacter</i> . See also faecal coliforms and presumptive coliforms .

transgression	A drinking-water sample is said to transgress the Standards when a determinand of any priority class that is present in the sample exceeds the Maximum Acceptable Value (MAV) or the compliance criteria requirements.
turbidity	Loss of clarity in a sample caused by scattering of light by suspended particles in the sample. For these Standards, turbidity is measured by nephelometry.
USEPA	The United States Environmental Protection Agency.
virus	Very small parasitic organisms which can only reproduce if they can colonise a living cell by “highjacking” some of the host cell’s metabolic processes. They are submicroscopic particles of nucleic material enclosed in a protein coat. Viruses are responsible for several waterborne diseases such as infectious hepatitis and polio.
water supplier or water supply authority	Any person or entity that owns, or is responsible for operating, a drinking-water supply.
water treatment plant	The point where the drinking-water supply enters the distribution system, regardless of the treatment process.
water treatment process	A chemical, biological or physical process employed to enhance the quality of a drinking-water supply prior to distribution.
well head	The physical structure, facility or device at the land surface from which groundwater is abstracted from subsurface water-bearing formations.
WHO	World Health Organization.
wholesome drinking-water	Potable water which does not contain any determinands which exceed the Guideline Values for Aesthetic Determinands given in the DWSNZ 2000. See also potable .

8 Units

8.1 Basis for units

The Drinking-Water Standards for New Zealand 1995 use the International System of Units (SI) (Système Internationale d'Unités of the CIPM), consistent with the units used in the United States Environmental Protection Authority and the Australian Drinking-Water Standards.

The internationally recognised (Comité International des Poids et Mesures) (CIPM) unit of volume is the litre (L).

The SI unit of weight is the kilogram (kg).

The SI unit of length is the metre (m).

The decimal prefixes may be used to form names and symbols of multiples of the SI units. The choice of appropriate multiple is governed by convenience, to result in a numerical value within a practical range.

8.2 Units of concentration

Standard Unit	Standard Symbol	Other Units	Unit Symbol	Equivalent Units	Equivalent Units
milligrams per litre	mg/L or mgL ⁻¹			parts per million, ppm	grams per cubic metre, g/m ³ or gm ⁻³
		micrograms per litre	µg/L or µgL ⁻¹	parts per billion, ppb = 10 ⁻³ ppm	milligrams per cubic metre, mg/m ⁻³ or mgm ⁻³
		nanograms per litre	ng/L or ngL ⁻¹	parts per trillion ppt=10 ⁻³ ppb	

1 mg/L = 1,000 or 10³ µg/L = 1,000,000 or 10⁶ ng/L

1 ng/L = 0.001 or 10⁻³ µg/L = 0.000001 or 10⁻⁶ mg/L

Note that one billion is one thousand million or 10⁹.

8.3 Microbiological

Colony forming units per millilitre (cfu/mL).

Most probable number per 100 millilitres (MPN/100 mL).

1 μ m = 0.001 or 10⁻³ millimetres.

8.4 Physical and other

8.4.1 Aggressiveness

Drinking-Water Standards for New Zealand 1995 proposed use of the Langelier Saturation Index to quantify aggressiveness. In some waters it is found that the correlation is not good so the Langelier Saturation Index is not used for this purpose in the *Drinking-Water Standards for New Zealand 2000*.

The Langelier Saturation Index is defined as the actual pH of the water minus the pH at which the water will be in equilibrium with solid calcium carbonate, ie

$$\text{SI} = \text{pHac} - \text{pHs}$$

Where SI = Langelier Saturation Index

pHac = the actual pH

pHs = the pH of the water in equilibrium with calcium carbonate

The units of the Langelier Saturation Index are therefore pH units which are dimensionless.

8.4.2 C.t

= concentration of the disinfectant in mg/L X exposure time in minutes

8.4.3 Colour

Hazen Colour Unit (HU), sometimes referred to as True Colour Units (TCU). Strictly speaking, true colour is the colour of a filtered sample. The colour of an unfiltered sample is called "apparent colour".

1 HU = 1 mg platinum/L in the form of the chloroplatinate ion.

8.4.4 Conductivity

millisiemens per metre (mS/m or mS.m⁻¹).

$$1\text{mS/m} = 10\mu\text{mhos/cm}$$

$$1\mu\text{S/cm} = 1\mu\text{mhos/cm}$$

Note that conductivity is strongly influenced by the temperature of the sample being tested. Normal practice is to measure the conductivity at 25°C or to convert it to this temperature, including the temperature in the report.

8.4.5 pH

$$-\log(\text{hydrogen ion activity}) = -\log a\text{H}^+$$

Approximated to indicate $-\log(\text{hydrogen ion concentration}) = -\log [\text{H}^+]$.

8.4.6 Temperature

degrees celsius (°C).

8.4.7 Turbidity

Nephelometric Turbidity Unit (NTU).

The turbidity of a specified concentration of formazin suspension (1.000g of hydrazine sulphate/100ml of water) is defined as 40 NTU. Alternative standards are defined relative to this standard.

8.5 Chemical

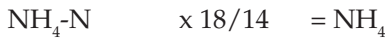
The concentration of some determinands can be expressed using different units.

8.5.1 Asbestos

Million fibres per litre (MF/L).

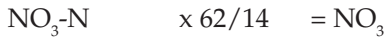
8.5.2 Ammonium

ammonium nitrogen $\times 18/14$ = ammonium



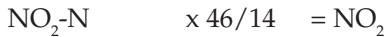
8.5.3 Nitrate

nitrate nitrogen $\times 62/14$ = nitrate



8.5.4 Nitrite

nitrite nitrogen $\times 46/14$ = nitrite



8.5.5 Hardness

total hardness = calcium hardness + magnesium hardness, expressed as mg/L CaCO_3

$$\text{Ca as CaCO}_3 = \text{Ca as Ca} \times 100/40$$

$$\text{Mg as CaCO}_3 = \text{Mg as Mg} \times 100/24.3$$

8.6 Radioactivity

8.6.1 Activity of radionuclide

becquerel per litre (Bq/L) or picocurie per litre (pCi/L)

1 picocurie = 3.7×10^{-2} Becquerel

second to the power minus one, s^{-1}

1 curie (Ci) = 3.7×10^{10} Bq

millisievert (msv)

9 Index of Synonyms

This index of synonyms lists chemicals of health significance and those for which health queries have been raised but no MAV can be set. The list can be used to determine which name for a compound has been used in these Standards when there is more than one possibility. For example, for “bendioxide, *see bentazone*”, “bendioxide” is the name looked up, and “bentazone” is the name by which bendioxide is referred to in the Standards.

acetyl chloride, *see chloroacetone*

acrylamide

alachlor

aldicarb

aldrin

anatoxin

anatoxin-a

atrazine

azinphos methyl

basudin, *see diazinon*

bendioxide, *see bentazone*

bentazone

benzene

benzo(a)pyrene

N,N-bis(carboxymethyl)glycine, *see nitrilotriacetic acid*

bis(2-ethylhexyl)adipate, *see di(2-ethylhexyl)adipate*

bis(2-ethylhexyl)phthalate, *see di(2-ethylhexyl)phthalate*

boron

bromacil

bromate

bromochloroacetonitrile

bromochloroethanenitrile, *see bromochloroacetonitrile*

bromodichloromethane

bromoform

carbofuran

carbon tetrachloride
chloracetone, *see chloroacetone*
chloral hydrate, *see trichloroacetaldehyde*
chloramines, *see monochloramine and dichloramine*
chlordane
chloroacetic acid, *see monochloroacetic acid*
chloroacetone
chlorobenzene, *see monochlorobenzene*
chlorodibromomethane, *see dibromochloromethane*
3-chloro-1,2-dibromopropane, *see 1,2-dibromo-3-chloropropane*
3-chloro-4-(dichloromethyl)-5-hydroxy-2(h)-furanone, *see MX*
2-chloro-2',6'-dimethyl-N-methoxymethyl acetanilide, *see alachlor*
6-chloro-N,N'-dimethyl-1,3,5-triazine-2,4-diamine, *see simazine*
1-chloro-2,3-epoxypropane, *see epichlorohydrin*
chloroethanoic acid, *see monochloroacetic acid*
chloroethene, *see vinyl chloride*
chlorethene, *see 1,1,1-trichloroethane*
chloroethylene, *see vinyl chloride*
6-chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine, *see atrazine*
2-chloro-6'-ethyl-N-(2-methoxy-1-methylethyl)acet-o-toluidide, *see metolachlor*
chloroform
chloromethanenitrile, *see cyanogen chloride*
chloromethyl ethylene oxide, *see epichlorohydrin*
chloromethyl oxirane, *see epichlorohydrin*
4-chloro-2-methylphenoxyethanoic acid, *see MCPA*
2-chlorophenol
6-chloro-3-phenylpyridazin-4-yl-S-octyl thiocarbonate, *see pyridate*
chloropicrin
1-chloro-2-propanone, *see chloroacetone*
4-chloro-o-toloxylacetic acid, *see MCPA*
3-(3-chloro-p-tolyl)-1,1-dimethyl urea, *see chlortoluron*
4-(4-chloro-o-tolyoxy)butanoic acid, *see MCPB*
2-(4-chloro-o-tolyoxy)propionic acid, *see mecoprop*
chlortoluron, *see chlortoluron*

chlorpyrifos
chlortoluron
cyanazine
cyanide
cyanogen chloride
cylindrospermopsin
2,4-D
2,4-DB
DBCP, *see 1,2-dibromo-3-chloropropane*
1,1-DCA, *see 1,1-dichloroethane*
1,2-DCA, *see 1,2-dichloroethane*
DCA, *see dichloroacetic acid*
1,2-DCB, *see 1,2-dichlorobenzene*
1,3-DCB, *see 1,3-dichlorobenzene*
1,4-DCB, *see 1,4-dichlorobenzene*
1,1-DCE, *see 1,1-dichloroethene*
1,2-DCE, *see 1,2-dichloroethene*
DCP, *see 1,3-dichloropropene*
DCPA, *see propanil*
DDT
DEHA, *see di(2-ethylhexyl)adipate*
DEHP, *see di(2-ethylhexyl)phthalate*
di(2-ethylhexyl)adipate
di(2-ethylhexyl)phthalate
dialkyltins
diazinon
1,2-dibromo-3-chloropropane
dibromoacetonitrile
dibromochloromethane
1,2-dibromoethane
dibromoethanenitrile, *see dibromoacetonitrile*
dichloramine
dichloro-1,3-propene, *see 1,3-dichloropropene*
dichloroacetic acid

dichloroacetonitrile
1,4-dichlorobenzene
1,2-dichlorobenzene
1,3-dichlorobenzene
dichlorobromomethane, *see bromodichloromethane*
1,1 dichloroethane
1,2 dichloroethane
dichloroethanenitrile, *see dichloroacetonitrile*
dichloroethanoic acid, *see dichloroacetic acid*
1,1-dichloroethene
1,2-dichloroethene
dichloromethane
2,4-dichlorophenol
dichlorophenoxyacetic acid, *see 2,4-D*
4-(2,4-dichlorophenoxy)butanoic acid, *see 2,4-DB*
dichlorophenoxybutyric acid, *see 2,4-DB*
2,4-dichlorophenoxyethanoic acid, *see 2,4-D*
2-(2,4-dichlorophenoxy)propionic acid, *see dichlorprop*
N-(3,4-dichlorophenyl)propionamide, *see propanil*
1,2-dichloropropane
1,3-dichloropropane
1,3-dichloropropene
dichlorprop
dieldrin, *see aldrin/dieldrin*
2,3-dihydro-2,2-dimethyl-7-benzofuranol methylcarbamate, *see carbofuran*
1,2-dimethylbenzene, *see xylenes*
1,4-dimethylbenzene, *see xylenes*
1,3-dimethylbenzene, *see xylenes*
2,6-dinitro-N,N-dipropyl-4-(trifluoromethyl)benzenamine, *see trifluralin*
dioxins
diquat
diuron
DMDT, *see methoxychlor*
2,4-DP, *see dichlorprop*

dursban, *see chlorpyrifos*
EDB, *see ethylene dibromide*
edetic acid, *see EDTA*
EDTA
epichlorohydrin
ethylbenzene
ethylenediamine tetraacetic acid, *see EDTA*
ethylene dibromide, *see 1,2-dibromoethane*
ethylene dichloride, *see 1,1 dichloroethane or 1,2 dichloroethane*
S-ethyl-N,N-hexamethylenethiocarbamate, *see molinate*
N-(1-ethylpropyl)-2,6-dinitro-3,4-xylidine, *see pendimethalin*
fenoprop
fluoranthane
formaldehyde
gamma benzene hexachloride, *see lindane*
gamma-BHC, *see lindane*
gamma-HCH, *see lindane*
gesapon, *see diazinon*
HCB, *see hexachlorobutadiene*
HCB, *see hexachlorobenzene*
HEOD, *see dieldrin*
heptachlor
heptachlor epoxide, *see heptachlor/heptachlor epoxide*
1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene, *see heptachlor*
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclohexane, *see lindane*
1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydroendo,exo-1,4:5,8-dimethanonaphthalene, *see dieldrin*
1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-dimethanonaphthalene, *see aldrin*
hexazinone
homoanatoxin-a
3-(4-isopropylphenyl)-1,1-dimethyl urea, *see isoproturon*

isoproturon
lindane
lorsban, *see chlorpyrifos*
LPS endoxins
MCB, *see monochlorobenzene*
MCP, *see MCPA*
MCPA
MCPB
MCP, *see mecoprop*
mecoprop
metadichlorobenzene, *see 1,3-dichlorobenzene*
metadimethylbenzene, *see xylenes*
metalaxyl
methanal, *see formaldehyde*
methoxychlor
methylbenzene, *see toluene*
methylchloroform, *see 1,1,1-trichloroethane*
methylene chloride, *see dichloromethane*
3-(1-methylethyl)-1H-2,1,3-benzothiadiazin-4(3H)-one-2,2-dioxide, *see bentazone*
2-methyl-2-(methylthio)propionaldehyde-O-methylcarbamoyloxime, *see aldicarb*
metolachlor
metribuzin
microcystins
molinate
monochloramine
monochloroacetic acid
monochloroacetone, *see chloroacetone*
monochlorobenzene
MX
N-(3,5-dichlorophenyl)-1,2-dimethylcyclopropane-1,2-dicarboximide, *see procymidone*
nitrate & nitrite
nitrilotriacetic acid
nitrochloroform, *see chloropicrin*

N,N-bis(carboxymethyl)glycine *see nitrilotriacetic acid*

nodularin

NTA, *see nitrilotriacetic acid*

1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene, *see chlordane*

O,O-diethylO-2-isopropyl-6-methylpysimidin-4yl phopphothioate, *see diazinon*

ortho-chlorophenol, *see 2-chlorophenol*

orthodichlorobenzene, *see 1,2-dichlorobenzene*

orthodimethylbenzene, *see xylenes*

oryzalin

oxadiazon

PAHs

paradichlorobenzene, *see 1,4-dichlorobenzene*

paradimethylbenzene, *see xylenes*

PCBs

PCE, *see tetrachloroethene*

PCP, *see pentachlorophenol*

pendimethalin

pentachlorophenol

perchlorobenzene, *see hexachlorobenzene*

permethrin

3-phenoxybenzyl (1RS)-cis,trans-3-(2,2-dichlorovinyl)-2,2-dimethyl cyclopropane carboxylate, *see permethrin*

phenyl chloride, *see monochlorobenzene*

phenyl hydride, *see benzene*

phenylethene, *see styrene*

pirimiphos methyl

primisulfuron, primisulfuron, primisulfuron-methyl

polychlorinated biphenyls, *see PCBs*

polycyclic aromatic hydrocarbons, *see PAHs*

polynuclear aromatic hydrocarbons, *see PAHs*

procymidone

propanil

propazine

propenamide, *see acrylamide*
pyridate
saxitoxins
silvex, *see fenoprop*
simazine
sodium monofluoroacetate, *see 1080*
sodium fluoroethanoate, *see 1080*
sodium fluoroacetate, *see 1080*
styrene
sumisclex, *see procymidone*
2,4,5-T
TBTO, *see tributyltin oxide*
1,1,1-TCA, *see 1,1,1- trichloroethane*
TCA, *see trichloroacetic acid*
1,2,3-TCB, *see trichlorobenzenes*
1,2,4-TCB, *see trichlorobenzenes*
1,3,5-TCB, *see trichlorobenzenes*
TCE, *see trichloroethene*
2,4,5-TCPPA, *see fenoprop*
terbutylazine
tetrachloroethene
tetrachloroethylene, *see tetrachloroethene*
tetrachloromethane, *see carbon tetrachloride*
THM, *see bromodichloromethane or dibromochloromethane or tribromomethane or trichloromethane*
thiabendazole
toluene
2,4,5-TP, *see fenoprop*
triazine
tribromomethane, *see bromoform*
tributyltin oxide
trichloramine, *see chloramines*
trichloroacetaldehyde
trichloroacetic acid

trichloroacetonitrile
trichlorobenzenes
1,2,3-trichlorobenzene, *see trichlorobenzenes*
1,2,4-trichlorobenzene, *see trichlorobenzenes*
1,3,5-trichlorobenzene, *see trichlorobenzenes*
1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane, *see DDT*
1,1,1-trichloro-2,2-bis(4-methoxyphenyl)ethane, *see methoxychlor*
trichloroethanal, *see trichloroacetaldehyde*
1,1,1-trichloroethane
trichloroethanenitrile, *see trichloroacetonitrile*
trichloroethanoic acid, *see trichloroacetic acid*
trichloroethene
trichloroethylene, *see trichloroethene*
trichloromethane, *see chloroform*
trichloronitromethane, *see chloropicrin*
2,4,6-trichlorophenol
2-(2,4,5-trichlorophenoxy)propionic acid, *see silvex*
trichlorophenoxyacetic acid, *see 2,4,5-T*
2,4,5-trichlorophenoxyethanoic acid, *see 2,4,5-T*
3,5,6-trichloro-2-pyridyloxyacetic acid, *see triclopyr*
3,5,6-trichloro-2-pyridyloxyethanoic acid, *see triclopyr*
triclopyr
trifluralin
triglycine, *see nitrilotriacetic acid*
trihalomethane, *see bromodichloromethane or dibromochloromethane or tribromomethane or trichloromethane*
VC, *see vinyl chloride*
vinyl chloride
vinyl benzene, *see styrene*
vinylidene chloride, *see 1,1-dichloroethene*
xylenes
666, *see lindane*
1080

10 Tables of Synonyms

(for organic determinands of health significance and pesticides)

Tables 10.1 and 10.2 list the organic determinands of health significance and the pesticides in the alphabetical order in which they appear in the table of MAVs in Section 14. The name used in DWSNZ 2000 may appear in the column for IUPAC Nomenclature, Common Names or Abbreviation and is given in **bold**. Where available, other synonyms are given in the appropriate columns.

Table 10.1 Synonyms for organic determinands of health significance

IUPAC Nomenclature	Common Names	Abbreviation	CAS Registry Number
propenamide	acrylamide		79-06-1
benzene	phenyl hydride		71-43-2
benzo(a)pyrene			50-32-8
bromochloroethanenitrile	bromochloroacetonitrile		83463-62-1
bromodichloromethane	dichlorobromomethane		75-27-4
tribromomethane	bromoform		75-25-2
tetrachloromethane	carbon tetrachloride		56-23-5
monochloramine dichloramine trichloramine	chloramines, or combined chlorine		
1-chloro-2-propanone	chloroacetone , or chloracetone or acetyl chloride, or monochloroacetone		78-95-5
trichloromethane	chloroform		67-66-3
2-chlorophenol	orthochlorophenol		95-57-8
trichloronitromethane	chloropicrin , or nitrochloroform		76-06-2
dialkyltins			
1,2-dibromoethane	ethylene dibromide		103-93-4

Table 10.1 Synonyms for organic determinands of health significance (continued)

IUPAC Nomenclature	Common Names	Abbreviation	CAS Registry Number
dibromoethanenitrile	dibromoacetonitrile		3252-43-5
dibromochloromethane	chlorodibromomethane		124-48-1
dichloroethanoic acid	dichloroacetic acid	DCA	79-43-6
dichloroethanenitrile	dichloroacetonitrile		3018-12-0
1,2-dichlorobenzene	orthodichlorobenzene	1,2-DCB	95-50-1
1,3-dichlorobenzene	metadichlorobenzene	1,3-DCB	541-73-1
1,4-dichlorobenzene	paradichlorobenzene	1,4-DCB	106-46-7
1,1-dichloroethane	ethylene dichloride	1,1-DCA	75-34-3
1,2-dichloroethane	ethylene dichloride	1,2-DCA	107-06-2
1,1-dichloroethene	vinylidene chloride	1,1-DCE	75-35-4
1,2-dichloroethene	ethylene dichloride	1,2-DCE	540-59-0
dichloromethane	methylene chloride		75-09-2
2,4-dichlorophenol			120-83-2
di(2-ethylhexyl)adipate	bis(2-ethylhexyl)adipate	DEHA	103-23-1
di(2-ethylhexyl)phthalate	bis(2-ethylhexyl) phthalate	DEHP	117-81-7
ethylenediamine tetra-acetic acid	edetic acid	EDTA	60-00-4
1-chloro-2,3-epoxypropane	epichlorohydrin, or chloromethyl oxirane, or chloromethyl ethylene oxide		106-89-8
ethylbenzene			100-41-4
methanal	formaldehyde		50-00-0
hexachlorobutadiene		HCB	87-68-3
chloroethanoic acid	monochloroacetic acid, or chloroacetic acid		79-11-8
chlorobenzene	monochlorobenzene, or phenyl chloride	MCB	(50717-45-8) replaced by 108-90-7
3-chloro-4-(dichloromethyl)- 5-hydroxy-2(5h)-furanone		MX	77469-76-0

Table 10.1 Synonyms for organic determinands of health significance (continued)

IUPAC Nomenclature	Common Names	Abbreviation	CAS Registry Number
N,N-bis(carboxymethyl) glycine	nitrilotriacetic acid , or triglycine	NTA	139-13-9 556-33-2
1,2 - dibromoethane	ethylene dibromide		106-93-4
	polynuclear aromatic hydrocarbons	PAH	
phenylethene, or styrene	styrene , or vinyl benzene		100-42-5
tetrachloroethene	tetrachloroethylene	PCE	127-18-4
methylbenzene, or toluene	toluene		108-88-3
tributyltin oxide		TBTO	56-35-9
trichloroethanal	trichloroacetaldehyde , or chloral hydrate		75-87-6
trichloroethanoic acid	trichloroacetic acid	TCA	76-03-9
trichloroethanenitrile	trichloroacetonitrile		545-06-2
1,2,3-trichlorobenzene	trichlorobenzenes	1,2,3-TCB	87-61-6
1,2,4-trichlorobenzene		1,2,4-TCB	120-82-1
1,3,5-trichlorobenzene		1,3,5-TCB	108-70-3
1,1,1-trichloroethane	methylchloroform, or chloroethene	1,1,1-TCA	71-55-6
trichloroethene	trichloroethylene	TCE	79-01-6
2,4,6-trichlorophenol		TCP	88-06-2
	trihalomethane	THM	
chloroethene	vinyl chloride , or chloroethylene	VC	75-01-4
1,2-dimethylbenzene	xylenes , or orthodimethylbenzene, or metadimethylbenzene, or paradimethylbenzene		95-47-6
1,3-dimethylbenzene			108-38-3
1,4-dimethylbenzene			106-42-3

Table 10.2 Synonyms for pesticides

IUPAC Nomenclature	Common Names	Abbreviation	CAS Registry Number
2-chloro-2',6'-dimethyl-N-methoxymethyl acetanilide	alachlor		15972-60-8
2-methyl-2-(methylthio)propionaldehyde-O-methylcarbamoyloxime	aldicarb		116-06-3
1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-dimethanonaphthalene	aldrin		309-00-2
6-chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine	atrazine		1912-24-9
S-(3,4-dihydro-4-oxobenzo(d)(1,2,3)-triazin-3-ylmethyl) O,O-dimethyl phosphorodithioate	azinphos methyl		86-50-0
3-(1-methylethyl)-1H-2,1,3-benzothiadiazin-4(3H)-one-2,2-dioxide	bentazone , or bendioxide		25057-89-0
5-bromo-3-sec-butyl-6-methyluracil	bromacil		314-40-9
2,3-dihydro-2,2-dimethyl-7-benzofuranol methylcarbamate	carbofuran		1563-66-2
1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene	chlordane		57-74-9
	chlorpyrifos		
3-(3-chloro-p-tolyl)-1,1-dimethyl urea	chlortoluron , or chlorotoluron		15545-48-9
	cyanazine		
2,4-dichlorophenoxy ethanoic acid	dichlorophenoxyacetic acid	2,4-D	94-75-7
4-(2,4-dichlorophenoxy) butanoic acid	dichlorophenoxybutyric acid	2,4-DB	94-82-6
1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane		DDT	50-29-3
O,O-diethyl O-2-isopropyl-6-methylpyrimidin-4-yl phosphorothioate	diazinon		333-41-5
1,2-dibromo-3-chloropropane	3-chloro-1,2-dibromopropane	DBCP	96-12-8

Table 10.2 Synonyms for pesticides (continued)

IUPAC Nomenclature	Common Names	Abbreviation	CAS Registry Number
1,2-dichloropropane			78-87-5
1,3-dichloropropane			
1,3-dichloropropene	dichloro-1,3-propene	DCP	542-75-6
2-(2,4-dichlorophenoxy) propionic acid	dichlorprop	2,4-DP	120-36-5
1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydroendo,exo-1,4:5,8-dimethanonaphthalene	dieldrin	HEOD	60-57-1
9,10-dihydro-8a,10a-diazoniaphenanthrene; 6,7-dihydrodipyrido-(1,2-a:2',1'c) pyrazine-5,8-di-ium; 1,1'-ethylene-2,2'-bipyridyldiylum	diquat		2764-72-9
3-(3,4-dichlorophenyl)-1,1-dimethylurea	diuron		330-54-1
1,2-dibromoethane	ethylene dibromide	EDB	106-93-4
2-(2,4,5-trichlorophenoxy) propionic acid	fenoprop , or silvex	2,4,5-TCPPA, 2,4,5-TP	93-72-1
1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene	heptachlor		76-44-8
	heptachlor epoxide		1024-57-3
hexachlorobenzene	hexachlorobenzene, or perchlorobenzene	HCB	118-74-1
3-cyclohexyl-6-dimethylamino-1-methyl-1,3,5-triazine	hexazinone		51235-04-2
3-(4-isopropylphenyl)-1,1-dimethyl urea	isoproturon		34123-59-6
hexachlorocyclohexane	lindane , or gamma benzene hexachloride	gamma-BHC, 666, gamma-HCH	58-89-9
4-chloro-2-methylphenoxyethanoic acid	4-chloro-o-toloxycetic acid	MCPA , MCP	94-74-6
4-(4-chloro-o-tolyloxy) butanoic acid		MCPB	94-81-5
2-(4-chloro-o-tolyloxy)propionic acid	mecoprop	MCPP	7085-19-0

Table 10.2 Synonyms for pesticides (continued)

IUPAC Nomenclature	Common Names	Abbreviation	CAS Registry Number
methyl N-(methoxyacetyl)-N-2,6-xylyl)-DL-alaninate	metalaxyl		57837-19-1 70630-17-0
1,1,1-trichloro-2,2-bis(4-methoxyphenyl)ethane	methoxychlor	DMDT	72-43-5
2-chloro-6'-ethyl-N-(2-methoxy-1-methylethyl)acet-o-toluidide	metolachlor		51218-45-2
4-amino-6- <i>tert</i> -butyl-3-(methylthio)-1,2,4-triazin-5-one	metribuzin		21087-64-9
S-ethyl-N,N-hexamethylenethiocarbamate	molinate		2212-67-1
3-chloro-4-(dichloromethyl)-5-hydroxy-2(h)-furanone	MX		
4-(dipropylamino)-3,5-dinitrobenzenesulphonamide	oryzalin		19044-88-3
3-(2,4-dichloro-5-(1-methylethoxy)phenyl)-5-(1,2-dimethylethyl)-1,3,4-oxydiazol-2-(3H)-one	oxadiazon		19666-30-9
N-(1-ethylpropyl)-2,6-dinitro-3,4-xylylidine	pendimethalin		40487-42-1
pentachlorophenol	pentachlorophenol	PCP	87-86-5
3-phenoxybenzyl (1RS)-cis,trans-3-(2,2-dichlorovinyl)-2,2-dimethyl cyclopropane carboxylate	permethrin		52645-53-1
4-amino-3,5,6-trichloro-2-picolinic acid	picloram	grazon	1918-02-1
O-2-diethylamino-6-methylpyrimidin-4-yl O,O-dimethylphosphorothioate	pirimiphos-methyl		29232-93-7
methyl 2-((((4,6-bis(difluoromethoxy)-2-pyrimidinyl)amino)carbonyl)amino)sulphonyl)benzoic acid	primisulfuron methyl		86209-51-0
N-(3,5-dichlorophenyl)-1,2-dimethylcyclopropane-1,2-dicarboximide	procymidone, or sumisclex		

Table 10.2 Synonyms for pesticides (continued)

IUPAC Nomenclature	Common Names	Abbreviation	CAS Registry Number
N-(3,4-dichlorophenyl) propionamide	propanil		709-98-8
2,4-bis(isopropylamino)-6-chloro-s-triazine	propazine		139-40-2
6-chloro-3-phenylpyridazin-4-yl-S-octyl thiocarbonate	pyridate		55512-33-9
6-chloro-N,N'-dimethyl-1,3,5-triazine-2,4-diamine	simazine		122-34-9
2,4,5-trichlorophenoxyethanoic acid	trichlorophenoxyacetic acid	2,4,5-T	93-76-5
2-tert-butylamino-4-chloro-6-ethylamino-1,3,5-triazine	terbuthylazine		5915-41-3
2-(thiazol-4-yl)benzimidazole	thiabendazole		148-79-8
3,5,6-trichloro-2-pyridyloxyethanoic acid	trichlopyr, or 3,5,6-trichloro-2-pyridyloxyacetic acid		55335-06-3
2,6-dinitro-N,N-dipropyl-4-(trifluoromethyl) benzenamine	trifluralin		1582-09-8
sodium fluoroethanoate	sodium fluoroacetate, or sodium monofluoroacetate	1080	62-74-8