

# Waste Classification Guidelines

## Part 1: Classifying Waste

Department of **Environment & Climate Change** NSW



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*Note: The Environment Protection Authority (EPA) is a statutory body with specific powers under environment protection legislation, including the regulation of waste. The EPA is part of the Department of Environment and Climate Change, which carries out these waste regulation activities on its behalf.*

## Introduction

Classifying wastes into groups that pose similar risks to the environment and human health facilitates their management and appropriate disposal.

Six waste classes are used:

- Special waste
- Liquid waste
- Hazardous waste
- Restricted solid waste
- General solid waste (putrescible)
- General solid waste (non-putrescible)

## Who should use this guide?

This guide should be used by waste generators to classify the wastes they produce.

Waste classification helps those involved in the management and treatment of waste for disposal to ensure the environmental and human health risks associated with it are managed appropriately and in accordance with the *Protection of the Environment Operations Act 1997* (the POEO Act) and its associated regulations.

Generators of waste may need to further classify their waste to meet waste tracking or dangerous goods storage and transport requirements.

Under the POEO Act, it is an offence to supply false or misleading information to another person, including information about the type, classification, characteristics, composition or quantity of the waste, among other things. Significant penalties apply (s.144AA).

## How to use this guide

This guide explains the six basic steps for classifying your waste. These steps are briefly outlined below. A full explanation of each is provided later in this document.

**Step 1:** Establish if the waste should be classified as special waste. If the waste is special waste due to its contamination with asbestos (i.e. classified as asbestos waste), continue to classify the waste in accordance with the steps below.

**Step 2:** If not special waste (other than asbestos waste), establish whether the waste should be classified as liquid waste.

**Step 3:** If not special waste (other than asbestos waste) or liquid waste, establish whether the waste is of a type that has been 'pre-classified'. To simplify the classification process, the Environment Protection Authority (EPA) has pre-classified a number of commonly generated wastes as either hazardous, restricted solid or general solid waste (putrescible) or general solid waste (non-putrescible).

**Step 4:** If the waste is not special waste (other than asbestos waste), liquid waste or pre-classified, establish if it has certain hazardous characteristics and can therefore be classified as hazardous waste.

**Step 5:** If the waste does not possess hazardous characteristics, it needs to be chemically assessed to determine whether it is hazardous, restricted solid or general solid waste (putrescible and non-putrescible). If the waste is not chemically assessed, you must manage the waste as if it were hazardous waste.

**Step 6:** If the waste is chemically assessed as general solid waste, a further assessment is available to determine whether the waste is putrescible or non-putrescible. The assessment determines whether the waste is capable of significant biological transformation. If you do not wish to undertake this assessment, you must manage the waste as if it were general solid waste (putrescible).

In using this guide to classify waste, it should be noted that:

- the steps for waste classification must be applied in the order presented
- once a waste's class has been established under a particular step, do not go to the next step (unless the waste is asbestos waste).

**Note:** Air pollution from gaseous emissions is regulated under Part 5.4 of the POEO Act. The occupier of any premises dealing with waste must also comply with these laws.

## Other DECC guidance on managing waste

This guide assists waste generators in classifying waste to ensure it is appropriately managed, transported and disposed of. It forms part of the *Waste Classification Guidelines* issued by the Department of Environment and Climate Change (DECC). Other guidance materials that may also assist in managing waste are available from DECC's website at [www.environment.nsw.gov.au/waste/envguidlms/index.htm](http://www.environment.nsw.gov.au/waste/envguidlms/index.htm)

## General classification principles

The following principles must be applied at all times when using the step-by-step waste classification process.

- Where practicable, it is desirable to separate a mixture of wastes before classifying them separately. For example, if waste tyres (special waste) are mixed with lead-acid batteries (hazardous waste), it would be desirable to separate the wastes so that only the hazardous component needs to be managed as hazardous waste.
- If it is not possible to separate wastes, the whole waste must be classified according to the highest class of waste. For example, if clinical and related waste (special waste) is thoroughly mixed with municipal waste (general solid waste (putrescible)), the whole waste stream must be managed as special waste.
- If asbestos is mixed with other waste to form asbestos waste, the waste must continue to be assessed in accordance with these guidelines to enable the disposal of the asbestos waste at an appropriate waste facility. Asbestos waste must then be managed to meet the management and disposal requirements of both asbestos *and* the other class of waste with which it is mixed (if any).
- If liquid waste is mixed with hazardous or solid waste and retains the characteristics of liquid waste specified in Step 2, the waste remains liquid waste.

- Two or more classes of waste must not be mixed in order to reduce the concentration of chemical contaminants. Dilution of contaminants is not an acceptable waste management option.

## What to do once a waste has been classified

Once a waste has been properly classified, appropriate management options for it can be considered, as required under the POEO Act and its associated regulations. DECC's website has further guidance on managing specific wastes: [www.environment.nsw.gov.au/waste/wastetypes.htm](http://www.environment.nsw.gov.au/waste/wastetypes.htm)

A waste generator may also seek an immobilisation approval from DECC for a waste stream or particular waste type. A waste may be able to be immobilised so that it can be safely disposed of in an appropriate landfill. Further guidance on immobilisation approvals is available from DECC's website at [www.environment.nsw.gov.au/waste/immobilisation.htm](http://www.environment.nsw.gov.au/waste/immobilisation.htm)

## Step 1: Is the waste 'special waste'?

'Special waste' is a class of waste that has unique regulatory requirements. The potential environmental impacts of special waste need to be managed to minimise the risk of harm to the environment and human health.

Special waste means any of the following:

- clinical and related waste
- asbestos waste
- waste tyres.

Generators of special waste (except asbestos mixed with other waste – see below) do not need to make any further assessment of their waste if it falls within the definitions of special wastes below.

**Note:** Where asbestos is mixed with other waste to form asbestos waste, the generator must continue to assess the waste in accordance with the remainder of the steps in this guide. Asbestos waste can only be disposed of at a waste facility that can lawfully receive asbestos *and* the other class of waste with which it is mixed (if any).

The EPA may classify additional wastes as special waste from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted special wastes are listed on DECC's website at [www.environment.nsw.gov.au/waste/wastetypes.htm](http://www.environment.nsw.gov.au/waste/wastetypes.htm)

## Clinical and related waste

Clinical and related waste means:

- clinical waste, or
- cytotoxic waste, or
- pharmaceutical, drug or medicine waste, or
- sharps waste.

**Clinical waste** means any waste resulting from medical, nursing, dental, pharmaceutical, skin penetration or other related clinical activity, being waste that has the potential to cause injury, infection or offence, and includes waste containing any of the following:

- human tissue (other than hair, teeth and nails)
- bulk body fluids or blood
- visibly blood-stained body fluids, materials or equipment
- laboratory specimens or cultures
- animal tissue, carcasses or other waste from animals used for medical research

but does not include any such waste that has been treated by a method approved in writing by the Director-General of the Department of Health.

**Cytotoxic waste** means any substance contaminated with any residues or preparations that contain materials that are toxic to cells principally through their action on cell reproduction.

**Pharmaceutical, drug or medicine waste** means waste that has been generated by activities carried out for business or other commercial purposes and that consists of pharmaceutical or other chemical substances specified in the Poisons List made under section 8 of the *Poisons and Therapeutic Goods Act 1966*.



It does not include pharmaceutical, drug or medicine waste generated in the home.

**Sharps waste** means any waste collected from designated sharps waste containers used in the course of business, commercial or community service activities, being waste resulting from the use of sharps for any of the following purposes:

- human health care by health professionals and other health care providers
- medical research or work on cadavers
- veterinary care or veterinary research
- skin penetration or the injection of drugs or other substances for medical or non-medical reasons

but does not include waste that has been treated on the site where it was generated, and to a standard specified in an EPA gazettal notice.

**Sharps** means those things:

- that have sharp points or edges capable of cutting, piercing or penetrating the skin (such as needles, syringes with needles or surgical instruments), and
- that are designed for the purpose of cutting, piercing or penetrating the skin, and
- that have the potential to cause injury or infection.

## Asbestos waste

**Asbestos** means the fibrous form of those mineral silicates that belong to the serpentine or amphibole groups of rock-forming minerals, including actinolite, amosite (brown asbestos), anthophyllite, chrysotile (white asbestos), crocidolite (blue asbestos) and tremolite.

**Asbestos waste** means any waste that contains asbestos.

## Waste tyres

**Waste tyres** means used, rejected or unwanted tyres, including shredded tyres or tyre pieces.

**Note:** Waste tyres must be tracked when transported interstate but not when transported within NSW.

## Step 2: Is the waste 'liquid waste'?

If you have established that the waste is not special waste, decide whether it is 'liquid waste'.

*Liquid waste* means any waste that:

- has an angle of repose of less than 5 degrees above horizontal, or
- becomes free-flowing at or below 60 degrees Celsius or when it is transported, or
- is generally not capable of being picked up by a spade or shovel.

If the waste meets the criteria outlined above, there is no need for any further assessment.

If the waste does not satisfy any of these criteria, move to Step 3 to classify the waste.

The waste generator may choose to separate the waste into the liquid and solid fractions so that only the solid fraction needs to be further classified in accordance with the following steps.

The EPA may classify additional wastes as liquid waste from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted liquid wastes are listed on DECC's website at [www.environment.nsw.gov.au/waste/wastetypes.htm](http://www.environment.nsw.gov.au/waste/wastetypes.htm)

### Step 3: Is the waste 'pre-classified'?

If the waste is neither special nor liquid waste, establish whether the waste has already been classified by the EPA. Some commonly generated wastes have been pre-classified as hazardous waste, general solid waste (putrescible) or general solid waste (non-putrescible). Wastes that have been classified by the EPA cannot be reclassified by any other party.

The following wastes have already been classified by the EPA.

#### Hazardous waste

The following wastes have been pre-classified by the EPA as 'hazardous waste':

- containers, having previously contained a substance of Class 1, 3, 4, 5 or 8 within the meaning of the *Transport of Dangerous Goods Code*, or a substance to which Division 6.1 of the *Transport of Dangerous Goods Code* applies, from which residues have not been removed by washing or vacuuming
- coal tar or coal tar pitch waste (being the tarry residue from the heating, processing or burning of coal or coke) comprising of more than 1% (by weight) of coal tar or coal tar pitch waste
- lead-acid or nickel-cadmium batteries (being waste generated or separately collected by activities carried out for business, commercial or community services purposes)
- lead paint waste arising otherwise than from residential premises or educational or child care institutions
- any mixture of the wastes referred to above.

The EPA may pre-classify additional wastes as hazardous waste from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted hazardous wastes are listed on DECC's website at [www.environment.nsw.gov.au/waste/wastetypes.htm](http://www.environment.nsw.gov.au/waste/wastetypes.htm)

#### Restricted solid waste

Currently, no wastes have been pre-classified by the EPA as 'restricted solid waste'.

Restricted solid waste therefore only includes wastes assessed and classified as such in accordance with the procedures in Step 5 of this guide.

However the EPA may classify waste as restricted solid waste from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted restricted wastes will be listed on DECC's website at [www.environment.nsw.gov.au/waste/wastetypes.htm](http://www.environment.nsw.gov.au/waste/wastetypes.htm)

#### General solid waste (putrescible)

The following wastes have been pre-classified by the EPA as 'general solid waste (putrescible)':

- household waste that contains putrescible organics
- waste from litter bins collected by or on behalf of local councils
- manure and night soil
- disposable nappies, incontinence pads or sanitary napkins
- food waste

- animal waste
- grit or screenings from sewage treatment systems that have been dewatered so that the grit or screenings do not contain free liquids
- any mixture of the wastes referred to above.

In assessing whether waste has been pre-classified as general solid waste (putrescible), the following definitions apply:

**Animal waste** includes dead animals and animal parts and any mixture of dead animals and animal parts.

**Food waste** means waste from the manufacture, preparation, sale or consumption of food but does not include grease-trap waste.

**Manure** includes any mixture of manure and biodegradable animal bedding, such as straw.

Wastes may be classified as general solid waste (putrescible) by the EPA from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted general solid wastes (putrescible) are listed on DECC's website at [www.environment.nsw.gov.au/waste/wastetypes.htm](http://www.environment.nsw.gov.au/waste/wastetypes.htm)

## General solid waste (non-putrescible)

The following wastes have been pre-classified as 'general solid waste (non-putrescible)':

- glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal
- paper or cardboard
- household waste from municipal clean-up that does not contain food waste
- waste collected by, or on behalf of, local councils from street sweeping
- grit, sediment, litter and gross pollutants collected in, and removed from, stormwater treatment devices and/or stormwater management systems that has been dewatered so that it does not contain free liquids
- grit and screenings from potable water and water reticulation plants that has been dewatered so that it does not contain free liquids
- garden waste
- wood waste
- waste contaminated with lead (including lead paint waste) from residential premises or educational or child care institutions
- containers, previously containing dangerous goods, from which residues have been removed by washing or vacuuming
- drained oil filters (mechanically crushed), rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and do not contain free liquids
- drained motor oil containers that do not contain free liquids
- non-putrescible vegetative waste from agriculture, silviculture or horticulture
- building cavity dust waste removed from residential premises or educational or child care institutions, being waste that is packaged securely to prevent dust emissions and direct contact

- synthetic fibre waste (from materials such as fibreglass, polyesters and other plastics) being waste that is packaged securely to prevent dust emissions, but excluding asbestos waste
- virgin excavated natural material
- building and demolition waste
- asphalt waste (including asphalt resulting from road construction and waterproofing works)
- biosolids categorised as unrestricted use, or restricted use 1, 2 or 3, in accordance with the criteria set out in the *Biosolids Guidelines* (EPA 2000)
- cured concrete waste from a batch plant
- fully cured and set thermosetting polymers and fibre-reinforcing resins,
- fully cured and dried residues of resins, glues, paints, coatings and inks
- any mixture of the wastes referred to above.

In assessing whether waste has been pre-classified as general solid waste (non-putrescible), the following definitions apply:

**Building and demolition waste** means unsegregated material (other than material containing asbestos waste) that results from:

- the demolition, erection, construction, refurbishment or alteration of buildings other than:  
chemical works, or  
mineral processing works, or  
container reconditioning works, or  
waste treatment facilities, or
- the construction, replacement, repair or alteration of infrastructure development such as roads, tunnels, sewage, water, electricity, telecommunications and airports,

and includes materials such as:

bricks, concrete, soil, paper, plastics, glass and metal, and timber, including unsegregated timber, that may contain timber treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP).

**Garden waste** means waste that consists of branches, grass, leaves, plants, loppings, tree trunks, tree stumps and similar materials, and includes any mixture of those materials.

**Virgin excavated natural material** means natural material (such as clay, gravel, sand, soil or rock fines):

- that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities, and
- that does not contain sulfidic ores or soils, or any other waste,

and includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the *NSW Government Gazette*.

**Wood waste** means sawdust, timber offcuts, wooden crates, wooden packaging, wooden pallets, wood shavings and similar materials, and includes any mixture of those materials, but

does not include wood treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP).

Additional wastes may be classified as general solid waste (non-putrescible) by the EPA from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted general solid wastes (non-putrescible) are listed on DECC's website at [www.environment.nsw.gov.au/waste/wastetypes.htm](http://www.environment.nsw.gov.au/waste/wastetypes.htm)

## Step 4: Does the waste possess hazardous characteristics?

Waste must be classified as 'hazardous waste' if it is a dangerous good under any of the following classes or divisions of the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission 2008):

- Class 1: Explosives
- Class 2: Gases (compressed, liquefied or dissolved under pressure)
- Division 4.1: Flammable solids (excluding garden waste, natural organic fibrous material and wood waste, and all physical forms of carbon such as activated carbon and graphite)
- Division 4.2: Substances liable to spontaneous combustion (excluding garden waste, natural organic fibrous material and wood waste, and all physical forms of carbon such as activated carbon and graphite)
- Division 4.3: Substances which in contact with water emit flammable gases
- Class 5: Oxidising agents and organic peroxides
- Division 6.1: Toxic substances
- Class 8: Corrosive substances.

For further information on the test methods to establish whether the waste exhibits any of the above characteristics, please refer to the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission 2008).

## Step 5: Determining a waste's classification using chemical assessment

Waste generators should chemically assess their waste to determine its classification where:

- the waste is not special waste, liquid waste, a waste pre-classified by the EPA or a waste possessing hazardous characteristics, and
- the composition of the waste is not known.

Chemical assessment may not be necessary where the waste generator knows the processes which produced the waste and the maximum possible levels of contaminants it contains. The generator must be certain that the waste can be classified without SCC and/or TCLP testing (see below). In these cases, the generator must ensure that the reasons for not undertaking the chemical assessment are documented and records of the decision retained for three years.

Where waste generators are unsure of the appropriate sampling or analytical methods for a particular waste, they are strongly encouraged to seek expert help, either from a laboratory that specialises in waste analysis or someone specialising in waste management issues, or both.

The chemical assessment process is based around the waste's potential to release chemical contaminants into the environment through contact with liquids, mainly water, which leads to the production of leachates.

Information on sampling and analytical methods is provided at Appendix I.

Where a waste generator does not wish to undertake this chemical assessment, the waste must be managed as if it were hazardous waste, which cannot be disposed of and must be treated.

### Measurable properties of waste

The two measurable properties of chemical contaminants used to classify waste are:

- the specific contaminant concentration (SCC) of any chemical contaminant in the waste, expressed as milligrams per kilogram (mg/kg)
- the leachable concentration of any chemical contaminant using the toxicity characteristics leaching procedure (TCLP), expressed as milligrams per litre (mg/L).

### Test methods for determining SCC and TCLP

The reference test methods for determining both the SCC and TCLP values are as described in the United States Environmental Protection Agency's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (USEPA 1986) and Updates I, II, IIIA, IIIB, IVA and IVB, available at [www.epa.gov/epaoswer/hazwaste/test/sw846.htm](http://www.epa.gov/epaoswer/hazwaste/test/sw846.htm)

The following procedures for leachate preparation are recommended:

- *AS 4439.1–1999: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Preliminary Assessment* (Australian Standard 1999b)
- *AS 4439.3–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Bottle Leaching Procedure* (Australian Standard 1997a)
- *AS 4439.2–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Zero Headspace Procedure* (Australian Standard 1997b).

The standard pH for the leaching solutions used must be either  $4.93 \pm 0.05$  if the pH of the waste sample is less than 5.0, or  $2.88 \pm 0.05$  if the pH of the waste sample is greater than 5.0.



To determine the pH of the waste sample, use the test method specified in Clause 7.5 (Selection of Leaching Fluid) of AS 4439.3–1997 (above).

In some instances the EPA may permit the use of leachates with a pH different from those specified above. EPA authorisation to use an alternative must be sought in writing and will only be provided with adequate justification for the proposed variation. An example might be the testing of a non-putrescible waste for disposal into a monofill or monocell which it can be shown will not be penetrated by acidic leachate or groundwater. For further assistance, contact DECC’s Waste Management Section.

## Classifying a waste using the SCC test

The first test that should be used to chemically assess waste is the specific contaminant concentration (SCC) test.

The SCC test acts as an initial screening test for the classification of a waste. Based on SCC alone, the test value for each contaminant must be less than or equal to the contaminant threshold (CT) value specified for that contaminant in Table 1 for it to fall into the following classes:

- General solid waste  $\leq$  CT1
- Restricted solid waste  $\leq$  CT2

If a waste’s SCC test value exceeds the contaminant threshold value set for general solid waste (CT1), further assessment using the TCLP test may be used.

Where the contaminant threshold value set for restricted solid waste (CT2) is exceeded, a TCLP test is necessary to determine the leachable concentration and class of waste.

**Note:** For waste assessment and classification, it is recommended that the sample mean, the sample standard deviation and the 95% upper confidence limit (UCL) of the mean concentration is calculated for each contaminant to ensure that the 95% UCL for the mean concentration is less than or equal to the CT limit value specified for that contaminant.

## Classifying a waste using both the SCC test and TCLP

To establish the waste’s classification using both SCC and TCLP, the test values for each chemical contaminant must be compared with the threshold values set in Table 2.

Classification	SCC value	TCLP value
General solid waste	$\leq$ SCC1	$\leq$ TCLP1
Restricted solid waste	$\leq$ SCC2	$\leq$ TCLP2
Hazardous waste	$>$ SCC2	$>$ TCLP2

If any of the SCC or TCLP threshold values specified in Table 2 is exceeded for general solid waste, the waste must be classified as restricted solid waste. If any of the SCC or TCLP threshold values specified in Table 2 is exceeded for restricted solid waste, the waste must be classified as hazardous waste. Detailed interpretative guidance regarding the use of both SCC and TCLP values to establish a waste’s classification is provided in Table 3.

It is important to note that wherever an EPA approval has been given for the immobilisation of the contaminant(s), the waste can be classified according to its TCLP test results alone.

**Note:** For waste assessment and classification, it is recommended that the sample mean, the sample standard deviation and the 95% UCL of the mean concentration is calculated for each contaminant to ensure that the 95% UCL for the mean concentration is less than or equal to the SCC or TCLP limit value specified for that contaminant.

**Table 1: Contaminant threshold values (CT1 & CT2) for classifying waste by chemical assessment without the leaching (TCLP) test**

*For disposal requirements for organic and inorganic chemical contaminants not listed below, contact DECC. Aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have not been listed with values in this table and need not be tested for.*

Contaminant	Maximum values of <i>specific contaminant concentration</i> (SCC) for classification without TCLP		CAS Registry Number
	General solid waste <sup>1</sup>	Restricted solid waste	
	CT1 (mg/kg)	CT2 (mg/kg)	
Arsenic	100	400	
Benzene	10	40	71-43-2
Benzo(a)pyrene <sup>2</sup>	0.8	3.2	50-32-8
Beryllium	20	80	
Cadmium	20	80	
Carbon tetrachloride	10	40	56-23-5
Chlorobenzene	2000	8000	108-90-7
Chloroform	120	480	67-66-3
Chlorpyrifos	4	16	2921-88-2
Chromium (VI) <sup>3</sup>	100	400	
m-Cresol	4000	16000	108-39-4
o-Cresol	4000	16000	95-48-7
p-Cresol	4000	16000	106-44-5
Cresol (total)	4000	16000	1319-77-3
Cyanide (amenable) <sup>4</sup>	70	280	
Cyanide (total)	320	1280	
2,4-D	200	800	94-75-7
1,2-Dichlorobenzene	86	344	95-50-1
1,4-Dichlorobenzene	150	600	106-46-7
1,2-Dichloroethane	10	40	107-06-2
1,1-Dichloroethylene	14	56	75-35-4
Dichloromethane	172	688	75-09-2
2,4-Dinitrotoluene	2.6	10.4	121-14-2
Endosulfan <sup>5</sup>	60	240	See below <sup>5</sup>
Ethylbenzene	600	2400	100-41-4
Fluoride	3000	12000	
Fluroxypyr	40	160	69377-81-7

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Contaminant	Maximum values of <i>specific contaminant concentration</i> (SCC) for classification without TCLP		CAS Registry Number
	General solid waste <sup>1</sup>	Restricted solid waste	
	CT1 (mg/kg)	CT2 (mg/kg)	
Lead	100	400	
Mercury	4	16	
Methyl ethyl ketone	4000	16000	78-93-3
Moderately harmful pesticides <sup>6</sup> (total)	N/A <sup>7</sup>	N/A <sup>7</sup>	See below <sup>6</sup>
Molybdenum	100	400	
Nickel	40	160	
Nitrobenzene	40	160	98-95-3
C6-C9 petroleum hydrocarbons	N/A <sup>7</sup>	N/A <sup>7</sup>	
C10-C36 petroleum hydrocarbons	N/A <sup>7</sup>	N/A <sup>7</sup>	
Phenol (non-halogenated)	288	1152	108-95-2
Picloram	60	240	1918-02-1
Plasticiser compounds <sup>8</sup>	20	80	See below <sup>8</sup>
Polychlorinated biphenyls	N/A <sup>7</sup>	N/A <sup>7</sup>	1336-36-3
Polycyclic aromatic hydrocarbons (total)	N/A <sup>7</sup>	N/A <sup>7</sup>	
Scheduled chemicals	N/A <sup>7</sup>	N/A <sup>7</sup>	
Selenium	20	80	
Silver	100	400	
Styrene (vinyl benzene)	60	240	100-42-5
Tebuconazole	128	512	107534-96-3
1,2,3,4-Tetrachlorobenzene	10	40	634-66-2
1,1,1,2-Tetrachloroethane	200	800	630-20-6
1,1,2,2-Tetrachloroethane	26	104	79-34-5
Tetrachloroethylene	14	56	127-18-4
Toluene	288	1152	108-88-3
1,1,1-Trichloroethane	600	2400	71-55-6
1,1,2-Trichloroethane	24	96	79-00-5
Trichloroethylene	10	40	79-01-6
2,4,5-Trichlorophenol	8000	32000	95-95-4
2,4,6-Trichlorophenol	40	160	88-06-2

	<b>Maximum values of <i>specific contaminant concentration</i> (SCC) for classification without TCLP</b>		
<b>Contaminant</b>	<b>General solid waste<sup>1</sup></b>	<b>Restricted solid waste</b>	<b>CAS Registry Number</b>
	<b>CT1 (mg/kg)</b>	<b>CT2 (mg/kg)</b>	
Triclopyr	40	160	55335-06-3
Vinyl chloride	4	16	75-01-4
Xylenes (total)	1000	4000	1330-20-7

**Notes**

1. Values are the same for both general solid waste (putrescible) and general solid waste (non-putrescible).
2. There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.
3. These limits apply to chromium in the +6 oxidation state only.
4. Analysis for cyanide (amenable) is the established method for assessing potentially leachable cyanide. DECC may consider other methods if it can be demonstrated that these methods yield the same information.
5. Endosulfan (CAS Registry Number 115-29-7) means the total of Endosulfan I (CAS Registry Number 959-98-8), Endosulfan II (CAS Registry Number 891-86-1) and Endosulfan sulfate (CAS Registry Number 1031-07-8).
6. The following moderately harmful pesticides (CAS Registry Number) are to be included in the total values specified:  
  

Atrazine (1912-24-9), Azoxystrobin (131860-33-8), Bifenthrin (82657-04-3), Brodifacoum (56073-10-0), Carboxin (5234-68-4), Copper naphthenate (1338-02-9), Cyfluthrin (68359-37-5), Cyhalothrin (68085-85-8), Cypermethrin (52315-07-08), Deltamethrin (52918-63-5), Dichlofluanid (1085-98-9), Dichlorvos (62-73-7), Difenoconazole (119446-68-3), Dimethoate (60-51-5), Diquat dibromide (85-00-7), Emamectin benzoate (137515-75-4 & 155569-91-8), Ethion (563-12-2), Fenthion (55-38-9), Fenitrothion (122-14-5), Fipronil (120068-37-3), Fluazifop-P-butyl (79241-46-6), Fludioxonil (131341-86-1), Glyphosate (1071-83-6), Imidacloprid (138261-41-3), Indoxacarb (173584-44-6), Malathion (Maldison) (121-75-5), Metalaxyl (57837-19-1), Metalaxyl-M (70630-17-0), Methidathion (950-37-8), 3-Methyl-4-chlorophenol (59-50-7), Methyl chlorpyrifos (5598-13-0), N-Methyl pyrrolidone (872-50-4), 2-octylthiazol-3-one (26530-20-1), Oxyfluorfen (42874-03-3), Paraquat dichloride (1910-42-5), Parathion methyl (298-00-0), Permethrin (52645-53-1), Profenofos (41198-08-7), Prometryn (7287-19-6), Propargite (2312-35-8), Pentachloronitrobenzene (Quintozene) (82-68-8), Simazine (122-34-9), Thiabendazole (148-79-8), Thiamethoxam (153719-23-4), Thiodicarb (59669-26-0) and Thiram (137-26-8).
7. N/A means not applicable, because these contaminants are only assessed using SCC - see Table 2 for SCC criteria.
8. Plasticiser compounds means the total of di-2-ethyl hexyl phthalate (CAS Registry Number 117-81-7) and di-2-ethyl hexyl adipate (CAS Registry Number 103-23-1) contained within a waste.

**Table 2: Leachable concentration (TCLP) and specific contaminant concentration (SCC) values for classifying waste by chemical assessment**

For disposal requirements for organic and inorganic chemical contaminants not listed below, contact DECC. Aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have not been listed with values in this table and need not be tested for.

Contaminant	Maximum values for <i>leachable concentration</i> and <i>specific contaminant concentration</i> when used together				CAS Registry Number
	General solid waste <sup>1</sup>		Restricted solid waste		
	Leachable concentration TCLP1 (mg/L)	Specific contaminant concentration SCC1 (mg/kg)	Leachable concentration TCLP2 (mg/L)	Specific contaminant concentration SCC2 (mg/kg)	
Arsenic	5.0 <sup>2</sup>	500	20	2000	
Benzene	0.5 <sup>2</sup>	18	2	72	71-43-2
Benzo(a)pyrene <sup>3</sup>	0.04 <sup>4</sup>	10	0.16	23	50-32-8
Beryllium	1.0 <sup>5</sup>	100	4	400	
Cadmium	1.0 <sup>2</sup>	100	4	400	
Carbon tetrachloride	0.5 <sup>2</sup>	18	2	72	56-23-5
Chlorobenzene	100 <sup>2</sup>	3600	400	14400	108-90-7
Chloroform	6 <sup>2</sup>	216	24	864	67-66-3
Chlorpyrifos	0.2	7.5	0.8	30	2921-88-2
Chromium (VI) <sup>6</sup>	5 <sup>2</sup>	1900	20	7600	
m-Cresol	200 <sup>2</sup>	7200	800	28800	108-39-4
o-Cresol	200 <sup>2</sup>	7200	800	28800	95-48-7
p-Cresol	200 <sup>2</sup>	7200	800	28800	106-44-5
Cresol (total)	200 <sup>2</sup>	7200	800	28800	1319-77-3
Cyanide (amenable) <sup>7, 8</sup>	3.5 <sup>7</sup>	300	14	1200	
Cyanide (total) <sup>7</sup>	16 <sup>7</sup>	5900	64	23600	
2,4-D	10 <sup>2</sup>	360	40	1440	94-75-7
1,2-Dichlorobenzene	4.3 <sup>2</sup>	155	17.2	620	95-50-1
1,4-Dichlorobenzene	7.5 <sup>2</sup>	270	30	1080	106-46-7
1,2-Dichloroethane	0.5 <sup>2</sup>	18	2	72	107-06-2
1,1-Dichloroethylene	0.7 <sup>2</sup>	25	2.8	100	75-35-4
Dichloromethane	8.6 <sup>2</sup>	310	34.4	1240	75-09-2

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Contaminant	Maximum values for <i>leachable concentration</i> and <i>specific contaminant concentration</i> when used together				CAS Registry Number
	General solid waste <sup>1</sup>		Restricted solid waste		
	Leachable concentration	Specific contaminant concentration	Leachable concentration	Specific contaminant concentration	
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	
2,4-Dinitrotoluene	0.13 <sup>2</sup>	4.68	0.52	18.7	121-14-2
Endosulfan <sup>9</sup>	3	108	12	432	See below <sup>9</sup>
Ethylbenzene	30 <sup>10</sup>	1080	120	4320	100-41-4
Fluoride	150 <sup>10</sup>	10000	600	40000	
Fluroxypyr	2	75	8	300	69377-81-7
Lead	5 <sup>2</sup>	1500	20	6000	
Mercury	0.2 <sup>2</sup>	50	0.8	200	
Methyl ethyl ketone	200 <sup>2</sup>	7200	800	28800	78-93-3
Moderately harmful pesticides <sup>11</sup> (total)	N/A <sup>12</sup>	250	N/A <sup>12</sup>	1000	See below <sup>11</sup>
Molybdenum	5 <sup>10</sup>	1000	20	4000	
Nickel	2 <sup>10</sup>	1050	8	4200	
Nitrobenzene	2 <sup>2</sup>	72	8	288	98-95-3
C6-C9 petroleum hydrocarbons <sup>13</sup>	N/A <sup>12</sup>	650	N/A <sup>12</sup>	2600	
C10-C36 petroleum hydrocarbons <sup>13</sup>	N/A <sup>12</sup>	10000	N/A <sup>12</sup>	40000	
Phenol (non-halogenated)	14.4 <sup>14</sup>	518	57.6	2073	108-95-2
Picloram	3	110	12	440	1918-02-1
Plasticiser compounds <sup>15</sup>	1	600	4	2400	See below <sup>15</sup>
Polychlorinated biphenyls <sup>12</sup>	N/A <sup>12</sup>	< 50	N/A <sup>12</sup>	< 50	1336-36-3
Polycyclic aromatic hydrocarbons (total) <sup>16</sup>	N/A <sup>12</sup>	200	N/A <sup>12</sup>	800	
Scheduled chemicals <sup>17</sup>	N/A <sup>12</sup>	< 50	N/A <sup>12</sup>	< 50	See below <sup>17</sup>
Selenium	1 <sup>2</sup>	50	4	200	

Waste Classification Guidelines

Contaminant	Maximum values for <i>leachable concentration</i> and <i>specific contaminant concentration</i> when used together				CAS Registry Number
	General solid waste <sup>1</sup>		Restricted solid waste		
	Leachable concentration	Specific contaminant concentration	Leachable concentration	Specific contaminant concentration	
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	
Silver	5.0 <sup>2</sup>	180	20	720	
Styrene (vinyl benzene)	3 <sup>10</sup>	108	12	432	100-42-5
Tebuconazole	6.4	230	25.6	920	107534-96-3
1,2,3,4-Tetrachlorobenzene	0.5	18	2	72	634-66-2
1,1,1,2-Tetrachloroethane	10 <sup>2</sup>	360	40	1440	630-20-6
1,1,2,2-Tetrachloroethane	1.3 <sup>2</sup>	46.8	5.2	187.2	79-34-5
Tetrachloroethylene	0.7 <sup>2</sup>	25.2	2.8	100.8	127-18-4
Toluene	14.4 <sup>14</sup>	518	57.6	2073	108-88-3
1,1,1-Trichloroethane	30 <sup>2</sup>	1080	120	4320	71-55-6
1,1,2-Trichloroethane	1.2 <sup>2</sup>	43.2	4.8	172.8	79-00-5
Trichloroethylene	0.5 <sup>2</sup>	18	2	72	79-01-6
2,4,5-Trichlorophenol	400 <sup>2</sup>	14400	1600	57600	95-95-4
2,4,6-Trichlorophenol	2 <sup>2</sup>	72	8	288	88-06-2
Triclopyr	2	75	8	300	55335-06-3
Vinyl chloride	0.2 <sup>2</sup>	7.2	0.8	28.8	75-01-4
Xylenes (total)	50 <sup>18</sup>	1800	200	7200	1330-20-7

**Notes**

1. Values are the same for general solid waste (putrescible) and general solid waste (non-putrescible).
2. See *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule* (USEPA 1990) for TCLP levels.
3. There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.

4. Calculated from *Hazardous Waste: Identification and Listing – Proposed Rule* (USEPA 1995)
5. Calculated from 'Beryllium' in *The Health Risk Assessment and Management of Contaminated Sites* (DiMarco & Buckett 1996)
6. These limits apply to chromium in the +6 oxidation state only.
7. Taken from the *Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil: Proposed Rule* (USEPA 1993)
8. Analysis for cyanide (amenable) is the established method used to assess the potentially leachable cyanide. DECC may consider other methods if it can be demonstrated that these methods yield the same information.
9. Endosulfan (CAS Registry Number 115-29-7) means the total of Endosulfan I (CAS Registry Number 959-98-8), Endosulfan II (CAS Registry Number 891-86-1) and Endosulfan sulfate (CAS Registry Number 1031-07-8).
10. Calculated from *Australian Drinking Water Guidelines* (NHMRC 1994)
11. The following moderately harmful pesticides (CAS Registry Number) are to be included in the total values specified:  

Atrazine (1912-24-9), Azoxystrobin (131860-33-8), Bifenthrin (82657-04-3), Brodifacoum (56073-10-0), Carboxin (5234-68-4), Copper naphthenate (1338-02-9), Cyfluthrin (68359-37-5), Cyhalothrin (68085-85-8), Cypermethrin (52315-07-08), Deltamethrin (52918-63-5), Dichlofluanid (1085-98-9), Dichlorvos (62-73-7), Difenconazole (119446-68-3), Dimethoate (60-51-5), Diquat dibromide (85-00-7), Emamectin benzoate (137515-75-4 & 155569-91-8), Ethion (563-12-2), Fenthion (55-38-9), Fenitrothion (122-14-5), Fipronil (120068-37-3), Fluazifop-P-butyl (79241-46-6), Fludioxonil (131341-86-1), Glyphosate (1071-83-6), Imidacloprid (138261-41-3), Indoxacarb (173584-44-6), Malathion (Maldison) (121-75-5), Metalaxyl (57837-19-1), Metalaxyl-M (70630-17-0), Methidathion (950-37-8), 3-Methyl-4-chlorophenol (59-50-7), Methyl chlorpyrifos (5598-13-0), N-Methyl pyrrolidone (872-50-4), 2-octylthiazol-3-one (26530-20-1), Oxyfluorfen (42874-03-3), Paraquat dichloride (1910-42-5), Parathion methyl (298-00-0), Permethrin (52645-53-1), Profenofos (41198-08-7), Prometryn (7287-19-6), Propargite (2312-35-8), Pentachloronitrobenzene (Quintozene) (82-68-8), Simazine (122-34-9), Thiabendazole (148-79-8), Thiamethoxam (153719-23-4), Thiodicarb (59669-26-0) and Thiram (137-26-8).
12. No TCLP analysis is required. Moderately harmful pesticides, petroleum hydrocarbons, polychlorinated biphenyls, polycyclic aromatic hydrocarbons and scheduled chemicals are assessed using SCC1 and SCC2.
13. Approximate range of petroleum hydrocarbon fractions: petrol C6-C9, kerosene C10-C18, diesel C12-C18, and lubricating oils above C18. Laboratory results are reported as four different fractions: C6-C9, C10-C14, C15-C28 and C29-C36. The results of total petroleum hydrocarbons (C10-C36) analyses are reported as a sum of the relevant three fractions. Please note that hydrocarbons are defined as molecules that only contain carbon and hydrogen atoms. Prior to TPH (C10-C36) analysis, cleanup may be necessary to remove non-petroleum hydrocarbon compounds. Where the presence of other materials that will interfere with the analysis may be present, such as oils and fats from food sources, you are advised to treat the extract that has been solvent exchanged to hexane with silica gel as described in *USEPA Method 1664A* (USEPA 1999).
14. Proposed level for phenol and toluene in *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule* (USEPA 1990)
15. Plasticiser compounds means the total of di-2-ethyl hexyl phthalate (CAS Registry Number 117-81-7) and di-2-ethyl hexyl adipate (CAS Registry Number 103-23-1) contained within a waste.



16. The following polycyclic aromatic hydrocarbons (CAS number) are assessed as the total concentration of 16 USEPA Priority Pollutant PAHs, as follows:

<b>Polycyclic aromatic hydrocarbons (total)</b>			
<b>PAH name</b>	<b>CAS Registry Number</b>	<b>PAH name</b>	<b>CAS Registry Number</b>
Acenaphthene	83-32-9	Chrysene	218-01-9
Acenaphthylene	208-96-8	Dibenzo(a,h)anthracene	53-70-3
Anthracene	120-12-7	Fluoranthene	206-44-0
Benzo(a)anthracene	56-55-3	Fluorene	86-73-7
Benzo(a)pyrene	50-32-8	Indeno(1,2,3-cd)pyrene	193-39-5
Benzo(b)fluoranthene	205-99-2	Naphthalene	91-20-3
Benzo(ghi)perylene	191-24-2	Phenanthrene	85-01-8
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0

17. The following Scheduled Chemicals (CAS Registry Number) are to be included in the total values specified:

Aldrin (309-00-2), Alpha-BHC (319-84-6), Beta-BHC (319-85-7), Gamma-BHC (Lindane) (58-89-9), Delta-BHC (319-86-8), Chlordane (57-74-9), DDD (72-54-8), DDE (72-55-9), DDT (50-29-3), Dieldrin (60-57-1), Endrin (72-20-8), Endrin aldehyde (7421-93-4), Heptachlor (76-44-8), Heptachlor epoxide (1024-57-3), Hexachlorobenzene (118-74-1), Hexachlorophene (70-30-4), Isodrin (465-73-6), Pentachlorobenzene (608-93-5), Pentachloronitrobenzene (82-68-8), Pentachlorophenol (87-86-5), 1,2,4,5-Tetrachlorobenzene (95-94-3), 2,3,4,6 Tetrachlorophenol (58-90-2), 1,2,4-Trichlorobenzene (120-82-1), 2,4,5-Trichlorophenoxyacetic acid, salts and esters (93-76-5).

18. Calculated from *Guidelines for Drinking Water Quality* (WHO 1993)

**Table 3: Summary of criteria for chemical assessment to determine waste classification**

Waste classification <sup>1</sup>	Criteria <sup>2</sup> for classification by chemical assessment (any of the alternative options given)	Comments
<b>General solid waste</b>	1. SCC test values $\leq$ CT1	TCLP test not required
	2. TCLP test values $\leq$ TCLP1 and SCC test values $\leq$ SCC1	
	3. TCLP test values $\leq$ TCLP1 and SCC test values $>$ SCC1 and DECC approves immobilisation <sup>3</sup>	Without DECC approval of immobilisation, classify as restricted solid or hazardous (as applicable)
<b>Restricted solid waste</b>	1. SCC test values $\leq$ CT2	TCLP test not required
	2. TCLP1 $<$ TCLP test values $\leq$ TCLP2 and SCC test values $\leq$ SCC2	
	3. TCLP test values $\leq$ TCLP2 and SCC1 $<$ SCC test values $\leq$ SCC2	
	4. TCLP1 $<$ TCLP test values $\leq$ TCLP2 and SCC test values $>$ SCC2 and DECC approves immobilisation <sup>3</sup>	Without DECC approval of immobilisation, classify as hazardous
<b>Hazardous waste</b>	1. TCLP test values $>$ TCLP 2	
	2. TCLP test values $\leq$ TCLP2 and SCC test values $>$ SCC2 and no DECC approval for immobilisation	

**Notes:**

1. See also the general waste classification principles on page 2 for other criteria that must be satisfied before the waste can be classified.
2. These criteria apply to each toxic and ecotoxic contaminant present in the waste (see Tables 1 and 2).
3. In certain cases DECC will consider specific conditions, such as segregation of the waste from all other types of waste in a monofill or monocell in order to achieve a greater margin of safety against a possible failure of the immobilisation in the future. Information about the construction and operation of a monofill/monocell is available in the *Draft Environmental Guidelines for Industrial Waste Landfilling* (EPA 1998).

## Step 6: Is the waste putrescible?

Where chemical assessment of a waste results in classification of the waste as general solid waste, further assessment may be undertaken to determine whether the waste can be classified as 'general solid waste (putrescible)' or 'general solid waste (non-putrescible)'.

General solid waste may only be classified as non-putrescible if:

- it does not readily decay under standard conditions, does not emit offensive odours and does not attract vermin or other vectors (such as flies, birds and rodents), or
- has a specific oxygen uptake of less than 1.5 milligrams O<sub>2</sub> per hour per gram of total organic solids at 20 degrees Celsius, or
- is such that, during composting (for the purpose of stabilisation), the mass of volatile solids in the organic waste has been reduced by at least 38%, or
- has been treated by composting for at least 14 days, during which time the temperature of the organic waste must have been greater than 40 degrees Celsius and the average temperature greater than 45 degrees Celsius, or
- in the case of biologically treated putrescible wastes, the temperature of the organics fraction does not exceed a self-heating temperature of 40 degrees Celsius, when tested in accordance with the test method in Appendix K of *AS 4454–2003: Composts, Soils, Conditioners and Mulches* (Australian Standard 2003a), or
- has been subjected to and has met the requirements of alternative tests approved by the EPA from time to time by notice published in the *NSW Government Gazette* and published on DECC's website.

Non-putrescible materials typically do not:

- readily decay under standard conditions
- emit offensive odours
- attract vermin or other vectors (such as flies, birds and rodents).

Wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forestry and crop materials, and natural fibrous organic and vegetative materials.

**Note:** Output from Alternative Waste Technology facilities (AWTs) that requires disposal must be assessed in accordance with the above to determine its putrescibility.

Where a waste generator does not wish to undertake further assessment of the waste in accordance with this step, the waste must be classified as 'general solid waste (putrescible)'.

## Appendix I: Chemical assessment

### Sampling and analytical methods

Sampling identifies the average levels of contaminants in the waste being assessed. While the following is provided as a guide, it is not possible to recommend sampling methods for all waste types. Appropriate sampling depends on how consistent any tested property is throughout a batch of waste. It is the waste generator's responsibility to ensure that the sampling and analytical methods used are appropriate for the contaminants they are testing for.

Where the property being tested for is highly consistent throughout the waste, sampling is relatively straightforward and useful guidance can be found in the following Australian Standards:

- *AS 1199.0–2003: Sampling Procedures for Inspection by Attributes – Introduction to the ISO2859 Attribute Sampling System* (Australian Standard 2003b)
- *AS 1141.0–1999: Methods for Sampling and Testing Aggregates* (Australian Standard 1999a) is useful for sampling wastes such as aggregates, foundry sand, furnace slag or mining waste.

It is more difficult to accurately sample waste that consists of many different types of waste materials or has chemical contaminants that are not distributed evenly throughout the batch. In such situations, keeping different waste types separate, or separating portions of waste that contain high levels of contaminants from the rest, can be of great benefit.

If unsure of the appropriate sampling or analytical methods for a particular waste, waste generators are strongly encouraged to seek expert help, either from a laboratory that specialises in waste analysis or an appropriately qualified person specialising in such waste management issues, or both. Since most incorrect chemical assessments of waste are due to poor sampling, it is essential that the sampling regime and analytical method used ensure the results are representative of all components and their variability in the waste.

### Precision in chemical analyses

It is important that the test methods and instruments used in analysing a waste are capable of measuring the concentration of each chemical contaminant with enough confidence to assure correct classification.

It is recommended that the upper limit of the combined confidence interval of sampling and analysis (at a probability of 95%) is used for comparison with the maximum values specified in Tables 1 and 2. This approach should give the assessor confidence that a correct classification has been made.

### Who can do the chemical analysis and leaching tests?

It is strongly recommended that analytical laboratories accredited by the National Association of Testing Authorities (NATA) are used to perform these analyses and tests. If accredited laboratories are not available locally, contact DECC's Waste Management Section for advice.

## Frequency of testing

There may be situations in which frequent testing of the waste for an initial period establishes that the characteristics of the waste are consistent enough to give the waste generator confidence to reduce the frequency of testing.

On the other hand, some waste streams may show such large variations in properties that every load of waste would need to be tested before classification.

It is the responsibility of the waste generator to ensure that frequency of testing provides representative samples for all contaminants in that waste.

## Which contaminants should be tested for?

Tables 1 and 2 in this guidance note list the chemical contaminants that are used in the classification of wastes. If a waste contains chemical contaminants that are not in these tables, contact DECC's Waste Management Section for advice.

## References

- Australian Standard 1997a, *AS 4439.3–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Bottle Leaching Procedure*, Standards Australia, Sydney
- Australian Standard 1997b, *AS 4439.2–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Zero Headspace Procedure*, Standards Australia, Sydney
- Australian Standard 1999a, *AS 1141.0–1999: Methods for Sampling and Testing Aggregate*, Standards Australia, Sydney
- Australian Standard 1999b, *AS 4439.1–1999: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Preliminary Assessment*, Standards Australia, Sydney
- Australian Standard 2003a, *AS 4454–2003: Composts, Soils, Conditioners and Mulches*, Standards Australia Sydney
- Australian Standard 2003b, *AS 1199.0–2003: Sampling Procedures for Inspection by Attributes – Introduction to the ISO2859 Attribute Sampling System*, Standards Australia Sydney
- DiMarco, P and Buckett, KJ 1996, ‘Beryllium’ in A Langley, B Markey and H Hill (eds), *The Health Risk Assessment and Management of Contaminated Sites*, Proceedings of the Third National Workshop on the Health Risk Assessment and Management of Contaminated Sites, Contaminated Sites Monograph Series No. 5, South Australian Health Commission, Adelaide
- EPA 1998, *Draft Environmental Guidelines for Industrial Waste Landfilling*, NSW Environment Protection Authority, Sydney
- EPA 2000, *Environmental Guidelines: Use and Disposal of Biosolids Products*, NSW Environment Protection Authority, Sydney
- National Transport Commission 2008, *Australian Code for the Transport of Dangerous Goods by Road and Rail*, 7th edition, Melbourne
- NHMRC 1994, *Australian Drinking Water Guidelines*, National Health and Medical Research Council, Canberra
- USEPA 1986, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW–846, Third Edition, 1986 and Updates I, II, IIIA, IIIB, IVA and IVB, Office of Solid Waste and Emergency Response, United States Environmental Protection Agency, available at [www.epa.gov/epaoswer/hazwaste/test/sw846.htm](http://www.epa.gov/epaoswer/hazwaste/test/sw846.htm)
- USEPA 1990, *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule*, United States Environmental Protection Agency, Federal Register, Vol. 55, No. 61, Washington DC
- USEPA 1993, *Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil – Proposed Rule*, United States Environmental Protection Agency, Federal Register, Vol. 58, No. 176, 48103–48106, Washington DC
- USEPA 1995, *Hazardous Waste: Identification and Listing – Proposed Rule*, United States Environmental Protection Agency, Federal Register, Vol. 60, No. 245, 66445, Washington DC
- USEPA 1999, *USEPA Method 1664A: n-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated n-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry*, Revision A, United States Environmental Protection Agency, Washington DC
- WHO 1993, *Guidelines for Drinking Water Quality*, World Health Organisation, Geneva