Waste Classification Guidelines

Part 1: Classifying waste

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Contents

Classifying wastes into groups that pose similar risks to the environment and human health facilitates their management and appropriate disposal. It is the responsibility of those who generate waste to classify that waste. To assist waste generators classify the wastes they produce, the EPA has developed the Waste Classification Guidelines ('the Guidelines') which are a step-by-step process for classifying waste.

Generators and waste facilities must carefully follow the procedures in these Guidelines to ensure they comply with applicable laws in classifying their waste and safeguard protection of the environment and human health.

The Guidelines are comprised of the following sections, of which this document is Part 1:

Overview of the Guidelines

Part 1: Classifying waste

Part 2: Immobilisation of waste

Part 3: Waste containing radioactive material

Part 4: Acid sulfate soils

All sections of the Guidelines are available for download from the EPA website at www.epa.nsw.gov.au/waste/classification.htm.

Introduction

This part of the Waste Classification Guidelines (the Guidelines) covers the classification of wastes into groups that pose similar risks to the environment and human health.

The following classes of waste are defined in clause 49 of Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act):

- special waste
- liquid waste
- hazardous waste
- restricted solid waste
- general solid waste (putrescible)
- general solid waste (non-putrescible).

To determine which of the above classifications applies to your waste, the following steps must be followed in the order below. Once a waste's classification has been established under a particular step, do not go to the next step[1]; the waste will be taken to have that classification and must be managed accordingly.

If an immobilisation approval applies to a waste, a generator who complies with the terms of that approval may classify that waste as set out in the approval, rather than according to these Guidelines.

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
- anything classified as special waste under an EPA gazettal notice.

Generators of special waste do not need to make any further assessment of their waste if it falls within the definitions of special wastes below.

The only exception to this is where special waste is mixed with restricted solid or hazardous waste. In these circumstances, the waste must be classified as special waste and restricted solid or hazardous waste (as applicable), and managed as both of those classifications.

The meanings of the terms clinical and related waste, asbestos waste, and waste tyres are detailed below.

Clinical and related waste

Clinical and related waste means:

- clinical waste
- cytotoxic waste

[1] The only exception to this is where special waste is mixed with or incorporates other restricted solid waste or hazardous waste – see Step 1 for further details.

- pharmaceutical, drug or medicine waste
- 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 NSW 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*.

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)
- that are designed for the purpose of cutting, piercing or penetrating the skin
- 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 casings, seconds, shredded tyres or tyre pieces.

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 (other than special waste) that:

- has an angle of repose of less than 5 degrees above horizontal
- becomes free-flowing at or below 60 degrees Celsius or when it is transported
- is generally not capable of being picked up by a spade or shovel
- is classified as liquid waste under an EPA gazettal notice.

If the waste meets the criteria outlined above, it is classified as liquid waste, and no further assessment for classification is required.

Note: The waste generator may choose to separate the waste into its liquid and solid fractions so that the solid fraction can be further classified in accordance with these Guidelines.

Step 3: Is the waste pre-classified?

If the waste is neither special nor liquid waste, establish whether the waste has been pre-classified by the EPA.

Some commonly generated waste types have been pre-classified as hazardous waste, general solid waste (putrescible) or general solid waste (non-putrescible). These pre-classifications are contained in the definitions of those classifications in Schedule 1 of the POEO Act.

The following wastes have already been pre-classified by the EPA. The EPA may also pre-classify other waste types as either hazardous waste, restricted solid waste, general solid waste (putrescible) or general solid waste (non-putrescible) by a notice published in the *NSW Government Gazette*. All currently gazetted special, liquid and pre-classified wastes are listed on the EPA website at: Types of waste.

Once a waste's classification has been established under a particular pre-classification below, do not go to the next classification; the waste has that classification and must be managed accordingly.

Hazardous waste

The following waste types (other than special waste or liquid waste) 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 washing2 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.

[2] The cleaning method used must be as good as or better than the triple-rinsing method outlined in Appendix 2.

Transport of Dangerous Goods Code means the document called the Australian Code for the Transport of Dangerous Goods by Road and Rail (7th edition), approved by the Ministerial Council for Road Transport and published by the Commonwealth Government from time to time.

Restricted solid waste

Currently, no wastes have been pre-classified by the EPA as 'restricted solid waste'. Restricted solid waste therefore currently only includes wastes assessed and classified as restricted solid waste in accordance with the procedures in Step 5 of this guide.

General solid waste (putrescible)

The following wastes (other than special waste, liquid waste, hazardous waste or restricted solid waste) 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.

General solid waste (non-putrescible)

The following wastes (other than special waste, liquid waste, hazardous waste, restricted solid waste or general solid waste (putrescible)) are 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 sweepings
- 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 they do 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[3] 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 or liquid waste) that results from:

- the demolition, erection, construction, refurbishment or alteration of buildings other than
    - chemical works
    - mineral processing works
    - container reconditioning works
    - waste treatment facilities
- 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, paper, plastics, glass and metal
- 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)

but does not include excavated soil (for example, soil excavated to level off a site prior to construction or to enable foundations to be laid or infrastructure to be constructed).

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.

[3] The cleaning method must be as good as or better than the triple-rinsing method outlined in Appendix 2.

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
- 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).

Step 4: Does the waste possess hazardous characteristics?

If a waste has not been classified under Steps 1–3, it must be classified as 'hazardous waste' if it is a dangerous good under any of the following classes or divisions of the *Transport of Dangerous Goods Code*

- 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 when 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 *Transport of Dangerous Goods Code*.

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

Waste generators must chemically assess their waste in accordance with Step 5 to determine the waste's classification where it has not been classified under Steps 1–4 of the Guidelines.

If the waste generator does not undertake chemical assessment of the waste, the waste must be classified as hazardous waste. Waste classified as hazardous waste cannot be disposed of in NSW and must be treated prior to disposal.

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

Testing of contaminants as set out below, however, is not necessary where the waste generator knows the processes which produced the waste and the maximum possible levels of contaminants it contains. In order to classify the waste, the generator must be certain that

the maximum possible levels of contaminants in the waste do not exceed the specific contaminant concentration (SCC) and/or toxicity characteristics leaching procedure (TCLP) test values for that classification (see *Measurable properties of waste* below). In these cases, the generator must ensure that the reasons for not undertaking the chemical assessment are documented and records of the decision are retained for three years.

Guidance on sampling and analytical methods is provided in Appendix 1. 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.

Measurable properties of waste

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

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

Generators of waste must select the chemical contaminants that are known to be present, or are likely to be present in the waste. This may be informed by the site activities, site history, or the processes which produced the waste. Generators of waste must be able to justify the chemical contaminants selected for testing and keep records of that decision for three years.

If a waste generator reasonably suspects that a waste contains chemical contaminants that are not listed in Tables 1 and 2 below, the waste generator must test for these contaminants and contact EPA's Waste and Resource Recovery Branch for advice.

Classifying a waste using the SCC test

The first test which must be used to chemically assess waste is the 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, and if so it will fall into one of the following classes:

- general solid waste ≤CT1
- restricted solid waste ≤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 must be carried out to determine the leachable concentration of that contaminant and the class of waste.

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 the SCC and TCLP tests

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, and the classification is then determined as follows:

Classification	SCC value	TCLP value
General solid waste	≤SCC1	≤TCLP1
Restricted solid waste	≤SCC2	≤TCLP2
Hazardous waste	>SCC2	>TCLP2

If any of the SCC or TCLP threshold values specified in Table 2 are 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 are 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.

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: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test

For disposal requirements for organic and inorganic chemical contaminants not listed below, contact the EPA. 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.

	Maximum values of *specific contaminant concentration* (SCC) for classification without TCLP		
	General solid waste[1]	**Restricted solid waste**	
Contaminant	**CT1 (mg/kg)**	**CT2 (mg/kg)**	**CAS Registry Number**
Arsenic	100	400	
Benzene	10	40	71-43-2
Benzo(a)pyrene[2]	0.8	3.2	50-32-8
Beryllium	20	80	
Cadmium	20	80	
Carbon tetrachloride	10	40	56-23-5
Chlorobenzene	2,000	8,000	108-90-7
Chloroform	120	480	67-66-3
Chlorpyrifos	4	16	2921-88-2
Chromium (VI)[3]	100	400	
m-Cresol	4,000	16,000	108-39-4
o-Cresol	4,000	16,000	95-48-7
p-Cresol	4,000	16,000	106-44-5
Cresol (total)	4,000	16,000	1319-77-3
Cyanide (amenable)[4]	70	280	
Cyanide (total)	320	1,280	
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[5]	60	240	See below[5]
Ethylbenzene	600	2,400	100-41-4
Fluoride	3,000	12,000	
Fluroxypyr	40	160	69377-81-7
Lead	100	400	

Contaminant	Maximum values of *specific contaminant concentration* (SCC) for classification without TCLP		CAS Registry Number
	General solid waste[1]	Restricted solid waste	
	CT1 (mg/kg)	CT2 (mg/kg)	
Mercury	4	16	
Methyl ethyl ketone	4,000	16,000	78-93-3
Moderately harmful pesticides[6] (total)	250	1,000	See below[6]
Molybdenum	100	400	
Nickel	40	160	
Nitrobenzene	40	160	98-95-3
C6–C9 petroleum hydrocarbons[7]	650	2,600	
C10–C36 petroleum hydrocarbons[7]	10,000	40,000	
Phenol (non-halogenated)	288	1,152	108-95-2
Picloram	60	240	1918-02-1
Plasticiser compounds[8]	20	80	See below[8]
Polychlorinated biphenyls[9]	<50	<50	1336-36-3
Polycyclic aromatic hydrocarbons (total)[10]	200	800	
Scheduled chemicals[11]	<50	<50	
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	1,152	108-88-3
1,1,1-Trichloroethane	600	2,400	71-55-6
1,1,2-Trichloroethane	24	96	79-00-5
Trichloroethylene	10	40	79-01-6
2,4,5-Trichlorophenol	8,000	32,000	95-95-4
2,4,6-Trichlorophenol	40	160	88-06-2
Triclopyr	40	160	55335-06-3

Contaminant	Maximum values of *specific contaminant concentration* (SCC) for classification without TCLP		CAS Registry Number
	General solid waste[1]	Restricted solid waste	
	CT1 (mg/kg)	CT2 (mg/kg)	
Vinyl chloride	4	16	75-01-4
Xylenes (total)	1,000	4,000	1330-20-7

Notes

1. Values are the same for 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. The EPA 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 are to be included in the total values specified:

Moderately harmful pesticides (total)			
Name	CAS Registry Number	Name	CAS Registry Number
Atrazine	1912-24-9	Imidacloprid	138261-41-3
Azoxystrobin	131860-33-8	Indoxacarb	173584-44-6
Bifenthrin	82657-04-3	Malathion (Maldison)	121-75-5
Brodifacoum	56073-10-0	Metalaxyl	57837-19-1
Carboxin	5234-68-4	Metalaxyl-M	70630-17-0
Copper naphthenate	1338-02-9	Methidathion	950-37-8
Cyfluthrin	68359-37-5	3-Methyl-4-chlorophenol	59-50-7
Cyhalothrin	68085-85-8	Methyl chlorpyrifos	5598-13-0
Cypermethrin	52315-07-08	N-Methyl pyrrolidone	872-50-4
Deltamethrin	52918-63-5	2-octylthiazol-3-one	26530-20-1
Dichlofluanid	1085-98-9	Oxyfluorfen	42874-03-3
Dichlorvos	62-73-7	Paraquat dichloride	1910-42-5
Difenoconazole	119446-68-3	Parathion methyl	298-00-0
Dimethoate	60-51-5	Permethrin	52645-53-1
Diquat dibromide	85-00-7	Profenofos	41198-08-7
Emamectin benzoate	137515-75-4 & 155569-91-8	Prometryn	7287-19-6
Ethion	563-12-2	Propargite	2312-35-8
Fenthion	55-38-9	Pentachloronitrobenzene (Quintozene)	82-68-8
Fenitrothion	122-14-5	Simazine	122-34-9
Fipronil	120068-37-3	Thiabendazole	148-79-8

Moderately harmful pesticides (total)			
Name	**CAS Registry Number**	**Name**	**CAS Registry Number**
Fluazifop-P-butyl	79241-46-6	Thiamethoxam	153719-23-4
Fludioxonil	131341-86-1	Thiodicarb	59669-26-0
Glyphosate	1071-83-6	Thiram	137-26-8

7. 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 (TPH) (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, clean-up 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 2000).
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.
9. Polychlorinated biphenyls must be managed in accordance with the EPA's polychlorinated biphenyl (PCB) chemical control order 1997, which is available on the EPA website at Polychlorinated Biphenyl (PCB) Chemical Control Order 1997.
10. The following polycyclic aromatic hydrocarbons (PAHs) are assessed as the total concentration of 16 USEPA Priority Pollutant PAHs, as follows:

Polycyclic aromatic hydrocarbons (total)			
PAH name	**CAS Registry Number**	**PAH name**	**CAS Registry Number**
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

11. Scheduled chemicals must be managed in accordance with the EPA's scheduled chemical wastes chemical control order 2004, which is available on the EPA website at Scheduled Chemical Wastes Chemical Control Order 2004.

    The following scheduled chemicals are to be included in the total values specified:

Scheduled chemicals (total)			
Name	**CAS Registry Number**	**Name**	**CAS Registry Number**
Aldrin	309-00-2	Heptachlor	76-44-8
Alpha-BHC	319-84-6	Heptachlor epoxide	1024-57-3
Beta-BHC	319-85-7	Hexachlorobenzene	118-74-1
Gamma-BHC (Lindane)	58-89-9	Hexachlorophene	70-30-4
Delta-BHC	319-86-8	Isodrin	465-73-6

Scheduled chemicals (total)			
Name	**CAS Registry Number**	**Name**	**CAS Registry Number**
Chlordane	57-74-9	Pentachlorobenzene	608-93-5
DDD	72-54-8	Pentachloronitrobenzene	82-68-8
DDE	72-55-9	Pentachlorophenol	87-86-5
DDT	50-29-3	1,2,4,5-Tetrachlorobenzene	95-94-3
Dieldrin	60-57-1	2,3,4,6-Tetrachlorophenol	58-90-2
Endrin	72-20-8	1,2,4-Trichlorobenzene	120-82-1
Endrin aldehyde	7421-93-4	2,4,5-Trichlorophenoxyacetic acid, salts and esters	93-76-5

Table 2: TCLP and SCC values for classifying waste by chemical assessment

For disposal requirements for organic and inorganic chemical contaminants not listed below, contact the EPA. 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.

	Maximum values for *leachable concentration* and *specific contaminant concentration* when used together				
	General solid waste[1]		**Restricted solid waste**		
	Leachable concentration	**Specific contaminant concentration**	**Leachable concentration**	**Specific contaminant concentration**	
Contaminant	**TCLP1 (mg/L)**	**SCC1 (mg/kg)**	**TCLP2 (mg/L)**	**SCC2 (mg/kg)**	**CAS Registry Number**
Arsenic	5.0[2]	500	20	2,000	
Benzene	0.5[2]	18	2	72	71-43-2
Benzo(a)pyrene[3]	0.04[4]	10	0.16	23	50-32-8
Beryllium	1.0[5]	100	4	400	
Cadmium	1.0[2]	100	4	400	
Carbon tetrachloride	0.5[2]	18	2	72	56-23-5
Chlorobenzene	100[2]	3,600	400	14,400	108-90-7
Chloroform	6[2]	216	24	864	67-66-3
Chlorpyrifos	0.2	7.5	0.8	30	2921-88-2
Chromium (VI)[6]	5[2]	1,900	20	7,600	
m-Cresol	200[2]	7,200	800	28,800	108-39-4
o-Cresol	200[2]	7,200	800	28,800	95-48-7
p-Cresol	200[2]	7,200	800	28,800	106-44-5
Cresol (total)	200[2]	7,200	800	28,800	1319-77-3
Cyanide (amenable)[7, 8]	3.5[7]	300	14	1,200	
Cyanide (total)[7]	16[7]	5,900	64	23,600	
2,4-D	10[2]	360	40	1,440	94-75-7
1,2-Dichlorobenzene	4.3[2]	155	17.2	620	95-50-1
1,4-Dichlorobenzene	7.5[2]	270	30	1,080	106-46-7
1,2-Dichloroethane	0.5[2]	18	2	72	107-06-2
1,1-Dichloroethylene	0.7[2]	25	2.8	100	75-35-4
Dichloromethane	8.6[2]	310	34.4	1,240	75-09-2
2,4-Dinitrotoluene	0.13[2]	4.68	0.52	18.7	121-14-2
Endosulfan[9]	3	108	12	432	See below[9]

Contaminant	Maximum values for *leachable concentration* and *specific contaminant concentration* when used together				CAS Registry Number
	General solid waste[1]		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)	
Ethylbenzene	30[10]	1,080	120	4,320	100-41-4
Fluoride	150[10]	10,000	600	40,000	
Fluroxypyr	2	75	8	300	69377-81-7
Lead	5[2]	1,500	20	6,000	
Mercury	0.2[2]	50	0.8	200	
Methyl ethyl ketone	200[2]	7,200	800	28,800	78-93-3
Moderately harmful pesticides[11](total)	N/A[12]	250	N/A[12]	1,000	See below[11]
Molybdenum	5[10]	1,000	20	4,000	
Nickel	2[10]	1,050	8	4,200	
Nitrobenzene	2[2]	72	8	288	98-95-3
C6–C9 petroleum hydrocarbons[13]	N/A[12]	650	N/A[12]	2,600	
C10–C36 petroleum hydrocarbons[13]	N/A[12]	10,000	N/A[12]	40,000	
Phenol (non-halogenated)	14.4[14]	518	57.6	2,073	108-95-2
Picloram	3	110	12	440	1918-02-1
Plasticiser compounds[15]	1	600	4	2,400	See below[15]
Polychlorinated biphenyls[12]	N/A[12]	< 50	N/A[12]	< 50	1336-36-3
Polycyclic aromatic hydrocarbons (total)[16]	N/A[12]	200	N/A[12]	800	
Scheduled chemicals[17]	N/A[12]	< 50	N/A[12]	< 50	See below[17]
Selenium	1[2]	50	4	200	
Silver	5.0[2]	180	20	720	
Styrene (vinyl benzene)	3[10]	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

Contaminant	Maximum values for *leachable concentration* and *specific contaminant concentration* when used together				CAS Registry Number
	General solid waste[1]		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)	
1,1,1,2-Tetrachloroethane	10[2]	360	40	1,440	630-20-6
1,1,2,2-Tetrachloroethane	1.3[2]	46.8	5.2	187.2	79-34-5
Tetrachloroethylene	0.7[2]	25.2	2.8	100.8	127-18-4
Toluene	14.4[14]	518	57.6	2,073	108-88-3
1,1,1-Trichloroethane	30[2]	1,080	120	4,320	71-55-6
1,1,2-Trichloroethane	1.2[2]	43.2	4.8	172.8	79-00-5
Trichloroethylene	0.5[2]	18	2	72	79-01-6
2,4,5-Trichlorophenol	400[2]	14,400	1,600	57,600	95-95-4
2,4,6-Trichlorophenol	2[2]	72	8	288	88-06-2
Triclopyr	2	75	8	300	55335-06-3
Vinyl chloride	0.2[2]	7.2	0.8	28.8	75-01-4
Xylenes (total)	50[18]	1,800	200	7,200	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 2012b) 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* (USEPA 2012a).
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. The EPA 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 2011).
11. The following moderately harmful pesticides are to be included in the total values specified:

Moderately harmful pesticides (total)			
Name	**CAS Registry Number**	**Name**	**CAS Registry Number**
Atrazine	1912-24-9	Imidacloprid	138261-41-3
Azoxystrobin	131860-33-8	Indoxacarb	173584-44-6
Bifenthrin	82657-04-3	Malathion (Maldison)	121-75-5
Brodifacoum	56073-10-0	Metalaxyl	57837-19-1
Carboxin	5234-68-4	Metalaxyl-M	70630-17-0
Copper naphthenate	1338-02-9	Methidathion	950-37-8
Cyfluthrin	68359-37-5	3-Methyl-4-chlorophenol	59-50-7
Cyhalothrin	68085-85-8	Methyl chlorpyrifos	5598-13-0
Cypermethrin	52315-07-08	N-Methyl pyrrolidone	872-50-4
Deltamethrin	52918-63-5	2-octylthiazol-3-one	26530-20-1
Dichlofluanid	1085-98-9	Oxyfluorfen	42874-03-3
Dichlorvos	62-73-7	Paraquat dichloride	1910-42-5
Difenoconazole	119446-68-3	Parathion methyl	298-00-0
Dimethoate	60-51-5	Permethrin	52645-53-1
Diquat dibromide	85-00-7	Profenofos	41198-08-7
Emamectin benzoate	137515-75-4 & 155569-91-8	Prometryn	7287-19-6
Ethion	563-12-2	Propargite	2312-35-8
Fenthion	55-38-9	Pentachloronitrobenzene (Quintozene)	82-68-8
Fenitrothion	122-14-5	Simazine	122-34-9
Fipronil	120068-37-3	Thiabendazole	148-79-8
Fluazifop-P-butyl	79241-46-6	Thiamethoxam	153719-23-4
Fludioxonil	131341-86-1	Thiodicarb	59669-26-0
Glyphosate	1071-83-6	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.

    Polychlorinated biphenyls must be managed in accordance with the EPA's polychlorinated biphenyl (PCB) chemical control order 1997, which is available on the EPA website at Polychlorinated Biphenyl (PCB) Chemical Control Order 1997.

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, clean-up 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 2000).
14. Proposed level for phenol and toluene in *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule* (USEPA 2012b).

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 are assessed as the total concentration of 16 USEPA Priority Pollutant PAHs, as follows:

Polycyclic aromatic hydrocarbons (total)			
PAH name	**CAS Registry Number**	**PAH name**	**CAS Registry Number**
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. Scheduled chemicals must be managed in accordance with the EPA's scheduled chemical wastes chemical control order 2004, which is available on the EPA website at Scheduled Chemical Wastes Chemical Control Order 2004.

    The following scheduled chemicals are to be included in the total values specified:

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

18. Calculated from *Guidelines for Drinking Water Quality* (WHO 2011).

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

Waste classification	Criteria[1] for classification by chemical assessment (any of the alternative options given)	Comments
General solid waste	1. SCC test values ≤ CT1	TCLP test not required
	2. TCLP test values ≤ TCLP1 and SCC test values ≤ SCC1	
	3. TCLP test values ≤ TCLP1 and SCC test values > SCC1[2]	Classify as restricted solid or hazardous (as applicable) If immobilisation approval applies, classify in accordance with that approval
Restricted solid waste	1. SCC test values ≤ CT2	TCLP test not required
	2. TCLP1 < TCLP test values ≤ TCLP2 and SCC test values ≤ SCC2	
	3.TCLP test values ≤ TCLP2 and SCC1 < SCC test values ≤ SCC2	
	4. TCLP1 < TCLP test values ≤ TCLP2 and SCC test values > SCC2[2]	Classify as hazardous. If immobilisation approval applies, classify in accordance with that approval
Hazardous waste	1. TCLP test values > TCLP 2	
	2. TCLP test values ≤ TCLP2 and SCC test values > SCC2	Classify as hazardous if no immobilization approval applies

Notes

1. These criteria apply to each toxic and ecotoxic contaminant present in the waste (see Tables 1 and 2).
2. In certain cases the EPA 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 or non-putrescible?

Where chemical assessment of a waste under Step 5 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)'.Otherwise (for example, if the waste generator does not wish to undertake this chemical assessment), the waste must be classified as 'general solid waste (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
- it has a specific oxygen uptake of less than 1.5 milligrams O_2 per hour per gram of total organic solids at 20 degrees Celsius, or
- it 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
- it 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.

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.

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

Appendix 1: 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* (Standards Australia 2003)
- *AS 1141.3.1–2012: Methods for sampling and testing aggregates – Sampling – Aggregates* (Standards Australia 2012a) 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.

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 2007) and Updates I, II, IIIA, IIIB, IVA and IVB, available at Hazardous Waste Test Methods / SW-846 – US EPA.

The following procedures for leachate preparation are recommended:

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

The standard pH for the leaching solutions used must be either 4.93 ± 0.05 if the pH of the waste sample is less than 5.0, or 2.88 ± 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 (Standards Australia 1997a).

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 the EPA's Waste and Resource Recovery Branch.

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?

Analytical laboratories accredited by the National Association of Testing Authorities (NATA) must be used to perform these analyses and tests. If accredited laboratories are not available locally, contact the EPA's Waste and Resource Recovery Branch 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.

Appendix 2: Triple-rinsing procedure for cleaning containers

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, are pre-classified as hazardous waste.

The triple rinsing procedure outlined below is for effective washing of empty chemical containers in an effort to change the waste classification of such containers from hazardous waste to general solid waste (non-putrescible). Rinsing must be done immediately after emptying the container, as residues on the walls are more difficult to remove when dry. It is acceptable to use other rinsing treatments, such as pressure rinsing, integrated rinsing or vacuuming, if the results achieved are equal to or better than those from the triple-rinse procedure.

Triple-rinsing (a three-stage rinsing process)

1. Empty the contents into the spray tank and allow the container to drain for an extra 30 seconds after the flow reduces to drops.
2. Fill the container with clean water to between 20% and 25% of its capacity and replace the cap securely.
3. Shake, rotate, roll or invert the container vigorously for at least 30 seconds, so that the rinse reaches all inside surfaces.
4. Empty the rinsate from the container into the spray tank. Let it drain for an extra 30 seconds after the flow reduces to drops.
5. Repeat until the container has been rinsed three times.

Follow these procedures after rinsing the container

After rinsing the container, check the container thread and outside of the container and, if contaminated, rinse with a hose into the spray tank. Rinse the cap separately in a bucket of water and empty the rinsate into the spray tank.

To ensure that it is fully drained, puncture the container from the inside, for example using a crowbar through the container opening. Allow the container to dry completely and store it in a dry place awaiting disposal.

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