

Misclassification of waste – and how you can avoid it

Misclassification is common not only amongst waste producers but also amongst waste receivers, carriers, brokers, laboratories and consultancies.

Some common errors and misconceptions are described below along with an outline of why they are wrong and what should be done instead.

This note makes reference to the official guidance on waste classification from the four UK Environment Agencies, known as WM3, which can be found via the following link:

<https://www.gov.uk/government/publications/waste-classification-technical-guidance>

1) WAC	
Common Error	<p>a Using landfill WAC results to classify a waste.</p> <ul style="list-style-type: none"> • “waste has failed inert WAC therefore it is hazardous”. • “waste passes hazardous WAC therefore it is non-hazardous”
Why it is wrong	<p>Landfill Waste Acceptance Criteria (WAC) are not relevant to hazardous waste classification.</p> <p>A WAC test will not identify whether a waste is hazardous or non-hazardous.</p>
What you should do	<p>Before a waste can be disposed of, it must be classified as being either hazardous or non-hazardous, using the characterisation assessment and analysis described by the WM3 technical guidance. Then, if a waste hierarchy assessment determines that disposal to landfill is the appropriate disposal option for the waste, chemical WAC testing must be undertaken for wastes destined for inert, stable non-reactive hazardous or hazardous classes of landfill.</p>
	<p>b Using the WAC (leachable) metal results for hazardous waste classification.</p>
	<p>For the metals in a waste, the hazardous waste classification has to be based on an assessment of total metal concentrations, so trying to use the leachable metal results will underestimate the metal content (for most wastes).</p> <p>Analysis for hazardous waste classification must be based on the total metal concentration (i.e. both the soluble and insoluble metal compounds) together with the other hazardous substances that may be present in the waste. However leachable metal results can be helpful in determining the species of metals present and thereby assist in the classification.</p>
2) Inert	
	<p>a Confusing the waste category “inert” with the classification of waste as hazardous or non-hazardous</p>
	<p>The classification of waste in accordance with WM3 guides you to whether your waste is hazardous or non-hazardous, which then allows you to select the correct mirror entry from the List of Waste; it does not help you determine whether inert/non inert.</p>
	<p>“Inert” is a category of waste which is defined in a separate piece of legislation, in article 2(e) of the Landfill Directive 1999/31/EC; and the supporting Decision Document (Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC);</p> <p>“inert waste means waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise chemically or physically react, biodegrade or adversely affect other matter with which it comes into contact...”</p>

		<p>as opposed to hazardous waste which is defined in the revised Waste Framework Directive as one that displays one or more of the 15 hazard properties (HP1-HP15).</p> <p>The Landfill Directive does provide a short list of wastes that are assumed to fulfil the criteria set out in Article 2(e) – this includes for example 17 05 04 soil and stones, but excludes topsoil, peat and soil from contaminated sites.</p>
3) List of Waste (LoW)/EWC Code		
	a	Using a simple search of the List of Waste to identify entries that look OK (or happen to be a non-hazardous entry).
		Picking from the List of Waste can often generate several answers but only one is correct.
		It is essential to follow the order of precedence detailed in WM3, Appendix A; searching by industry process or business activity that produced the waste to reach the correct List of Waste code.
	b	Assigning a LoW mirror entry code without an assessment of the composition and hazardous properties of the waste.
		It is a legal requirement to undertake such an assessment.
		To determine whether to select the hazardous or non-hazardous mirror entry, the waste must be classified based on an evaluation of its composition and the hazardous properties of substances that may be present in that waste.
4) Laboratory Analytical Suites		
	a	<p>Relying on one or more standard analytical suites.</p> <ul style="list-style-type: none"> • Requesting a lab's default suite (and not considering other parameters) • Only analysing the determinands listed in the WAC tables • Not testing for factors such as flammability, acidic/alkali reserve, pH etc • Analysing metal powders without considering flammability
		Standard suites may not pick up key parameters that affect the waste classification
		The analytical suite must be based on the hazardous substances that might be present in the waste. As well as using a lab's standard suites where appropriate, it is important to supplement the basic analysis and add tests for other substances where the assessment of the site's history (for a soil for example) or the process that created the waste (for a filter cake for example) has indicated the presence of one or more substances that are not in a lab's standard test suite(s).
5) Hazard Property Codes		
	a	Using H codes (H1, H2, H3 etc.)
		The hazardous properties (H) classification system was replaced in 2015.
		Hazardous Properties must be defined by use of the (HP) codes.
	b	Simply replacing H codes with HP codes. Notably H5 to HP5 (eg Glycol being classified as HP5 but should be HP6).
		The new 'HP' system has introduced new Hazardous Properties, therefore it is not a straight swap.
		The HP codes and their definitions are set out in WM3.
6) Data Sources		
	a	The literature tells you to use the data in Annex VI, Table 3.1 of the CLP Regulation 1272/2008/EC and you download the 2008 CLP document.
		Table 3.1 of Annex VI of the CLP is updated regularly by adaptations to technical progress (ATPs). The original version is out of date.
		Since the original CLP Regulation (and in particular Annex VI, Table 3.1) was published

		in 2008, it has been updated every year by one or more ATPs. Whilst there are occasional consolidated versions of the CLP (and Table 3.1), you must always make sure that you are using the latest data set and that there aren't more recent data that could affect the CLP data set.
	b	Using data (in particular the hazard statements) for substances that are out of date or incomplete. For example, substances where the classifier has defined hazard statements for substances that are either a) not in the CLP or b) are incomplete entries in the CLP.
		The CLP requires the classifier to assess the latest knowledge on all the substances they are using in the classification of a waste.
		Data in ATPs should be reviewed as soon as they are published. Other data sources must be checked on a regular basis (at least every 6 months) to see if the classification information has been updated.
		The online ECHA C&L Inventory database (www.echa.europa.eu/information-on-chemicals/cl-inventory-database https://echa.europa.eu/information-on-chemicals) and the REACH or EC Inventory must be reviewed to check (first) the classification of harmonised entries. This and other up-to-date data sources (such as the IARC monographs for carcinogens) must be used for incomplete entries, or for substances that are not listed in the CLP.
	c	Using an MSDS instead of a REACH compliant SDS.
		Material Safety Data Sheets MSDS are not the same as REACH compliant Safety Data Sheets (SDS) and should not be used.
		MSDS are what SDS used to be called before countries implemented the Globally Harmonised System (GHS) of classification and labelling of chemicals. In Europe, the contents of SDS are defined by the REACH Regulation (EC) No 1907/2006, so if you need to use a SDS you need to make sure that it is REACH compliant.
	d	Use of REACH compliant SDS and no other information.
		SDS are often poor quality, incomplete, out of date and furthermore they only represent the pure product of the specific manufacturer described on the sheet.
		The use of Safety Data Sheets is only directly appropriate if the substance covered by it remains unchanged when it becomes waste. If the substance has chemically or physically changed, or is mixed with another substance, then the SDS a) will not adequately describe the hazardous properties of the waste and/or b) may completely mis-represent the hazardous properties of the waste.
		A full assessment will be required in accordance with the principles in WM3.
7) Metals		
	a	Not converting metal concentrations to metal compound concentrations
		When a laboratory supplies the results for a set of metals (e.g. copper, nickel, zinc etc.), they are only telling you the concentration of that particular metal and not the concentration of the actual metal compound that might be in your waste. Using just the metal concentrations significantly underestimate the actual concentration of the metal compounds.
		For waste classification (and for most of the metals), you have to calculate the mass of the actual metal compound e.g. zinc oxide that you can reasonably expect to be present in your waste. If you don't know which metal compound is present then you have to use the mass of the worst case metal compound e.g. zinc chromate (see Chapter 3.4 of WM3). To undertake the waste classification, you have to calculate the compound concentration before undertaking the calculations defined in WM3.
	b	Using a rule of thumb such as
		<ul style="list-style-type: none"> • "If all the metals add up to less than 2500 mg/kg, the waste is non-hazardous".
		Rules of thumb are unreliable. This 2500mg/kg example is very wrong because;

	<p>a) it doesn't specify which or how many metals,</p> <p>b) it completely ignores the compound concentration calculations (see 7a),</p> <p>c) it ignores additivity calculations with other substances in the waste See 7c), and</p> <p>d) it ignores the hazard properties that have 1000 mg/kg thresholds.</p>
	<p>Rules of thumb ignore the approach required by law and the guidance contained in WM3. It is important to use the threshold values for each individual substance taking into account the hazardous statement code for each one.</p>
	<p>c Comparing the concentration of each substance in isolation against the hazardous thresholds for the various hazardous properties.</p>
	<p>It is necessary to consider additive effects.</p>
	<p>Certain hazard properties (HP4, HP6, HP8, HP14*) require that the classifier assess all substances with a particular hazard property and add their individual concentrations together before comparing this total concentration to the hazardous threshold for that hazard property. (*The calculations for HP14 are even more complicated.) All these calculations are explained in Appendix C of WM3.</p>
	<p>d Not considering the relevant metal species in solid versus liquid wastes.</p>
	<p>Worst case metal compounds may be different in solid waste compared with those in a liquid waste.</p>
	<p>The solubility of a compound can affect its presence in a waste. It is important to consider which compound is the correct one to assume is present in a liquid and a solid waste as they may be different.</p>
<p>8) Hydrocarbons</p>	
	<p>a Assessment of unknown oil and coal tars and the incorrect use of PAHs and other markers.</p>
	<p>This is a complex area of assessment.</p>
	<p>Guidance on the assessment of waste containing coal tar (Note that coal tar is not an oil) and waste containing unknown oil(s) can be found in Chapter 3.2 and 3.4 of WM3. There is a specific system to follow for unknown oils and the correct use of markers for assessment of HP7 and HP11.</p>
	<p>b Use of an oil, coal or coal tar entry from CLP Annex VI, Table 3.1 without realising that these are incomplete entries (also known as Note H substances) and should not be used.</p>
	<p>All the oils in the CLP Annex VI Table 3.1 (and many coals and coal tars) are incomplete entries and should not be used without first researching and adding the missing hazard properties.</p>
	<p>In order to classify oils in the CLP Annex VI Table 3.1 (and many coals and coal tars) it is necessary to carry out the searches needed to identify all the missing hazard statements.</p> <p>The approach for researching and adding missing hazard properties is detailed in WM3, Appendix B.</p>
	<p>c Using the TPH results for the DRO range (C10-C25) and assuming that they represent only diesel.</p>
	<p>The Diesel Range Organics (DRO) not only covers diesel but also other oils including kerosene and light fuel oils.</p>
	<p>The assessment of unknown oil must be made on the whole oil and not components of the oil. If a laboratory confirms that your unknown oil is only a diesel (weathered, biodegraded), based on an assessment of the chromatograph and chemical, ideally supported by the site history (eg petrol station), then you can use the diesel petroleum group as defined in WM3. If you cannot rule out the possibility that there are other</p>

		contaminants then a worst case assessment must be carried out as specified in WM3.
	d	Assessing estimates of the amount of diesel present in a mixed/unknown oil waste.
		Estimations of components of an oil are not acceptable.
		Calculations should be based on worst case scenarios. If you have a mixture of, for example diesel and lubricating oil, you have an unknown oil. You cannot then estimate the amount of diesel and use this against the diesel petroleum group threshold and place the remaining (estimated) lubricating oil concentration against the TPH (C6-C40) petroleum group threshold.
		See WM3 for the definitions of the hazard statements for diesel, unknown oil and other petroleum groups
9) POPs		
	a	The classifier asks for the laboratory default POP suite not realising that the laboratory suite doesn't match the full list of POPs stated in WM3.
		Existing laboratory test suites for POPs may not be suitable as they predate the WM3 list of POPs, having been originally derived for other purposes.
		It is important that the full list of POPs as per the list in Table C16.1 of WM3 are considered and analysed, unless it can be justified otherwise. It also should be noted that any amendments by ATPs to the thresholds in the table in Annex IV of (EC) 850/2004 will take precedence over the WM3 table. It is also worth noting that if any other substances such as pesticides are suspected as being present, these should also be analysed.
10) Moisture Correction		
	a	Not correctly taking into account the moisture content (or not taking it into account at all).
		Moisture content can be a significant component of a waste and affect its characterisation.
		Waste is characterised as-received so the moisture content should be included in the assessment and this should be requested from the laboratory. For those analytical results reported in dry-weight terms, their concentrations should be converted back to their as-received (wet-weight) equivalents using the appropriate moisture correction calculation. It is important to be aware that laboratories may report results with (as received) and without (dry weight) moisture included for different analyses. Ensuring a representative sample is particularly critical for moisture determination.
11) Asbestos		
	a	Misunderstanding how waste containing asbestos is classified.
		The assessment of asbestos containing waste considers both the presence of asbestos as fibres that are free and dispersed, and identifiable pieces of asbestos containing material.
		If the waste contains fibres that are free and dispersed then the waste will be hazardous if the waste as a whole contains 0.1% or more asbestos. Any identifiable piece of asbestos (with 0.1% or more asbestos fibres) in a mixed load including soils will render the whole load hazardous. The hazardous properties should be HP5 and HP7.

It is hoped that this short guide is useful. If you have examples of other common misconceptions please forward to Roy Hathaway at ESA: r-hathaway@esauk.org