

## Appendix C:

# Hazardous Property Assessment

The aim of this appendix is to:

- give advice on the hazards properties H1 to H14 identified in Annex III of the HWD;
- provide assessment methods and threshold concentrations for the hazards; and
- advise on which test methods should be considered.

The primary aim of the Hazardous Property Assessments is to assist in evaluating wastes covered by "*mirror entries*" and in determining whether they are hazardous waste or not.

Wastes identified as "*absolute entries*" in the EWC 2002 are hazardous waste. Assessment determines their appropriate hazards for Duty of Care purposes.

# Appendix C:

## C9 Assessment of Hazard H9: Infectious

### C9.1 Definition

Annex III of the HWD defines H9 "Infectious" as :

*"substances containing viable micro-organisms or their toxins which are known or reliably believed to cause disease in man or other living organisms".*

### C9.2 Background

The definition of H9 includes the terms:

- "*micro-organisms*" - a microbiological entity, cellular or non-cellular, capable of replication or of transferring genetic material (includes algae, bacteria, fungi, parasites, plasmids, prions, viruses, rickettsia, and genetically modified variants thereof)
- "*viable*" - Micro-organisms that have been killed are not considered infectious. Viability relates solely to the state of the organism at the point and time of the production of the waste.
- "*or their toxins*" - Toxins produced by micro-organisms render the waste 'infectious' even if the producing organism is no longer present.
- "*cause disease*" - This includes any disease regardless of severity.
- "*man or other living organisms*" - This includes Animals, but not plants. The European Waste Catalogue provides sub-chapters for human and animal healthcare only.

Note that the CHIP Regulations apply to chemical hazards and as such do not include any risk phrases related to the hazardous property 'Infectious'.

### C9.3 Principle for Assessing Hazard H9

It should be recognised that many waste streams may contain pathogens. However a waste would not be hazardous by H9 where:-

For Non-healthcare wastes –

- where there is a low probability that infectious substances are present, **or**
- the concentration is at a level naturally encountered in a healthy individual or environment,

For healthcare wastes –

- where the waste is not clinical waste **and**
- where there is no requirement to treat the waste to render it microbiologically safe, **and**
- where the infectious fraction has been removed by specific segregation at source.

The following procedures are used to assess H9 .

### C9.4 Assessment Procedure

Due to the unique nature of H9, the assessment procedure has been divided into three sections:

- waste arising from human or animal healthcare (i.e. those under EWC Chapter 18); and
- potentially infectious wastes from other sources (Chapters 1-17 19 and 20).
- microbial toxins

#### C9.4.1 Chapter 18: Wastes From Human or Animal Healthcare

The key entries under Chapter 18 are:

18 01	wastes from natal care, diagnosis, treatment or prevention of disease in humans
18 01 03*	wastes whose collection and disposal is subject to special requirements in order to prevent infection
18 02	wastes from research, diagnosis, treatment or prevention of disease involving animals
18 02 02*	wastes whose collection and disposal is subject to special requirements in order to prevent infection

Both of these entries (18 01 03 and 18 02 02) are absolute entries, without threshold concentration, that refer to "*special requirements*."

Figure C9.1 provides the assessment method to determine whether a waste is covered by "*special requirements*" and Table C9.1 provides examples of the application of the assessment methodology.

"*Special requirements*" (and H9) apply to healthcare wastes where any of the following apply.

- (i) the source person, or animal is known or suspected to have a disease/infection caused by a micro-organism or its toxin **and** the waste is likely to contain the viable infectious agent or toxin.
- (ii) the waste is, or is contaminated with, a culture or an enrichment of a micro-organism or its toxin that may cause disease in man or other living animals.
- (iii) The healthcare waste "*may cause infection to any person (or other living organism) coming into contact with it*". (note this step refers to the definition of a clinical waste)

This should be determined by clinical assessment of each item and source patient, as follows:-

- Clinical assessment should be carried out by a healthcare professional who is familiar with type of waste generated, the current medical condition and, where feasible, the past medical history of the patient.
- It is unlikely that it will always be practical or possible to identify specific pathogens or toxins within the waste when a patient first presents symptoms as definitive laboratory identification requires time to undertake. The procedure for determining whether a waste is considered hazardous by H9 must therefore, where this is the case, assume that the disease causing agent has not been confirmed and should be based on clinical assessment of whether an unidentified infection of any type is suspected or known. Laboratory identification is not required to assess the waste for H9.
- All pathogens and microbial toxins should be included in the assessment. H9 does not consider the severity of the disease.
- Note that any underlying or secondary infections, previously diagnosed by a healthcare worker, may also generate waste that is subject to assessment for special requirements.

The following indicates how the general principles (C9.3) are applied to healthcare waste. "*Special requirements*" do not apply where

- Clinical assessment of the specific waste item, and where applicable the source patient, indicates that the waste does not meet the criteria for "*special requirements*" **and**
- the waste is segregated from waste that is subject to "*special requirements*."

Assessment is item and patient specific. General premises or waste stream based assessment is not included in the assessment methodology for "*special requirements*".

Note: Waste Segregation

The "infectious" fraction of healthcare waste should be identified and segregated on the basis of "special requirements."

Healthcare waste streams that contain the "infectious" fraction in any quantity are hazardous waste.

Where the healthcare waste has not been clinically assessed for H9 on an item and /or patient specific basis, then the infectious fraction has not been identified and segregated, and the waste should be regarded as subject to special requirements.

**C9.4.2 Potentially Infectious Wastes that do not arise from Human or Animal Healthcare and/ or Related Research .**

Where there is a low probability that infectious substances are present, or where the concentration is at a level naturally encountered, the waste should not be classified as hazardous by H9.

The term "a level naturally encountered" is difficult to define, but can be taken to accept the presence of pathogens in wastes arising from a generally healthy population or environment. For example this may include the majority of foodstuffs, soil, construction and demolition waste, wastes treated to eliminate pathogens and domestic refuse.

Risk assessment, analysis or knowledge should be used to determine :

- if the waste is likely to contain a microbial toxin above a level naturally encountered. (Where the presence of elevated levels of toxin is indicated the waste should be assessed as indicated in C9.4.3).
- if the waste is likely to contain a human/animal pathogen above naturally encountered levels.
- if the waste a culture or enrichment of a micro-organism reliably believed to cause disease in man or other living animal.

**C9.4.3 : Microbial Toxins**

Toxins from micro-organisms are assessed in the same manner as chemical toxins.

Microbial toxins are assessed using the procedure provided in Figure C9.2 with reference to Appendix C5 Assessment of Hazards H5/H6: Harmful and Toxic'í .

These substances are unlikely to be described with chemical risk phrases. The assessment will therefore require the use of appropriate data sources (see Appendix D) .

Only those microbial toxins which are "very toxic" , "toxic" or "harmful" are potentially hazardous by H9. Threshold concentrations are provided in Appendix C5.

Where these toxins are present at or above the threshold concentration the appropriate hazards are H9, and either H5 or H6.

Examples of microbes that produce toxins include:

- *Clostridium botulinum* and *C. perfringens*,
- Toxigenic *Vibrio sp.* and verocytotoxin or enterotoxin producing *E.coli*
- *Cyanobacteria* - blue green algae ,
- *Dinophyceae* - (Paralytic/Diarrhetic Shellfish Poisoning, Fish Kills)

C9.5 Decision Tree

Figures C9.1 and C9.2 set out the assessment process for the Hazard H9

Figure C9.1: Healthcare Wastes Chapter 18

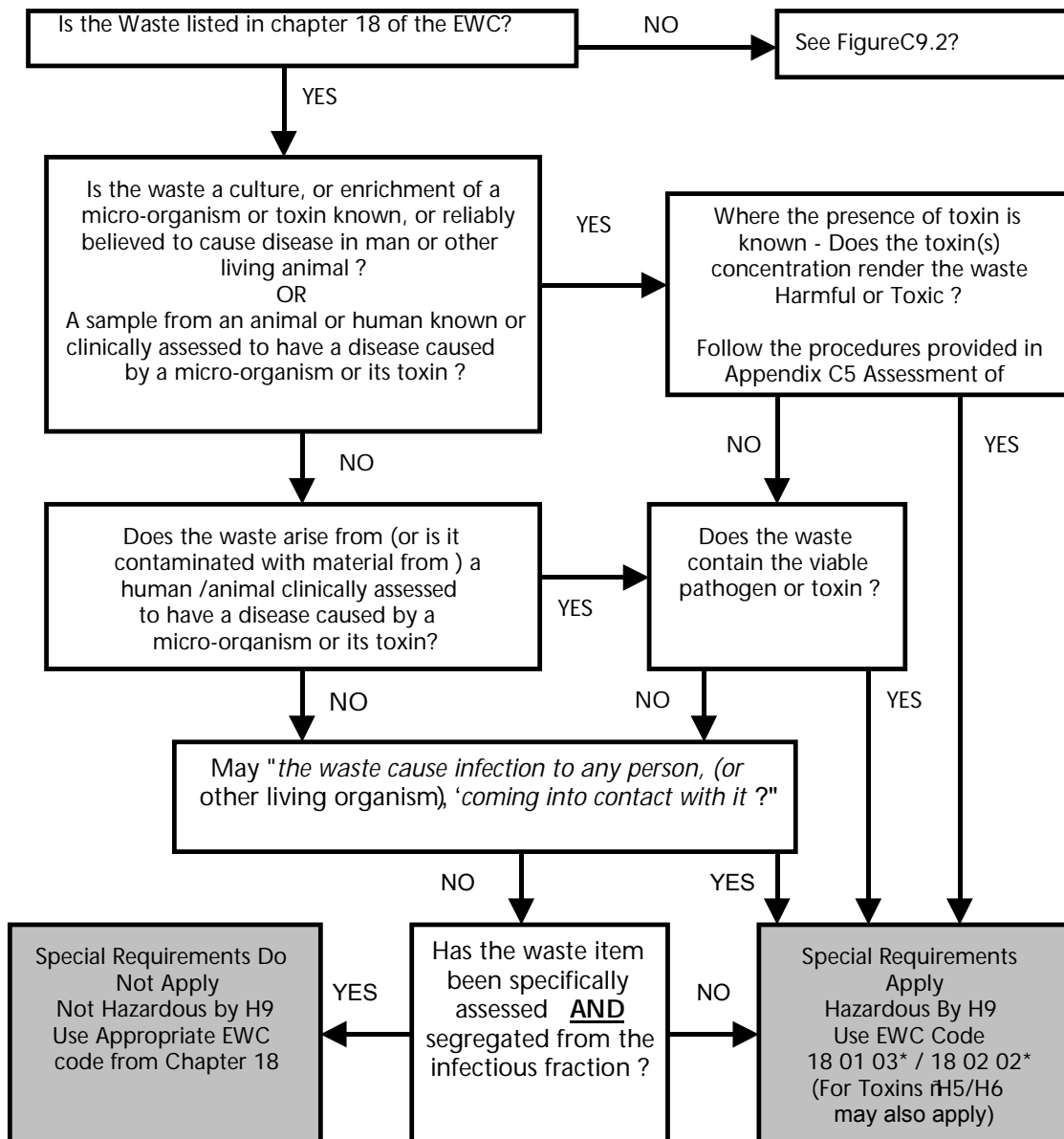
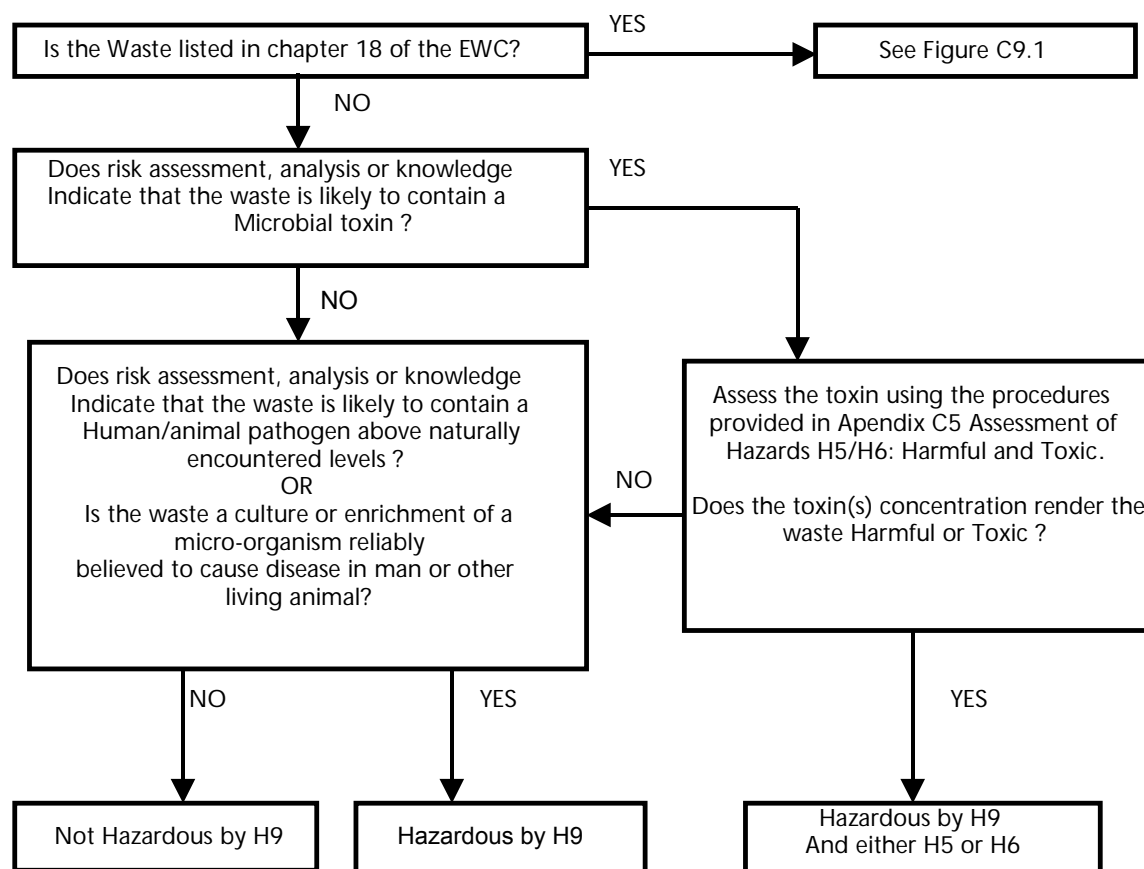


Figure C9.2: Potentially infectious wastes from other sources (Chapters 17, 19 and 20)



### C9.6 Test Methods

The potential hazards posed by different types of wastes are not fully documented and tests to quantitatively define all hazards associated with wastes do not exist.

Micro-organisms may not be distributed homogenously throughout a waste stream. Sampling must therefore be representative of, and appropriate to, the waste stream. Additionally, any analysis should only be carried out at a suitably accredited laboratory, using relevant and appropriate analytical methods.

Table C9.1: Examples From Chapter 18 of the EWC rHealthcare Wastes (see Figure C9.1 for assessment procedure)  
(Note: This is not an inclusive list)

Source	Special Requirements Apply (Hazardous by H9)	Special Requirements DO NOT apply
General Principles	<p><b>Clinical (or animal healthcare) Waste which has not been subject to specific assessment and segregation protocols to remove waste subject to special requirements.</b></p> <p>The specifically segregated "special requirements" fraction.</p>	<ul style="list-style-type: none"> <li>Non-clinical Healthcare waste where the "special requirements" fraction has been removed following item and/or patient specific assessment and segregation .</li> </ul>
Healthcare premises, (Hospital, Veterinary practice, dentist, veterinary practice, Nursing home)	<p>Clinical (or animal healthcare) waste arising from a patient clinically assessed or known to have a disease caused by a micro-organism or its toxin. <b>Where the causal pathogen or toxin is present in the waste</b> For example</p> <ul style="list-style-type: none"> <li>Waste from infectious disease cases.</li> <li>Waste from wound infections and other hospital acquired infections.</li> <li>hygiene products from patients in with UTI infections.</li> <li>Waste from patients with diarrhoea and vomiting caused by infectious agents or toxins. For example Norwalk and <i>Clostridium difficile</i> .</li> <li>Blood contaminated dressings from a patient with HIV, Hepatitis B, rubella, measles, mumps, influenza or other infection that may be present in the blood.</li> <li>Respiratory materials from patients with Pulmonary Tuberculosis, Influenza, RSV or other respiratory infections.</li> <li>Contaminated waste from provision of general healthcare care to patients with known or suspected underlying or secondary microbial diseases.</li> </ul> <p><b>Healthcare waste that may cause infection to any person (or other living organism) coming into contact with it.</b></p>	<ul style="list-style-type: none"> <li>Non-clinical Healthcare waste where the "special requirements" fraction has been removed following item and/or patient specific assessment and segregation .</li> </ul>

**Table C9.1: Examples From Chapter 18 of the EWC rHealthcare Wastes (see Figure C9.1 for assessment procedure)**  
 (Note: This is not an inclusive list)

Source	Special Requirements Apply (Hazardous by H9)	Special Requirements DO NOT apply
<b>Community</b>	<p>Clinical (or animal healthcare ) waste arising from a patient with a disease caused by a micro-organism or is toxin .</p> <ul style="list-style-type: none"> <li>• A contaminated dressing from a leg ulcer with a bacterial infection arising from provision of healthcare in the home</li> <li>• Contaminated clinical waste hygiene products from patients in Residential homes with UTI infections.</li> </ul> <p><b>Healthcare waste that may cause infection to any person (or other living organism) coming into contact with it.</b></p>	<ul style="list-style-type: none"> <li>• Non-clinical Healthcare waste where the "special requirements" fraction has been removed following item and /or patient specific assessment and segregation .</li> <li>• See also Municipal Waste examples .</li> </ul>
	<p>Human/animal hygiene waste that a healthcare worker has identified as healthcare waste is subject to assessment.</p> <ul style="list-style-type: none"> <li>• Dog faeces from a boarding kennels with an outbreak of gastrointestinal disease diagnosed by a veterinarian</li> <li>• A childcare nursery with an outbreak of gastrointestinal disease diagnosed by a healthcare worker.</li> </ul>	<p>Non-clinical Human/animal hygiene waste that is classified under chapter 20 of the EWC is not subject to assessment for H9 .</p> <ul style="list-style-type: none"> <li>• Dog faeces from community collection bins</li> <li>• Feminine hygiene waste from public toilets</li> </ul> <p>This waste would only be subject to assessment if a considered to be healthcare waste ( classified under chapter 18 of the EWC)</p>
<b>Laboratory waste</b> (including microbiological waste from colleges, environmental and food analysis)	<p>Cultures of human and animal pathogens, or solutions of their toxins (above threshold concentration)</p> <p>Clinical samples from source individuals known or clinically assessed to have a microbial disease, which contain the causal pathogen or toxin</p> <p>Healthcare waste that may cause infection to any person (or other living organism) coming into contact with it</p>	<p>Clinical samples from source individuals not known or clinically assessed to have a microbial disease, <b>and</b> that do not fall within the 'may cause infection to any person (or other living organism) coming into contact with it' definition</p>
<b>Medicines</b>		<p>Medicines are hazardous only where they are considered to be Cytotoxic and Cytostatic.</p>



**Table C9.2: Examples From Chapters 1 to 17, 19 and 20 of the EWC rNon-Healthcare Wastes (see Figure C9.2 for assessment procedure)**  
(Note: This is not an inclusive list)

Source	Infectious - Hazardous by H9	Not Hazardous by H9
<b>Construction and demolitions wastes</b>	<p>Canal dredgings, or surface skimmings, from a site where a cyanobacterial bloom has occurred AND where risk assessment or analysis indicates a toxin above the appropriate threshold concentration.</p> <p>Sludges from an industrial effluent plant where industrial or commercial activity has increased the numbers or ranges of pathogens normally present.</p>	<p>Canal dredgings where risk assessment identified no evidence that a cyanobacterial bloom has occurred.</p> <p>Sludges from waste water treatment for a generally healthy population.</p>
<b>Municipal Waste</b>		<p>Mixed municipal waste ( black bag), 20 03 01, is non-hazardous.</p> <p>Clinical waste classified in chapter 20 of the EWC2002 (that does not arise from Human or Animal Healthcare and/or related research.) and is therefore not subject to assessment</p> <ul style="list-style-type: none"> <li>• Sharps litter from substance abuse (20 01 99)</li> <li>• Sharps waste from cosmetic body piercing and application of tattoos. (20 01 99)</li> </ul> <p>This waste is still subject to a requirement to be rendered safe .</p> <p>(This does not include community healthcare waste, for example diabetic sharps, which should be classified under chapter 18 and are subject to assessment .)</p>