



Manual on Classification of Waste

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Activity 1





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1.Introduction

What is the purpose of this guidance document?

- Assistance for authorities and companies
- Definition and classification of waste.
- Discrimination of mirror entries





2. Approach for waste classification

The European Waste Catalogue (EWC) is the key document for classification of waste.

- Absolute hazardous (AH) entry, marked with an asterisk (*)
- Absolute non-hazardous (ANH) entry
- Mirror entry (M)

(842 entries, 408 hazardous, 434 non hazardous, 180 mirror entries)





2. Approach for waste classification

Step 1:

Is the WFD applicable?

Step 2:

Which entry of the European Waste Catalogue is applicable?

Step 3:

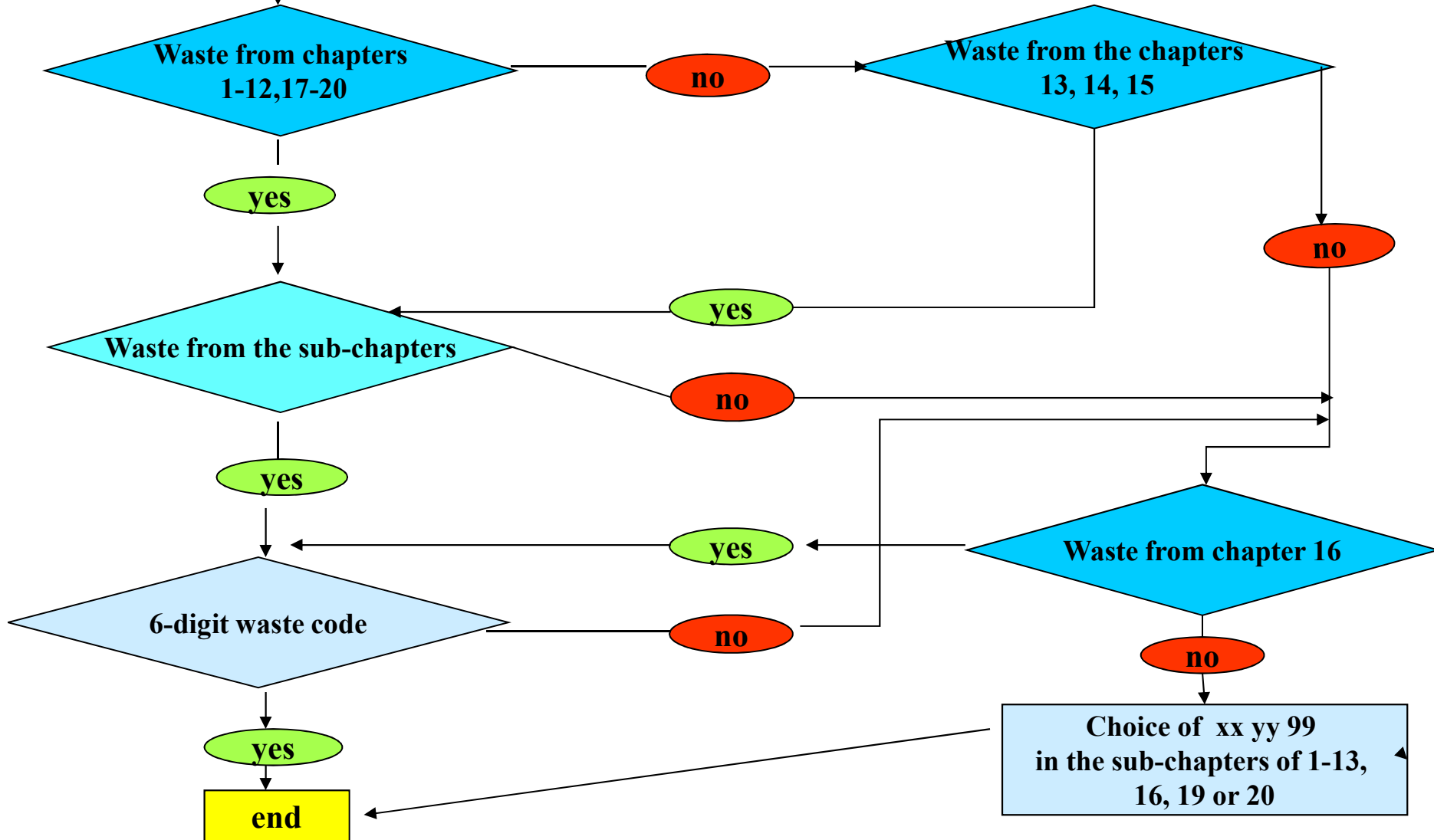
In case of mirror entries - Is the waste a hazardous or non-hazardous waste?





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2. Approach for waste classification

Step 4:

Does the waste display any of the hazardous properties HP1 to HP15?

Step 5:

Is it likely or known that the waste contains any of the POPs?





3. Hazardous Properties

CLP-Regulation (Classification, Labelling and Packaging) (EG) Nr. 1272/2008 provides the criteria to assess the physical, human health and environmental hazards of substances.

- **Hazard statement code:** the code assigned to the hazard class and category; (e.g. a carcinogen could be H350 or H351)
- **Hazard Class:** the nature of the hazard; (e.g. a carcinogenic is 'Carc.')
- **Hazard Category:** a sub-category of the hazard class that describes the severity of the hazard; (e.g. a carcinogen could be 1A, 1B or 2)

(s. Annex VI to the CLP)





4. Approach to determine hazard properties

- HP1 Explosive
- HP2 Oxidising
- HP3 Flammable
- HP4 Irritant – skin irritation and eye damage
- HP5 Specific Target Organ Toxicity (STOT)/
Aspiration Toxicity
- HP6 Acute Toxicity





4. Approach to determine hazard properties

- HP7 Carcinogenic
- HP8 Corrosive
- HP9 Infectious
- HP10 Toxic for reproduction
- HP11 Mutagenic
- HP12 Release of an acute toxic gas





4. Approach to determine hazard properties

- HP13 Sensitizing
- HP14 Ecotoxic
- HP15 Waste capable of exhibiting a hazardous property listed above not directly displayed by the original waste





4. Approach to determine hazard properties

Hazardous Property		Hazard Statement Code and Concentration Limit	
HP1 ⁵	Explosive	Substance	H200, H201, H202, H203, H204, H240, H241
HP2	<u>Oxidising</u>	Substance	H270, H271, H272
HP3 ⁶	Flammable	Substance	H220, H221, H222, H223, H224, H225, H226, H228, H242, H250, H251, H252, H260, H261
HP4	Irritant – skin irritation and eye damage	Sum of the concentration of all substances	Sum of all substances with H314: > 1% Sum of all substances with H318: > 10% Sum of all substances with H315 and H319: > 20%
HP5	Specific Target Organ Toxicity (STOT)/Aspiration Toxicity	Substance	STOT SE 1-3: H370, H371, H335 >1% >10% >20% STOT RE 1-2: H372, H373: >1% >10% Asp. <u>Tox.</u> : H304: > 10%
HP6	Acute Toxicity	Sum of the concentration of all substances	Acute <u>Tox.</u> Oral 1-4: H300, H301, H302: >0,1%, 0,25%, 5%, 25% Acute <u>Tox.</u> Dermal 1-4: H310, H311, H312: >0,25%, 2,5%, 15%, 55% Acute <u>Tox.</u> Inhal. 1-4: H330, H331, H332: >0,1%, 0,5%, 3,5%, 22,5%
HP7	Carcinogenic	Substance	H350: > 0,1%, H351: > 1%
HP8	Corrosive	Sum of the concentration of all substances	Substances with H314 > 5%
HP9	Infectious		





4. Approach to determine hazard properties

Hazardous Property		Hazard Statement Code and Concentration Limit	
HP10	Toxic for Reproduction	Substance	H360: > 0,3%, H361: >3%
HP11	Mutagenic	Substance	H340: >0,1%, H341: >1%
HP12	Release of an acute toxic gas	Substance	EUH029, EUH031, EUH032
HP13	Sensitising	Substance	H317, H334: >10%
HP14	<u>Ecotoxic</u> : Aquatic Toxicity <u>Ecotoxic</u> : Damage to ozone layer		H400, H410, H411: >0,25%, H412: >2,5%, H413: >25% H420: > 0,1%
HP15	Waste capable of exhibiting a hazardous property listed above not directly displayed by the original waste		H205, EUH001, EUH019, EUH044 Leachate values in accordance with table 15





5. Sampling and Chemical Analysis of Waste

- There is an European Framework on Waste Sampling (CEN/TC 15310 Part 1-5) and National Standards and Guidelines (Germany: LAGA PN 98)
- In the Council Regulation(EC) No. 440/2008 are laying down test methods pursuant to Regulation (EC) No. 1907/2006 (REACH)
- There are a number of standardized analysis methods, that can be used.





6. Step by Step approach for Assessment of Hazardous Properties in Practise

In the individual decision to classify a waste all available information are taken into account, in particular:

- Description of the waste origin, its composition, origin and handling
- Safety data sheet of the substances in processes used
- Classification and labeling of intermediate and end products
- Documentation of known waste analyzes





6. Step by Step approach for Assessment of Hazardous Properties in Practise

Step 1: Investigation of the leachate

The chemical analysis of the aqueous leachate will provide the information whether the waste is displaying the hazardous property **HP15**.

Is the concentration of all parameters lower than the respective limit value, the hazardous properties HP1 to HP14 are examined.





6. Step by Step approach for Assessment of Hazardous Properties in Practise

Step 1: Investigation of the leachate

Parameter	Concentration Limit for Eluates [mg/l]
Antimony	> 0,07
Arsenic	> 0,2
Barium	> 10
Lead	> 1
Cadmium	> 0,1
Chrome, total	> 1
Copper	> 5
Nickel	> 1
Mercury	> 0,02
Selenium	> 0,05
Zinc	> 5
Cyanide, easily purgeable	> 0,5
Phenole	> 50





6. Step by Step approach for Assessment of Hazardous Properties in Practise

Step 2: Investigation of the Waste Composition (Total Contents of Parameters)

These parameters are to use for the chemical analysis of waste and the subsequent review for the assessment as hazardous or non-hazardous.





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Concentration Limit for Total Contents [mg/kg]

Parameter	Concentration limit for total contents [mg/kg]
Metals	
Vanadium	25,000
Antimony	25,000
Copper	2,500
Cobalt	2,500
Silver	2,500
Barium	2,500
Zinc	2,500
Lead	2,500
Selen	2,500
Arsenic	1,000
Nickel	1,000
Chrome, Chrome-VI-compounds	1,000
Tin, organic compounds	1,000
Cadmium	1,000
Beryllium	1,000
Thallium	1,000
Mercury	1,000
Organic compounds	
Petroleum-derived hydrocarbon	1,000
Volatile halogenated hydrocarbons	1,000
BTEX	1,000
Polycyclic aromatic hydrocarbon (PAH)	1,000
Benzo(a)pyren	50
PCP	5
POP, without PCB, PCDD/PCDF, PBDE und PFOS	50
PCB	50
Tetra-, Penta-, Hexa- und Hepta-BDE (Sum)	1000
PFOS	10
PCDD/PCDF	0,001
Others	
Pesticides	2,500
Artificial mineralfibres	1,000
Cyanides	1,000
Cyklial Amine	1,000





6. Step by Step approach for Assessment of Hazardous Properties in Practise

Step 2: Investigation of the Waste Composition (Total Contents of Parameters)

For metals this system applies only, if the concrete metal compound is unknown.

Otherwise applies the next Table for metal compounds with the concentration values therein laid down:





7. Specific Components of Specific Waste Types

Metals

Heavy metal means any compound of antimony, arsenic, cadmium, chromium (VI), copper, lead, mercury, nickel, selenium, tellurium, thallium and tin, as well as these materials in metallic form, as far as these are classified as hazardous substances.





7. Specific Components of Specific Waste Types

Organic Parameters

Mineral Oil Hydrocarbon (MOH)

MOH covers the 10 to 40 Carbon atoms (C10 to C40), MOH with 10 to 22 Carbon atoms (C10 to C22) are mobile hydrocarbons.

- limit value of 0,1 % (1.000 mg/kg) on the single substance for the classification as hazardous (Hazardous Property HP7)





7. Specific Components of Specific Waste Types

Organic Parameters

Polycyclic Aromatic Hydrocarbons (PAH)

Only 16 PAH after EPA (US-Environmental Protection-Agency) are investigated by chemical analysis.

- limit value of 0,1 % (1.000 mg/kg) on the single substance for the classification to be hazardous
- Benzo[a]pyrene as a marker compound for carcinogenicity for certain coal tar entries (limit value of 0,005 % = 50 mg/kg for classification to be hazardous)





7. Specific Components of Specific Waste Types

Organic Parameters

PCB

- PCBs include 209 individual substances. Six of the most relevant PCB congeners are used as so-called Ballschmiter congeners in the conventional analysis (PCB-28, -52, -101, -138, -153, -180).
- Wastes with a concentration limit of 0,005 % (50 mg/kg) PCB are PCB-containing wastes.





7. Specific Components of Specific Waste Types

Organic Parameters

BTEX

- BTEX (acronym for Benzene, Toluene, Ethylbenzene and Xylene) is a group of related volatile organic compounds.
- Benzene as the substance with the highest danger potential is the main parameter with a concentration limit of 0,1 % (1.000 mg/kg), resultant from its carcinogenic effect (HP7).





7. Specific Components of Specific Waste Types

Organic Parameters

Volatile Hydrocarbons (VHC)

Because of the chemical classification of the most of VHCs as specific target organ toxic, acute toxic, carcinogen and ecotoxic (Ocone) the concentration limit for the classification of VHC-containing wastes is 0,1 % (1.000 mg/kg).





7. Specific Components of Specific Waste Types

Organic Parameters

Persistent Organic pollutions (POPs)

In Annex IV of the EU-Directive 850/2004 a concentration limit of 0,005 % (50 mg/kg) is fixed, from this POP-contained wastes are to be destroyed basically.

Meanwhile, hexachlorobutadiene, polychlorinated naphthalenes, short-chain chlorinated paraffins, endosulfan were included in the EC regulation 850/2004.

For **PBDE** a concentration limit value of **0.1 % (1000 mg/kg)**, and **PFOS** of **0.001 % (10 mg/kg)** was set as the limit.





7. Specific Components of Specific Waste Types

Organic Parameters

Others

- For unknown pesticides, a concentration limit on the chemical classification for ecotoxic of 2,5 % (2.500 mg/kg) is applied.
- For materials containing asbestos in the chemical assessment the concentration limit is 1.000 mg/kg because of the carcinogenicity.
- For cyanide containing wastes, in particular from metallurgical and galvanic processes and organic synthesis processes, concentration limit of 0,1 % (1.000 mg/kg) is applied.
- For the classification of amine (derivatives of ammonia with alkyl or aryl groups) containing wastes a concentration limit of 0,1 % (1.000 mg/kg) is applied because of the carcinogen properties of certain amines.





References and useful information sources

- [LAGA 2012] Bund/Länder-Arbeitsgemeinschaft Abfall (2012): LAGA-Methodensammlung Abfalluntersuchung, Dresden, Germany
- UN-RTDG Manual on Test and Criteria
http://www.unece.org/trans/danger/publi/manual/rev5/manrev5-files_e.html
- ECHA>Information on Chemicals
<https://echa.europa.eu/information-on-chemicals>
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Thank you for yor attention!

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