
ANNEX	5
1. QUESTIONNAIRE	5
PART 1: GENERAL INFORMATION	6
Contact person	6
PART 2: TRANSPOSITION AND APPLICATION OF THE LOW	6
PART 3: PRACTICAL APPLICATION	7
Classification problems	7
Need for additional waste codes	7
Unnecessary waste codes	7
Structure of the LoW	8
PART 4: APPLICATION OF HAZARD CRITERIA AND MIRROR ENTRIES	8
Property H9 "Infectious"	8
Property H12 "Release of toxic or very toxic gases"	8
Property H13 "Substances which, after disposal, yield other substances with characteristics listed above"	9
Property H14 "Ecotoxic"	9
Properties H3 to H8, H10 and H11	9
PART 5: LABORATORY ANALYSES	9
PART 6: OTHER REMARKS	10
2. DISTRIBUTION LISTS FOR QUESTIONNAIRE SURVEY	11
2.1. DISTRIBUTION LIST TO TAC MEMBERS	11
2.2. DISTRIBUTION LIST TO PERMANENT REPRESENTANTS OF MEMBER STATES	12
2.3. DISTRIBUTION LIST TO STAKEHOLDERS	13
3. RETURNS TO THE QUESTIONNAIRE SURVEY	15
3.1. RETURNS FROM MEMBER STATES TO THE QUESTIONNAIRE SURVEY	15
3.2. RETURNS FROM ASSOCIATIONS TO THE QUESTIONNAIRE SURVEY	16
3.3. RETURNS FROM ENTERPRISES TO THE QUESTIONNAIRE SURVEY	17
4. ANALYSIS OF STATISTICAL INFORMATION	18
4.1. DISTRIBUTION LIST FOR REQUEST OF STATISTICAL INFORMATION	18
4.2. RETURNS TO THE REQUEST OF STATISTICAL INFORMATION	19
4.3. STATISTICAL DATA FOR WASTE ITEMS ACCORDING TO WSTATR, ANNEX I	20
4.4. EWC-STAT AND CORRESPONDING LOW-CODES	21
4.5. OVERVIEW OF COLLECTED DATA	25
4.6. FREQUENCY OF USAGE AND DESCRIPTIVE PARAMETERS OF SHARE FROM NATIONAL AMOUNT BY SIX-DIGIT CODE FROM LOW - NON-HAZARDOUS WASTES	26
4.7. FREQUENCY OF USAGE AND DESCRIPTIVE PARAMETERS OF SHARE FROM NATIONAL AMOUNT BY SIX-DIGIT CODE FROM LOW - HAZARDOUS WASTES	36
4.8. FREQUENCY OF USAGE AND DESCRIPTIVE PARAMETERS OF SHARE FROM NATIONAL AMOUNT BY SIX-DIGIT CODE FROM LOW - 99-CODES	45

4.9. FRACTIONS OF AMOUNTS OF 99-CODES PER COUNTRY AND YEAR AS PERCENTAGE OF TOTAL AMOUNTS - BY SUB-CHAPTER.....	47
4.10.FREQUENCY OF WASTE-CODES NOT USED PER COUNTRY AND YEAR AS PERCENTAGE OF AVAILABLE NUMBER OF CODES - BY SUB-CHAPTER.....	49
4.11.LOW CODES WITH LOWEST USAGE AND SMALLEST AMOUNTS, INCLUDING DESCRIPTIVE PARAMETERS OF SHARE FROM NATIONAL AMOUNT – HAZARDOUS WASTE.....	52
4.12.LOW CODES WITH LOWEST USAGE AND SMALLEST AMOUNTS, INCLUDING DESCRIPTIVE PARAMETERS OF SHARE FROM NATIONAL AMOUNT – NON-HAZARDOUS WASTE.....	54
4.13.LOW CODES WITH LARGEST AMOUNTS, INCLUDING DESCRIPTIVE PARAMETERS OF SHARE FROM NATIONAL AMOUNT	56
5. LIST OF GUIDANCE DOCUMENTS AND TOOLS.....	58
6. DETAILS FOR ASSESSMENT OF GUIDANCE DOCUMENTS.....	61
6.1. PRIMARY ASSESSMENT SCHEME	61
6.2. TRANSLATED FLOW SCHEME ACCORDING TO EUROPESE AFVALSTOFFENLIJST EURAL HANDLEIDING [BE 2004].....	66
6.3. TRANSLATED PART OF THE FLOW SCHEME ACCORDING TO EUROPESE AFVALSTOFFENLIJST (EURAL) HANDREIKING EURAL [NL 2001A].....	67
6.4. EXCERPT FROM SPANISH MINISTRY ORDER OF 13 TH OCTOBER 1989 ON THE DETERMINATION OF CHARACTERIZATION METHODS FOR TOXIC AND HAZARDOUS WASTE	68
6.5. EXCERPT FROM THE EUROPEAN WASTE CATALOGUE AND HAZARDOUS WASTE LIST (IRELAND) AND FROM EXCERPT FROM WASTE MANAGEMENT ACT, 1996	69
7. DETAILED INFORMATION ON TRANSPOSITION OF DECISION 2000/532/EC.....	75
7.1. NATIONAL WASTE CODES OF POLAND	75
7.2. NATIONAL WASTE CODES OF ESTONIA	77
7.3. NATIONAL ADAPTATIONS TO THE LOW IN FINLAND	79
8. DETAILED INFORMATION ON H9.....	81
8.1. GERMAN PROTECTION AGAINST INFECTION ACT SECTION7	81
8.2. VERORDNUNG ÜBER ANZEIGEPFLICHTIGE TIERSEUCHEN TIERSEUCHANZV (GERMAN ORDINANCE ON NOTIFIABLE ANIMAL EPIDEMICS)	83
8.3. VERORDNUNG ÜBER MELDEPFLICHTIGE TIERKRANKHEITEN (MTIERKRHTV) (GERMAN ORDINANCE ON NOTIFIABLE ANIMAL DISEASES)	84
8.4. DECISION TREE FOR HEALTHCARE WASTES ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C FIGURE A [UK 2006]	85
8.5. DECISION TREE FOR POTENTIALLY INFECTIOUS WASTES FROM OTHER SOURCES ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C FIGURE B [UK 2006]	86
8.6. OVERVIEW FOR CLASSIFICATION OF HEALTHCARE WASTES ACCORDING TO LAGA (2002)	87
8.7. OVERVIEW OF ANSWERS TO THE QUESTIONNAIRE SURVEY REGARDING H9.....	88
9. DETAILED INFORMATION ON H12.....	99
9.1. EXAMPLES OF SUBSTANCES WHICH MAY CAUSE A WASTE TO EXHIBIT HAZARD H12 ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C TABLE C12.2 [UK 2006]	99
9.2. EXAMPLES OF TOXIC GASES WHICH MAY CAUSE A WASTE TO EXHIBIT HAZARD H12 ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C TABLE C12.1 [UK 2006]	100

9.3. SUMMARY OF RELEVANT TEST METHODS FOR THE APPLIED RISK PHRASES ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C TABLE C12.3 [UK 2006].....	100
9.4. OUTLINE OF METHOD DEVELOPED FOR MEASUREMENT OF SO ₂ EVOLVED WHEN A WASTE IS IN CONTACT WITH AN ACID ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C12 ANNEX 1 [UK 2006]	100
9.5. CALCULATION METHOD FOR H12 ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C12 [UK 2006]	101
9.6. OVERVIEW OF ANSWERS TO THE QUESTIONNAIRE SURVEY REGARDING H12	102
10. DETAILED INFORMATION ON H13	108
10.1.LIMIT VALUES FOR DIFFERENT PARAMETERS FOR CLASSIFICATION OF H13 FROM DIFFERENT SOURCES – TOTAL CONTENT	108
10.2.LIMIT VALUES FOR DIFFERENT PARAMETERS FOR CLASSIFICATION OF H13 FROM DIFFERENT SOURCES – ELUATE	109
10.3.DECISION TREE FOR THE ASSESSMENT PROCESS FOR HAZARDS H13 ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C FIGURE C13.1 [UK 2006].....	112
10.4.OVERVIEW OF ANSWERS TO THE QUESTIONNAIRE SURVEY REGARDING H13	112
11. DETAILED INFORMATION ON H14	117
11.1.ASSESSMENT OF H14 – LIMITING CONCENTRATIONS AND CALCULATION METHODS FOR THE AQUATIC ENVIRONMENT ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C [UK 2006].....	117
11.2.DECISION TREE FOR THE ASSESSMENT PROCESS FOR HAZARDS H14 ACCORDING TO TECHNICAL GUIDANCE WM 2.1 APPENDIX C FIGURE C14.1 [UK 2006].....	118
11.3.ECOTOXICAL APPROACH ACCORDING TO METHODOLOGICAL GUIDE WASTE CLASSIFICATION APPENDIX 3 [FNADE 2003].....	119
11.4.EXOTOXICITY TESTS ON WASTE ACCORDING TO METHODOLOGICAL GUIDE WASTE CLASSIFICATION STAGE 4 [FNADE 2003].....	120
11.5.OVERVIEW OF ANSWERS TO THE QUESTIONNAIRE SURVEY REGARDING H14	120
12. DETAILED INFORMATION ON H7	129
12.1.DEFINITIONS OF CATEGORIES FOR CLASSIFICATION OF H7 ACCORDING TO COUNCIL DIRECTIVE 67/548/EEC	129
12.2.CONCENTRATION LIMITS FOR METAL COMPOUNDS ACCORDING TO TABLE 7 [DE 2005]	130
12.3.CRITERIA FOR HAZARDOUS PROPERTY H13 ACCORDING TO ANNEX III [DE 2005]	131
12.4.TESTING METHODS FOR HEAVY METALS AND ORGANIC SUM PARAMETERS IN SOLIDS AND IN ELUATE ACCORDING TO [DE 2005]	131
13. PROPOSAL FOR ADDITIONAL WASTE CODES/ SECTIONS AND AMENDMENTS OF EXISTING WASTE CODES/ SECTIONS	134
13.1.PROPOSALS FROM MEMBER STATES AND STAKEHOLDERS	134
13.2.PROPOSALS CONCERNING WEEE PROVIDED BY WEEE FORUM.....	150
14. PROPOSALS OF UNNECESSARY WASTE CODES.....	152
15. CLASSIFICATION OF BATTERIES	154

Annex

1. Questionnaire

Questionnaire on the Implementation of the European list of waste (LoW) as established by Commission Decision 2000/532/EC¹

Preliminary remarks

The questionnaire covers a wide range of questions with regard to the application of the European Waste List (LoW). We kindly ask you to distribute the questionnaire to other institutions, stakeholders and experts that might be able to contribute to all or to some of the questions.

Please fill in the questionnaire electronically and insert as many lines as needed for your answers.

Wherever it is more convenient for you to provide information in separate documents than to complete the questionnaire please feel free to do so.

If you should refer in your answers to legal or other documents we kindly ask you to send these documents together with the questionnaire or to provide information on where the documents are available (e.g. link for download, institution, etc.).

Your institution might have commented on some aspects of the questionnaire already in previous studies or directly to the Commission. If this should be the case please feel free to attach the previous answers instead of completing the respective questions again, or indicate in which context and to whom the information had been provided.

In case the questionnaire is completed by a sub-national institution the term "country" should generally be understood as the geographic area to which the provided information refers.

We kindly ask you to return the questionnaire by 30. November 2007 to the contact address below. If you should have any questions please don't hesitate to contact us.

Contact: ARGUS GmbH, Franklinstr. 1, D-10587 Berlin, Germany
Juergen Gonser
Phone: +49 30 398060-0
Fax: +49 30 398060-55
Email: juergen.gonser@argus-statistik.de

¹ Commission Decision 2000/532/EC of 3 May 2000 (OJ L 226, 6.9.2000, p.3), last amended by Council Decision 2001/573/EC of 23 July 2001 (OJ L 203, 28.7.2001, p.18)

Part 1: General information

Information on the institution

- (1) *Name of the institution:*
- (2) *Department/Unit:*
- (3) *Street / no.:*
- (4) *Postal code / city:*
- (5) *Please describe briefly the tasks of the institution. Focus on those tasks that are related to the application of the European Waste List.*

Contact person

- (6) *Name:*
- (7) *Position within the institution:*
- (8) *Phone:*
- (9) *Email:*

Part 2: Transposition and application of the LoW

- (10) *When did the European Waste List (LoW) become effective in your country for the permitting of treatment, recovery and disposal facilities and for the permitting of waste transports?*
- (11) *Has the LoW been adapted to national requirements in the course of transposition, e.g. by modifications of individual waste codes or by introduction of new waste code?*
If yes, please describe the differences compared to the wording of Decision 2000/532/EC.
- (12) *Has the classification procedure laid down in point 3 of the introduction to the Annex to Decision 2000/532/EC been modified in any way?*
If yes, please describe the modifications compared to Decision 2000/532/EC.
- (13) *Do there exist official guidance documents or tools in your country / region that are intended to support authorities and/or enterprises in the application of the LoW?*
If yes, please name the document(s) / tool(s) and send them together with the completed questionnaire. If you cannot provide the document(s) for some reason then please give an overview of the character and the contents of the document(s) (target group, scope of the document, legal status, volume, date of publication, ...) and indicate where the document is available.

Part 3: Practical application

Classification problems

- (14) *Which are according to your experience the most serious classification problems resulting from LoW application?*

Please describe the problems and the concerned waste codes or materials. Sort the problems according to their relevance starting with the most serious one.

Specify the extent and the possible impact of the listed classification problems (e.g. frequency of the problem, burden to companies / administration, possible environmental impacts through misclassification, etc.)

Describe how the listed problems are handled in practice.

Need for additional waste codes

- (15) *Do you think there is a need for the introduction of additional waste codes in the LoW?*

- (a) If yes, please list the waste types for which new codes should be added.
- (b) Please specify the characteristics (consistency, composition, hazard properties) and the origin (economic sector, technical process) of these waste types.
- (c) Please indicate to which waste codes the proposed waste types are assigned at present.

- (16) *Do you think there is a need for the introduction of additional sections or chapters in the LoW?*

If yes, please specify the sections/chapters that should be added and give the reasons why they should be added.

- (17) *The LoW contains 69 waste codes with the ending "99" which are dedicated to non-hazardous waste types that cannot be assigned elsewhere.*

- (a) Please indicate which of the 99-codes are used in your country and give the respective quantities (annually generated amounts, preferably for year 2004).
- (b) Which types of waste are allocated to the 99-codes in your country? Please specify the characteristics (consistency, composition, hazard properties, ...) and the origin (economic sector, technical process) of these waste types for each of the 99-codes used.
- (c) Do you consider the 99-codes as helpful or as problematic? Please describe the advantages and problems according to your experience.

- (18) *The LoW currently contains one waste code with the ending "98*" ² which is dedicated to hazardous waste that cannot be assigned elsewhere.*

- (a) Do you think the introduction of 98*-codes in other sections of the LoW would be helpful? If yes, please describe the cases in which 98*-codes would be desirable.
- (b) Which problems do you see if additional 98*-codes should be introduced? Please describe.

Unnecessary waste codes

- (19) *Which of the about 840 waste codes of the LoW are not used in your country? Please list the respective waste codes.*

² 11 01 98* Other wastes containing dangerous substances

-
- (20) *Does the LoW contain waste codes, sections or whole chapters that should be deleted according to your experience? If yes, please list these codes, sections or chapters and specify the reasons why they should be deleted.*

Structure of the LoW

- (21) *The structure of the LoW in its present form is under discussion from different sides. The main criticism refers to:*
- the lack of a hierarchical structure that would allow a meaningful aggregation of waste types;
 - the use of the origin of waste as a structuring element;
 - the non-compatibility with the structure of Annex VIII and IX of the Basel Convention.

Assuming that the structure of the LoW will be revised, which structural changes would you consider as most important? Please feel free to outline your ideas.

- (22) *Do you consider the LoW a suitable classification for the compilation of waste statistics? What should be changed or improved in this regard according to your opinion? Please describe.*

Part 4: Application of hazard criteria and mirror entries

Property H9 "Infectious"

- (23) *Does there exist a definition of the hazard criteria H9 'infectious' in your country?*
- (a) If yes, please give the definition:
 - (b) Are there specific definitions for different waste categories (e.g. health care waste, animal testing waste, ...)? If yes, please specify.
- (24) *Which methods are used to determine whether a waste should be classified as hazardous on account of the criterion H9? Please describe the decision criteria and/or other approaches used, if necessary for the different categories of waste.*
- (25) *What is your experience with the definition and the methods applied? What are the advantages and shortcomings? Please give an assessment, in particular with regard to the relevance of the results and the (analytical) burden on the health care sector and on companies.*
- (26) *For which waste types the property H9 might be relevant according to your experience? Please name the LoW-codes.*

Property H12 "Release of toxic or very toxic gases"

- (27) *Is the criterion H12 applied in your country?*
- (28) *Which methods are used to determine whether a waste should be classified as hazardous on account of the criterion H12?*
- (a) Please describe the test methods and/or other approaches used.
 - (b) If analytical methods are applied:
 - which parameters are analysed?
 - which concentration levels are applied?
- (29) *What is your experience with the applied methods? What are the advantages and shortcomings? Please give an assessment, in particular with regard to the relevance of the results and the (analytical) burden on companies.*
- (30) *For which waste types the property H12 might be relevant according to your experience? Please name the LoW-codes.*

Property H13 “Substances which, after disposal, yield other substances with characteristics listed above”

- (31) *Is the criterion H13 applied in your country?*
- (32) *Which methods are used to determine whether a waste should be classified as hazardous on account of the criterion H13?*
 - (a) Please describe the calculation, the test methods and/or other approaches used.
 - (b) If analytical methods are applied:
 - which parameters are analysed?
 - which limit values are set for the release of toxic gases?
- (33) *What is your experience with the applied methods? What are the advantages and shortcomings? Please give an assessment, in particular with regard to the relevance of the results and the (analytical) burden on companies.*
- (34) *For which waste types the property H13 might be relevant according to your experience? Please name the LoW-codes.*

Property H14 “Ecotoxic”

- (35) *Is the criterion H14 applied in your country?*
- (36) *Which definitions are used to define “ecotoxicity” and on which legal documents are they based?*
- (37) *Which methods are used to determine whether a waste should be classified as hazardous on account of the criterion H14?*
 - (a) Please describe the test methods and/or other approaches used.
 - (b) If test methods are applied:
 - which parameters are analysed?
 - which concentration levels are applied?
- (38) *What is your experience with the applied methods? What are the advantages and shortcomings? Please give an assessment, in particular with regard to the relevance of the results and the (analytical) burden on companies.*
- (39) *Can you give examples of waste types that are classified as hazardous on account of criterion H14 but would not be considered as hazardous according to any other H-criteria? If yes, please name the LoW-codes.*

Properties H3 to H8, H10 and H11

- (40) *Which problems do you encounter in the application of the hazard criteria H3 to H8, H10 or H11 in practice? Please describe the problems separately for the each of the concerned H-criteria and indicate how these problems are handled.*
- (41) *Which approaches are taken in your country to reduce the analytical efforts for the application of the H-criteria under consideration? Please describe the approaches and give an assessment of their advantages and their shortcomings.*

Part 5: Laboratory analyses

- (42) *How many laboratory analyses are carried out in your country in order to determine whether a waste is hazardous or not? Please give the frequency (per year) and specify the number by waste codes and H-criteria. Please provide estimates if no statistics are available.*
- (43) *If you are not able to provide the respective figures or estimates, where in your country might this information be available?*

-
- (44) *Which laboratories carry out analyses to determine the hazard properties of waste on behalf of the waste generators, waste management companies or competent authorities? Please name the laboratories or attach a list, if possible.*

Part 6: Other remarks

- (45) *If you should have any other remarks concerning the application and the structure or the LoW please feel free to describe it here.*

2. Distribution lists for questionnaire survey

2.1. Distribution List to TAC members

Table 1: TAC members and other national waste experts

Cou ntry	Email address	Institution
AT	christine.hochholdinger@bmlfuw.gv.at	Bundesministerium für Forst- und Landwirtschaft, Umwelt und Wasserschutz
AT	evelyn.wolfslehner@bmlfuw.gv.at	Bundesministerium für Forst- und Landwirtschaft, Umwelt und Wasserschutz
BE	els.de.picker@OVAM.be	OVAM (Public Waste Agency)
BE	m.gillet@mrw.wallonie.be	MRW - Ministere de la Region Wallonie
BG	matova@moew.government.bg	Ministry of Environment and Water Bulgaria
BG	vergiev@nfp-bg.eionet.eu.int	European Environemtn Information and Observation Network - Bulgaria
CY	gkoullapis@moi.gov.cy	Ministry of Interior - Cyprus
CZ	vladimir_riha@env.cz	Ministry of the Environment - Czech Republic
DE	L-Vz1-EU@bruessel.auswaertiges- amt.de	Auswaertiges Amt
DE	andreas.jaron@bmu.bund.de	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit
DE	karl.wagner@bmu.bund.de	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit
DE	joachim.wuttke@uba.de	Umweltbundesamt
DE	behrend@mlu.lsa-net.de	Ministerium für Landwirtschaft und Umweltschutz Sachsen-Anhalt
DE	m.engler@rpu-wi.hessen.de	Regierungspräsidium Darmstadt
DK	beb@mst.dk	Danish Ministry of the Environment
DK	los@mst.dk	Danish Ministry of the Environment
EE	peeter.eek@envir.ee	Ministry of the Environment Estonia
EE	Matti.Viisimaa@ic.envir.ee	Estonian Environment Information Centre
EE A	pawel.kazmierczyk@eea.eu.int	European Environment Agency
ES	pilar.garcia@reper.mae.es	Representacion Permanente de Espana ante la Union Europea
ES	fmhurtado@mma.es	Ministero de Medio Ambiente
ES	mmatesanz@mma.es	Ministero de Medio Ambiente
FI	TAC@ymparisto.fi	Finland's environmental administration
FI	klaus.pfister@ymparisto.fi	Finland's environmental administration
FR	thierry.rimbon@industrie.gouv.fr	Ministere de l'economie des finances ed de l'emploi
FR	Daniel.beguine@ademe.fr	Agence de l'Environnement et de la Maîtrise de l'Energie
FR	Patrick.even@ademe.fr	Agence de l'Environnement et de la Maîtrise de l'Energie
FR	Colette.keil@ademe.fr	Agence de l'Environnement et de la Maîtrise de l'Energie
FR	Anne.virieux@ademe.fr	Agence de l'Environnement et de la Maîtrise de l'Energie
FR	Agnes.jacques@ademe.fr	Agence de l'Environnement et de la Maîtrise de l'Energie
FR	Ademe.franche-comte@ademe.fr	Agence de l'Environnement et de la Maîtrise de l'Energie
GR	waste@minenv.gr	Hellenic Ministry for the Environment, Physical Planning & Public Works
HU	marko@mail.kvvm.hu	Ministry of Environment and Water Hungary
HU	fekete@mail.kvvm.hu	Ministry of Environment and Water Hungary
IE	brendan_o'neill@environ.ie	Department of the Environment, Heritage & Local Government
IE	siobhan_nichthigheamain@environ.irlgov.ie	Department of the Environment, Heritage & Local Government

Country	Email address	Institution
IT	mannino.bordet@attivaproduttive.gov.it	Direzione Generale dell'Energia e delle Risorse Minerarie
IT	minamb.ars@mclink.it	
IT	maurizio.coronidi@casaccia.enea.it	Ente per le nuove tecnologie, L'Energia e l'Ambiente
IT	musmeci@iss.it	Istituto Superiore di Sanità
LT	v.juozefaitis@aaa.am.lt	Environmental Protection Agency Lithuania
LT	a.naktinis@am.lt	Ministry of the Environment Lithuania
LU	henri.haine@mev.etat.lu	Ministry of the Environment Luxembourg
LV	signe.zakka@vidm.gov.lv	Ministry of the Environment Latvia
LV	marks.baltkalns@vidm.gov.lv	Ministry of the Environment Latvia
LV	ilze.donina@vidm.gov.lv	Ministry of the Environment Latvia
LV	juris.fridmanis@lvvma.gov.lv	Latvian Environment, geology and meteorology agency
MT	christopher.ciantar@gov.mt	Ministry for Rural Affairs and the Environment
MT	andrew.vella@gov.mt	Ministry for Rural Affairs and the Environment
NL	kees.denherder@minvrom.nl	Netherlands Ministry of Housing, Spatial Planning and the Environment
NL	annemarieke.grinwis@minvrom.nl	Netherlands Ministry of Housing, Spatial Planning and the Environment
NL	r.k.bekhof@minez.nl	Netherlands Ministry of Economic Affairs
PL	beata.klapotek@mos.gov.pl	Ministry of the Environment Poland
PL	justyna.drzewinska@mos.gov.pl	Ministry of the Environment Poland
PT	anabela.borges@inresiduos.pt	Ministerio do Ambiente, do Ordenamento do Território e do Desenvolvimento Regional
PT	luisa.pinheiro@inresiduos.pt	Ministerio do Ambiente, do Ordenamento do Território e do Desenvolvimento Regional
RO	brandusa.petroaica@anpm.ro	National Environment Protection Agency Romania
RO	nicoleta.chiriac@mmediu.ro	Ministry of the Environment Romania
SE	margareta.appelberg@naturvardsverket.se	Swedish Environmental Protection Agency
SE	christian.haglund@sustainable.ministry.se	Ministry of the Environment
SI	lucija.jukic-sorsak@gov.si	Government of the Republic of Slovenia
SK	dobrocsyova.anna@enviro.gov.sk	Ministry of Environment SK
SK	lintnerova.alica@enviro.gov.sk	Ministry of Environment SK
UK	andy.howarth@defra.gsi.gov.uk	Department for Environment, Food and Rural Affairs
UK	john.macintyre@defra.gsi.gov.uk	Department for Environment, Food and Rural Affairs
UK	roy.watkinson@environment-agency.gov.uk	Environmental Agency UK

2.2. Distribution List to Permanent Representatives of Member States

Table 2: Permanent Representations of Member States

Country	Email address
AT	bruessel-ov@bmeia.gv.at
BE	denis.vaneeckhout@diplobel.fed.be
BE	marjan.decroos@diplobel.fed.be
BE	dominique.lerat@diplobel.fed.be
BG	s.zhekova@missionbg.be
CY	cy.perm.rep@mfa.gov.cy
CZ	vaclav_dvorak@mzv.cz
CZ	dana_dvorakova@mzv.cz
DE	info@eu-vertretung.de
DE	sven.kaiser@diplo.de
DK	brurep@um.dk
EE	kerli.kiili@mfa.ee
EL	rp@rp-grece.be
ES	buzcec@reper.mae.es
FI	eikka.kosonen@formin.fi
FR	pierre.vimont@diplomatie.gouv.fr

HU	sec@hunrep.be
HU	sec.beu@kum.hu
IE	anne.anderson@iveagh.irlgov.ie
IT	ambiente@rpue.esteri.it
LV	permrep.eu@mfa.gov.lv
LT	office@lt-mission-eu.be
LU	mertens@mae.etat.lu
LU	claudfranc@mae.etat.lu
MT	maltarep@gov.mt
NL	bre-mil@minbuza.nl
PL	izabela.kakol@pol-mission-eu.be
PT	reper@reper-portugal.be
RO	violeta.dragu@roumisue.org
SE	representationen.bryssel@foreign.ministry.se
SK	slovakmission@pmsreu.be
SI	mission.bruxelles@gov.si
UK	rob.watt@fco.gov.uk

2.3. Distribution List to Stakeholders

Table 3: Stakeholders

Abbreviation	Stakeholder	Email address
ACEA	European Automobile Manufacturers' Association	wr@acea.be
APME	Association of Plastics Manufacturers in Europe	hanane.Taidi@apme.org
BIR	Bureau of International Recycling	bir@bir.org
Business Europe	Business Europe	main@businessseurope.eu
CEFIC	European Chemical Industry Council	mail@cefic.be
CEMBUREAU	The European Cement Association	jm.chandelle@cembureau.eu
CEMR	Council of European Municipalities and Regions	j.hoffenberg@euronet.be
CEPI	Confederation of European Paper Industries	m.mensink@cepi.org
CEWEP	Confederation of European Waste-To-Energy plants	ella.stengler@cewep.eu
CEWEP	Confederation of European Waste-To-Energy plants	sian.davies@cewep.eu
ECOS	European Environmental Citizens Organisation for Standardisation	ralf.lottes@ecostandard.org
EEB	European Environmental Bureau	Nathalie.cliquot@eeb.org
ERFO	European Recovered Fuel Organisation	ludwig.ramacher@remondis.com
ETRMA	European Tyre & Rubber Manufacturers' Association	info@etrma.org
EUCOPRO	European association of co-processing	isabelle.conche@eucopro.org
EULA	European Lime Association	yves.de.lespinay@eula.be
Eurelectric	Association of electric industry in Europe	atorner@eurelectric.org
EURITS	European Union for Responsible Incineration & Treatment	helen.donoghue@centrallobby.com
EURO COOP	European Community of Consumer Cooperatives	info@eurocoop.coop
Eurocommerce	Europcommerce	bastings@eurocommerce.be
EUROFER	European Confederation of Iron and Steel	c.moro@eurofer.org
EUROMETAUX	European Association of Metals	chung@eurometaux.be
Euromines	European Association of Mining Industries	euromines@euromines.be
EUROPEN	European Organization for Packaging and the Environment	packaging@europen.be
EXCA	European Expanded Clay Association	karin.gabel@exca.eu
FEAD	European Federation of Waste Management and Environmental Services	laetitia.reynaud@fead.be
FEVE	European Container Glass Federation	secretariat@feve.org
FoEE	Friends of Earth Europe	michael.warhurst@foe.co.uk
FoEE	Friends of Earth Europe	becky.slater@foe.co.uk
GEIR	Groupement Européen de l'Industrie de la Régénération	christian.hartmann@paralube.com
Greenpeace	Greenpeace	martin.hojcik@int.greenpeace.org
DHI	DHI Wasser & Umwelt	oh@dhigroup.com
ISWA	International solid waste association	am@iswa.dk
JAMA	Japan Automobile Manufacturers Association	TCA@Jama-e.be
	Nutzenberger, Klaus	Klaus.Nutzenberger@eurocommun alle.org
OEA	Organisation of European Aluminium Refiners and Remelters	office@oea-alurecycling.org

Abbreviation	Stakeholder	Email address
Orgalime	The European Engineering Industries Association representing the interests of the Mechanical, Electrical, Electronic, Metalworking & Metal Articles Industries	secretariat@orgalime.be
PRO EUROPE	Pro Europe	proeurope@green-dot.org
RREUSE		rreuse@skynet.be
UEAPME	European Association of Craft, Small and Medium-sized Enterprises	info@ueapme.com
FFACT	Wielenga, Kees, FFACT Management Consultants	wielenga@ffact.nl

3. Returns to the Questionnaire Survey

3.1. Returns from Member States to the questionnaire survey

Table 4: Returns from Member States to the Questionnaire Survey

Countries	Contact	Date of reception	Provided Documents		
			Questionnaire	Comment	Guidance document
Sweden	Jan.Christiansson@naturvardsverket.se	29.11.2007	X		X
Estonia	Matti.Viisimaa@ic.envir.ee	30.11.2007	X	X	
UK	olu.ogunbadejo@DEFRA.GSI.GOV.UK	03.12.2007	X		X
Slovenia	Lucija.Jukic-Sorsak@gov.si	03.12.2007	X		
Finland	eevaleena.hakkinen@ymparisto.fi	04.12.2007	X		X
Lithuania	a.naktinis@am.lt	07.12.2007	X		
Italy	Martinini.Alfonso@minambiente.it	07.12.2007	X		
Latvia	Ilze.Donina@vidm.gov.lv	05.12.2007	X		
Bulgaria	Matova@moew.government.bg	07.12.2007	X		
Hungary	fekete@mail.kvvm.hu	10.12.2007	X		
Germany	Ruediger.Wagner@bmu.bund.de	19.12.2007	X		X
Poland	Justyna.Drzewinska@mos.gov.pl	24.12.2007	X		
Romania	nicoleta.chiriac@mmediu.ro	11.01.2008	X		
Netherlands	Annemarieke.Grinwis@minvrom.nl	15.01.2008	X		
MLU Sachsen-Anhalt(Germany)	Stefan.Behrend@mlu.sachsen-anhalt.de	28.12.2007	X		X
Austria	Maria.Amon@lebensministerium.at	05.02.2008	X		
Spain	pilar.garcia@reper.mae.es	08.02.2008	X		

3.2. Returns from associations to the questionnaire survey

Table 5: Returns from Associations to the Questionnaire Survey

Organisations	Contact	Date of reception	Provided Documents		
			Questionnaire	Comment	Guidance document
ECPA	danuta.obierzynska@ecpa.eu	26.11.2007	X		
ACEA	rm@acea.be	28.11.2007		X	
Eurelectric	atorner@eurelectric.org	28.11.2007		X	
ETRMA	f.cinaralp@etrma.org	30.11.2007		X	
CEMBUREAU	mh.troger@cembureau.eu	30.11.2007		X	
Assocarta	massimo.medugno@assocarta.it	30.11.2007	X		
FNADE	c.fernandez@fnade.com	30.11.2007	X		X
ESTAL	m.kalmar@actreu.ch	01.12.2007	X		
Waste Denmark	hjo@affalddanmark.dk	05.12.2007	X		
SYPPRED	nicolas.humez@syppred.fr	29.11.2007	X		X
Industrieverband Agrar (ECPA)	neck@vci.de	05.12.2007	X		
Eucopro	isabelle.conche@eucopro.org	19.12.2007	X		
BDE (Bundesverband der deutschen Entsorgungswirtschaft)	giern@bde-berlin.de	19.12.2007		X	
DAKOFA (Danish Waste Management Association)	am@dakofa.dk	19.12.2007	X		
BIR	bir@bir.de	21.12.2007		X	
WEEE Forum	pascal.leroy@weee-forum.org	13.01.2008	X		X
FEAD	laetitia.reynaud@fead.be	18.01.2008	X		
Vereniging Afvalbedrijven (Dutch Waste Management Association)	vankooten@verenigingafvalbedrijven.nl	18.01.2008		X	

3.3. Returns from Enterprises to the questionnaire survey

Table 6: Returns from Enterprises to the Questionnaire Survey

Enterprises	Contact	Date of reception	Provided Documents		
			Questionnaire	Comment	Guidance document
Treibacher	Peter.Niss@treibacher.com	27.11.2007	X		
Arcelormittal: Industeel Creusot	jean.gaudillere@arcelormittal.com	29.11.2007	X		
Arcelormittal: Industeel Loire	sophie.perret@arcelormittal.com	29.11.2007	X		
Arcelormittal: Stahlwerk Eisenhüttenstadt	Kathleen.Rothe@arcelor.com	30.11.2007	X		
SITA	Isabelle.MARTIN@sit.fr	30.11.2007			X
VW	daniel.goldmann@volkswagen.de	04.12.2007		X	
Arcelormittal - Corporation	christian.josis@arcelormittal.com	14.12.2007	X		
Sigfito (ECPA)	rpastor@sigfito.es	30.11.2007	X		

4. Analysis of statistical information

4.1. Distribution list for request of statistical information

Table 7: Distribution list for the data request on the provision of statistical data on the level of the six-digit LoW codes

Country Code	Contact	E-mail	Institution
BE	Bruno Kestemont	Bruno.kestemont@statbel.minec.p.fgov.be	Statistics Belgium
BE	Maarten de Groof	mdgroof@ovam.be	OVAM (Public Waste Agency)
BG	Stefan Tsonev	stzonev@nsi.bg	NSI - Bulgaria, Environmental statistics
CY	Pantelis Protopapas	cydsr@cytanet.com.cy	Statistical Service Cyprus
CZ	Helena Burtova	helenaburtova@czso.cz	Czech Statistical Office - Environmental Statistics Section
CZ	Miloslava Vesela	vesela@czso.cz	Czech Statistical Office - Environmental Statistics Section
DE	Hermann Knichel	hermann.knichel@destatis.de	Statistisches Bundesamt
DK	Lene Gravesen	lgr@mst.dk	Danish Ministry of the Environment
EE	Kaia Oras	kaia.oras@stat.ee	Statistics Estonia
EE	Matti Viisimaa	Matti.Viisimaa@ic.envir.ee	Estonian Environmental Information centre
EL	Gerasimos Antzoulatos	genv@statistics.gr	National Statistical Service of Greece
EL	George Papageorgiou	construct2@statistics.gr	National Statistical Service of Greece
ES	Cesar Berrade	cberrade@ine.es	National Statistics Institute
FI	Marianne Kaplas	marianne.kaplas@stat.fi	Statistics Finland - Environment and Energy
FI	Jukka Muukkonen	jukka.muukkonen@stat.fi	Statistics Finland - Environment and Energy
FR	Moisette Crosnier	moisette.crosnier@ifen.fr	Ministère de l'écologie et du développement durable IFEN
HU	Pal Aujeszký	pal.aujeszky@ksh.hu	Hungarian Central Statistical Office
HU	Katalin Fekete	fekete@mail.kvvm.hu	Ministry of Environment and Water
IE	Odile le Bolloch	o.lebolloch@epa.ie	Environmental Protection Agency Ireland
IT		waste@apat.it	Agency for the Protection of the Environment and Technical Services
LU	Robert Schmit	Robert.Schmit@aev.etat.lu	Administration de l'Environnement
LU	Serge Less	Serge.Less@aev.etat.lu	Administration de l'Environnement
LV	Juris Fridmanis	juris.fridmanis@lvgma.gov.lv	Latvian Environment, geology and meteorology agency
MT	George Said	george.said@gov.mt	National Statistics office – Malta; Environment Unit
MT	Jeffrey Galea	Jeffrey.galea@gov.mt	National Statistics office – Malta; Environment Unit
NL	Hendrik Jan Dijkerman	hdkn@cbs.nl	Statistics Netherlands, taskgroup Environment
NL	Harrie Meeuwissen	hmwn@cbs.nl	Statistics Netherlands, taskgroup Environment
PL	Izabela Drelich	izabela.drelich@mos.gov.pl	Ministry of Environment, Department of Waste Management
PL	Domanska	W.Domanska@stat.gov.pl	Central Statistical Office, Agriculture and Environment Statistics Division

Country Code	Contact	E-mail	Institution
PT	Nuno Romao	nuno.romao@ine.pt	National Statistical Office / Agricultural and Environment Statistics Unit
PT	Pedro Delgado	pedro.delgado@inresiduos.pt	Instituto des Residuos
RO	Brindusa Petroaica	brandusa.petroaica@anpm.ro	NEPA (National Environment Protection Agency)
RO	Adriana Chiritoiu	mediu@insse.ro	National Institute of Statistics Romania
SE	Helena Looström Urban	helena.loostrom.urban@naturvardsverket.se	Swedish Environmental Protection Agency
SE	Anna Nordin	anna.nordin@naturvardsverket.se	Swedish Environmental Protection Agency
SI	Mojca Zitnik	mojca.zitnik@gov.si	Statistical Office of the Republic of Slovenia
SK	Ivan Sucha	Ivan.Sucha@statistics.sk	Statistical Office of the Slovak Republic
UK	Dr. Jane Hinton	jane.hinton@defra.gsi.gov.uk	Department for Environment, Food and Rural Affairs (DEFRA)

4.2. Returns to the request of statistical information

Country	Reply-Date	Anwer from	Data send	Data used
BE	No	n.a.	n.a.	n.a.
BG	No	n.a.	n.a.	n.a.
CY	20.11.2007	Pantelis Protopapas(cydsr@cytanet.com.cy)	no data	n.a.
CZ	28.11.2007	helena.nemeckova@czso.cz	send data	Yes
DE	20.12.2007	barbara.firmenich@destatis.de	send data	No
DK	No	n.a.	n.a.	n.a.
EE	14.02.2008	Matti Viisimaa (Matti.Viisimaa@ic.envir.ee)	send data	Yes
EL	27.12.2007	Ioanna Papanagnou (papanag@statistics.gr)	send data	Yes
ES	15.11.2007	Cesar Berrade (cberrade@ine.es)	no data	n.a.
FI	04.12.2007	Marianne Kaplas (marianne.kaplas@stat.fi)	send data	Yes
FR	03.01.2008	philippe.dorelon@ifen.ecologie.gouv.fr	send data	Yes
HU	12.12.2007	Katalin Fekete (fekete@mail.kvvm.hu)	send data	Yes
IE	16.11.2007	Odile le Bolloch (o.lebolloch@epa.ie)	send data	Yes
IT	No	n.a.	n.a.	n.a.
LU	18.12.2007	Serge Less (Serge.Less@aev.etat.lu)	send data	No
LV	28.11.2007	Juris Fridmanis (juris.fridmanis@lvgrma.gov.lv)	send data	Yes
MT	12.12.2007	Jeffrey Galea (Jeffrey.galea@gov.mt)	send data	No
NL	21.11.2007	Harrie Meeuwissen (hmwn@cbs.nl)	send data	Yes
PL	07.12.2007	Joanna Sulik (J.Sulik@stat.gov.pl)	send data	Yes
PT	20.12.2007	Nuno Romao (nuno.romao@ine.pt)	send data	Yes
RO	No	n.a.	n.a.	n.a.
SE	21.12.2007	Anna Nordin (anna.nordin@naturvardsverket.se)	no data	n.a.
SI	07.12.2007	Aleksander.Sever@gov.si	send data	Yes
SK	No	n.a.	n.a.	n.a.
UK	04.12.2007	steven.melbourne@DEFRA.GSI.GOV.UK	send data	No

n.a.: not applicable

4.3. Statistical data for waste items according to WStatR, Annex I

Item No	EWC-Stat	Description	Hazardous	Number of EWL codes aggregated	Statistical data EU 27			
					0	>0	M	Amount [kg/cap.a]
1	01.1	Spent solvents	h	20	2	25	0	6,0
2	01.2	Acid, alkaline or saline wastes	nh	13	5	22	0	6,8
3	01.2	Acid, alkaline or saline wastes	h	43	2	25	0	9,1
4	01.3	Used oils	h	33	2	25	0	8,3
5	01.4	Spent chemical catalysts	nh	3	10	17	0	0,1
6	01.4	Spent chemical catalysts	h	4	5	22	0	0,2
7	02	Chemical preparation wastes	nh	47	3	24	0	7,5
8	02	Chemical preparation wastes	h	61	1	26	0	7,0
9	03.1	Chemical deposits and residues	nh	28	2	25	0	24,3
10	03.1	Chemical deposits and residues	h	75	2	25	0	22,2
11	03.2	Industrial effluent sludges	nh	47	3	24	0	14,2
12	03.2	Industrial effluent sludges	h	39	2	25	0	3,4
13	05	Health care and biological wastes	nh	5	5	22	0	1,7
14	05	Health care and biological wastes	h	2	1	26	0	1,7
15	06	Metallic wastes	nh	26	1	26	0	151,9
16	06	Metallic wastes	h	4	5	22	0	0,5
17	07.1	Glass wastes	nh	6	0	27	0	29,9
18	07.1	Glass wastes	h	1	12	15	0	0,1
19	07.2	Paper and cardboard wastes	nh	5	0	27	0	106,0
20	07.3	Rubber wastes	nh	1	1	26	0	5,3
21	07.4	Plastic wastes	nh	8	1	26	0	22,3
22	07.5	Wood wastes	nh	7	1	26	0	173,0
23	07.5	Wood wastes	h	3	5	22	0	6,8
24	07.6	Textile wastes	nh	12	2	25	0	8,4
25	07.7	Waste containing PCB	h	6	2	25	0	0,1
26	08 (excl. 08.1, 08.41)	Discarded equipment (excluding discarded vehicles and batteries and accumulators waste)	nh	9	2	25	0	4,2
27	08 (excl. 08.1, 08.41)	Discarded equipment (excluding discarded vehicles and batteries and accumulators waste)	h	11	3	24	0	1,9
28	08.1	Discarded vehicles	nh	1	5	22	0	9,3
29	08.1	Discarded vehicles	h	1	4	23	0	6,9
30	08.41	Batteries and accumulators wastes	nh	3	7	20	0	0,3
31	08.41	Batteries and accumulators wastes	h	4	1	26	0	1,8
32	09 (excl. 09.11, 09.3)	Animal and vegetal wastes (excluding animal of food preparation and products; and excluding animal faeces, urine and manure)	nh	24	2	25	0	144,4
33	09.11	Animal waste of food preparation and products	nh	3	1	26	0	17,5
34	09.3	Animal faeces, urine and manure	nh	1	4	23	0	51,0
35	10.1	Household and similar wastes	nh	4	0	27	0	416,9
36	10.2	Mixed and undifferentiated materials	nh	22	1	26	0	124,4
37	10.2	Mixed and undifferentiated materials	h	2	2	25	0	7,7
38	10.3	Sorting residues	nh	11	2	25	0	67,6
39	10.3	Sorting residues	h	3	10	17	0	1,2
40	11 (excl. 11.3)	Common sludges (excluding dredging spoils)	nh	17	1	26	0	31,3
41	11.3	Dredging spoils	nh	1	6	21	0	195,8
42	12 (excl. 12.4, 12.6)	Mineral wastes (excluding combustion wastes, contaminated soils and polluted dredging spoils)	nh	72	1	26	0	3655,5
43	12 (excl. 12.4, 12.6)	Mineral wastes (excluding combustion wastes, contaminated soils and polluted dredging spoils)	h	36	1	26	0	21,3
44	12.4	Combustion wastes	nh	55	1	26	0	305,3
45	12.4	Combustion wastes	h	51	2	25	0	25,5
46	12.6	Contaminated soils and polluted dredging spoils	h	4	5	22	0	21,3
47	13	Solidified, stabilised or vitrified wastes	nh	3	12	15	0	4,8
48	13	Solidified, stabilised or vitrified wastes	h	2	12	14	1	1,2

4.4. EWC-Stat and corresponding LoW-codes

Table 8: Waste items according to Annex I of the WStatR with EWC-Stat codes and corresponding LoW codes

Item No	EWC-Stat	Description	Hazardous	No. of LoW codes	LoW Codes ¹⁾
1	01.1	Spent solvents	h	20	070103*, 070104*, 070203*, 070204*, 070303*, 070304*, 070403*, 070404*, 070503*, 070504*, 070603*, 070604*, 070703*, 070704*, 140601*, 140602*, 140603*, 140604*, 140605*, 200113*
2	01.2	Acid, alkaline or saline wastes	nh	13	030309, 050116, 050702, 060199, 060299 , 060314, 060316, 060399, 060499 , 060603, 060699 , 110114, 110206
3	01.2	Acid, alkaline or saline wastes	h	43	050111*, 060101*, 060102*, 060103*, 060104*, 060105*, 060106*, 060201*, 060203*, 060204*, 060205*, 060311*, 060313*, 060315*, 060403*, 060404*, 060405*, 060602*, 060704*, 080316*, 090101*, 090102*, 090103*, 090104*, 090105*, 100109*, 100308*, 100403*, 110105*, 110106*, 110107*, 110108*, 110113*, 110205*, 110301*, 110302*, 110504*, 160606*, 160901*, 160902*, 191104*, 200114*, 200115*
4	01.3	Used oils	h	33	050102*, 050103*, 050104*, 050112*, 080319*, 080417*, 120106*, 120107*, 120108*, 120109*, 120110*, 120112*, 120118*, 120119*, 130104*, 130105*, 130109*, 130110*, 130111*, 130112*, 130113*, 130204*, 130205*, 130206*, 130207*, 130208*, 130306*, 130307*, 130308*, 130309*, 130310*, 130506*, 200126*
5	01.4	Spent chemical catalysts	nh	3	160801, 160803, 160804
6	01.4	Spent chemical catalysts	h	4	160802*, 160805*, 160806*, 160807*
7	02	Chemical preparation wastes	nh	47	020109, 020703, 030199, 030299 , 040109, 040215, 040217, 060799, 060899, 061099, 061199 , 070215, 070217, 070514, 080112, 080114, 080116, 080118, 080120, 080199 , 080201, 080299 , 080307, 080308, 080313, 080315, 080318, 080399 , 080410, 080412, 080414, 080416, 080499 , 100916, 101014, 101016, 110599 , 160115, 160505, 160509, 180107, 180109, 180206, 180208, 200128, 200130, 200132
8	02	Chemical preparation wastes	h	61	020108*, 030201*, 030202*, 030203*, 030204*, 030205*, 040214*, 040216*, 050701*, 060802*, 061002*, 061301*, 070214*, 070216*, 070413*, 070513*, 080111*, 080113*, 080115*, 080117*, 080119*, 080121*, 080312*, 080314*, 080317*, 080409*, 080411*, 080413*, 080415*, 080501*, 100913*, 100915*, 101013*, 101015*, 110116*, 110198*, 150110*, 160113*, 160114*, 160401*, 160402*, 160403*, 160504*, 160506*, 160507*, 160508*, 160903*, 160904*, 180106*, 180108*, 180205*, 180207*, 190204*, 190208*, 190209*, 190211*, 200117*, 200119*, 200127*, 200129*, 200131*
9	03.1	Chemical deposits and residues	nh	28	030302, 040104, 040105, 050117, 050699, 060999 , 061303, 061399, 070199, 070299, 070399, 070499, 070599, 070699, 070799 , 100125, 100302, 100318, 100813, 100814, 110112, 110203, 150203, 190903, 190904, 190905, 190906, 200141

Item No	EW-Stat	Description	Hazardous	No. of LoW codes	LoW Codes ¹⁾
10	03.1	Chemical deposits and residues	h	75	040103*, 050106*, 050107*, 050108*, 050115*, 050601*, 050603*, 060702*, 060703*, 061302*, 061305*, 070101*, 070107*, 070108*, 070109*, 070110*, 070201*, 070207*, 070208*, 070209*, 070210*, 070301*, 070307*, 070308*, 070309*, 070310*, 070401*, 070407*, 070408*, 070409*, 070410*, 070501*, 070507*, 070508*, 070509*, 070510*, 070601*, 070607*, 070608*, 070609*, 070610*, 070701*, 070707*, 070708*, 070709*, 070710*, 090113*, 100317*, 100812*, 110111*, 110115*, 130401*, 130402*, 130403*, 130501*, 130502*, 130503*, 130507*, 130508*, 130701*, 130702*, 130703*, 130801*, 130802*, 130899* , 150202*, 160709*, 190110*, 190207*, 190403*, 190806*, 190807*, 190808*, 191101*, 191102*
11	03.2	Industrial effluent sludges	nh	47	030305, 040106, 040107, 040220, 050110, 050114, 050199 , 050604, 050799 , 060503, 070112, 070212, 070312, 070412, 070512, 070612, 070712, 100121, 100123, 100126, 100212, 100215, 100328, 100410, 100509, 100610, 100708, 100820, 101120, 101213, 110110, 110299 , 120115, 161002, 161004, 190206, 190404, 190699 , 190703, 190812, 190814, 190899 , 191106, 191199 , 191304, 191306, 191308
12	03.2	Industrial effluent sludges	h	39	010505*, 040219*, 050109*, 060502*, 070111*, 070211*, 070311*, 070411*, 070511*, 070611*, 070711*, 100120*, 100122*, 100211*, 100327*, 100409*, 100508*, 100609*, 100707*, 100819*, 101119*, 110109*, 110207*, 120114*, 120301*, 120302*, 160708*, 161001*, 161003*, 190205*, 190702*, 190810*, 190811*, 190813*, 191103*, 191105*, 191303*, 191305*, 191307*
13	05	Health care and biological wastes	nh	5	180101, 180102, 180104, 180201, 180203
14	05	Health care and biological wastes	h	2	180103*, 180202
15	06	Metallic wastes	nh	26	020110, 100210, 101099 , 101206, 110501, 120101, 120102, 120103, 120104, 150104, 160117, 160118, 170401, 170402, 170403, 170404, 170405, 170406, 170407, 170411, 190102, 191001, 191002, 191202, 191203, 200140
16	06	Metallic wastes	h	4	090106*, 170409*, 170410*, 180110*
17	07.1	Glass wastes	nh	6	101112, 150107, 160120, 170202, 191205, 200102
18	07.1	Glass wastes	h	1	101111*
19	07.2	Paper and cardboard wastes	nh	5	030310, 030399 , 150101, 191201, 200101
20	07.3	Rubber wastes	nh	1	160103
21	07.4	Plastic wastes	nh	8	020104, 070213, 120105, 150102, 160119, 170203, 191204, 200139
22	07.5	Wood wastes	nh	7	030101, 030105, 030301, 150103, 170201, 191207, 200138
23	07.5	Wood wastes	h	3	030104*, 191206*, 200137*
24	07.6	Textile wastes	nh	12	040101, 040102, 040108, 040199 , 040209, 040210, 040221, 040222, 150109, 191208, 200110, 200111
25	07.7	Waste containing PCB	h	6	130101*, 130301*, 160109*, 160209*, 160210*, 170902*
26	08 (excl. 08.1, 08.41)	Discarded equipment (excluding discarded vehicles and batteries and accumulators waste)	nh	9	090110, 090112, 160112, 160116, 160122, 160199 , 160214, 160216, 200136

Item No	EW-Stat	Description	Hazardous	No. of LoW codes	LoW Codes ¹⁾
27	08 (excl. 08.1, 08.41)	Discarded equipment (excluding discarded vehicles and batteries and accumulators waste)	h	11	090111*, 160107*, 160108*, 160110*, 160121*, 160211*, 160213*, 160215*, 200121*, 200123*, 200135*
28	08.1	Discarded vehicles	nh	1	160106
29	08.1	Discarded vehicles	h	1	160104*
30	08.41	Batteries and accumulators wastes	nh	3	160604, 160605, 200134
31	08.41	Batteries and accumulators wastes	h	4	160601*, 160602*, 160603*, 200133*
32	09 (excl. 09.11, 09.3)	Animal and vegetal wastes (excluding animal of food preparation and products; and excluding animal faeces, urine and manure)	nh	24	020101, 020103, 020107, 020199 , 020203, 020299 , 020301, 020302, 020303, 020304, 020399 , 020499 , 020501, 020599 , 020601, 020602, 020701, 020702, 020704, 190809, 200108, 200125, 200201, 200302
33	09.11	Animal waste of food preparation and products	nh	3	020102, 020201, 020202
34	09.3	Animal faeces, urine and manure	nh	1	020106
35	10.1	Household and similar wastes	nh	4	200301, 200303, 200307, 200399
36	10.2	Mixed and undifferentiated materials	nh	22	020699 , 020799 , 040299 , 090107, 090108, 090199 , 100199 , 100699 , 100799 , 100899 , 110199 , 120113, 120199 , 150105, 150106, 160304, 160306, 160799 , 190203, 190210, 190299 , 200199
37	10.2	Mixed and undifferentiated materials	h	2	160303*, 160305*
38	10.3	Sorting residues	nh	11	030307, 030308, 190501, 190502, 190503, 190599 , 190801, 191004, 191006, 191210, 191212
39	10.3	Sorting residues	h	3	191003*, 191005*, 191211*
40	11 (excl. 11.3)	Common sludges (excluding dredging spoils)	nh	17	020204, 020305, 020403, 020502, 020603, 020705, 030311, 050113, 190603, 190604, 190605, 190606, 190805, 190902, 190999 , 200304, 200306
41	11.3	Dredging spoils	nh	1	170506
42	12 (excl. 12.4, 12.6)	Mineral wastes (excluding combustion wastes, contaminated soils and polluted dredging spoils)	nh	72	010101, 010102, 010306, 010308, 010309, 010399 , 010408, 010409, 010410, 010411, 010412, 010413, 010499 , 010504, 010507, 010508, 010599 , 020401, 020402, 060904, 061101, 080202, 080203, 100299 , 100305, 100399 , 100499 , 100599 , 100906, 100908, 100914, 100999 , 101006, 101008, 101103, 101105, 101110, 101114, 101199 , 101201, 101208, 101212, 101299 , 101301, 101304, 101306, 101310, 101311, 101314, 101399 , 120117, 120121, 161102, 161104, 161106, 170101, 170102, 170103, 170107, 170302, 170504, 170508, 170604, 170802, 170904, 190199 , 190802, 190901, 191209, 191302, 200202, 200203
43	12 (excl. 12.4, 12.6)	Mineral wastes (excluding combustion wastes, contaminated soils and polluted dredging spoils)	h	36	010304*, 010305*, 010307*, 010407*, 010506*, 060701*, 060903*, 061304*, 100905*, 100907*, 101005*, 101007*, 101109*, 101113*, 101211*, 101309*, 110202*, 120116*, 120120*, 150111*, 160111*, 160212*, 161101*, 161103*, 161105*, 170106*, 170204*, 170301*, 170303*, 170601*, 170603*, 170605*, 170801*, 170901*, 170903*, 191301*

Item No	EWC-Stat	Description	Hazardous	No. of LoW codes	LoW Codes ¹⁾
44	12.4	Combustion wastes	nh	55	060902, 100101, 100102, 100103, 100105, 100107, 100115, 100117, 100119, 100124, 100201, 100202, 100208, 100214, 100316, 100320, 100322, 100324, 100326, 100330, 100501, 100504, 100511, 100601, 100602, 100604, 100701, 100702, 100703, 100704, 100705, 100804, 100809, 100811, 100816, 100818, 100903, 100910, 100912, 101003, 101010, 101012, 101116, 101118, 101203, 101205, 101210, 101307, 101313, 110502, 190112, 190114, 190116, 190118, 190119
45	12.4	Combustion wastes	h	51	100104*, 100113*, 100114*, 100116*, 100118*, 100207*, 100213*, 100304*, 100309*, 100315*, 100319*, 100321*, 100323*, 100325*, 100329*, 100401*, 100402*, 100404*, 100405*, 100406*, 100407*, 100503*, 100505*, 100506*, 100510*, 100603*, 100606*, 100607*, 100808*, 100810*, 100815*, 100817*, 100909*, 100911*, 101009*, 101011*, 101115*, 101117*, 101209*, 101312*, 101401*, 110503*, 190105*, 190106*, 190107*, 190111*, 190113*, 190115*, 190117*, 190402*, 191107*
46	12.6	Contaminated soils and polluted dredging spoils	h	4	050105*, 170503*, 170505*, 170507*
47	13	Solidified, stabilised or vitrified wastes	nh	3	190305, 190307, 190401
48	13	Solidified, stabilised or vitrified wastes	h	2	190304*, 190306*

1) 99-codes are highlighted in bold print because they are discussed in depth in chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**

4.5. Overview of collected data

Country	Year	Data coverage	Source	Statistical unit	No. of stat. units available	Number of waste-types			
						Total	used	not used	additional codes ⁴
CZ	2004	All sectors	DR	Enterprise	Yes	720	720	0	0
EE	2005	All sectors	DR	Enterprise	No	363	360	3	17
EE	2006	All sectors	DR	Enterprise	No	351	348	3	20
EL	2004	All sectors	DR	Enterprise	No	839	386	453	0
FI ¹	2006	All sectors	DR	Local unit	Yes	563	371	192	2
FR	2006	only HW with gaps for agriculture and services	DR	Local unit	Yes	375	375	0	0
HU	2004	All sectors (mining waste separately)	DR	Local unit (not available)	Yes (No)	700	700	0	0
IE	2004	Waste from manufacturing sector	DR	Enterprise	Yes	410	408	1	0
LV	2006	All sectors	DR	Enterprise	Yes	317	317	0	0
NL ¹	2004	Non-haz. waste [NACE C-E]/ hazardous waste all sectors	DR	Enterprise/ Local Unit	Yes/No	319/ 218	202/ 218	117/ 0	0/ 0
PL	2004	All chapters except 20	DR	not available	No	749	744	5	61
PT	2004	All sectors	DR	Enterprise	No	611	577	34	0
SI	2004	All sectors	DR	KAU	Yes	592	592	0	0
BG ²	2004	99-codes, All sectors	Q	not available	No	32	32	0	0
DE ²	2005	99-codes & unused codes, All sectors	Q	not available	No	119	50	69	0
HU ²	2004	99-codes & unused codes, All sectors	Q	not available	No	258	119	139	0
HU ²	2005	99-codes & unused codes, All sectors	Q	not available	No	257	103	154	0
HU ²	2006	99-codes & unused codes, All sectors	Q	not available	No	257	93	164	0
IT ²	2004	99-codes, All sectors	Q	not available	No	87	70	17	0
LT ²	2005/06	99-codes & unused codes, All sectors	Q	not available	No	407	11	396	0
LV ²	2004	99-codes, All sectors	Q	not available	No	18	18	0	0
NL ²	2006	99-codes & unused codes, All sectors	Q	not available	No	179	64	115	0
RO ²	2004	99-codes, All sectors	Q	not available	No	51	51	0	0
SI ²	2004	99-codes & unused codes, All sectors	Q	not available	No	302	53	249	0

1) "not used" refers to confidential data

2) "used" refers only to "99"-codes

3) DR = data request; Q = Questionnaire

4) Number of additional codes is included in number of "used" waste-types

4.6. Frequency of usage and descriptive parameters of share from national amount by six-digit code from LoW - non-hazardous wastes

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
010101	14	5	9	6	1.0802%	0.0042%	0.0000%	3.3372%
010102	14	2	12	8	14.6638%	1.2582%	0.0350%	44.6763%
010306	14	4	10	6	1.8281%	0.5341%	0.0023%	8.7777%
010308	13	6	7	5	0.0071%	0.0002%	0.0000%	0.0296%
010309	13	7	6	3	2.4835%	2.9807%	0.0000%	4.4698%
010399	15	4	11	9	0.5374%	0.0020%	0.0000%	4.4409%
010408	14	2	12	8	0.4162%	0.0806%	0.0013%	2.8360%
010409	13	1	12	8	0.3370%	0.1062%	0.0028%	1.8840%
010410	13	2	11	7	0.1108%	0.0280%	0.0003%	0.4392%
010411	13	10	3	1	0.0005%	0.0005%	0.0005%	0.0005%
010412	13	3	10	7	3.6159%	0.0493%	0.0000%	23.6094%
010413	13	2	11	8	0.4424%	0.0254%	0.0014%	2.2210%
010499	14	3	11	10	0.2176%	0.0148%	0.0000%	1.8278%
010504	13	6	7	5	0.1332%	0.1028%	0.0000%	0.3336%
010507	13	8	5	3	0.0022%	0.0018%	0.0016%	0.0032%
010508	13	7	6	3	0.0653%	0.0243%	0.0208%	0.1507%
010599	14	5	9	8	0.0803%	0.0069%	0.0001%	0.5790%
020101	14	2	12	9	0.0379%	0.0254%	0.0000%	0.1150%
020102	14	1	13	10	0.1436%	0.0879%	0.0222%	0.5221%
020103	14		14	11	0.3390%	0.1146%	0.0204%	1.2043%
020104	14	2	12	8	0.0054%	0.0032%	0.0003%	0.0134%
020106	14	2	12	9	3.5960%	0.8982%	0.0831%	15.0674%
020107	13	2	11	6	0.0152%	0.0020%	0.0005%	0.0533%
020109	13	1	12	7	0.0148%	0.0000%	0.0000%	0.1032%
020110	14		14	11	0.0028%	0.0007%	0.0000%	0.0185%
020199	14		14	13	0.0172%	0.0141%	0.0002%	0.0528%
020201	14		14	11	0.0559%	0.0287%	0.0000%	0.1999%
020202	14		14	11	0.7716%	0.4397%	0.0079%	2.4454%
020203	14		14	11	0.2757%	0.1641%	0.0009%	1.2705%
020204	14		14	11	0.1732%	0.0687%	0.0007%	0.7540%
020299	16		16	14	0.1553%	0.0526%	0.0003%	1.1056%
020301	14	1	13	11	0.3087%	0.1593%	0.0000%	1.5946%
020302	13	7	6	3	0.0000%	0.0000%	0.0000%	0.0000%
020303	13	5	8	6	0.0057%	0.0027%	0.0001%	0.0184%
020304	14	1	13	10	2.5478%	0.0877%	0.0095%	24.2827%
020305	13	2	11	9	0.2284%	0.0181%	0.0000%	1.6458%
020399	16	1	15	14	0.1545%	0.0592%	0.0000%	1.0369%
020401	13	2	11	8	1.2099%	0.7525%	0.1938%	4.0696%
020402	13	2	11	8	0.6045%	0.3420%	0.0599%	2.6278%
020403	13	4	9	6	0.5436%	0.0012%	0.0002%	3.2310%
020499	15	2	13	12	0.9230%	0.0179%	0.0002%	8.5180%
020501	14		14	11	0.1491%	0.0717%	0.0004%	0.4662%

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
020502	14		14	10	0.1070%	0.0251%	0.0034%	0.5173%
020599	15		15	14	0.3403%	0.0254%	0.0000%	3.9926%
020601	14	2	12	9	0.0320%	0.0134%	0.0018%	0.1081%
020602	13	8	5	4	0.0000%	0.0000%	0.0000%	0.0000%
020603	14	5	9	7	0.0112%	0.0052%	0.0001%	0.0499%
020699	15	2	13	12	0.0040%	0.0016%	0.0001%	0.0199%
020701	14		14	11	0.5376%	0.0994%	0.0053%	3.1354%
020702	14	2	12	9	0.1612%	0.0817%	0.0003%	0.5215%
020703	14	5	9	6	0.0104%	0.0003%	0.0000%	0.0601%
020704	14	1	13	10	0.4045%	0.0560%	0.0001%	2.1189%
020705	14	4	10	8	0.0406%	0.0077%	0.0001%	0.1513%
020799	16		16	14	0.1340%	0.0495%	0.0000%	0.6969%
030101	14		14	10	0.9819%	0.2598%	0.0198%	4.3758%
030105	14		14	11	4.7807%	2.5650%	0.1643%	21.4867%
030199	16	1	15	14	0.1135%	0.0156%	0.0002%	0.5117%
030299	14	6	8	6	0.0081%	0.0000%	0.0000%	0.0483%
030301	13		13	10	1.3434%	0.2101%	0.0006%	7.3206%
030302	13	6	7	5	0.1682%	0.0367%	0.0001%	0.5479%
030305	13	2	11	8	0.4376%	0.1821%	0.0000%	1.2920%
030307	14	1	13	10	0.4028%	0.1482%	0.0059%	1.8305%
030308	14		14	11	0.0723%	0.0696%	0.0008%	0.1962%
030309	13	5	8	5	0.1553%	0.1479%	0.0120%	0.3829%
030310	13	3	10	8	0.6353%	0.1431%	0.0000%	3.9264%
030311	14	2	12	10	1.8224%	0.0722%	0.0000%	12.9228%
030399	14	2	12	11	0.1855%	0.0117%	0.0015%	1.3730%
040101	13	2	11	7	0.0157%	0.0106%	0.0006%	0.0443%
040102	13	5	8	3	0.0013%	0.0015%	0.0002%	0.0021%
040104	13	6	7	5	0.0222%	0.0014%	0.0000%	0.0937%
040105	13	7	6	4	0.6319%	0.0139%	0.0041%	2.4958%
040106	13	1	12	8	0.0462%	0.0037%	0.0000%	0.2501%
040107	13	5	8	3	0.0133%	0.0152%	0.0009%	0.0239%
040108	13	3	10	6	0.2320%	0.0044%	0.0028%	1.3514%
040109	13	3	10	7	0.0118%	0.0011%	0.0001%	0.0720%
040199	15	1	14	12	0.0258%	0.0016%	0.0000%	0.2206%
040209	14	2	12	9	0.0341%	0.0082%	0.0003%	0.1532%
040210	13	2	11	6	0.0102%	0.0008%	0.0000%	0.0500%
040215	13	5	8	6	0.0082%	0.0021%	0.0000%	0.0311%
040217	13	3	10	7	0.0045%	0.0000%	0.0000%	0.0309%
040220	14	4	10	8	0.0061%	0.0053%	0.0002%	0.0120%
040221	14	1	13	10	0.1154%	0.0116%	0.0024%	0.8897%
040222	14		14	11	0.0677%	0.0206%	0.0006%	0.4501%
040299	16		16	13	0.1287%	0.0033%	0.0002%	1.6198%
050110	14	5	9	6	0.0005%	0.0005%	0.0000%	0.0010%
050113	13	9	4	1	0.0002%	0.0002%	0.0002%	0.0002%
050114	13	9	4	1	0.0000%	0.0000%	0.0000%	0.0000%
050116	13	5	8	5	0.6714%	0.0022%	0.0003%	3.3440%
050117	13	3	10	7	0.0049%	0.0007%	0.0000%	0.0300%

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
050199	15	4	11	11	0.0046%	0.0009%	0.0000%	0.0178%
050604	13	11	2	1	0.0000%	0.0000%	0.0000%	0.0000%
050699	14	7	7	6	0.0495%	0.0002%	0.0000%	0.2948%
050702	13	7	6	3	0.0003%	0.0000%	0.0000%	0.0008%
050799	14	5	9	7	0.0113%	0.0001%	0.0000%	0.0588%
060199	14	2	12	11	0.0061%	0.0014%	0.0000%	0.0281%
060299	16	4	12	12	0.0048%	0.0012%	0.0000%	0.0182%
060314	14		14	11	0.1123%	0.0019%	0.0000%	1.0995%
060316	13	4	9	7	0.0104%	0.0002%	0.0000%	0.0642%
060399	15	2	13	11	0.0109%	0.0003%	0.0000%	0.0898%
060499	15	4	11	9	0.0010%	0.0001%	0.0000%	0.0033%
060503	14	1	13	10	0.1446%	0.0117%	0.0002%	1.0247%
060603	13	6	7	3	0.0313%	0.0000%	0.0000%	0.0939%
060699	14	6	8	6	0.0083%	0.0001%	0.0001%	0.0344%
060799	13	8	5	3	0.0041%	0.0017%	0.0000%	0.0104%
060899	15	4	11	10	0.0151%	0.0003%	0.0000%	0.1406%
060902	13	7	6	2	0.0000%	0.0000%	0.0000%	0.0000%
060904	13	8	5	2	1.4087%	1.4087%	0.0011%	2.8164%
060999	14	8	6	5	7.6421%	0.0010%	0.0000%	38.1950%
061099	15	5	10	7	0.0015%	0.0000%	0.0000%	0.0100%
061101	13	10	3	1	3.3580%	3.3580%	3.3580%	3.3580%
061199	15	6	9	9	0.0948%	0.0078%	0.0001%	0.6196%
061303	13	7	6	3	0.0006%	0.0008%	0.0001%	0.0009%
061399	16	3	13	12	0.0071%	0.0008%	0.0000%	0.0591%
070112	14	6	8	6	0.0162%	0.0048%	0.0007%	0.0720%
070199	16		16	15	0.0388%	0.0024%	0.0000%	0.2651%
070212	14	2	12	9	0.0082%	0.0001%	0.0000%	0.0506%
070213	14		14	11	0.0848%	0.0448%	0.0000%	0.3423%
070215	13	3	10	5	0.0008%	0.0000%	0.0000%	0.0039%
070217	13	7	6	4	0.0003%	0.0002%	0.0001%	0.0009%
070299	16		16	16	0.0290%	0.0071%	0.0003%	0.1405%
070312	13	8	5	3	0.0002%	0.0001%	0.0001%	0.0003%
070399	14	5	9	8	0.0009%	0.0004%	0.0000%	0.0034%
070412	13	10	3	2	0.0002%	0.0002%	0.0000%	0.0004%
070499	14	4	10	7	0.0000%	0.0000%	0.0000%	0.0001%
070512	14	6	8	5	0.0174%	0.0008%	0.0001%	0.0683%
070514	14	5	9	5	0.0146%	0.0054%	0.0001%	0.0516%
070599	16	3	13	11	0.0060%	0.0022%	0.0000%	0.0410%
070612	13	4	9	5	0.0032%	0.0010%	0.0000%	0.0124%
070699	15	2	13	12	0.0030%	0.0017%	0.0000%	0.0093%
070712	14	9	5	3	0.0577%	0.0087%	0.0041%	0.1603%
070799	15	2	13	12	0.0151%	0.0012%	0.0000%	0.1661%
080112	14		14	11	0.0030%	0.0005%	0.0001%	0.0142%
080114	14	3	11	7	0.0010%	0.0008%	0.0000%	0.0026%
080116	14	1	13	9	0.0022%	0.0012%	0.0000%	0.0061%
080118	14	4	10	6	0.0004%	0.0004%	0.0000%	0.0009%
080120	14		14	9	0.0016%	0.0006%	0.0000%	0.0055%

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
080199	15	1	14	13	0.0019%	0.0006%	0.0000%	0.0108%
080201	14	1	13	9	0.0021%	0.0003%	0.0000%	0.0106%
080202	13	5	8	5	0.0045%	0.0018%	0.0004%	0.0163%
080203	13	8	5	3	0.0759%	0.0064%	0.0003%	0.2211%
080299	15	3	12	10	0.0024%	0.0009%	0.0000%	0.0122%
080307	14	2	12	7	0.0002%	0.0002%	0.0000%	0.0006%
080308	14	1	13	10	0.0036%	0.0017%	0.0000%	0.0122%
080313	14	3	11	7	0.0004%	0.0002%	0.0000%	0.0014%
080315	13	3	10	6	0.0001%	0.0000%	0.0000%	0.0002%
080318	14	1	13	10	0.0011%	0.0009%	0.0000%	0.0052%
080399	14	4	10	8	0.0015%	0.0003%	0.0000%	0.0105%
080410	14	1	13	10	0.0015%	0.0015%	0.0000%	0.0030%
080412	13	3	10	5	0.0012%	0.0002%	0.0001%	0.0050%
080414	14	2	12	7	0.0007%	0.0003%	0.0000%	0.0021%
080416	13	2	11	7	0.0008%	0.0003%	0.0000%	0.0023%
080499	14	3	11	11	0.0012%	0.0009%	0.0000%	0.0031%
090107	13		13	10	0.0039%	0.0002%	0.0000%	0.0359%
090108	14		14	9	0.0009%	0.0000%	0.0000%	0.0065%
090110	13	9	4	3	0.0000%	0.0000%	0.0000%	0.0000%
090112	13	8	5	2	0.0000%	0.0000%	0.0000%	0.0000%
090199	15	3	12	9	0.0005%	0.0004%	0.0000%	0.0011%
100101	14		14	11	2.3229%	1.3827%	0.0677%	10.7125%
100102	14		14	11	8.7819%	5.4090%	0.0002%	53.7964%
100103	14	2	12	8	0.4277%	0.0126%	0.0012%	3.1716%
100105	14	3	11	8	1.3299%	0.9442%	0.0005%	3.0553%
100107	13	4	9	6	1.0768%	0.2181%	0.0050%	4.6579%
100115	13	3	10	6	0.0635%	0.0035%	0.0000%	0.2908%
100117	13	5	8	4	0.1311%	0.0135%	0.0004%	0.4969%
100119	13	3	10	6	0.0033%	0.0010%	0.0000%	0.0158%
100121	13	3	10	8	0.0374%	0.0068%	0.0002%	0.1625%
100123	14	6	8	5	0.0061%	0.0017%	0.0001%	0.0219%
100124	13	3	10	6	0.0697%	0.0033%	0.0000%	0.2126%
100125	13	7	6	3	0.0045%	0.0016%	0.0000%	0.0117%
100126	14	3	11	8	0.0010%	0.0002%	0.0000%	0.0049%
100199	16	3	13	11	0.0112%	0.0054%	0.0001%	0.0696%
100201	13	4	9	5	0.8542%	0.2823%	0.0006%	2.7133%
100202	13	1	12	10	1.9290%	1.0958%	0.0044%	5.5445%
100208	13	5	8	5	0.0833%	0.0909%	0.0002%	0.2134%
100210	14	4	10	8	0.1315%	0.1294%	0.0002%	0.3190%
100212	13	8	5	3	0.0214%	0.0023%	0.0009%	0.0609%
100214	13	6	7	4	0.0498%	0.0312%	0.0002%	0.1364%
100215	14	4	10	8	0.0068%	0.0013%	0.0000%	0.0211%
100299	15	2	13	12	0.2942%	0.0939%	0.0000%	1.6894%
100302	13	7	6	4	0.0950%	0.0660%	0.0000%	0.2479%
100305	14	2	12	7	0.3970%	0.0001%	0.0000%	2.7728%
100316	14	1	13	8	0.0500%	0.0062%	0.0004%	0.2391%
100318	13	7	6	3	0.0035%	0.0014%	0.0000%	0.0090%

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
100320	13	8	5	2	0.0009%	0.0009%	0.0000%	0.0017%
100322	13	7	6	3	0.0002%	0.0000%	0.0000%	0.0004%
100324	13	9	4	1	0.0000%	0.0000%	0.0000%	0.0000%
100326	13	11	2	0				
100328	13	11	2	0				
100330	13	10	3	1	0.0003%	0.0003%	0.0003%	0.0003%
100399	14	2	12	11	0.0094%	0.0002%	0.0000%	0.0603%
100410	13	12	1	0				
100499	14	3	11	8	0.0052%	0.0007%	0.0000%	0.0240%
100501	13	4	9	5	0.0029%	0.0016%	0.0003%	0.0068%
100504	14	5	9	5	0.0112%	0.0020%	0.0002%	0.0444%
100509	13	11	2	1	0.0000%	0.0000%	0.0000%	0.0000%
100511	14	5	9	6	0.0046%	0.0004%	0.0001%	0.0259%
100599	14	8	6	6	0.0010%	0.0003%	0.0000%	0.0031%
100601	13	4	9	6	0.4859%	0.0009%	0.0000%	2.9066%
100602	13	6	7	4	0.0001%	0.0001%	0.0000%	0.0003%
100604	13	8	5	3	0.0000%	0.0000%	0.0000%	0.0001%
100610	13	12	1	0				
100699	14	8	6	4	0.0017%	0.0009%	0.0000%	0.0050%
100701	13	9	4	2	0.0000%	0.0000%	0.0000%	0.0000%
100702	13	9	4	2	0.0000%	0.0000%	0.0000%	0.0000%
100703	13	12	1	0				
100704	13	8	5	2	0.0000%	0.0000%	0.0000%	0.0000%
100705	13	12	1	0				
100708	13	12	1	0				
100799	13	7	6	5	0.0001%	0.0000%	0.0000%	0.0005%
100804	13	6	7	4	0.0008%	0.0006%	0.0001%	0.0017%
100809	13	4	9	5	1.5873%	0.0004%	0.0000%	7.9329%
100811	13	6	7	4	0.0001%	0.0000%	0.0000%	0.0003%
100813	13	10	3	1	0.0000%	0.0000%	0.0000%	0.0000%
100814	13	8	5	3	0.0000%	0.0000%	0.0000%	0.0000%
100816	13	7	6	3	0.2883%	0.0157%	0.0000%	0.8491%
100818	13	9	4	1	0.0000%	0.0000%	0.0000%	0.0000%
100820	13	12	1	0				
100899	14	5	9	7	0.0337%	0.0023%	0.0000%	0.2254%
100903	13	2	11	8	0.0714%	0.0581%	0.0019%	0.2280%
100906	13	4	9	6	0.0338%	0.0118%	0.0015%	0.0995%
100908	14	3	11	9	0.3086%	0.2308%	0.0006%	1.0611%
100910	13	3	10	6	0.0185%	0.0078%	0.0007%	0.0801%
100912	13	3	10	8	0.0246%	0.0183%	0.0001%	0.0716%
100914	13	9	4	3	0.0030%	0.0022%	0.0014%	0.0053%
100916	13	12	1	0				
100999	16	1	15	14	0.0487%	0.0134%	0.0000%	0.2016%
101003	13		13	9	0.0617%	0.0212%	0.0000%	0.4200%
101006	13	8	5	3	0.0040%	0.0049%	0.0013%	0.0059%
101008	13	4	9	6	0.0258%	0.0216%	0.0031%	0.0659%
101010	13	5	8	4	0.0005%	0.0005%	0.0000%	0.0011%

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
101012	13	7	6	4	0.0037%	0.0028%	0.0002%	0.0091%
101014	14	11	3	2	0.0001%	0.0001%	0.0000%	0.0003%
101016	13	12	1	0				
101099	16	1	15	14	0.0208%	0.0036%	0.0000%	0.1042%
101103	14	3	11	9	0.0868%	0.0763%	0.0021%	0.2221%
101105	13	2	11	6	0.0044%	0.0004%	0.0000%	0.0168%
101110	14	3	11	6	0.0246%	0.0033%	0.0001%	0.1239%
101112	14		14	11	0.2235%	0.0372%	0.0000%	1.6516%
101114	13	3	10	6	0.0025%	0.0006%	0.0000%	0.0099%
101116	13	6	7	3	0.0003%	0.0002%	0.0002%	0.0006%
101118	13	9	4	2	0.0012%	0.0012%	0.0000%	0.0025%
101120	14	4	10	6	0.0193%	0.0021%	0.0000%	0.0896%
101199	14	1	13	12	0.0162%	0.0014%	0.0000%	0.1127%
101201	14	2	12	9	0.1320%	0.0153%	0.0020%	1.0080%
101203	14	2	12	8	0.0178%	0.0018%	0.0000%	0.0970%
101205	13	9	4	1	0.0003%	0.0003%	0.0003%	0.0003%
101206	13	1	12	7	0.0364%	0.0065%	0.0002%	0.1864%
101208	13		13	10	0.4189%	0.0752%	0.0053%	1.5362%
101210	13	7	6	3	0.0147%	0.0027%	0.0007%	0.0407%
101212	13	7	6	5	0.0014%	0.0002%	0.0000%	0.0063%
101213	13	5	8	6	0.0938%	0.0433%	0.0000%	0.4008%
101299	15	3	12	11	0.0645%	0.0084%	0.0001%	0.3950%
101301	13	3	10	7	0.0249%	0.0178%	0.0001%	0.1140%
101304	14	2	12	8	0.0224%	0.0296%	0.0005%	0.0380%
101306	13	1	12	7	0.0129%	0.0045%	0.0000%	0.0562%
101307	13	7	6	4	0.0144%	0.0014%	0.0001%	0.0546%
101310	13	8	5	2	0.0060%	0.0060%	0.0000%	0.0120%
101311	13	5	8	6	0.0292%	0.0102%	0.0007%	0.1249%
101313	13	4	9	5	0.8206%	0.0072%	0.0001%	4.0848%
101314	14	1	13	10	0.2335%	0.0842%	0.0015%	1.6537%
101399	15	2	13	12	0.0152%	0.0048%	0.0002%	0.0566%
110110	14	3	11	9	0.0076%	0.0047%	0.0000%	0.0290%
110112	14	3	11	7	0.0041%	0.0031%	0.0002%	0.0094%
110114	13	3	10	7	0.0002%	0.0001%	0.0000%	0.0006%
110199	16	2	14	14	0.0034%	0.0006%	0.0000%	0.0261%
110203	13	7	6	3	0.0000%	0.0000%	0.0000%	0.0000%
110206	13	10	3	2	0.0007%	0.0007%	0.0004%	0.0010%
110299	15	9	6	5	0.0030%	0.0000%	0.0000%	0.0110%
110501	14	2	12	9	0.0051%	0.0046%	0.0002%	0.0119%
110502	14	1	13	10	0.0042%	0.0031%	0.0005%	0.0141%
110599	15	2	13	9	0.0008%	0.0001%	0.0000%	0.0033%
120101	14		14	11	0.5894%	0.3267%	0.0111%	2.3559%
120102	14		14	11	0.6640%	0.1583%	0.0033%	4.8187%
120103	14		14	11	0.0650%	0.0266%	0.0020%	0.2850%
120104	14		14	11	0.0364%	0.0114%	0.0000%	0.1263%
120105	14	1	13	10	0.0575%	0.0145%	0.0011%	0.2682%
120113	14		14	9	0.0017%	0.0010%	0.0000%	0.0057%

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
120115	14		14	10	0.0035%	0.0012%	0.0000%	0.0160%
120117	14		14	10	0.2031%	0.0402%	0.0003%	1.1306%
120121	14		14	9	0.0073%	0.0010%	0.0000%	0.0488%
120199	16		16	16	0.0922%	0.0176%	0.0000%	0.7453%
150101	14		14	11	0.5069%	0.5194%	0.0728%	0.8612%
150102	14		14	11	0.1402%	0.1349%	0.0225%	0.3602%
150103	14		14	11	0.1156%	0.0532%	0.0161%	0.3140%
150104	14		14	11	0.0557%	0.0450%	0.0098%	0.1393%
150105	14	1	13	10	0.0097%	0.0095%	0.0003%	0.0203%
150106	14		14	11	0.0876%	0.0290%	0.0085%	0.3693%
150107	14		14	11	0.1189%	0.0544%	0.0089%	0.5067%
150109	13	2	11	7	0.0027%	0.0015%	0.0004%	0.0088%
150203	14		14	11	0.0082%	0.0049%	0.0004%	0.0236%
160103	14		14	11	0.0677%	0.0527%	0.0001%	0.1823%
160106	13		13	9	0.0534%	0.0184%	0.0006%	0.2115%
160112	13	3	10	6	0.0006%	0.0003%	0.0000%	0.0018%
160115	14	1	13	8	0.0012%	0.0000%	0.0000%	0.0089%
160116	13	6	7	4	0.0000%	0.0000%	0.0000%	0.0001%
160117	14		14	11	0.2666%	0.1964%	0.0148%	0.8584%
160118	14		14	11	0.0129%	0.0050%	0.0002%	0.0315%
160119	14		14	11	0.0041%	0.0029%	0.0001%	0.0123%
160120	13		13	9	0.0061%	0.0064%	0.0001%	0.0221%
160122	13	3	10	7	0.0078%	0.0028%	0.0011%	0.0384%
160199	16	1	15	15	0.0221%	0.0023%	0.0000%	0.1617%
160214	14		14	11	0.1676%	0.0079%	0.0000%	1.7447%
160216	14		14	11	0.0087%	0.0026%	0.0001%	0.0570%
160304	14	1	13	10	0.0161%	0.0075%	0.0000%	0.0735%
160306	14		14	11	0.0690%	0.0070%	0.0006%	0.5774%
160505	13	4	9	7	0.0000%	0.0000%	0.0000%	0.0001%
160509	14	2	12	9	0.0013%	0.0002%	0.0000%	0.0057%
160604	14	1	13	10	0.0002%	0.0001%	0.0000%	0.0010%
160605	14		14	11	0.0007%	0.0002%	0.0000%	0.0026%
160799	16	2	14	13	0.0034%	0.0013%	0.0000%	0.0260%
160801	14	2	12	8	0.0004%	0.0001%	0.0000%	0.0016%
160803	14	2	12	9	0.0051%	0.0004%	0.0000%	0.0242%
160804	13	7	6	2	0.0023%	0.0023%	0.0000%	0.0047%
161002	14		14	11	0.3681%	0.0618%	0.0000%	3.1181%
161004	13	4	9	6	0.0364%	0.0042%	0.0002%	0.1937%
161102	13	4	9	6	0.0150%	0.0015%	0.0001%	0.0689%
161104	14	2	12	8	0.1122%	0.0499%	0.0000%	0.4946%
161106	14	2	12	9	0.0170%	0.0070%	0.0017%	0.0799%
170101	14		14	11	0.9710%	0.5033%	0.0023%	4.6057%
170102	14	1	13	10	0.3042%	0.0515%	0.0000%	2.5583%
170103	13	3	10	6	0.0343%	0.0093%	0.0018%	0.1075%
170107	14	1	13	10	0.7857%	0.4505%	0.0015%	2.6847%
170201	14	2	12	9	0.1528%	0.0280%	0.0012%	0.8030%
170202	14		14	10	0.0188%	0.0038%	0.0000%	0.0830%

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
170203	14	1	13	10	0.0079%	0.0041%	0.0002%	0.0357%
170302	13		13	10	0.5342%	0.3325%	0.0006%	2.0289%
170401	14	1	13	10	0.0201%	0.0074%	0.0000%	0.0500%
170402	14		14	11	0.0319%	0.0212%	0.0000%	0.0727%
170403	13	1	12	7	0.0033%	0.0008%	0.0000%	0.0174%
170404	13	2	11	7	0.0015%	0.0013%	0.0000%	0.0031%
170405	14		14	11	1.0166%	0.4361%	0.0152%	3.7776%
170406	13	4	9	4	0.0001%	0.0001%	0.0000%	0.0003%
170407	14		14	11	0.0548%	0.0233%	0.0085%	0.2307%
170411	14		14	11	0.0098%	0.0058%	0.0002%	0.0295%
170504	14		14	11	3.9587%	1.5825%	0.0000%	24.3048%
170506	13	2	11	7	1.9978%	0.6503%	0.0001%	11.0160%
170508	13	4	9	5	0.0712%	0.0157%	0.0015%	0.2839%
170604	14	1	13	9	0.0470%	0.0101%	0.0002%	0.3278%
170802	14	3	11	7	0.0323%	0.0165%	0.0000%	0.1300%
170904	14		14	11	1.3063%	1.4554%	0.0069%	2.8162%
180101	14	1	13	9	0.0322%	0.0005%	0.0000%	0.2852%
180102	13	3	10	6	0.0005%	0.0006%	0.0000%	0.0011%
180104	14	1	13	9	0.0060%	0.0018%	0.0002%	0.0233%
180107	13	2	11	7	0.0001%	0.0000%	0.0000%	0.0009%
180109	13	3	10	7	0.0005%	0.0003%	0.0000%	0.0011%
180201	13	5	8	6	0.0002%	0.0000%	0.0000%	0.0010%
180203	14	2	12	7	0.0003%	0.0001%	0.0000%	0.0008%
180206	13	8	5	3	0.0000%	0.0000%	0.0000%	0.0000%
180208	14	4	10	5	0.0001%	0.0000%	0.0000%	0.0002%
190102	13	4	9	5	0.0332%	0.0027%	0.0005%	0.1359%
190112	14	1	13	10	0.2577%	0.0462%	0.0001%	1.7818%
190114	13	6	7	3	0.0224%	0.0000%	0.0000%	0.0672%
190116	13	6	7	3	0.0005%	0.0002%	0.0000%	0.0014%
190118	13	7	6	2	0.0077%	0.0077%	0.0002%	0.0151%
190119	13	9	4	1	0.0000%	0.0000%	0.0000%	0.0000%
190199	14	3	11	8	0.0647%	0.0004%	0.0000%	0.5048%
190203	13	1	12	7	0.0072%	0.0015%	0.0000%	0.0216%
190206	14	1	13	9	0.0202%	0.0088%	0.0006%	0.0838%
190210	13	9	4	1	0.0121%	0.0121%	0.0121%	0.0121%
190299	13	5	8	7	0.0599%	0.0108%	0.0030%	0.2582%
190305	13	2	11	7	0.1081%	0.0707%	0.0000%	0.2962%
190307	13	2	11	7	0.0510%	0.0020%	0.0000%	0.3140%
190401	13	10	3	2	0.0001%	0.0001%	0.0001%	0.0001%
190404	13	11	2	0				
190501	14	5	9	4	0.0290%	0.0006%	0.0000%	0.1146%
190502	13	8	5	2	0.0000%	0.0000%	0.0000%	0.0000%
190503	14	6	8	4	0.0558%	0.0203%	0.0010%	0.1816%
190599	13	3	10	8	0.0615%	0.0223%	0.0003%	0.3111%
190603	13	8	5	3	0.0007%	0.0009%	0.0003%	0.0010%
190604	13	5	8	5	0.0080%	0.0003%	0.0000%	0.0308%
190605	13	10	3	1	0.4474%	0.4474%	0.4474%	0.4474%

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
190606	13	8	5	2	0.0310%	0.0310%	0.0006%	0.0613%
190699	13	8	5	5	0.0429%	0.0073%	0.0000%	0.1912%
190703	13	3	10	5	0.4153%	0.1903%	0.0029%	1.5652%
190801	14		14	10	0.0713%	0.0391%	0.0005%	0.3813%
190802	14		14	10	0.0757%	0.0484%	0.0000%	0.3015%
190805	14	1	13	9	1.5764%	1.1631%	0.0003%	6.2706%
190809	13	2	11	7	0.0348%	0.0119%	0.0024%	0.1125%
190812	14		14	11	0.3271%	0.1506%	0.0173%	1.5215%
190814	14		14	11	0.2380%	0.0547%	0.0003%	1.6278%
190899	15	2	13	13	0.3789%	0.0153%	0.0001%	4.5356%
190901	13	2	11	8	0.0671%	0.0024%	0.0000%	0.5242%
190902	13	1	12	9	0.3148%	0.0254%	0.0019%	1.5650%
190903	13	3	10	7	0.8272%	0.0727%	0.0076%	5.3543%
190904	14	3	11	6	0.0002%	0.0001%	0.0000%	0.0005%
190905	14	2	12	8	0.0012%	0.0010%	0.0001%	0.0026%
190906	14	4	10	5	0.4536%	0.1069%	0.0000%	1.6755%
190999	15	1	14	12	0.0073%	0.0017%	0.0000%	0.0521%
191001	14	1	13	10	0.2836%	0.0510%	0.0001%	1.0051%
191002	13		13	8	0.0076%	0.0065%	0.0003%	0.0235%
191004	13	3	10	6	0.0199%	0.0121%	0.0000%	0.0707%
191006	13	3	10	6	0.1272%	0.0426%	0.0001%	0.5664%
191106	13	5	8	4	0.0024%	0.0005%	0.0000%	0.0084%
191199	13	7	6	4	0.0010%	0.0000%	0.0000%	0.0041%
191201	14		14	11	0.1334%	0.0254%	0.0001%	1.1863%
191202	14		14	11	0.4106%	0.0607%	0.0005%	2.9160%
191203	14		14	11	0.0097%	0.0049%	0.0000%	0.0513%
191204	14		14	11	0.0358%	0.0137%	0.0003%	0.1220%
191205	13	1	12	9	0.0453%	0.0023%	0.0000%	0.2833%
191207	14	2	12	9	0.0621%	0.0081%	0.0001%	0.3663%
191208	13	3	10	7	0.0084%	0.0084%	0.0000%	0.0260%
191209	13	4	9	6	0.0820%	0.0405%	0.0002%	0.3140%
191210	14	6	8	6	0.1796%	0.0182%	0.0004%	0.9223%
191212	14	1	13	10	0.3728%	0.1197%	0.0020%	1.1221%
191302	13	7	6	3	0.1062%	0.0923%	0.0000%	0.2263%
191304	13	10	3	0				
191306	13	8	5	2	0.0788%	0.0788%	0.0142%	0.1433%
191308	13	8	5	2	0.0075%	0.0075%	0.0063%	0.0086%
200101	13	1	12	10	1.0539%	0.4821%	0.0419%	3.8866%
200102	13		13	10	0.0448%	0.0351%	0.0012%	0.1575%
200108	13		13	10	0.0900%	0.0301%	0.0010%	0.4147%
200110	13	2	11	7	0.0033%	0.0008%	0.0000%	0.0158%
200111	13		13	10	0.0306%	0.0047%	0.0000%	0.2257%
200125	13		13	10	0.0226%	0.0097%	0.0000%	0.0977%
200128	13	1	12	9	0.0034%	0.0002%	0.0000%	0.0262%
200130	13	1	12	8	0.0002%	0.0000%	0.0000%	0.0011%
200132	12	3	9	5	0.0009%	0.0013%	0.0000%	0.0015%
200134	13	2	11	7	0.0003%	0.0000%	0.0000%	0.0019%

Waste code	No of countries that				Descriptive statistical parameters			
	provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
200136	13		13	10	0.0171%	0.0120%	0.0000%	0.0788%
200138	13		13	10	0.1018%	0.0294%	0.0064%	0.6228%
200139	13		13	10	0.0884%	0.0496%	0.0012%	0.3521%
200140	13		13	10	0.7191%	0.1240%	0.0129%	2.9071%
200141	12	1	11	7	0.0030%	0.0001%	0.0000%	0.0168%
200199	14	1	13	12	0.0854%	0.0098%	0.0000%	0.3625%
200201	13		13	10	0.2441%	0.1359%	0.0034%	1.2375%
200202	13		13	10	0.1091%	0.0474%	0.0000%	0.4256%
200203	13	3	10	7	0.0517%	0.0089%	0.0010%	0.2190%
200301	13		13	10	3.4052%	2.4454%	0.1164%	12.9909%
200302	12	4	8	4	0.0449%	0.0299%	0.0064%	0.1135%
200303	12		12	9	0.9184%	0.0451%	0.0003%	7.8424%
200304	13		13	10	0.3813%	0.2040%	0.0024%	1.5261%
200306	12		12	9	0.2883%	0.0393%	0.0041%	1.9832%
200307	13	1	12	9	0.0845%	0.0203%	0.0011%	0.2882%
200399	13	1	12	11	0.0801%	0.0479%	0.0016%	0.3692%

4.7. Frequency of usage and descriptive parameters of share from national amount by six-digit code from LoW - hazardous wastes

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses code	Provided quantities	Mean	Median	Min	Max
010304	13	9	4	2	41.9191%	41.9191%	0.4742%	83.3639%
010305	14	8	6	3	28.7150%	0.3961%	0.0143%	85.7346%
010307	14	8	6	3	1.2532%	0.0138%	0.0000%	3.7460%
010407	15	8	7	5	0.0067%	0.0054%	0.0001%	0.0204%
010505	14	6	8	5	0.3290%	0.1099%	0.0016%	1.0798%
010506	14	7	7	5	0.1272%	0.0050%	0.0001%	0.4548%
020108	14	2	12	9	0.0069%	0.0053%	0.0002%	0.0220%
030104	15		15	11	0.9646%	0.0778%	0.0006%	5.7506%
030201	15	4	11	8	0.0015%	0.0014%	0.0000%	0.0032%
030202	14	7	7	4	0.0033%	0.0001%	0.0000%	0.0130%
030203	14	10	4	4	0.0017%	0.0009%	0.0001%	0.0050%
030204	13	3	10	6	0.0006%	0.0001%	0.0000%	0.0029%
030205	14	2	12	7	0.0015%	0.0001%	0.0000%	0.0086%
040103	14	8	6	4	0.0027%	0.0006%	0.0003%	0.0093%
040214	14	5	9	5	0.0075%	0.0048%	0.0000%	0.0230%
040216	15	5	10	6	0.0070%	0.0020%	0.0001%	0.0310%
040219	14	5	9	6	0.0626%	0.0153%	0.0006%	0.3050%
050102	13	7	6	4	0.1015%	0.0062%	0.0015%	0.3921%
050103	14		14	11	0.3415%	0.1435%	0.0054%	0.9847%
050104	14	10	4	2	0.0160%	0.0160%	0.0006%	0.0313%
050105	15	2	13	8	0.0698%	0.0340%	0.0000%	0.3319%
050106	15	1	14	10	0.1257%	0.1106%	0.0001%	0.3363%
050107	14	7	7	4	0.8489%	0.2915%	0.0000%	2.8125%
050108	14	4	10	7	0.0135%	0.0032%	0.0001%	0.0378%
050109	14	2	12	7	0.4313%	0.1020%	0.0165%	2.2041%
050111	14	11	3	1	0.1679%	0.1679%	0.1679%	0.1679%
050112	14	10	4	4	0.0006%	0.0001%	0.0000%	0.0022%
050115	14	5	9	7	0.0684%	0.0523%	0.0064%	0.1749%
050601	13	9	4	2	0.0108%	0.0108%	0.0000%	0.0216%
050603	14	5	9	5	0.3053%	0.0118%	0.0003%	1.2336%
050701	14	8	6	3	0.0216%	0.0000%	0.0000%	0.0649%
060101	15		15	12	0.7526%	0.0609%	0.0000%	7.0323%
060102	15	2	13	10	0.0212%	0.0107%	0.0000%	0.0809%
060103	15	6	9	7	0.0019%	0.0009%	0.0000%	0.0083%
060104	15	3	12	9	0.0051%	0.0012%	0.0000%	0.0287%
060105	15	2	13	10	0.0088%	0.0036%	0.0000%	0.0411%
060106	15		15	12	0.0914%	0.0209%	0.0000%	0.4353%
060201	14	5	9	7	0.7275%	0.0169%	0.0000%	4.6358%
060203	15	3	12	8	0.0052%	0.0021%	0.0001%	0.0172%
060204	15	1	14	11	0.2816%	0.0741%	0.0000%	1.3397%
060205	15	1	14	12	0.0779%	0.0150%	0.0000%	0.3468%
060311	15	4	11	9	0.0110%	0.0028%	0.0003%	0.0744%

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses code	Provided quantities	Mean	Median	Min	Max
060313	15		15	12	0.8512%	0.0047%	0.0000%	10.0853%
060315	14	5	9	7	0.0119%	0.0072%	0.0000%	0.0323%
060403	14	7	7	4	0.0056%	0.0053%	0.0005%	0.0113%
060404	15		15	12	0.0240%	0.0069%	0.0000%	0.1923%
060405	15		15	12	0.0349%	0.0182%	0.0000%	0.1245%
060502	15		15	12	0.2353%	0.0302%	0.0007%	1.7122%
060602	15	6	9	6	0.0446%	0.0028%	0.0001%	0.2575%
060701	13	9	4	2	0.0014%	0.0014%	0.0003%	0.0025%
060702	14	8	6	4	0.0002%	0.0002%	0.0001%	0.0004%
060703	13	10	3	1	0.2596%	0.2596%	0.2596%	0.2596%
060704	14	10	4	3	0.0005%	0.0000%	0.0000%	0.0015%
060802	14	9	5	3	0.0001%	0.0001%	0.0001%	0.0001%
060903	14	11	3	2	0.0001%	0.0001%	0.0000%	0.0002%
061002	14	5	9	5	0.0076%	0.0010%	0.0000%	0.0253%
061301	15	6	9	6	0.0013%	0.0005%	0.0000%	0.0034%
061302	15	4	11	8	0.0122%	0.0028%	0.0000%	0.0709%
061304	14	7	7	4	0.0102%	0.0028%	0.0000%	0.0349%
061305	14	8	6	3	0.0005%	0.0006%	0.0000%	0.0008%
070101	15	3	12	10	0.2794%	0.0162%	0.0001%	1.3737%
070103	15	3	12	8	0.0290%	0.0052%	0.0001%	0.1148%
070104	15		15	12	0.4805%	0.0260%	0.0000%	4.7755%
070107	14	5	9	6	0.3155%	0.0446%	0.0002%	1.0413%
070108	14	2	12	8	0.2086%	0.0697%	0.0202%	0.9439%
070109	14	7	7	5	0.0263%	0.0043%	0.0004%	0.1195%
070110	14	2	12	10	0.0446%	0.0355%	0.0003%	0.1276%
070111	14	5	9	6	0.0998%	0.0268%	0.0002%	0.4743%
070201	15	4	11	8	0.2342%	0.0118%	0.0002%	1.7038%
070203	15	4	11	7	0.0086%	0.0075%	0.0001%	0.0188%
070204	15	3	12	8	0.0354%	0.0204%	0.0013%	0.0919%
070207	14	6	8	6	0.0139%	0.0036%	0.0001%	0.0471%
070208	15	2	13	9	0.1267%	0.1072%	0.0006%	0.3637%
070209	15	5	10	7	0.0075%	0.0031%	0.0000%	0.0258%
070210	15	5	10	7	0.0333%	0.0069%	0.0000%	0.1880%
070211	14	4	10	7	0.0214%	0.0157%	0.0021%	0.0646%
070214	14	3	11	7	0.0233%	0.0207%	0.0000%	0.0613%
070216	14	6	8	4	0.0058%	0.0016%	0.0002%	0.0197%
070301	14	2	12	8	0.0421%	0.0020%	0.0000%	0.3139%
070303	14	6	8	5	0.0011%	0.0013%	0.0000%	0.0022%
070304	15	1	14	10	0.3499%	0.0152%	0.0016%	2.3769%
070307	14	8	6	4	0.0090%	0.0048%	0.0002%	0.0262%
070308	14	4	10	6	0.0104%	0.0028%	0.0003%	0.0478%
070309	14	9	5	3	0.0007%	0.0007%	0.0001%	0.0012%
070310	14	7	7	4	0.0181%	0.0099%	0.0003%	0.0524%
070311	14	7	7	5	0.0052%	0.0045%	0.0014%	0.0122%
070401	15	3	12	9	0.0765%	0.0098%	0.0012%	0.4007%
070403	14	6	8	6	0.0898%	0.0239%	0.0000%	0.3601%
070404	15	3	12	9	0.0149%	0.0006%	0.0000%	0.1096%

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses code	Provided quantities	Mean	Median	Min	Max
070407	14	7	7	5	0.0040%	0.0028%	0.0003%	0.0096%
070408	14	7	7	5	0.0064%	0.0035%	0.0002%	0.0161%
070409	14	7	7	4	0.0019%	0.0012%	0.0000%	0.0051%
070410	14	8	6	3	0.0004%	0.0004%	0.0000%	0.0008%
070411	14	7	7	4	0.0033%	0.0026%	0.0018%	0.0062%
070413	15	3	12	8	0.0406%	0.0039%	0.0002%	0.2830%
070501	15	3	12	9	1.0962%	0.0396%	0.0048%	7.9396%
070503	15	2	13	10	0.3416%	0.1204%	0.0010%	2.0457%
070504	15	2	13	11	1.6419%	0.4130%	0.0001%	7.7309%
070507	15	4	11	8	0.0379%	0.0015%	0.0000%	0.2102%
070508	15	4	11	9	0.1005%	0.0189%	0.0011%	0.3161%
070509	15	7	8	4	0.0004%	0.0004%	0.0000%	0.0009%
070510	15	3	12	8	0.0833%	0.0201%	0.0005%	0.4449%
070511	15	5	10	7	0.0641%	0.0191%	0.0006%	0.2973%
070513	15	1	14	11	0.1464%	0.0096%	0.0000%	0.8913%
070601	15	2	13	9	1.4436%	0.0092%	0.0005%	12.1839%
070603	14	4	10	6	0.0049%	0.0020%	0.0000%	0.0137%
070604	15	3	12	10	0.0131%	0.0068%	0.0000%	0.0716%
070607	14	6	8	5	0.0066%	0.0032%	0.0000%	0.0222%
070608	15	5	10	8	0.0406%	0.0091%	0.0000%	0.1467%
070609	14	9	5	3	0.0008%	0.0001%	0.0000%	0.0023%
070610	14	7	7	5	0.0317%	0.0181%	0.0032%	0.0994%
070611	14	4	10	6	0.0548%	0.0091%	0.0002%	0.2792%
070701	15	4	11	8	0.2480%	0.0153%	0.0011%	1.6287%
070703	14	3	11	7	0.0563%	0.0047%	0.0001%	0.3752%
070704	15		15	11	0.1093%	0.0094%	0.0001%	1.0488%
070707	14	5	9	5	0.0129%	0.0009%	0.0000%	0.0544%
070708	14	3	11	8	0.1583%	0.0267%	0.0000%	1.0518%
070709	14	8	6	3	0.0016%	0.0003%	0.0002%	0.0042%
070710	14	6	8	6	0.0466%	0.0107%	0.0006%	0.1738%
070711	14	7	7	3	0.1825%	0.0035%	0.0006%	0.5435%
080111	15		15	12	0.4020%	0.3122%	0.0157%	2.0168%
080113	15	1	14	12	0.2089%	0.0693%	0.0000%	0.8105%
080115	15	2	13	10	0.1082%	0.0771%	0.0001%	0.4712%
080117	15	1	14	11	0.0550%	0.0314%	0.0003%	0.2414%
080119	15	2	13	9	0.0885%	0.0301%	0.0088%	0.2491%
080121	15	1	14	9	0.0615%	0.0090%	0.0000%	0.4847%
080312	15	1	14	11	0.1552%	0.0323%	0.0007%	1.3712%
080314	15	3	12	9	0.0305%	0.0207%	0.0013%	0.0976%
080316	13	6	7	5	0.0010%	0.0002%	0.0000%	0.0039%
080317	14	2	12	8	0.0179%	0.0080%	0.0007%	0.0618%
080319	14	11	3	2	0.0009%	0.0009%	0.0007%	0.0012%
080409	15	2	13	10	0.0829%	0.0725%	0.0000%	0.1640%
080411	14	3	11	7	0.0084%	0.0041%	0.0009%	0.0334%
080413	15	4	11	8	0.0191%	0.0187%	0.0007%	0.0443%
080415	15	1	14	11	0.0115%	0.0118%	0.0006%	0.0245%
080417	14	10	4	3	0.0063%	0.0006%	0.0003%	0.0181%

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses code	Provided quantities	Mean	Median	Min	Max
080501	14	2	12	9	0.0039%	0.0020%	0.0000%	0.0160%
090101	15	1	14	11	0.0510%	0.0492%	0.0002%	0.1523%
090102	15	1	14	11	0.0203%	0.0141%	0.0000%	0.0771%
090103	15		15	11	0.0082%	0.0024%	0.0000%	0.0487%
090104	15		15	12	0.0531%	0.0450%	0.0002%	0.1797%
090105	14	1	13	9	0.0369%	0.0158%	0.0009%	0.1529%
090106	14	1	13	11	0.0050%	0.0004%	0.0000%	0.0388%
090111	14	8	6	3	0.0001%	0.0000%	0.0000%	0.0002%
090113	14	6	8	5	0.0079%	0.0010%	0.0000%	0.0335%
100104	15	3	12	8	0.0315%	0.0071%	0.0016%	0.1071%
100109	14	6	8	5	0.0067%	0.0003%	0.0000%	0.0263%
100113	14	7	7	4	0.0070%	0.0009%	0.0001%	0.0260%
100114	15	3	12	8	0.0652%	0.0043%	0.0001%	0.3192%
100116	14	8	6	4	0.0469%	0.0249%	0.0000%	0.1380%
100118	14	8	6	4	0.1981%	0.0254%	0.0000%	0.7416%
100120	14	5	9	5	0.0562%	0.0082%	0.0000%	0.2521%
100122	15	4	11	9	0.0287%	0.0112%	0.0000%	0.1652%
100207	14	2	12	9	3.7442%	2.0713%	0.1417%	16.6327%
100211	14	7	7	4	7.6717%	0.9465%	0.1167%	28.6770%
100213	14	7	7	5	2.7773%	0.5683%	0.0000%	11.9394%
100304	14	4	10	7	0.3098%	0.0282%	0.0004%	1.9477%
100308	14	6	8	4	1.6709%	0.9481%	0.0054%	4.7819%
100309	14	9	5	3	0.4901%	0.5377%	0.0087%	0.9239%
100315	14	9	5	2	0.0854%	0.0854%	0.0443%	0.1265%
100317	14	9	5	3	0.0242%	0.0218%	0.0045%	0.0462%
100319	14	5	9	6	0.0563%	0.0153%	0.0002%	0.2301%
100321	14	6	8	4	0.0429%	0.0370%	0.0055%	0.0922%
100323	14	6	8	6	0.0214%	0.0068%	0.0000%	0.0995%
100325	14	9	5	2	0.0585%	0.0585%	0.0296%	0.0873%
100327	14	9	5	2	0.0032%	0.0032%	0.0007%	0.0056%
100329	14	11	3	3	2.8593%	0.5461%	0.3049%	7.7269%
100401	14	2	12	9	0.9642%	0.4005%	0.0024%	3.5354%
100402	15	4	11	9	0.1783%	0.0577%	0.0199%	0.5822%
100403	13	12	1	0				
100404	14	7	7	4	0.0504%	0.0498%	0.0017%	0.1003%
100405	14	5	9	7	0.1131%	0.0081%	0.0010%	0.6549%
100406	14	7	7	5	0.2085%	0.0156%	0.0001%	0.9937%
100407	13	8	5	3	0.0250%	0.0331%	0.0007%	0.0413%
100409	13	13	0	0				
100503	14	7	7	5	0.0493%	0.0245%	0.0018%	0.1304%
100505	14	9	5	2	0.0006%	0.0006%	0.0001%	0.0011%
100506	14	6	8	6	0.3776%	0.0256%	0.0000%	1.6242%
100508	13	11	2	1	0.0000%	0.0000%	0.0000%	0.0000%
100510	14	10	4	3	0.0020%	0.0003%	0.0003%	0.0053%
100603	14	7	7	5	0.2029%	0.0443%	0.0029%	0.7249%
100606	14	9	5	3	0.3120%	0.0005%	0.0000%	0.9356%
100607	13	9	4	2	1.4419%	1.4419%	0.0000%	2.8837%

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses code	Provided quantities	Mean	Median	Min	Max
100609	13	12	1	0				
100707	13	12	1	0				
100808	14	8	6	4	0.0350%	0.0272%	0.0011%	0.0847%
100810	14	10	4	2	0.0004%	0.0004%	0.0000%	0.0009%
100812	13	13	0	0				
100815	13	9	4	2	0.0060%	0.0060%	0.0004%	0.0117%
100817	13	9	4	2	0.0083%	0.0083%	0.0000%	0.0165%
100819	13	11	2	1	0.0027%	0.0027%	0.0027%	0.0027%
100905	14	6	8	6	0.1773%	0.1153%	0.0051%	0.5765%
100907	14	5	9	7	0.6770%	0.0383%	0.0000%	3.1718%
100909	14	6	8	5	0.1149%	0.0128%	0.0053%	0.5171%
100911	14	6	8	4	0.0096%	0.0073%	0.0001%	0.0237%
100913	14	9	5	3	0.0031%	0.0044%	0.0001%	0.0048%
100915	14	12	2	2	0.0024%	0.0024%	0.0000%	0.0048%
101005	14	6	8	6	0.0205%	0.0013%	0.0002%	0.0903%
101007	14	8	6	4	0.1249%	0.1240%	0.0083%	0.2432%
101009	14	6	8	4	0.0165%	0.0043%	0.0013%	0.0562%
101011	14	9	5	2	0.0022%	0.0022%	0.0006%	0.0038%
101013	14	8	6	5	0.0005%	0.0001%	0.0000%	0.0018%
101015	14	11	3	2	0.0100%	0.0100%	0.0002%	0.0198%
101109	15	5	10	7	0.0068%	0.0025%	0.0005%	0.0209%
101111	14	5	9	6	0.0624%	0.0313%	0.0000%	0.2547%
101113	15	6	9	7	0.0548%	0.0084%	0.0001%	0.3123%
101115	14	4	10	7	0.0379%	0.0260%	0.0003%	0.1458%
101117	14	10	4	3	0.0232%	0.0019%	0.0003%	0.0674%
101119	15	7	8	6	0.0263%	0.0051%	0.0003%	0.0988%
101209	14	8	6	4	0.0462%	0.0379%	0.0004%	0.1084%
101211	14	7	7	4	0.0059%	0.0020%	0.0004%	0.0193%
101309	15	6	9	6	0.0262%	0.0018%	0.0000%	0.1308%
101312	14	8	6	4	0.1161%	0.0444%	0.0009%	0.3748%
101401	13	10	3	0				
110105	15		15	12	0.8216%	0.2864%	0.0001%	5.1666%
110106	15	3	12	10	0.0959%	0.0461%	0.0023%	0.3511%
110107	15	2	13	10	0.1495%	0.0868%	0.0022%	0.3555%
110108	15	3	12	10	0.0365%	0.0206%	0.0005%	0.1775%
110109	15	2	13	10	0.4070%	0.2393%	0.0161%	1.8279%
110111	15		15	12	1.4089%	0.1329%	0.0000%	9.9210%
110113	15	1	14	11	0.1869%	0.0492%	0.0017%	1.1094%
110115	15	7	8	6	0.0062%	0.0010%	0.0000%	0.0257%
110116	15	4	11	9	0.0007%	0.0003%	0.0000%	0.0038%
110198	15	1	14	11	0.1602%	0.0480%	0.0021%	0.9923%
110202	15	6	9	6	3.0548%	0.3739%	0.0017%	11.9546%
110205	14	8	6	3	0.0190%	0.0029%	0.0016%	0.0526%
110207	15	6	9	6	0.1919%	0.0077%	0.0001%	1.0880%
110301	15	5	10	8	0.0033%	0.0028%	0.0001%	0.0089%
110302	15	1	14	10	3.0011%	0.0083%	0.0000%	29.8254%
110503	14	6	8	6	0.0061%	0.0021%	0.0001%	0.0272%

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses code	Provided quantities	Mean	Median	Min	Max
110504	15	4	11	6	0.0203%	0.0064%	0.0008%	0.0625%
120106	14	4	10	8	0.0030%	0.0010%	0.0002%	0.0153%
120107	15	1	14	10	0.0362%	0.0125%	0.0002%	0.1390%
120108	15	4	11	7	0.0125%	0.0175%	0.0010%	0.0284%
120109	15		15	12	1.3487%	1.0540%	0.0000%	3.5886%
120110	15	2	13	9	0.0216%	0.0029%	0.0004%	0.1207%
120112	15	4	11	9	0.0337%	0.0138%	0.0003%	0.1219%
120114	15		15	12	0.0741%	0.0219%	0.0000%	0.3416%
120116	15	3	12	10	0.1476%	0.0128%	0.0002%	0.8724%
120118	15	2	13	10	0.1962%	0.0832%	0.0000%	0.9960%
120119	14	4	10	6	0.0028%	0.0014%	0.0001%	0.0082%
120120	15	2	13	9	0.0331%	0.0155%	0.0000%	0.1617%
120301	15	4	11	8	0.5269%	0.3297%	0.0003%	1.5991%
120302	15	6	9	6	0.0448%	0.0068%	0.0002%	0.2437%
130101	15	3	12	7	0.0048%	0.0020%	0.0003%	0.0163%
130104	15	6	9	6	0.0006%	0.0003%	0.0000%	0.0026%
130105	15	1	14	10	0.0631%	0.0314%	0.0002%	0.1845%
130109	15	3	12	9	0.0009%	0.0004%	0.0001%	0.0046%
130110	15		15	11	0.0612%	0.0418%	0.0003%	0.1759%
130111	15		15	11	0.0224%	0.0048%	0.0000%	0.1895%
130112	14	5	9	6	0.0010%	0.0003%	0.0001%	0.0044%
130113	15		15	11	0.0780%	0.0358%	0.0056%	0.4926%
130204	15		15	12	0.0117%	0.0102%	0.0000%	0.0234%
130205	15		15	12	1.1828%	0.5172%	0.0030%	4.1212%
130206	15		15	11	0.1343%	0.1099%	0.0036%	0.3496%
130207	14	2	12	9	0.0060%	0.0022%	0.0005%	0.0203%
130208	15		15	12	1.0888%	0.4653%	0.0181%	5.2483%
130301	14	1	13	10	0.0097%	0.0020%	0.0000%	0.0413%
130306	15	4	11	7	0.0043%	0.0003%	0.0001%	0.0220%
130307	15		15	12	0.0412%	0.0318%	0.0016%	0.1277%
130308	15	4	11	9	0.0035%	0.0034%	0.0001%	0.0091%
130309	15	9	6	4	0.0003%	0.0001%	0.0000%	0.0009%
130310	15		15	11	0.0418%	0.0079%	0.0007%	0.3336%
130401	13	1	12	8	1.0311%	0.0020%	0.0007%	4.5938%
130402	13	6	7	5	0.2032%	0.0305%	0.0004%	0.7147%
130403	14	1	13	10	1.3287%	0.1901%	0.0001%	6.9287%
130501	15	1	14	11	1.8629%	0.0819%	0.0011%	19.6912%
130502	15	1	14	10	1.8873%	0.2968%	0.0041%	11.9604%
130503	15	2	13	9	0.7869%	0.0661%	0.0034%	4.5757%
130506	15		15	11	0.6617%	0.1458%	0.0009%	4.7905%
130507	15		15	11	1.7784%	0.7763%	0.0054%	6.3602%
130508	15		15	12	0.8569%	0.1337%	0.0000%	5.6125%
130701	15		15	12	0.3437%	0.0269%	0.0005%	2.1584%
130702	15	2	13	8	0.0025%	0.0023%	0.0000%	0.0049%
130703	15	1	14	10	0.0879%	0.0316%	0.0149%	0.2731%
130801	14	6	8	5	0.0003%	0.0001%	0.0000%	0.0006%
130802	15	1	14	11	0.2308%	0.0556%	0.0006%	1.7992%

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses code	Provided quantities	Mean	Median	Min	Max
130899	17		17	17	0.2914%	0.0970%	0.0000%	1.5469%
140601	14	2	12	9	0.0092%	0.0011%	0.0000%	0.0653%
140602	15		15	11	0.0215%	0.0029%	0.0000%	0.1030%
140603	15		15	11	0.2578%	0.0909%	0.0002%	1.4571%
140604	14	2	12	9	0.0150%	0.0075%	0.0006%	0.0623%
140605	15	1	14	12	0.0276%	0.0128%	0.0000%	0.1079%
150110	15		15	12	0.4336%	0.1566%	0.0057%	1.3728%
150111	15	2	13	10	0.0090%	0.0042%	0.0000%	0.0241%
150202	15		15	12	0.6489%	0.4423%	0.0068%	2.0209%
160104	15		15	12	0.3762%	0.0773%	0.0010%	2.6821%
160107	15		15	12	0.1463%	0.0607%	0.0004%	0.5918%
160108	14	5	9	5	0.0001%	0.0002%	0.0000%	0.0002%
160109	14	3	11	6	0.0003%	0.0002%	0.0000%	0.0011%
160110	14	5	9	5	0.0002%	0.0002%	0.0001%	0.0006%
160111	14	1	13	10	0.0044%	0.0008%	0.0000%	0.0322%
160113	15		15	12	0.0037%	0.0002%	0.0000%	0.0206%
160114	14		14	11	0.0299%	0.0199%	0.0000%	0.1317%
160121	14	3	11	8	0.0231%	0.0025%	0.0007%	0.1521%
160209	15	1	14	11	0.0651%	0.0099%	0.0003%	0.3701%
160210	14	4	10	8	0.0157%	0.0007%	0.0001%	0.1129%
160211	15	3	12	9	0.0102%	0.0026%	0.0002%	0.0580%
160212	14	5	9	5	0.0037%	0.0002%	0.0000%	0.0140%
160213	15		15	12	0.0915%	0.0736%	0.0005%	0.3339%
160215	15	2	13	10	0.0177%	0.0042%	0.0000%	0.1242%
160303	15		15	12	0.1218%	0.0071%	0.0003%	1.1681%
160305	15		15	11	0.0487%	0.0295%	0.0002%	0.1317%
160401	14	2	12	8	0.0003%	0.0002%	0.0000%	0.0009%
160402	14	8	6	4	0.0031%	0.0000%	0.0000%	0.0124%
160403	14	3	11	8	0.0055%	0.0034%	0.0002%	0.0135%
160504	15	3	12	10	0.0151%	0.0081%	0.0000%	0.0593%
160506	15		15	12	0.0215%	0.0111%	0.0002%	0.0882%
160507	15	1	14	11	0.0120%	0.0050%	0.0000%	0.0378%
160508	15		15	12	0.0123%	0.0082%	0.0000%	0.0551%
160601	15		15	12	0.9050%	0.5921%	0.0361%	3.2195%
160602	15		15	11	0.0218%	0.0193%	0.0001%	0.0881%
160603	15	2	13	9	0.0131%	0.0009%	0.0000%	0.1022%
160606	15	1	14	11	0.0601%	0.0050%	0.0000%	0.4396%
160708	15		15	12	1.9337%	0.7719%	0.0021%	8.9137%
160709	15	1	14	11	0.0702%	0.0325%	0.0022%	0.2551%
160802	15	2	13	10	0.0828%	0.0298%	0.0007%	0.2366%
160805	14	8	6	4	0.0037%	0.0026%	0.0013%	0.0082%
160806	14	9	5	3	0.0017%	0.0001%	0.0000%	0.0051%
160807	15	3	12	10	0.0320%	0.0134%	0.0000%	0.1647%
160901	14	7	7	4	0.0002%	0.0002%	0.0000%	0.0004%
160902	15	4	11	7	0.0005%	0.0001%	0.0000%	0.0016%
160903	15	4	11	7	0.0012%	0.0003%	0.0000%	0.0054%
160904	15	4	11	8	0.0013%	0.0003%	0.0000%	0.0083%

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses code	Provided quantities	Mean	Median	Min	Max
161001	15		15	11	0.8324%	0.1470%	0.0054%	4.0016%
161003	15	4	11	6	0.0156%	0.0016%	0.0001%	0.0834%
161101	14	5	9	7	0.4894%	0.1678%	0.0104%	2.0142%
161103	14	5	9	7	0.0629%	0.0244%	0.0014%	0.2127%
161105	15	5	10	8	0.0281%	0.0252%	0.0001%	0.0744%
170106	14	2	12	8	0.6764%	0.2346%	0.0001%	2.0070%
170204	15	1	14	11	0.3777%	0.0796%	0.0006%	2.1866%
170301	14	3	11	7	4.4874%	0.0763%	0.0005%	25.2385%
170303	14	3	11	8	0.0506%	0.0010%	0.0000%	0.3889%
170409	15	4	11	9	0.1550%	0.0382%	0.0008%	0.6693%
170410	14	5	9	6	0.0047%	0.0036%	0.0000%	0.0132%
170503	15		15	12	3.4115%	0.6044%	0.0049%	17.7645%
170505	14	4	10	6	0.0330%	0.0130%	0.0001%	0.1388%
170507	15	6	9	5	0.3418%	0.0010%	0.0001%	1.7043%
170601	15		15	11	0.0518%	0.0243%	0.0022%	0.1871%
170603	14	4	10	6	0.0170%	0.0042%	0.0003%	0.0719%
170605	15		15	12	0.7836%	0.0891%	0.0031%	4.4553%
170801	14	7	7	5	0.0295%	0.0004%	0.0001%	0.1436%
170901	14	6	8	4	0.3024%	0.0540%	0.0001%	1.1017%
170902	14	4	10	5	0.0027%	0.0012%	0.0000%	0.0082%
170903	14	3	11	8	0.9621%	0.0715%	0.0013%	7.2900%
180103	15	1	14	11	0.5061%	0.3386%	0.0004%	1.2967%
180106	14	1	13	10	0.0166%	0.0056%	0.0003%	0.0702%
180108	14	3	11	6	0.0044%	0.0025%	0.0000%	0.0178%
180110	13	4	9	7	0.0001%	0.0000%	0.0000%	0.0002%
180202	15	2	13	10	0.4957%	0.0129%	0.0000%	3.6762%
180205	15	3	12	7	0.0009%	0.0008%	0.0000%	0.0023%
180207	13	8	5	3	0.0021%	0.0000%	0.0000%	0.0063%
190105	14	6	8	5	0.1149%	0.0027%	0.0002%	0.4929%
190106	14	5	9	7	0.0609%	0.0158%	0.0058%	0.1981%
190107	15	3	12	9	0.6572%	0.2674%	0.0001%	2.9370%
190110	15	7	8	5	0.0018%	0.0019%	0.0009%	0.0024%
190111	15	3	12	9	0.6288%	0.3553%	0.0000%	2.1655%
190113	14	4	10	7	1.0050%	0.1784%	0.0000%	4.6125%
190115	14	4	10	6	0.0077%	0.0014%	0.0000%	0.0340%
190117	14	6	8	6	0.0890%	0.0079%	0.0003%	0.4937%
190204	14	5	9	6	0.0690%	0.0150%	0.0001%	0.2995%
190205	15	1	14	11	0.4966%	0.1431%	0.0083%	1.7256%
190207	14	1	13	9	0.0256%	0.0048%	0.0008%	0.1383%
190208	14	6	8	5	0.0740%	0.0198%	0.0014%	0.2139%
190209	14	8	6	4	0.1296%	0.0307%	0.0000%	0.4568%
190211	14	5	9	5	0.0627%	0.0016%	0.0001%	0.3076%
190304	14	4	10	8	0.6540%	0.0721%	0.0000%	2.4621%
190306	14	5	9	6	0.1431%	0.0126%	0.0002%	0.7967%
190402	14	10	4	2	0.2103%	0.2103%	0.0026%	0.4179%
190403	13	10	3	1	0.0209%	0.0209%	0.0209%	0.0209%
190702	14	6	8	3	0.3970%	0.5178%	0.0245%	0.6488%

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses code	Provided quantities	Mean	Median	Min	Max
190806	14	5	9	7	0.0046%	0.0032%	0.0002%	0.0120%
190807	14	7	7	5	0.0288%	0.0027%	0.0000%	0.1354%
190808	14	7	7	4	0.0070%	0.0075%	0.0004%	0.0123%
190810	14	1	13	8	0.1738%	0.1169%	0.0001%	0.4900%
190811	14	1	13	9	0.5801%	0.1144%	0.0086%	3.1792%
190813	15	1	14	11	1.4334%	0.3489%	0.0000%	5.8373%
191003	14	6	8	4	1.0536%	0.8231%	0.0000%	2.5680%
191005	14	7	7	2	0.0302%	0.0302%	0.0018%	0.0587%
191101	13	5	8	4	0.1937%	0.0813%	0.0007%	0.6115%
191102	14	11	3	1	0.0001%	0.0001%	0.0001%	0.0001%
191103	14	7	7	5	2.6626%	0.0588%	0.0008%	12.9943%
191104	14	12	2	1	0.0004%	0.0004%	0.0004%	0.0004%
191105	14	8	6	3	0.0102%	0.0104%	0.0043%	0.0157%
191107	14	12	2	1	0.0257%	0.0257%	0.0257%	0.0257%
191206	14	4	10	7	0.0029%	0.0003%	0.0000%	0.0157%
191211	15	3	12	10	0.8734%	0.0125%	0.0000%	7.4092%
191301	14	4	10	7	0.5276%	0.4333%	0.0002%	1.4344%
191303	14	8	6	3	0.0014%	0.0015%	0.0002%	0.0026%
191305	13	8	5	3	0.6178%	0.8278%	0.0010%	1.0245%
191307	13	7	6	4	0.0213%	0.0114%	0.0007%	0.0618%
200113	14	1	13	9	0.0174%	0.0024%	0.0002%	0.0785%
200114	14	1	13	9	0.0059%	0.0014%	0.0001%	0.0428%
200115	14	3	11	8	0.0159%	0.0159%	0.0000%	0.0378%
200117	13	1	12	9	0.0242%	0.0005%	0.0001%	0.1615%
200119	14	1	13	10	0.0080%	0.0008%	0.0000%	0.0506%
200121	14		14	11	0.0926%	0.0320%	0.0008%	0.5346%
200123	14	2	12	9	0.0344%	0.0063%	0.0000%	0.2010%
200126	14	2	12	10	0.2714%	0.0052%	0.0008%	1.7724%
200127	14		14	11	0.1673%	0.0150%	0.0002%	1.5307%
200129	13	3	10	7	0.0103%	0.0023%	0.0000%	0.0579%
200131	14	3	11	7	0.0099%	0.0002%	0.0000%	0.0668%
200133	14		14	11	0.1100%	0.0087%	0.0004%	0.9136%
200135	14		14	11	0.2064%	0.0208%	0.0006%	1.9684%
200137	13	1	12	9	0.0407%	0.0055%	0.0000%	0.1823%

4.8. Frequency of usage and descriptive parameters of share from national amount by six-digit code from LoW - 99-codes

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
010399	15	4	11	9	0.5374%	0.0020%	0.0000%	4.4409%
010499	14	3	11	10	0.2176%	0.0148%	0.0000%	1.8278%
010599	14	5	9	8	0.0803%	0.0069%	0.0001%	0.5790%
020199	14		14	13	0.0172%	0.0141%	0.0002%	0.0528%
020299	16		16	14	0.1553%	0.0526%	0.0003%	1.1056%
020399	16	1	15	14	0.1545%	0.0592%	0.0000%	1.0369%
020499	15	2	13	12	0.9230%	0.0179%	0.0002%	8.5180%
020599	15		15	14	0.3403%	0.0254%	0.0000%	3.9926%
020699	15	2	13	12	0.0040%	0.0016%	0.0001%	0.0199%
020799	16		16	14	0.1340%	0.0495%	0.0000%	0.6969%
030199	16	1	15	14	0.1135%	0.0156%	0.0002%	0.5117%
030299	14	6	8	6	0.0081%	0.0000%	0.0000%	0.0483%
030399	14	2	12	11	0.1855%	0.0117%	0.0015%	1.3730%
040199	15	1	14	12	0.0258%	0.0016%	0.0000%	0.2206%
040299	16		16	13	0.1287%	0.0033%	0.0002%	1.6198%
050199	15	4	11	11	0.0046%	0.0009%	0.0000%	0.0178%
050699	14	7	7	6	0.0495%	0.0002%	0.0000%	0.2948%
050799	14	5	9	7	0.0113%	0.0001%	0.0000%	0.0588%
060199	14	2	12	11	0.0061%	0.0014%	0.0000%	0.0281%
060299	16	4	12	12	0.0048%	0.0012%	0.0000%	0.0182%
060399	15	2	13	11	0.0109%	0.0003%	0.0000%	0.0898%
060499	15	4	11	9	0.0010%	0.0001%	0.0000%	0.0033%
060699	14	6	8	6	0.0083%	0.0001%	0.0001%	0.0344%
060799	13	8	5	3	0.0041%	0.0017%	0.0000%	0.0104%
060899	15	4	11	10	0.0151%	0.0003%	0.0000%	0.1406%
060999	14	8	6	5	7.6421%	0.0010%	0.0000%	38.1950%
061099	15	5	10	7	0.0015%	0.0000%	0.0000%	0.0100%
061199	15	6	9	9	0.0948%	0.0078%	0.0001%	0.6196%
061399	16	3	13	12	0.0071%	0.0008%	0.0000%	0.0591%
070199	16		16	15	0.0388%	0.0024%	0.0000%	0.2651%
070299	16		16	16	0.0290%	0.0071%	0.0003%	0.1405%
070399	14	5	9	8	0.0009%	0.0004%	0.0000%	0.0034%
070499	14	4	10	7	0.0000%	0.0000%	0.0000%	0.0001%
070599	16	3	13	11	0.0060%	0.0022%	0.0000%	0.0410%
070699	15	2	13	12	0.0030%	0.0017%	0.0000%	0.0093%
070799	15	2	13	12	0.0151%	0.0012%	0.0000%	0.1661%
080199	15	1	14	13	0.0019%	0.0006%	0.0000%	0.0108%
080299	15	3	12	10	0.0024%	0.0009%	0.0000%	0.0122%
080399	14	4	10	8	0.0015%	0.0003%	0.0000%	0.0105%
080499	14	3	11	11	0.0012%	0.0009%	0.0000%	0.0031%
090199	15	3	12	9	0.0005%	0.0004%	0.0000%	0.0011%
100199	16	3	13	11	0.0112%	0.0054%	0.0001%	0.0696%

Waste code	No of countries that				Descriptive statistical parameters			
	Provided information	Does not use code	Uses Code	Provided quantities	Mean	Median	Min	Max
100299	15	2	13	12	0.2942%	0.0939%	0.0000%	1.6894%
100399	14	2	12	11	0.0094%	0.0002%	0.0000%	0.0603%
100499	14	3	11	8	0.0052%	0.0007%	0.0000%	0.0240%
100599	14	8	6	6	0.0010%	0.0003%	0.0000%	0.0031%
100699	14	8	6	4	0.0017%	0.0009%	0.0000%	0.0050%
100799	13	7	6	5	0.0001%	0.0000%	0.0000%	0.0005%
100899	14	5	9	7	0.0337%	0.0023%	0.0000%	0.2254%
100999	16	1	15	14	0.0487%	0.0134%	0.0000%	0.2016%
101099	16	1	15	14	0.0208%	0.0036%	0.0000%	0.1042%
101199	14	1	13	12	0.0162%	0.0014%	0.0000%	0.1127%
101299	15	3	12	11	0.0645%	0.0084%	0.0001%	0.3950%
101399	15	2	13	12	0.0152%	0.0048%	0.0002%	0.0566%
110199	16	2	14	14	0.0034%	0.0006%	0.0000%	0.0261%
110299	15	9	6	5	0.0030%	0.0000%	0.0000%	0.0110%
110599	15	2	13	9	0.0008%	0.0001%	0.0000%	0.0033%
120199	16		16	16	0.0922%	0.0176%	0.0000%	0.7453%
130899*	17		17	17	0.2914%	0.0970%	0.0000%	1.5469%
160199	16	1	15	15	0.0221%	0.0023%	0.0000%	0.1617%
160799	16	2	14	13	0.0034%	0.0013%	0.0000%	0.0260%
190199	14	3	11	8	0.0647%	0.0004%	0.0000%	0.5048%
190299	13	5	8	7	0.0599%	0.0108%	0.0030%	0.2582%
190599	13	3	10	8	0.0615%	0.0223%	0.0003%	0.3111%
190699	13	8	5	5	0.0429%	0.0073%	0.0000%	0.1912%
190899	15	2	13	13	0.3789%	0.0153%	0.0001%	4.5356%
190999	15	1	14	12	0.0073%	0.0017%	0.0000%	0.0521%
191199	13	7	6	4	0.0010%	0.0000%	0.0000%	0.0041%
200199	14	1	13	12	0.0854%	0.0098%	0.0000%	0.3625%
200399	13	1	12	11	0.0801%	0.0479%	0.0016%	0.3692%

4.9. Fractions of amounts of 99-codes per country and year as percentage of total amounts - by sub-chapter

Sub-chapter	Country (Year)									
	CZ (2004)	EE (2006)	EL (2004)	FR (2006)	HU (2004)	IE (2004)	LV (2006)	PL (2004)	PT (2004)	SI (2004)
0103	0%	100%	9%		0%	24%	0%	0%	0%	0%
0104	0%	6%	12%		0%	0%	0%	0%	20%	2%
0105	0%	0%	0%		3%	0%	0%	37%	2%	100%
0201	0%	0%	5%		0%	4%	0%	9%	14%	0%
0202	10%	5%	60%		18%	7%	39%	3%	13%	4%
0203	11%	0%	3%		2%	0%	46%	23%	23%	4%
0204	2%	0%	2%		10%	100%	31%	5%	0%	0%
0205	14%	0%	40%		23%	1%	92%	5%	32%	2%
0206	5%	100%	1%		14%	0%	59%	20%	14%	20%
0207	12%	6%	3%		32%	73%	21%	1%	18%	31%
0301	1%	4%	0%		1%	0%	2%	1%	5%	1%
0302	0%	0%	0%		0%	8%	0%	24%	93%	24%
0303	0%	0%	0%		3%	0%	0%	30%	3%	1%
0401	1%	48%	0%		3%	0%	87%	2%	5%	3%
0402	1%	1%	1%		12%	8%	25%	4%	69%	4%
0501	1%	0%	45%		0%	0%	0%	2%	0%	0%
0506	0%	0%	100%		0%	0%	0%	64%	0%	0%
0507	100%	0%	0%		15%	0%	0%	6%	0%	100%
0601	6%	0%	0%		4%	3%	58%	5%	0%	41%
0602	0%	0%	0%		0%	41%	0%	13%	30%	74%
0603	12%	0%	0%		0%	98%	24%	79%	0%	0%
0604	42%	0%	0%		0%	77%	0%	78%	8%	93%
0606	26%	0%	0%		0%	0%	0%	61%	100%	0%
0607	0%	0%	0%		0%	0%	0%	98%	100%	0%
0608	0%	0%	100%		100%	100%	0%	100%	100%	0%
0609	0%	0%	0%		0%	0%	0%	1%	0%	100%
0610	0%	0%	100%		0%	0%	0%	69%	100%	0%
0611	100%	0%	0%		0%	100%	0%	12%	0%	0%
0613	19%	0%	99%		45%	96%	0%	94%	92%	0%
0701	9%	1%	91%		81%	99%	29%	5%	26%	9%
0702	30%	56%	9%		7%	7%	98%	17%	53%	21%
0703	0%	0%	0%		0%	1%	0%	93%	1%	0%
0704	0%	0%	3%		1%	0%	0%	3%	2%	0%
0705	1%	0%	0%		0%	5%	0%	79%	2%	2%
0706	29%	0%	0%		3%	0%	0%	58%	38%	55%
0707	0%	13%	0%		1%	38%	81%	96%	0%	11%
0801	1%	0%	17%		1%	15%	0%	2%	12%	8%
0802	2%	0%	0%		56%	0%	0%	39%	5%	52%
0803	0%	0%	0%		6%	0%	0%	65%	1%	0%
0804	2%	0%	1%		12%	25%	0%	5%	7%	17%
0901	2%	0%	0%		0%	13%	0%	37%	2%	10%
1001	0%	0%	0%		0%	0%	0%	0%	0%	0%
1002	20%	0%	5%		10%	0%	10%	15%	7%	10%
1003	0%	0%	48%		0%	0%	2%	34%	0%	0%
1004	0%	0%	27%		40%	0%	0%	2%	10%	18%
1005	0%	0%	0%		7%	0%	0%	2%	1%	0%

Sub-chapter	Country (Year)									
	CZ (2004)	EE (2006)	EL (2004)	FR (2006)	HU (2004)	IE (2004)	LV (2006)	PL (2004)	PT (2004)	SI (2004)
1006	0%	0%	0%		0%	0%	0%	0%	42%	0%
1007	0%	51%	0%		100%	0%	0%	100%	33%	0%
1008	0%	0%	3%		0%	0%	100%	32%	100%	12%
1009	12%	0%	0%		4%	26%	40%	8%	10%	1%
1010	5%	100%	100%		3%	92%	0%	12%	58%	1%
1011	1%	0%	96%		1%	0%	42%	0%	1%	0%
1012	0%	0%	8%		8%	0%	0%	20%	12%	10%
1013	1%	2%	3%		53%	18%	0%	3%	11%	7%
1080	0%	0%	0%		0%	0%	0%	50%	0%	0%
1101	0%	0%	6%		3%	5%	25%	1%	2%	0%
1102	20%	0%	0%		0%	0%	0%	0%	0%	0%
1105	7%	0%	84%		5%	0%	0%	0%	0%	0%
1201	0%	0%	5%		27%	3%	0%	10%	4%	1%
1308	1%	85%	100%	88%	39%	99%	0%	89%	53%	84%
1601	0%	0%	10%		0%	0%	1%	1%	33%	2%
1607	13%	0%	0%		3%	32%	0%	1%	2%	18%
1901	0%	0%	7%		0%	0%	0%	1%	21%	0%
1902	0%	19%	98%		47%	0%	0%	21%	0%	7%
1905	63%	100%	0%		1%	0%	0%	11%	0%	100%
1906	9%	0%	0%		0%	0%	100%	0%	0%	0%
1908	4%	0%	96%		1%	0%	0%	4%	1%	3%
1909	1%	26%	0%		8%	22%	100%	2%	3%	0%
1911	0%	0%	0%		0%	0%	0%	2%	100%	0%
2001	1%	0%	0%		2%	0%	9%		4%	3%
2003	4%	0%	1%		12%	1%	0%		3%	1%

Notes: blanks = not available, 0 %: smaller than 0.5 %

4.10. Frequency of waste-codes not used per country and year as percentage of available number of codes - by sub-chapter

	Country (Year)														No. of codes
	CZ (2004)	DE (2005)	EE (2006)	EL (2004)	FI (2006)	HU (2004)	IT (2004)	LT (2005/06)	LV (2006)	NL (2006)	PL (2004)	PT (2004)	SI (2004)	Average	
0101	0%	0%	50%	50%	50%	0%	0%	100%	100%	0%	0%	0%	0%	27%	2
0103	43%	0%	86%	29%	86%	29%	0%	71%	100%	43%	57%	43%	71%	51%	7
0104	0%	13%	50%	25%	75%	25%	0%	50%	63%	25%	25%	13%	25%	30%	8
0105	17%	17%	100%	100%	100%	0%	0%	83%	100%	0%	0%	67%	67%	50%	6
0201	10%	0%	0%	50%	0%	0%	0%	10%	40%	0%	0%	10%	0%	9%	10
0202	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5
0203	0%	0%	67%	17%	33%	17%	0%	67%	33%	17%	17%	0%	17%	22%	6
0204	0%	25%	100%	25%	0%	25%	0%	25%	0%	0%	0%	25%	25%	19%	4
0205	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3
0206	0%	25%	75%	0%	100%	25%	0%	75%	50%	50%	0%	25%	0%	33%	4
0207	0%	17%	50%	0%	33%	0%	0%	50%	33%	0%	0%	0%	17%	15%	6
0301	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	4
0302	33%	50%	100%	100%	17%	33%	17%	67%	50%	17%	17%	0%	33%	41%	6
0303	0%	0%	56%	22%	0%	0%	0%	44%	67%	11%	11%	0%	22%	18%	9
0401	30%	30%	80%	70%	10%	20%	0%	20%	70%	30%	0%	10%	40%	32%	10
0402	0%	0%	55%	36%	36%	0%	0%	36%	64%	18%	18%	9%	18%	22%	11
0501	35%	18%	88%	47%	53%	29%	6%	65%	65%	24%	35%	24%	65%	43%	17
0506	25%	25%	100%	75%	75%	75%	0%	100%	100%	50%	0%	100%	75%	62%	4
0507	33%	0%	100%	100%	67%	0%	0%	67%	100%	0%	33%	100%	67%	51%	3
0601	0%	0%	71%	29%	29%	0%	0%	14%	57%	0%	0%	14%	0%	16%	7
0602	0%	0%	60%	60%	20%	0%	0%	60%	80%	0%	0%	0%	0%	22%	5
0603	0%	0%	67%	33%	33%	0%	0%	50%	33%	0%	0%	17%	17%	19%	6
0604	0%	0%	50%	50%	25%	0%	0%	50%	50%	0%	0%	25%	25%	21%	4
0605	0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	2
0606	0%	0%	100%	67%	67%	67%	0%	33%	100%	0%	0%	67%	100%	46%	3
0607	80%	20%	100%	80%	100%	20%	20%	100%	100%	40%	60%	80%	100%	69%	5
0608	50%	0%	100%	50%	50%	50%	0%	50%	100%	50%	0%	50%	100%	50%	2
0609	75%	75%	100%	75%	75%	50%	0%	50%	100%	25%	50%	100%	75%	65%	4
0610	0%	50%	50%	50%	50%	50%	0%	0%	100%	0%	0%	50%	100%	38%	2
0611	50%	0%	100%	100%	50%	100%	0%	100%	100%	50%	50%	100%	0%	62%	2
0613	0%	17%	100%	67%	67%	17%	0%	33%	100%	0%	33%	67%	83%	45%	6
0701	10%	0%	50%	80%	20%	10%	0%	70%	60%	0%	10%	0%	20%	25%	10
0702	0%	0%	80%	60%	20%	13%	0%	40%	87%	0%	0%	27%	33%	28%	15
0703	10%	0%	100%	60%	60%	30%	0%	70%	90%	50%	40%	50%	10%	44%	10
0704	64%	9%	100%	64%	64%	0%	0%	91%	91%	18%	0%	64%	27%	45%	11
0705	25%	0%	100%	75%	8%	0%	0%	83%	42%	8%	0%	25%	8%	29%	12
0706	20%	0%	100%	70%	30%	0%	0%	80%	100%	10%	0%	30%	20%	35%	10
0707	20%	0%	70%	90%	20%	10%	0%	70%	70%	0%	20%	60%	40%	36%	10
0801	0%	0%	50%	17%	8%	0%	0%	8%	50%	0%	0%	0%	0%	10%	12
0802	0%	0%	75%	75%	50%	25%	0%	50%	100%	25%	0%	0%	25%	33%	4
0803	9%	27%	82%	55%	27%	9%	0%	18%	64%	18%	9%	18%	0%	26%	11
0804	10%	10%	50%	80%	10%	10%	0%	20%	80%	0%	10%	20%	10%	24%	10
0805	0%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	0%	0%	15%	1
0901	23%	8%	54%	38%	31%	0%	0%	31%	46%	8%	8%	31%	15%	23%	13

	Country (Year)														No. of codes
	CZ (2004)	DE (2005)	EE (2006)	EL (2004)	FI (2006)	HU (2004)	IT (2004)	LT (2005/06)	LV (2006)	NL (2006)	PL (2004)	PT (2004)	SI (2004)	Average	
1001	5%	0%	68%	59%	14%	27%	0%	41%	73%	14%	14%	41%	50%	31%	22
1002	0%	0%	91%	18%	55%	9%	0%	100%	64%	9%	9%	45%	55%	35%	11
1003	32%	5%	100%	59%	73%	45%	5%	91%	86%	23%	50%	82%	68%	55%	22
1004	30%	20%	90%	40%	80%	50%	20%	100%	100%	50%	50%	50%	50%	56%	10
1005	10%	30%	90%	100%	70%	60%	20%	100%	100%	40%	40%	40%	60%	58%	10
1006	67%	33%	100%	67%	67%	22%	22%	100%	100%	56%	44%	67%	89%	64%	9
1007	100%	50%	75%	100%	100%	88%	0%	100%	100%	88%	88%	63%	63%	78%	8
1008	53%	27%	93%	73%	93%	53%	7%	100%	93%	33%	60%	93%	67%	65%	15
1009	7%	29%	57%	100%	43%	36%	21%	71%	79%	36%	29%	21%	50%	44%	14
1010	29%	29%	86%	86%	57%	50%	14%	79%	93%	50%	29%	43%	43%	53%	14
1011	0%	13%	93%	80%	47%	20%	0%	60%	73%	0%	7%	27%	33%	35%	15
1012	9%	9%	64%	64%	64%	36%	0%	64%	82%	18%	9%	27%	18%	36%	11
1013	9%	9%	45%	36%	55%	36%	0%	64%	73%	36%	9%	18%	36%	33%	11
1014	100%	0%	100%	100%	100%	100%	0%	100%	100%	0%	100%	100%	100%	77%	1
1101	0%	7%	64%	43%	14%	0%	0%	50%	50%	0%	0%	7%	7%	19%	14
1102	50%	17%	100%	100%	33%	17%	0%	100%	100%	33%	50%	83%	83%	59%	6
1103	0%	0%	50%	50%	0%	0%	0%	50%	50%	0%	0%	0%	100%	23%	2
1105	0%	0%	80%	20%	20%	0%	0%	20%	100%	0%	0%	40%	20%	23%	5
1201	0%	0%	38%	24%	5%	0%	0%	19%	29%	5%	5%	5%	0%	10%	21
1203	0%	100%	100%	100%	0%	0%	0%	50%	100%	0%	0%	50%	0%	38%	2
1301	0%	0%	50%	50%	13%	0%	0%	38%	50%	13%	0%	13%	0%	17%	8
1302	0%	0%	20%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	3%	5
1303	0%	0%	50%	50%	17%	0%	0%	50%	67%	17%	17%	17%	17%	23%	6
1304	33%	0%	33%	0%	0%	0%	0%	33%	33%	0%	33%	33%	67%	20%	3
1305	0%	0%	33%	0%	0%	0%	0%	0%	17%	0%	0%	17%	0%	5%	6
1307	0%	0%	0%	67%	0%	0%	0%	0%	33%	0%	0%	0%	0%	8%	3
1308	0%	0%	33%	33%	0%	0%	0%	33%	33%	33%	0%	33%	33%	18%	3
1406	0%	0%	40%	20%	0%	0%	0%	20%	20%	0%	0%	0%	0%	8%	5
1501	0%	0%	20%	10%	0%	0%	0%	0%	20%	0%	0%	0%	0%	4%	10
1502	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2
1601	0%	10%	30%	30%	20%	0%	0%	5%	30%	0%	0%	25%	5%	12%	20
1602	0%	0%	50%	38%	0%	0%	0%	38%	50%	0%	0%	13%	0%	14%	8
1603	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	2%	4
1604	0%	0%	100%	33%	33%	33%	0%	67%	100%	0%	0%	33%	33%	33%	3
1605	0%	0%	33%	33%	0%	0%	0%	33%	67%	0%	0%	0%	0%	13%	6
1606	0%	0%	17%	17%	0%	0%	0%	0%	33%	0%	0%	0%	0%	5%	6
1607	0%	0%	33%	0%	0%	0%	0%	0%	67%	0%	0%	0%	0%	8%	3
1608	43%	0%	71%	43%	29%	29%	0%	57%	100%	14%	0%	43%	43%	36%	7
1609	0%	25%	100%	100%	0%	0%	0%	25%	100%	0%	25%	100%	0%	37%	4
1610	0%	0%	25%	50%	0%	0%	0%	25%	25%	0%	0%	50%	25%	15%	4
1611	0%	0%	83%	33%	67%	17%	0%	67%	100%	0%	0%	17%	0%	30%	6
1701	0%	0%	20%	80%	20%	0%	0%	0%	20%	0%	0%	0%	0%	11%	5
1702	0%	0%	0%	75%	0%	0%	0%	0%	25%	0%	0%	0%	0%	8%	4
1703	0%	0%	67%	67%	0%	0%	0%	33%	33%	0%	0%	0%	0%	15%	3
1704	0%	10%	20%	60%	0%	0%	0%	10%	40%	0%	0%	20%	10%	13%	10
1705	0%	0%	17%	50%	50%	0%	0%	17%	67%	0%	0%	50%	17%	21%	6
1706	0%	0%	25%	25%	25%	0%	0%	0%	50%	0%	0%	0%	0%	10%	4
1708	0%	0%	50%	100%	50%	50%	0%	50%	100%	0%	50%	0%	0%	35%	2
1709	0%	0%	75%	75%	0%	0%	0%	25%	75%	0%	0%	50%	25%	25%	4

	Country (Year)														No. of codes
	CZ (2004)	DE (2005)	EE (2006)	EL (2004)	FI (2006)	HU (2004)	IT (2004)	LT (2005/06)	LV (2006)	NL (2006)	PL (2004)	PT (2004)	SI (2004)	Average	
1801	0%	0%	22%	100%	11%	0%	0%	11%	11%	11%	0%	44%	0%	16%	9
1802	0%	14%	43%	86%	43%	14%	0%	57%	57%	29%	0%	100%	14%	35%	7
1901	20%	0%	87%	80%	47%	27%	0%	67%	67%	0%	7%	27%	67%	38%	15
1902	40%	0%	60%	40%	40%	20%	0%	60%	80%	0%	0%	40%	40%	32%	10
1903	0%	0%	0%	25%	25%	0%	0%	100%	100%	25%	0%	25%	25%	25%	4
1904	75%	50%	100%	100%	100%	100%	0%	100%	100%	75%	25%	100%	100%	79%	4
1905	0%	0%	75%	100%	25%	25%	0%	50%	75%	0%	25%	100%	75%	42%	4
1906	40%	0%	100%	80%	80%	60%	0%	100%	80%	60%	40%	80%	60%	60%	5
1907	0%	0%	100%	100%	0%	0%	0%	0%	50%	0%	100%	50%	50%	35%	2
1908	0%	8%	38%	38%	8%	8%	0%	31%	31%	8%	8%	15%	15%	16%	13
1909	0%	0%	43%	57%	0%	14%	0%	14%	86%	0%	0%	14%	0%	18%	7
1910	33%	0%	50%	67%	17%	0%	0%	0%	67%	0%	17%	33%	50%	26%	6
1911	63%	13%	100%	88%	100%	50%	13%	75%	75%	50%	38%	88%	88%	65%	8
1912	0%	0%	0%	42%	17%	8%	0%	17%	58%	0%	0%	17%	42%	15%	12
1913	38%	0%	100%	100%	75%	38%	0%	88%	88%	0%	50%	88%	88%	58%	8
2001	0%	0%	10%	50%	0%	0%	0%	10%	23%	0%		3%	3%	8%	30
2002	0%	0%	0%	33%	33%	0%	0%	0%	0%	0%		33%	0%	8%	3
2003	0%	0%	0%	29%	14%	0%	0%	0%	29%	0%		14%	0%	7%	7
Total	14%	8%	61%	54%	33%	17%	2%	47%	63%	14%	15%	31%	30%	30%	839

4.11. LoW codes with lowest usage and smallest amounts, including descriptive parameters of share from national amount – hazardous waste

Waste code	Designation	No of countries that					Descriptive statistical parameters			
		provided informatio n	Does not use code	Uses Code [Total]	Uses code [%]	Provided quantities	mean	Median	min	max
Codes with lowest usage										
100409	wastes from cooling-water treatment containing oil	13	13		0.00%	0				
100812	tar-containing wastes from anode manufacture	13	13		0.00%	0				
100403	calcium arsenate	13	12	1	7.69%	0				
100609	wastes from cooling-water treatment containing oil	13	12	1	7.69%	0				
100707	wastes from cooling-water treatment containing oil	13	12	1	7.69%	0				
100915	waste crack-indicating agent containing dangerous substances	14	12	2	14.29%	2	0.0024%	0.0024%	0.0000%	0.0048%
191107	wastes from flue-gas cleaning	14	12	2	14.29%	1	0.0257%	0.0257%	0.0257%	0.0257%
191104	wastes from cleaning of fuel with bases	14	12	2	14.29%	1	0.0004%	0.0004%	0.0004%	0.0004%
100819	wastes from cooling-water treatment containing oil	13	11	2	15.38%	1	0.0027%	0.0027%	0.0027%	0.0027%
100508	wastes from cooling-water treatment containing oil	13	11	2	15.38%	1	0.0000%	0.0000%	0.0000%	0.0000%
050111	wastes from cleaning of fuels with bases	14	11	3	21.43%	1	0.1679%	0.1679%	0.1679%	0.1679%
101401	waste from gas cleaning containing mercury	13	10	3	23.08%	0				
060703	barium sulphate sludge containing mercury	13	10	3	23.08%	1	0.2596%	0.2596%	0.2596%	0.2596%
060903	calcium-based reaction wastes containing or contaminated with dangerous substances	14	11	3	21.43%	2	0.0001%	0.0001%	0.0000%	0.0002%
101015	waste crack-indicating agent containing dangerous substances	14	11	3	21.43%	2	0.0100%	0.0100%	0.0002%	0.0198%
080319	disperse oil	14	11	3	21.43%	2	0.0009%	0.0009%	0.0007%	0.0012%
100329	wastes from treatment of salt slags and black drosses containing dangerous substances	14	11	3	21.43%	3	2.8593%	0.5461%	0.3049%	7.7269%
191102	acid tars	14	11	3	21.43%	1	0.0001%	0.0001%	0.0001%	0.0001%
190403	non-vitrified solid phase	13	10	3	23.08%	1	0.0209%	0.0209%	0.0209%	0.0209%

Waste code	Designation	No of countries that					Descriptive statistical parameters			
		provided informatio n	Does not use code	Uses Code [Total]	Uses code [%]	Provided quantities	mean	Median	min	max
Codes with smallest amounts										
090111	single-use cameras containing batteries included in 16 06 01, 16 06 02 or 16 06 03	14	8	6	42.86%	30	0.00008%	0.00000%	0.00000%	0.00023%
100508	wastes from cooling-water treatment containing oil	13	11	2	15.38%	10	0.00002%	0.00002%	0.00002%	0.00002%
180110	amalgam waste from dental care	13	4	9	69.23%	70	0.00008%	0.00002%	0.00000%	0.00021%
060802	wastes containing dangerous chlorosilanes	14	9	5	35.71%	30	0.00006%	0.00005%	0.00005%	0.00006%
191102	acid tars	14	11	3	21.43%	10	0.00006%	0.00006%	0.00006%	0.00006%
130309	readily biodegradable insulating and heat transmission oils	15	9	6	40.00%	40	0.00027%	0.00007%	0.00000%	0.00094%
060903	calcium-based reaction wastes containing or contaminated with dangerous substances	14	11	3	21.43%	20	0.00011%	0.00011%	0.00000%	0.00021%
130801	desalter sludges or emulsions	14	6	8	57.14%	50	0.00027%	0.00014%	0.00001%	0.00059%
060702	activated carbon from chlorine production	14	8	6	42.86%	40	0.00021%	0.00015%	0.00007%	0.00045%
160401	waste ammunition	14	2	12	85.71%	80	0.00027%	0.00015%	0.00001%	0.00094%
160108	components containing mercury	14	5	9	64.29%	50	0.00012%	0.00016%	0.00000%	0.00021%
160901	permanganates, e.g. potassium permanganate	14	7	7	50.00%	40	0.00018%	0.00016%	0.00000%	0.00039%
160110	explosive components (e.g. air bags)	14	5	9	64.29%	50	0.00024%	0.00019%	0.00006%	0.00057%
160109	components containing PCBs	14	3	11	78.57%	60	0.00032%	0.00019%	0.00000%	0.00111%
191104	wastes from cleaning of fuel with bases	14	12	2	14.29%	10	0.00038%	0.00038%	0.00038%	0.00038%
070410	other filter cakes and spent absorbents	14	8	6	42.86%	30	0.00040%	0.00038%	0.00000%	0.00080%

4.12. LoW codes with lowest usage and smallest amounts, including descriptive parameters of share from national amount – non-hazardous waste

Waste code	Designation	No of countries that					Descriptive statistical parameters			
		provided informatio n	Does not use code	Uses Code [Total]	Uses code [%]	Provided quantities	mean	Median	min	max
Codes with lowest usage										
100705	sludges and filter cakes from gas treatment	13	12	1	7.69%	0				
100410	wastes from cooling-water treatment other than those mentioned in 10 04 09	13	12	1	7.69%	0				
100610	wastes from cooling-water treatment other than those mentioned in 10 06 09	13	12	1	7.69%	0				
100703	solid wastes from gas treatment	13	12	1	7.69%	0				
100708	wastes from cooling-water treatment other than those mentioned in 10 07 07	13	12	1	7.69%	0				
100820	wastes from cooling-water treatment other than those mentioned in 10 08 19	13	12	1	7.69%	0				
100916	waste crack-indicating agent other than those mentioned in 10 09 15	13	12	1	7.69%	0				
101016	waste crack-indicating agent other than those mentioned in 10 10 15	13	12	1	7.69%	0				
100328	wastes from cooling-water treatment other than those mentioned in 10 03 27	13	11	2	15.38%	0				
050604	waste from cooling columns	13	11	2	15.38%	1	0.0000%	0.0000%	0.0000%	0.0000%
100326	sludges and filter cakes from gas treatment other than those mentioned in 10 03 25	13	11	2	15.38%	0				
190404	aqueous liquid wastes from vitrified waste tempering	13	11	2	15.38%	0				
100509	wastes from cooling-water treatment other than those mentioned in 10 05 08	13	11	2	15.38%	1	0.0000%	0.0000%	0.0000%	0.0000%
110206	wastes from copper hydrometallurgical processes other than those mentioned in 11 02 05	13	10	3	23.08%	2	0.0007%	0.0007%	0.0004%	0.0010%
010411	wastes from potash and rock-salt processing other than those mentioned in 01 04 07	13	10	3	23.08%	1	0.0005%	0.0005%	0.0005%	0.0005%
100330	wastes from treatment of salt slags and black drosses other than those mentioned in 10 03 29	13	10	3	23.08%	1	0.0003%	0.0003%	0.0003%	0.0003%
191304	sludges from soil remediation other than those mentioned in 19 13 03	13	10	3	23.08%	0				
190605	liquor from anaerobic treatment of animal and vegetable waste	13	10	3	23.08%	1	0.4474%	0.4474%	0.4474%	0.4474%
100813	carbon-containing wastes from anode manufacture other than those mentioned in 10 08 12	13	10	3	23.08%	1	0.0000%	0.0000%	0.0000%	0.0000%
070412	sludges from on-site effluent treatment other than those mentioned in 07 04 11	13	10	3	23.08%	2	0.0002%	0.0002%	0.0000%	0.0004%
101014	waste binders other than those mentioned in 10 10 13	14	11	3	21.43%	2	0.0001%	0.0001%	0.0000%	0.0003%
061101	calcium-based reaction wastes from titanium dioxide production	13	10	3	23.08%	1	3.3580%	3.3580%	3.3580%	3.3580%
190401	vitrified waste	13	10	3	23.08%	2	0.0001%	0.0001%	0.0001%	0.0001%

Waste code	Designation	No of countries that					Descriptive statistical parameters			
		provided informatio n	Does not use code	Uses Code [Total]	Uses code [%]	Provided quantities	mean	Median	min	max
Codes with smallest amounts										
100702	dross and skimmings from primary and secondary production	13	9	4	30.77%	2	0.00000%	0.00000%	0.00000%	0.00000%
020602	wastes from preserving agents	13	8	5	38.46%	4	0.00000%	0.00000%	0.00000%	0.00002%
090110	single-use cameras without batteries	13	9	4	30.77%	3	0.00000%	0.00000%	0.00000%	0.00000%
090112	single-use cameras containing batteries other than those mentioned in 09 01 11	13	8	5	38.46%	2	0.00000%	0.00000%	0.00000%	0.00000%
100814	anode scrap	13	8	5	38.46%	3	0.00001%	0.00000%	0.00000%	0.00002%
110203	wastes from the production of anodes for aqueous electrolytical processes	13	7	6	46.15%	3	0.00001%	0.00000%	0.00000%	0.00001%
160505	gases in pressure containers other than those mentioned in 16 05 04	13	4	9	69.23%	7	0.00002%	0.00000%	0.00000%	0.00008%
100813	carbon-containing wastes from anode manufacture other than those mentioned in 10 08 12	13	10	3	23.08%	1	0.00000%	0.00000%	0.00000%	0.00000%
160116	tanks for liquefied gas	13	6	7	53.85%	4	0.00002%	0.00001%	0.00000%	0.00007%
060902	phosphorous slag	13	7	6	46.15%	2	0.00001%	0.00001%	0.00000%	0.00001%
100701	slags from primary and secondary production	13	9	4	30.77%	2	0.00001%	0.00001%	0.00001%	0.00001%
020302	wastes from preserving agents	13	7	6	46.15%	3	0.00002%	0.00001%	0.00000%	0.00004%
050114	wastes from cooling columns	13	9	4	30.77%	1	0.00001%	0.00001%	0.00001%	0.00001%
190502	non-composted fraction of animal and vegetable waste	13	8	5	38.46%	2	0.00001%	0.00001%	0.00001%	0.00001%
190119	sands from fluidised beds	13	9	4	30.77%	1	0.00001%	0.00001%	0.00001%	0.00001%
100324	solid wastes from gas treatment other than those mentioned in 10 03 23	13	9	4	30.77%	1	0.00001%	0.00001%	0.00001%	0.00001%
100704	other particulates and dust	13	8	5	38.46%	2	0.00002%	0.00002%	0.00000%	0.00003%
180206	chemicals other than those mentioned in 18 02 05	13	8	5	38.46%	3	0.00002%	0.00002%	0.00000%	0.00005%
100818	sludges and filter cakes from flue-gas treatment other than those mentioned in 10 08 17	13	9	4	30.77%	1	0.00002%	0.00002%	0.00002%	0.00002%
070499	wastes not otherwise specified	14	4	10	71.43%	7	0.00004%	0.00003%	0.00000%	0.00009%

4.13. LoW codes with largest amounts, including descriptive parameters of share from national amount

Waste code	Designation	No of countries that					Descriptive statistical parameters			
		provided informatio n	Does not use code	Uses Code [Total]	Uses code [%]	Provided quantities	mean	Median	min	max
Hazardous waste codes with highest amounts										
100102	coal fly ash	14		14	100.0%	11	8.7819%	5.4090%	0.0002%	53.7964%
061101	calcium-based reaction wastes from titanium dioxide production	13	10	3	23.08%	13	3.3580%	3.3580%	3.3580%	3.3580%
010309	red mud from alumina production other than the wastes mentioned in 01 03 07	13	7	6	46.15%	32	4.835%	2.9807%	0.0000%	4.4698%
030105	sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04	14		14	100.0%	114	4.7807%	2.5650%	0.1643%	21.4867%
200301	mixed municipal waste	13		13	100.0%	103	4.052%	2.4454%	0.1164%	12.9909%
170504	soil and stones other than those mentioned in 17 05 03	14		14	100.0%	113	3.9587%	1.5825%	0.0000%	24.3048%
170904	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	14		14	100.0%	111	3.063%	1.4554%	0.0069%	2.8162%
060904	calcium-based reaction wastes other than those mentioned in 06 09 03	13	8	5	38.46%	21	4.087%	1.4087%	0.0011%	2.8164%
100101	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)	14		14	100.00%	112	3.229%	1.3827%	0.0677%	10.7125%
010102	wastes from mineral non-metalliferous excavation	14	2	12	85.71%	814	6.638%	1.2582%	0.0350%	44.6763%
190805	sludges from treatment of urban waste water	14	1	13	92.86%	91	5.764%	1.1631%	0.0003%	6.2706%
100202	unprocessed slag	13	1	12	92.31%	101	9.290%	1.0958%	0.0044%	5.5445%
020304	materials unsuitable for consumption or processing	14	1	13	92.86%	102	5.478%	0.0877%	0.0095%	24.2827%
010412	tailings and other wastes from washing and cleaning of minerals other than those mentioned in 01 04 07 and 01 04 11	13	3	10	76.92%	73	6.159%	0.0493%	0.0000%	23.6094%
060999	wastes not otherwise specified	14	8	6	42.86%	57	6.421%	0.0010%	0.0000%	38.1950%

Waste code	Designation	No of countries that					Descriptive statistical parameters			
		provided informatio n	Does not use code	Uses Code [Total]	Uses code [%]	Provided quantities	mean	Median	min	max
Non-hazardous waste codes with highest amounts										
010304	acid-generating tailings from processing of sulphide ore	13	9	4	30.77%	24	41.9191%	41.9191%	0.4742%	83.3639%
100207	solid wastes from gas treatment containing dangerous substances	14	2	12	85.71%	93	7.442%	2.0713%	0.1417%	16.6327%
100607	sludges and filter cakes from gas treatment	13	9	4	30.77%	21	4.419%	1.4419%	0.0000%	2.8837%
120109	machining emulsions and solutions free of halogens	15		15	100.0%	121	3.487%	1.0540%	0.0000%	3.5886%
100308	salt slags from secondary production	14	6	8	57.14%	41	6.709%	0.9481%	0.0054%	4.7819%
100211	wastes from cooling-water treatment containing oil	14	7	7	50.00%	47	6.717%	0.9465%	0.1167%	28.6770%
191305	sludges from groundwater remediation containing dangerous substances	13	8	5	38.46%	30	6.178%	0.8278%	0.0010%	1.0245%
191003	fluff-light fraction and dust containing dangerous substances	14	6	8	57.14%	41	0.536%	0.8231%	0.0000%	2.5680%
130507	oily water from oil/water separators	15		15	100.0%	111	7.784%	0.7763%	0.0054%	6.3602%
160708	wastes containing oil	15		15	100.0%	121	9.337%	0.7719%	0.0021%	8.9137%
170503	soil and stones containing dangerous substances	15		15	100.0%	123	4.115%	0.6044%	0.0049%	17.7645%
160601	lead batteries	15		15	100.0%	120	9.050%	0.5921%	0.0361%	3.2195%
100213	sludges and filter cakes from gas treatment containing dangerous substances	14	7	7	50.00%	52	7.773%	0.5683%	0.0000%	11.9394%
100329	wastes from treatment of salt slags and black drosses containing dangerous substances	14	11	3	21.43%	32	8.593%	0.5461%	0.3049%	7.7269%
130205	mineral-based non-chlorinated engine, gear and lubricating oils	15		15	100.0%	121	1.1828%	0.5172%	0.0030%	4.1212%
010305	other tailings containing dangerous substances	14	8	6	42.86%	328	7.150%	0.3961%	0.0143%	85.7346%
170301	bituminous mixtures containing coal tar	14	3	11	78.57%	74	4.874%	0.0763%	0.0005%	25.2385%
110302	other wastes	15	1	14	93.33%	103	0.011%	0.0083%	0.0000%	29.8254%

5. List of Guidance Documents and Tools

Titel of document	Country	Language	Publisher	Publishing date	Target Audience	Reference
Europese afvalstoffenlijst EURAL Handleiding	Belgium	Flemish	OVAM Openbare Afvalstoffenmaatschappij voor het Vlaamse Gewest	01.05.2004		BE 2004
Jäteluokitusopas (Waste Classification Guide)	Finland	Finnish	Ministry of the Environment, Statistics Finland, The Finnish Environment Institute; Publication Series: Statistics Finland, Handbooks 37	March 2005	waste producers and holders, waste treatment plants, environmental authorities	FI 2005D
Jäteluokitusopas (Waste Classification Guide)	Finland	English	Ministry of the Environment, Statistics Finland, The Finnish Environment Institute; Publication Series: Statistics Finland, Handbooks 37	June 1999	See above	FI 1999
Helena Dahlbo: Jätteen luokittelu ongelmajätteeksi – arvioinnin perusteet ja menetelmät (Classification of waste as hazardous waste – the basis and methods for evaluation)	Finland	Finnish	The Finnish Environment Institute; Publication Series: Environment Guide 98	01.09.2002	environmental authorities (regional and municipal), waste producers, research institutes and laboratories	FI 2002
Merilehto, Tuula Rytönen and Marianne Kaplas: Jätetietojen toimittaminen VAHTI-rekisteriin (Reporting of waste data to the VAHTI database)	Finland	Finnish	The Finnish Environment Institute; Publication Series: Environment Guide	2007	enterprises and environmental authorities	FI 2007B
Mise en oeuvre du décret n° 2002-540 du 18 avril 2002 relatif à la classification des déchets	France	French	La ministre de l'écologie et du développement durable	03.10.2002	les préfets de département; le préfet de police de PARIS	FR 2002
METHODOLOGICAL GUIDE Waste classification. Practical application to storage centers	France	English	FNADE (National Federation of Depollution and Environment Activities) and UNEDE (National Trade-union of Waste Operators)	2003	operators	FNADE 2003
Kurzbericht: Ergebnisse eines EU-weiten Ringtests zur Bestimmung der Ökotoxizität (H14) dreier Abfallsubstrate ...Auswertung einer Validierungsstudie zu CEN 14735	Germany	German	Umweltbundesamt (Dessau)	01.08.2007	EU-authorities	DE 2007D
Guidelines on the Application of the Waste Catalogue Ordinance of 10 December 2001, Federal Law Gazette I p. 3379	Germany	German and English	The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety	09.08.2005	producers or owners of waste responsible for designation and classification	DE 2005
Handbook "How to apply the	Germany	German	Ministerium für Umwelt	01.02.20		DE 2003

Titel of document	Country	Language	Publisher	Publishing date	Target Audience	Reference
European List of Waste 2001/118/EC"	Germany, Baden-Württemberg	German, English	Landesministerium für Umwelt und Verkehr Baden-Württemberg Reihe Abfall Heft 73	2003		
Zuordnung von Abfällen zu Abfallarten aus Spiegeleinträgen. Vorläufige Vollzugshinweise auf der Grundlage des Entwurfs einer Handlungilfe des Abfalltechnikausschusses der LAGA	Germany, Baden-Württemberg	German	Ministerium für Umwelt und Verkehr Baden-Württemberg Reihe Abfall Heft 69	20.10.2002; Aktualisiert: Feb 2006		DE 2006
Vollzugshinweise zur Zuordnung von Abfällen zu den Abfallarten eines Spiegeleintrages.	Germany, Brandenburg	German	MLUV Brandenburg	09.02.2007	Abfallbehörden im Land Brandenburg	DE 2007C
HAZARD-Check: Die Bewertung der Gefährlichkeit der Abfälle	Germany, Nordrhein-Westfalen (NRW)	German	Landesumweltamt (LUA) NRW		authorities of NRW	DE 2004
European Waste Catalogue and Hazardous Waste List Valid from 1 January 2002	Ireland	English	Environmental Protection Agency, Ireland.	2002		IE 2002
HWIT Hazardous Waste Identification Tool, developed under the project HAZTRAIN led by the Clean Technology Centre (CTC), Cork Institute of Technology.	Ireland	English	HAZTRAIN is a transnational environmental training project with partners from Austria, Denmark, Ireland, Portugal, Slovakia and Slovenia. It is co-funded by the European Commission Leonardo da Vinci Community Vocational Training Action Programme (IRL/04/B/F/PP-153225).		waste producers, waste management firms, consultants or regulators	IE 2007
Guidelines for registration and classification of waste (Draft version)	Latvia	English		2005	Operators and Regional Environmental Boards	LV 2005A
Guidelines for registration and classification of waste (Final version)	Latvia	Latvian		2006	Operators and regional Environmental Boards	LV 2006
"Farligt avfall - Handbok 2003:8".	Sweden	Swedish	SwEPA			SE 2003
Orden de 13 de octubre de 1989 por la que se determinan los metodos de caracterization de los residuos toxicos y peligrosos	Spain	Spanish	Ministerio de obras publicas y urbanismo	1989	waste management industry, producers, and regulators of hazardous waste	ES 1989
Normes per a la correcta codificació segons el Catàleg Europeu de Residus	Spain	Catalan	La Comunitat Autònoma de Catalunya	--	--	ES CATALUNA
EUROPESE	The Netherlands	Dutch	Ministerie van VROM	01.08.2001		NL 2001A

Titel of document	Country	Language	Publisher	Publishing date	Target Audience	Reference
AFVALSTOFFENLIJST (EURAL) Handreiking Eural	Netherlands			01		
EUROPESE AFVALSTOFFENLIJST (EURAL) Praktijktraining	The Netherlands	Dutch	Ministerie van VROM	01.09.2001		NL 2001B
Hazardous waste Interpretation of the definition and classification of hazardous waste (Technical Guidance WM 2.1)	United Kingdom	English	Environment Agency; Scottish Environment Protection Agency (SEPA); Environment and Heritage Service	2003; last update: Oct 2006	waste management industry, producers, and regulators of hazardous waste	UK 2006
The European Waste Catalogue & Hazardous Waste List (Hyperlink Tool)	United Kingdom	English	Biffa Waste Services Ltd.		waste management industry, producers	UK 2007B

6. Details for assessment of guidance documents

6.1. Primary Assessment scheme

Reference	Dominant structuring element			Reference to other relevant codes		Depth of guidance for waste classification				Supplementary limit values set for H-Criteria?	Regulation / guidance document etc. regarding H-criteria referred to	Comments
	LoW related	Origin /Industry branches related	Other	Statistical codes	OECD or Basel codes	Cases, practical examples or calculation methods given	Specific assessment steps explained	General description given	Any additional Guidance for classification			
BE 2004	yes	yes	no	no	no							Beneath LoW and waste specific description, infos to the nature of production in many industrial sectors are given. Assessment based on the answer from the questionnaire: "Gives general guidance and describes principles for classification of waste and evaluation of its hazardous properties." Assessment based on the answer from the questionnaire: "Gives guidance on reporting obligations and includes wide range of examples on waste types generated and how waste codes ... should be used in the data base.
FI 2002						no	no	yes	yes			
FI 2007B	yes	yes	no	no	no	yes						

Reference	Dominant structuring element			Reference to other relevant codes		Depth of guidance for waste classification				Supplementary limit values set for H-Criteria?	Regulation / guidance document etc. regarding H-criteria referred to	Comments
	LoW related	Origin /Industry branches related	Other	Statistical codes	OECD or Basel codes	Cases, practical examples or calculation methods given	Specific assessment steps explained	General description given	Any additional Guidance for classification			
FI 2005D	yes	yes	no	no	no	no	no	yes	yes			Assessment based on the answer from the questionnaire: "Gives guidance how waste classification in the Ministry of the Environment Decree on the list of the most common wastes and hazardous wastes (1129/2001) should be applied. The instructions for classifying a specific waste are given both by economic activity and by waste type."
FI 1999	no	yes	no	yes	no	no	N0	yes	yes			Published before LoW became effective, therefore no further assessment
FNADE 2002	no	no	yes	no	no		yes			no	Examples for tests on H14 in Appendix 3 to 5	The guide helps to direct waste to a suitable storage centre. The purpose is not waste classification by itself.
DE 2007D	no	no	yes	no	no	yes	no	no	no	no	Regarding H14; Ergebnis der Studie: Norm CEN 14735 ist zur Erfassung der Ökotoxizität von Abfällen unter Praxisbedingungen geeignet	

Reference	Dominant structuring element			Reference to other relevant codes		Depth of guidance for waste classification				Supplementary limit values set for H-Criteria?	Regulation / guidance document etc. regarding H-criteria referred to	Comments
	LoW related	Origin /Industry branches related	Other	Statistical codes	OECD or Basel codes	Cases, practical examples or calculation methods given	Specific assessment steps explained	General description given	Any additional Guidance for classification			
DE2005	yes	no	no	no	no	no	yes	yes	yes	yes	H1, H2, H9, H12, H13, H14 (see chapter 3.3 and 4.2.)	The handbook describes selected wastes from industrial processes and their material flow and assigns the respective waste codes.
DE 2003	yes	yes	no	no	no	yes	yes	yes	yes	no		
DE 2006	yes	no	no	no	no	yes	yes	yes	yes	no		
DE 2007C	yes	no	no	no	no	yes	yes	yes	yes	yes	Schwellenwerte für abfalltypische Summenparameter in Originalsubstanz und Eluat / H13 (Anlage IV). Analyseverfahren s. Anlage V.	guidance for mirror-entries
DE2004	yes	no	no	no	no	no	no	yes	yes	yes		
IE 2002	yes	no	no	no	no	no	no	yes	no	no	Berechnung von Stoffkonzentrationen und Zuordnung zu H1-H14 (Tab. 2)	computer applicated tool for mirror entries (based on calculation of concentration limits)
												The Environmental Protection Agency funded a project under the Environmental RTDI Programme entitled Procedure for Identification of the Hazardous Components of Waste. The tool is available at www.epa.ie/techinfo .

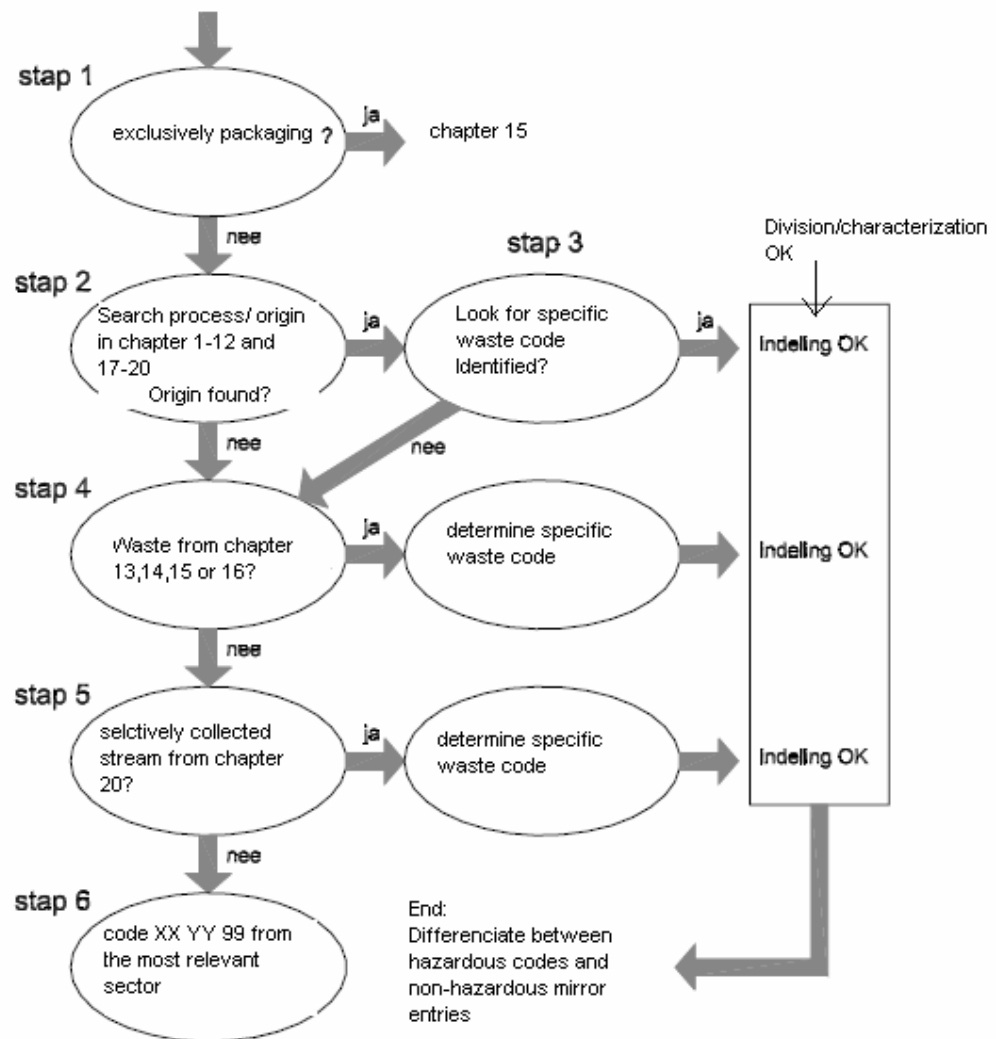
Reference	Dominant structuring element			Reference to other relevant codes		Depth of guidance for waste classification				Supplementary limit values set for H-Criteria?	Regulation / guidance document etc. regarding H-criteria referred to	Comments
	LoW related	Origin /Industry branches related	Other	Statistical codes	OECD or Basel codes	Cases, practical examples or calculation methods given	Specific assessment steps explained	General description given	Any additional Guidance for classification			
IE 2007	yes	no	no	no	no	no	yes	yes	yes	no	The tool (in the background) compares concentration values to the concentration limits laid down in the legislation.	The tool offers a list of possible property tests that are required by legislation. Based upon the results, the HWIT will present a report
LV 2005A	yes	no	no	no	no	no	yes	yes	yes	no		
ES 1989	No	No	No	No	No	No	No	Yes	Yes	No	No	Hazardous Waste Testing Protocols/Methodologies and Data Sources for H1 to H14 are under work in this draft (examples) and logical schemes for determination of hazardous properties of wastes are given."
ES Cataluna SE 2003	Yes	No	No	No	No	No	Yes	No	No	No		
NL2001A	yes	no	no	no	no	yes	yes	yes	yes	no	detailed list of R-phrases in relation to H-criteria; synopsis of underlying	No further assessment due to the comment from the questionnaire: "The Handbook is dealing with the general provisions for the implementation of Directive 2000/532/EC, but is insufficient with regard to classifying waste."

Reference	Dominant structuring element			Reference to other relevant codes		Depth of guidance for waste classification				Supplementary limit values set for H-Criteria?	Regulation / guidance document etc. regarding H-criteria referred to	Comments
	LoW related	Origin /Industry branches related	Other	Statistical codes	OECD or Basel codes	Cases, practical examples or calculation methods given	Specific assessment steps explained	General description given	Any additional Guidance for classification			
NL 2001B											publications	No further assessment as the guideline seems to be a training tool connected to document NL2.
UK 2006	yes	no	no	no	no	yes	yes	yes	yes	Appendix C of WM 2.1 sets out threshold concentrations for H1, H2, H3, H12, H13, H14 based on CHIP3 (national Chemical Regulations) and Directive 88/379/EEC	Appendix C9 of WM 2.1	WM 2.1 is the key reference in UK (s. questionnaire 13)
UK 2007B	yes	no	no	no	no	no	no	yes	yes	no	No	Hyperlink Tool only to assist with selecting the correct EWC code

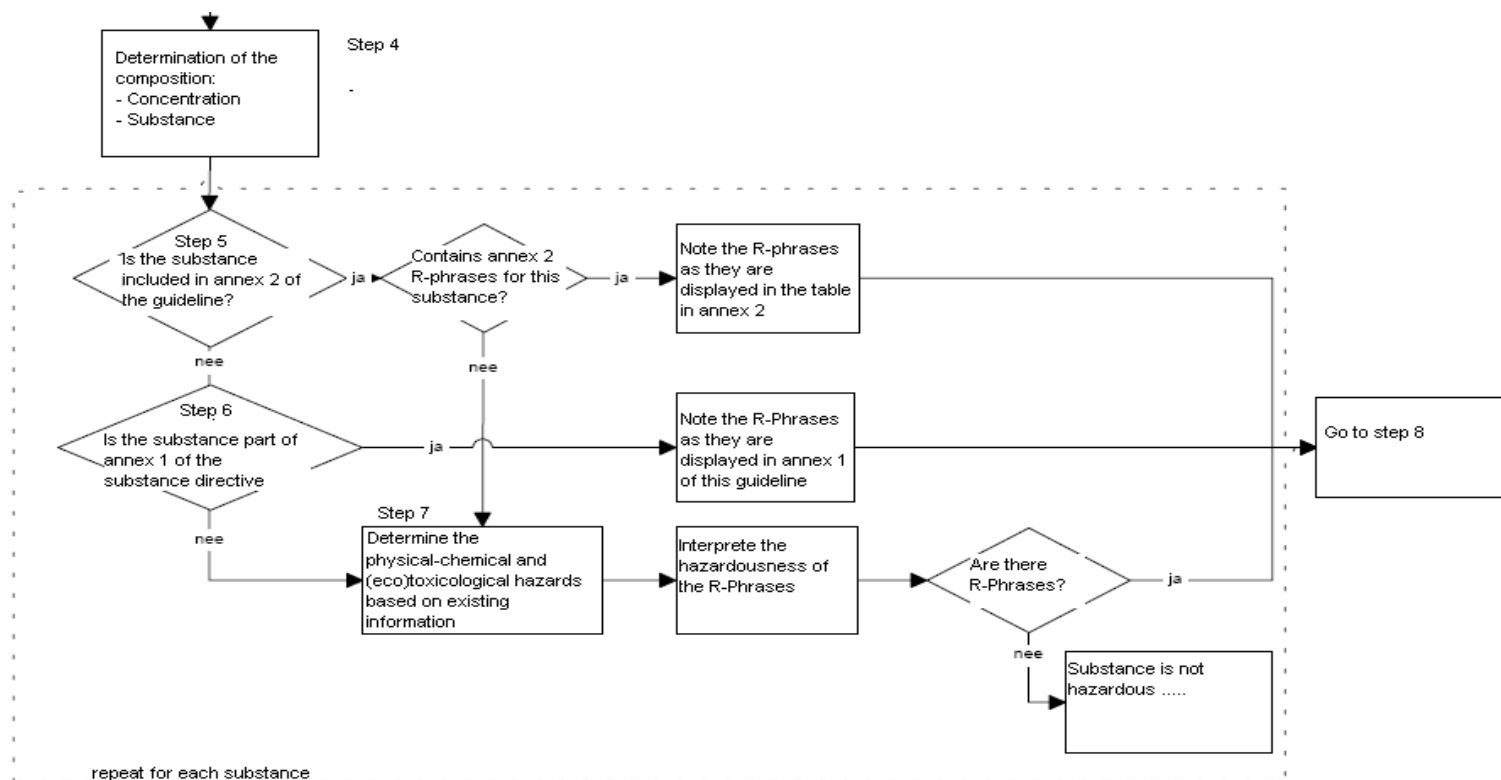
6.2. Translated Flow Scheme according to Europese afvalstoffenlijst EURL Handleiding [BE 2004]

Start:

Determine the origin by the apparent/outer characteristic of the waste



6.3. Translated Part of the Flow Scheme according to EUROPESE AFVALSTOFFENLIJST (EURAL) Handreiking Eural [NL 2001A]



6.4. Excerpt from Spanish Ministry Order of 13th October 1989 on the determination of characterization methods for toxic and hazardous waste

Definition of hazardous waste:

- Inflammable below 55°C determined according to the Directive 84/449/CEE A.9 “flash point”
- Corrosive characteristics:
 - $\text{pH } 2 \geq 12.5$ or $\text{pH} \leq 2$
 - Liquid waste, which corrodes more than 6.35 mm thick layer of iron at a temperature of 55°C.
 - Cause an injury of human tissue at an exposure of less than 5 minutes by inhalation, or contact with skin or eyes.
- Reactive characteristics, such as:
 - Instable and rapid changes with explosion,
 - Forms potentially explosive mixtures with water,
 - Releases easily inflammable or toxic gases in contact with water or humid air,
 - Contain substances like cyanide, sulphur, or others, which in media with pH 2-12.5 could generate toxic gases,
 - Could explode or react explosive when in contact with a source of energy ...
 - Could explode or react explosive under normal pressure or temperature.
- Contains a carcinogenic product or probably carcinogenic in a concentration $\geq 0.01\%$ in accordance with IARC (International Agency on Cancer)
- All carcinogenic, mutagenic, or teratogenic substances defined by the Real Decreto 2216/1985 in accordance with the R-phrases R45, R46, R47. Also Real Decreto 725/1988 and Orden de 7.9.1988 has to be taken into account here.
- Show a toxicity of LD50 at a concentration of ≤ 200 mg/kg as oral dose or LD50 at a concentration of ≤ 400 mg/kg in contact with skin or 2mg per $\frac{1}{4}$ hour by inhalation.
- The leachate, which are obtained by methods described in annex III of Orden de 1989, show LC50 at a concentration of ≤ 750 mg/l (Daphnia Magna) or $\leq \text{CE}50$ 3000 mg/l (photobacteria phosphoreum) in accordance with the bio tests described in annex IV of Orden de 1989.

Recognized bio test are:

- Luminescence test with photobacteria phosphoreum
- Inhibition test with Daphnia magna in accordance with 84/449/EEC

6.5. Excerpt from the EUROPEAN WASTE CATALOGUE AND HAZARDOUS WASTE LIST (IRELAND) and from Excerpt from WASTE MANAGEMENT ACT, 1996

The full text of the definition of hazardous waste can be read in the Waste Management Acts 1996 and 2001. It is also reproduced in full in the National Hazardous Waste Management Plan (available from EPA Publications, Richview, Clonskeagh Road, Dublin 14, tel: 01-2680100, fax: 01-2680199).

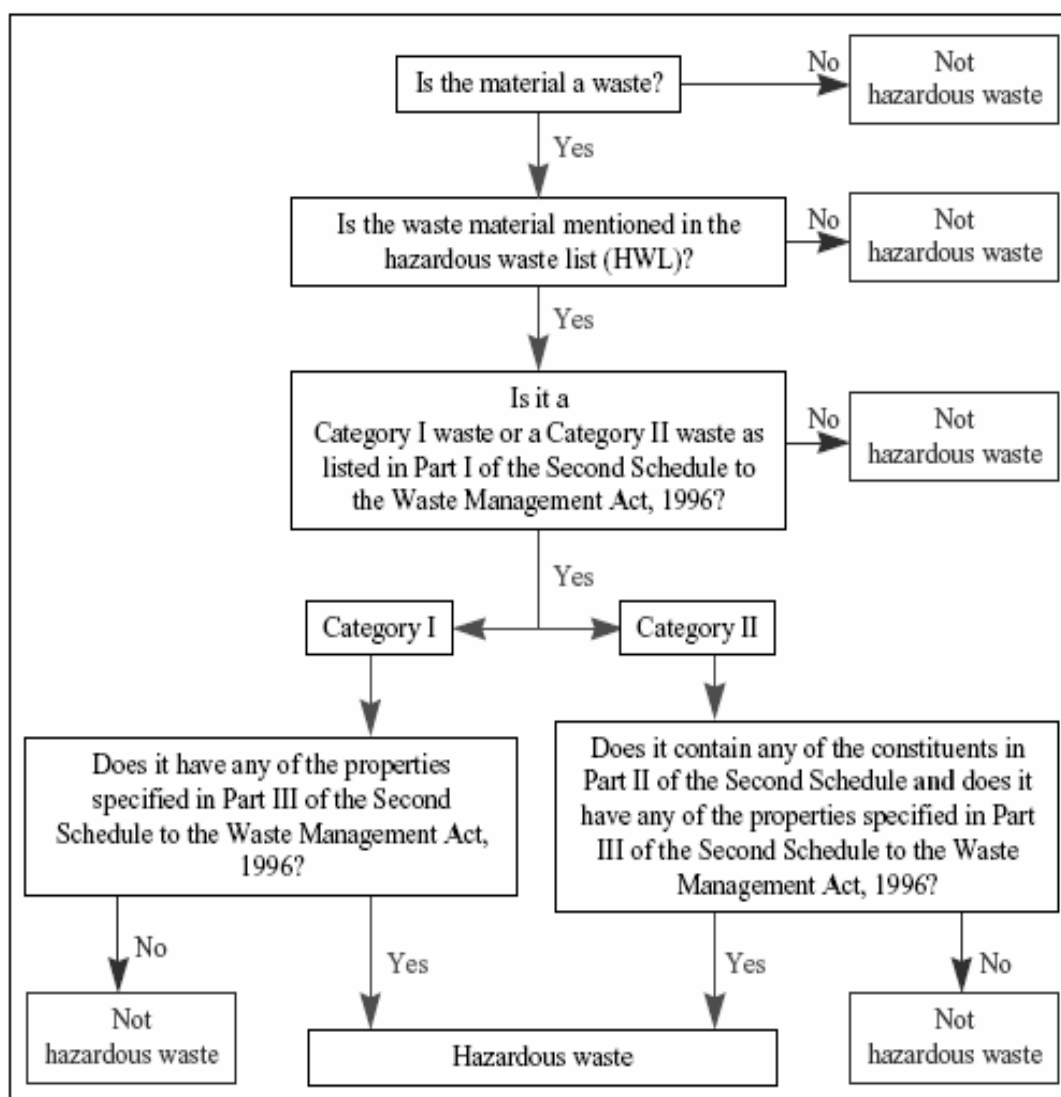


Figure 1 Hazardous waste flowchart

Excerpt from No. 10/1996:

WASTE MANAGEMENT ACT, 1996

20th May, 1996

4. —(1) (a) In this Act, "waste" means any substance or object belonging to a category of waste specified in the *First Schedule* or for the time being included in the European Waste Catalogue which the holder discards or intends or is required to discard, and anything which is discarded or otherwise dealt with as if it were waste shall be presumed to be waste until the contrary is proved.

(b) A reference in this Act to waste shall be construed as including a reference to hazardous waste unless the contrary intention appears.

(2) (a) In this Act, "hazardous waste" means—

(i) hazardous waste for the time being mentioned in the list prepared pursuant to Article 1 (4) of Council Directive 91/689/EEC of 12 December, 1991 ¹, being either—

(I) Category I waste that has any of the properties specified in *Part III* of the *Second Schedule*, or

(II) Category II waste that—

(A) contains any of the constituents specified in *Part II* of the *Second Schedule*, and

(B) has any of the properties specified in *Part III* of the said *Schedule*,

(ii) such other waste, having any of the properties specified in *Part III* of the *Second Schedule*, as may be prescribed for the purposes of this definition.

(b) For the purposes of the definition in this subsection—

"Category I waste" means waste specified in any of the following paragraphs of *Part I* of the *Second Schedule*, namely *paragraphs 1 to 18*;

"Category II waste" means waste specified in any of the following paragraphs of the said *Part I*, namely *paragraphs 19 to 40*.

FIRST SCHEDULE

CATEGORIES OF WASTE

1. Production or consumption residues not otherwise specified in this Schedule.
2. Products which have not been manufactured in accordance with the specifications relating to them.
3. Products whose date for appropriate use has expired.
4. Materials spilled, lost or which have undergone any other mishap (including any materials contaminated as a result of any such mishap).
5. Materials contaminated or soiled as a result of planned actions.
6. Unusable parts.
7. Substances which no longer perform satisfactorily.
8. Residues of industrial processes.
9. Residues from pollution abatement processes.
10. Machining or finishing residues.
11. Residues from the extraction and processing of raw materials.
12. Adulterated materials.
13. Any materials, substances or products whose use is prohibited by or under any enactment.
14. Products for which the holder has no further use.
15. Contaminated materials, substances or products resulting from any remedial action taken with respect to land.
16. Any materials, substances or products which are not otherwise specified in this Schedule.

SECOND SCHEDULE

HAZARDOUS WASTE

PART I

Categories or Generic Types of Hazardous Waste

Category I Waste

1. Anatomical substances, hospital or other clinical waste.
2. Pharmaceutical, medicinal or veterinary compounds.

-
3. Wood preservatives.
 4. Biocides or phyto-pharmaceutical substances.
 5. Residue from substances employed as solvents.
 6. Halogenated organic substances not employed as solvents, excluding inert polymerized materials.
 7. Tempering salts containing cyanides.
 8. Mineral oils or oily substances (including cutting sludges).
 9. Mixtures or emulsions of oil and water or hydrocarbon and water.
 10. Substances containing polychlorinated biphenyls or polychlorinated terphenyls (including dielectrics).
 11. Tarry materials arising from refining, distillation or any pyrolytic treatment (including still bottoms).
 12. Inks, dyes, pigments, paints, lacquers or varnishes.
 13. Resins, latex, plasticizers, glues or adhesives.
 14. Chemical substances arising from research and development or teaching activities (including laboratory residues) which are not identified or are new and whose effects on humans or the environment are not known.
 15. Pyrotechnics or other explosive materials.
 16. Photographic chemicals or processing materials.
 17. Any material contaminated with any congener of polychlorinated dibenzofuran.
 18. Any material contaminated with any congener of polychlorinated dibenzop-dioxin.

Category II Waste

19. Animal or vegetable soaps, fats or waxes.
20. Non-halogenated organic substances not employed as solvents.
21. Inorganic substances without metals or metal compounds.
22. Ashes or cinders.
23. Soil, sand or clay (including dredging spoils).
24. Non-cyanidic tempering salts.
25. Metallic dust or powder.
26. Spent catalyst materials.
27. Liquids or sludges containing metals or metal compounds.
28. Residue (other than the substances mentioned in *paragraphs 29, 30 and 33*) from pollution control operations (including baghouse dusts).
29. Scrubber sludges.
30. Sludges from water purification plants.
31. Decarbonization residue.
32. Ion-exchange column residue.
33. Sewage sludges, untreated or unsuitable for use in agriculture.
34. Residue from cleaning of tanks or equipment.
35. Contaminated equipment.
36. Contaminated containers (including packaging and gas cylinders).
37. Batteries or other electrical cells.
38. Vegetable oils.
39. Materials resulting from the selective collection of waste from households.
40. Any other waste.

PART II

Constituents of Category II Waste which render it hazardous when it has the properties specified in Part III

41. Beryllium or beryllium compounds.
42. Vanadium compounds.
43. Chromium (VI) compounds.
44. Cobalt compounds.
45. Nickel compounds.
46. Copper compounds.
47. Zinc compounds.
48. Arsenic or arsenic compounds.
49. Selenium or selenium compounds.
50. Silver compounds.
51. Cadmium or cadmium compounds.
52. Tin compounds.
53. Antimony or antimony compounds.
54. Tellurium or tellurium compounds.
55. Barium compounds, excluding barium sulphate.
56. Mercury or mercury compounds.
57. Thallium or thallium compounds.
58. Lead or lead compounds.
59. Inorganic sulphides.
60. Inorganic fluorine compounds, excluding calcium fluoride.
61. Inorganic cyanides.
62. Any of the following alkaline or alkaline earth metals, namely, lithium, sodium, potassium, calcium, magnesium in uncombined form.
63. Acidic solutions or acids in solid form.
64. Basic solutions or bases in solid form.
65. Asbestos (dust or fibres).
66. Phosphorus: phosphorus compounds, excluding mineral phosphates.
67. Metal carbonyls.
68. Peroxides.
69. Chlorates.
70. Perchlorates.
71. Azides.
72. Polychlorinated biphenyls or polychlorinated terphenyls.
73. Pharmaceutical or veterinary compounds.
74. Biocides or phyto-pharmaceutical substances (including pesticides).
75. Infectious substances.
76. Creosotes.
77. Isocyanates or thiocyanates.
78. Organic cyanides (including nitriles).
79. Phenols or phenol compounds.
80. Halogenated solvents.
81. Organic solvents, excluding halogenated solvents.
82. Organohalogen compounds, excluding inert polymerized materials and other substances referred to in this Part.
83. Aromatic compounds; polycyclic and heterocyclic organic compounds.
84. Aliphatic amines.
85. Aromatic amines.

-
86. Ethers.
87. Substances of an explosive character, excluding those referred to elsewhere in this Part.
88. Sulphur organic compounds.
89. Any congener of polychlorinated dibenzo-furan.
90. Any congener of polychlorinated dibenzo-p-dioxin.
91. Hydrocarbons and their oxygen, nitrogen or sulphur compounds not otherwise referred to in this Part.

PART III

Properties of Waste which render it hazardous

There is set out in each paragraph of this Part a general term denoting a particular property of waste which renders it hazardous, followed by an explanation of such general term by reference to a description of substances or preparations which possess the particular property.

92. "Explosive": substances or preparations which may explode under the effect of flame or which are more sensitive to shocks or friction than dinitrobenzene.
93. "Oxidizing": substances or preparations which exhibit highly exothermic reactions when in contact with other substances, particularly flammable substances.
94. "Highly flammable":
- (a) liquid substances or preparations having a flash point below 21°C (including extremely flammable liquids), or
 - (b) substances or preparations which may become hot and finally catch fire in contact with air at ambient temperature without any application of energy, or
 - (c) solid substances or preparations which may readily catch fire after brief contact with a source of ignition and which continue to burn or to be consumed after removal of the source of ignition, or
 - (d) gaseous substances or preparations which are flammable in air at normal pressure, or
 - (e) substances or preparations which, in contact with water or damp air, evolve highly flammable gases in dangerous quantities.
95. "Flammable": liquid substances or preparations having a flash point of not less than 21°C and not more than 55°C.
96. "Irritant": non-corrosive substances or preparations which, through immediate, prolonged or repeated contact with the skin or mucous membrane, can cause inflammation.
97. "Harmful". substances or preparations which, if they are inhaled or ingested or if they penetrate the skin, may involve limited health risks.
98. "Toxic": substances or preparations (including very toxic substances or preparations) which, if they are inhaled or ingested or if they penetrate the skin, may cause serious, acute or chronic health risks or death.
99. "Carcinogenic": substances or preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence.
100. "Corrosive": substances or preparations which may destroy living tissue on contact.
101. "Infectious": substances containing viable micro-organisms or their toxins which are known or reliably believed to cause disease in humans or other living organisms.

102. "Teratogenic": substances or preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce non-hereditary congenital malformations or increase their incidence.

103. "Mutagenic": substances or preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce hereditary genetic defects or increase their incidence.

104. "Ecotoxic": substances or preparations which present or may present immediate or delayed risks for one or more sectors of the environment.

105. "Residuary hazardous property":

(a) substances or preparations which release toxic or very toxic gases in contact with water, air or an acid, or

(b) substances or preparations capable by any means, after being disposed of, of yielding another substance which possesses any property referred to in this or any other paragraph of this Part.

7. Detailed information on transposition of Decision 2000/532/EC

7.1. National waste codes of Poland

Waste CODE	Designation
Chapter 1: Wastes resulting from exploration, mining, quarrying, physical and chemical treatment of minerals	
010180	Rock waste from copper, zinc and lead mining
010380*	Tailings from enrichment by flotation of non-iron metal ores that contain hazardous substances
010381	Tailings from enrichment by flotation of non-iron metal ores other than those mentioned in 010380
010480*	Tailings from enrichment by flotation of coal that contain hazardous substances
010481	Tailings from enrichment by flotation of coal other than those mentioned in 010480
010482*	Tailings from enrichment by flotation of sulfide ores that contain hazardous substances
010483	Tailings from enrichment by flotation of sulfide ores other than those mentioned in 010482
010484*	Tailings from enrichment by flotation of phosphoric ores (phosphorites, apatites) that contain hazardous substances
010485	Tailings from enrichment by flotation of phosphoric ores (phosphorites, apatites) other than those mentioned in 010484
Group 2: Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing	
020180*	Dead animals and animals slaughtered out of necessity as well as animal tissue waste, that exhibit hazardous properties
020181	Dead animals and animal tissue waste being high risk material (HRM) and special risk material (SRM) other than those mentioned in 020180
020182	Dead animals and animals slaughtered out of necessity
020183	Wastes from aquaculture
020280*	Animal tissue waste that exhibits hazardous properties
020281	Animal tissue waste being high risk material (HRM) and special risk material (SRM) with waste from meat-and-bone meal other than those mentioned in 020280
020282	Waste from fish flour production other than those mentioned in 020280
020380	Pomace (oil cake), sludge and other waste from vegetable products preparation (except 020381)
020381	Wastes from vegetable fodder manufacture
020382	Tobacco wastes
020480	Beet pulp
020580	Whey waste
020680	Unused edible oils
020780	Pomace (oil cake), must and post fermentation sludge, slops
Group 3: Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard	
030180*	Waste from chemical processing of wood that contain hazardous substances
030181	Waste from chemical processing of wood other than those mentioned in 030180
030182	Sludges from on-site effluent treatment
030380	Bleaching sludges from hypochlorite and chlorine processes
030381	Bleaching sludges from other bleaching processes
Group 4: Wastes from the leather, fur and textile industries	
040280	Wastes from wet treatment of textile products
Group 5: Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal	

Waste CODE	Designation
050680*	Liquid wastes that contain phenols
Group 6: Wastes from inorganic chemical processes	
060980	Phosphogypsum
060981	Phosphogypsum mixed with slags, bottom ashes and boiler dust (except boiler dust mentioned in 100104)
061180	Wastes from zirconium compounds manufacture
061181	Wastes from chromium compounds manufacture
061182	Wastes from cobalt compounds manufacture
061183	Ferric sulfate waste
Group 7: Wastes from organic chemical processes	
070180	Carbide residue no containing hazardous substances (other than those mentioned in 070108)
070280	Wastes from rubber industry and from rubber manufacture
070480*	Expired plant protection agents, toxicity class I and II (highly toxic and toxic)
070481	Expired plant protection agents other than those mentioned in 070480
070580*	Liquid wastes containing hazardous substances
070581	Liquid wastes other than those mentioned in 070580
070680	Fuller's earth from oil refining
070681	Return cosmetics and samples
Group 8: Wastes from the manufacture, formulation, supply and use (MFSU) of coatings (paints, varnishes and vitreous enamels), adhesives, sealants and printing inks	
080380	Disperse oil other than this mentioned in 080319
Group 9: Wastes from the photographic industry	
090180*	Expired photography reagents
Group 10: Wastes from thermal processes	
100180	Combination of ash and slags from wet diversion of boiler wastes
100181	Microspheres from fly-ashes
100182	Mixtures of fly-ashes and solid wastes from calcium based flue gas desulphurization (dry and semi-dry methods of emissions desulphurization in fluidized bed)
100280	Skimmings from iron industry
100281	Copperas waste
100580	Granulated slags from shaft furnaces and slags from rotating furnaces
100680	Shaft and granulated slags
100980	Scrap cast iron products
101180	Fluorosilicate sludges
101181*	Asbestos-containing waste
101380	Wastes from cement manufacture
101381	Wastes from gypsum manufacture
101382	Scrap products
108001	Slags from ferrosilicon manufacture
108002	Dusts from ferrosilicon manufacture
108003	Slags from ferrochromium manufacture
108004	Dusts from ferrochromium manufacture
108005	Slags from ferromanganese manufacture
108006	Dusts from ferromanganese manufacture
108099	Wastes not otherwise specified
Group 13: Oil wastes and wastes of liquid fuels (except edible oils, 05 and 12)	
130880	Oiled solid wastes from ships
Group 16: Wastes not otherwise specified in the list	
160380	Food products past their "use-by" date or unfit for consumption
1680	Other wastes
168001	Magnetic and optic recording medium
1681	Waste resulting from accidents and unplanned events
168101*	Wastes exhibiting hazardous properties
168102	Wastes other than those mentioned in 168101
1682	Waste resulting from natural disasters
168201*	Wastes exhibiting hazardous properties

Waste CODE	Designation
168202	Wastes other than those mentioned in 168210
Group 17: Construction and demolition wastes (including excavated soil from contaminated sites)	
170180	Removed plasters, wallpapers, veneers etc.
170181	Waste from streets repairs and rebuilding
170182	Wastes not otherwise specified
170380	Building (roofing) paper waste
Group 18: Wastes from human and animal health care and / or related research (except kitchen and restaurant wastes not arising from immediate health care)	
180180*	Used therapeutic baths, biologically active, with infectious capability
180181	Used therapeutic baths, biologically active, other than those mentioned in 180180
180182*	Food remains from feeding patients residing in infectious unit
Group 19: Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	
1980	Wastes from disposal human and animal health waste not specified in other sub-groups
198001	Waste after autoclaving of waste from human and animal health
Group 20: Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions	
200180	Pesticides other than those mentioned in 200119

7.2. National waste codes of Estonia

ESTONIAN LIST OF WASTE	REMARKS
01 WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING, AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS 01 04 wastes from physical and chemical processing of non-metalliferous minerals 01 04 13 wastes from stone cutting and sawing other than those mentioned in 01 04 07, incl. wastes from treatment of limestone and dolomite	Limestone and dolomite are the biggest potential sources for 01 04 13 category of waste in Estonia. It was considered from practical reasons to mention them especially in this entry.
02 WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING 02 05 wastes from the dairy products industry 02 05 98 whey wastes	Recovery and disposal of whey wastes from cheese production is a problem to be solved in Estonia. The special entry is needed for keeping records and reporting on this waste category.
03 WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD 03 02 wastes from wood preservation 03 02 97* wood preservatives containing phenols 03 02 98* sludges containing wood preservatives	In Estonia wood preservatives containing phenols (based on shale oil) are often used. Entry 03 02 98 allows to consider preservatives waste in form of sludge.
05 WASTES FROM PETROLEUM REFINING, NATURAL GAS PURIFICATION AND PYROLYTIC TREATMENT OF COAL AND OIL SHALE 05 06 wastes from the pyrolytic treatment of coal and oil shale 05 06 96* aqueous liquid waste containing phenols (phenol water) 05 06 97* oil shale semicoke 05 06 98* tarry waste from oil shale ('fuses')	Oil shale is in Estonia the main category of solid fuel, which is submitted to pyrolytic treatment. Semicoke, phenol water and tarry waste are the main categories of waste which are generated in the process of shale oil production using pyrolysis Wastes under heading 05 07 are generated also

ESTONIAN LIST OF WASTE	REMARKS
05 07 wastes from purification and transportation of natural gas and gas from pyrolytic treatment of coal and oil shale	in purification processes of gas from oil shale processing.
10 WASTES FROM THERMAL PROCESSES 10 01 wastes from power stations and other combustion plants (except 19) 10 01 01 bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04, 10 01 96 and 10 01 97) 10 01 95 wastes from fuel storage and preparation of oil shale-fired power plants 10 01 96* bottom ash, slag and boiler dust from combustion of heavy fuel oil 10 01 97* oil shale bottom ash 10 01 98* oil shale fly ash	Bottom and fly ash from oil shale power plants are the most voluminous categories of waste in Estonia. Entry 10 01 95 is analogous to 10 01 25. 10 01 96 is foreseen for registration of waste not covered with entry 10 01 04.
16 WASTES NOT OTHERWISE SPECIFIED IN THE LIST 16 02 wastes from electrical and electronic equipment and other equipment and apparatus 16 02 97* other discarded equipment containing hazardous components 16 02 98 other discarded equipment and apparatus other than those mentioned in 16 02 97	It has been difficult to classify according to EWC equipment and apparatus not containing electronic or electrical components. These extra entries have to solve this practical problem.
17 CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES) 17 03 bituminous mixtures, coal or oil shale tar and tarred products 17 03 01* bituminous mixtures containing coal or oil shale tar 17 03 02 bituminous mixtures other than those mentioned in 17 03 01 17 03 03* coal or oil shale tar and tarred products 17 04 metals (including their alloys) 17 04 10* cables containing oil, coal or oil shale tar and other dangerous substances	Tars from oil shale products are equalised with coal tar (not with crude oil bitumen)
18 WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/OR RELATED RESEARCH (except kitchen and restaurant wastes not arising from immediate health care) 18 01 wastes from natal care, diagnosis, treatment or prevention of disease in humans 18 01 94 used curative seamud (<i>sapropel</i>) 18 01 95* antibiotics 18 01 96* medicines with narcotic and psychotropic effect 18 01 97* medicines containing other dangerous active ingredients 18 01 98* unsorted batches of medicines 18 02 wastes from research, diagnosis, treatment or prevention of disease involving animals 18 02 95* antibiotics 18 02 96* medicines with narcotic and psychotropic effect 18 02 97* medicines containing other dangerous active ingredients 18 02 98* unsorted batches of medicines	Used sapropel is a voluminous type of waste generated in spas and other medical establishments and sanatoriums. Unfortunately there are no direct entries in LoW allowing to classify this waste category. As the separate collection systems of unused waste medicines are under development in Estonia, it was proposed by the Ministry of Social Affairs to have a stricter control on additional categories of medicine waste and unsorted medicines. Considering them as hazardous allows to demand special hazardous waste handling licences from companies managing medicines' waste and establish by health and environment protection authorities specific requirements for collection, storage and treatment to guarantee safety.
19 WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE 19 12 wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	It is not possible to classify according to original LoW mixed industrial or manufacturing wastes (which are not similar to household wastes), collected in enterprises together in the same waste bins and treated (disposed) usually together with municipal waste, but belongs principally not to the category 20 03 01.

ESTONIAN LIST OF WASTE	REMARKS
19 12 98 Mixed non-hazardous manufacturing wastes, excluding municipal wastes (mixed manufacturing waste)	
20 MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 01 separately collected fractions (except 15 01)	
20 01 95* antibiotics	
20 01 96* medicines with narcotic and psychotropic effect	
20 01 97* medicines containing other dangerous active ingredients	
20 01 98* unsorted batches of medicines	
20 03 other municipal wastes	
20 03 98 sorting residues of mixed municipal waste	See explanations above (18 01 and 18 02) 20 03 98 are wastes remaining after sorting of mixed municipal waste in specialised sorting facilities or after separate collection. Idea of classifying under chapter 20 (not under chapter 19) is to demonstrate that this category of waste must be considered firmly as municipal waste (as in Estonia disposal taxes are depending on this categorisation and from 2008 disposal of untreated mixed municipal waste 20 03 01 is prohibited)

7.3. National adaptations to the LoW in Finland

National amendments to the LoW:

- All waste medicines from consumers and health care sector are classified as hazardous (18 01 09*, 18 02 08*, 20 01 32*)
- Title of 16 02 has been extended to include also other discarded equipment than WEEE
- Two new entries were introduced for other equipment: 16 02 97* (discarded other equipment containing hazardous substances) and 16 02 98 (other discarded other equipment than those mentioned in 16 02 97)
- Other wood-based boards than particle board and veneer were included into entries 03 01 04* and 03 01 05
- The title of 20 01 was amended into "Specified waste types"

National adaptation to the hazard criteria in Art. 2 of 2000/532/EY:

The following national adaptations have been made to the hazard criteria in order to harmonise them with the Finnish and the EC Chemicals legislation:

H4: The limit value for irritant substances classified as R41 is 5 %

H5: The interpretation is specified by setting a separate limit value for substances which can cause long-term health effects:

- for substances classified as Xn and R68/exposure-route 10 %
- for substances classified as Xn and R48/exposure-route 10 %

H6: The interpretation is specified by setting a separate limit value for substances which can cause long-term health effects:

- - for substances classified T+ and R39/exposure-route 0.1 %
- - for substances classified T and R39/exposure-route 1 %
- - for substances classified T and R48/exposure-route 1 %

General provision for hazard criteria H4-8, H10 and H11: If a certain substance has a lower limit value in the EC List of Dangerous Substances the lower limit value is used instead of the limit values set in the Finnish Waste Decree.

8. Detailed information on H9

8.1. German Protection against Infection Act Section7

“Act on the Prevention and Control of Infectious Diseases in Man” (Protection against Infection Act) 20.07.2000

“Gesetz zur Verhütung und Bekämpfung von Infektionskrankheiten beim Menschen”(Infektionsschutzgesetz - IfSG) 20.07.2000

Section 7: Notifiable evidence of pathogens

(1) Any direct or indirect evidence of the following pathogens shall be notified on a named-patient basis, if the evidence suggests an acute infection:

1. Adenoviruses; only direct evidence from conjunctival smears is notifiable
2. Bacillus anthracis
3. Borrelia recurrentis
4. Brucella sp.
5. Campylobacter sp., enteropathogenic
6. Chlamydia psittaci
7. Clostridium botulinum or evidence of toxins
8. Corynebacterium diphtheriae, toxin-producing
9. Coxiella burnetii
10. Cryptosporidium parvum
11. Ebola virus
12. a) Escherichia coli, enterohemorrhagic strains (EHEC)
b) Escherichia coli, other enteropathogenic strains
13. Francisella tularensis
14. SSME virus
15. Yellow fever virus
16. Giardia lamblia
17. Haemophilus influenzae; only direct evidence obtained from liquor or blood is notifiable
18. Hanta viruses
19. Hepatitis A virus
20. Hepatitis B virus
21. Hepatitis C virus; all types of evidence are notifiable unless chronic infection is known to be present
22. Hepatitis D virus
23. Hepatitis E virus
24. Influenza viruses; only direct evidence is notifiable
25. Lassa virus
26. Legionella sp.
27. Leptospira interrogans
28. Listeria monocytogenes; only direct evidence obtained from blood, liquor or from other normally sterile sites as well as from smears taken from new borns is notifiable
29. Marburg virus
30. Measles virus
31. Mycobacterium leprae
32. Mycobacterium tuberculosis/africanum, mycobacterium bovis; notifiable is the direct evidence of pathogens and subsequently the result of resistance determination; initially also evidence of acid-fast bacilli in the sputum
33. Neisseria meningitidis; also direct evidence from liquor, blood, hemorrhagic infiltrations of the skin or from other normally sterile sites is notifiable
34. Norwalk-like virus; only direct evidence from stool is notifiable
35. Polio virus
35. Rabies virus
36. Rickettsia prowazekii
38. Rotavirus
39. Salmonella paratyphi; all types of direct evidence are notifiable
40. Salmonella typhi; all types of direct evidence are notifiable
41. Salmonella, others
42. Shigella sp.
43. Trichinella spiralis
44. Vibrio cholerae 01 and 0139
45. Yersinia enterocolitica, enteropathogenic
46. Yersinia pestis
47. Other agents of hemorrhagic fevers.

Notifications pursuant to sentence 1 shall be made according to section 8 paragraph 1 nos. 2, 3, 4 and paragraph 4, section 9 paragraphs 1, 2, 3 sentence 1 or 3.

(2) Pathogens other than those stipulated in this regulation shall be notified on a named-patient basis if their spatial and temporal cluster suggests the presence of a grave danger for the public. Notifications pursuant to sentence 1 shall be made according to section 8 paragraph 1 nos. 2, 3 and paragraph 4, section 9 paragraphs 2, 3 sentence 1 or 3.

(3) Direct or indirect evidence of the following pathogens shall be notified on a nonnamed-patient basis:

1. Treponema pallidum
2. HIV
3. Echinococcus sp.
4. Plasmodium sp.
5. Rubella virus; only congenital infections are notifiable
6. Toxoplasma gondii; only congenital infections are notifiable.

Notifications pursuant to sentence 1 shall be made according to section 8 paragraph 1 nos. 2, 3 and paragraph 4, section 9 paragraphs 2, 3 sentence 1 or 3.

8.2. Verordnung über anzeigepflichtige Tierseuchen TierSeuchAnzV (German Ordinance on notifiable animal epidemics)

Verordnung über anzeigepflichtige Tierseuchen - TierSeuchAnzV

Ausfertigungsdatum: 23.05.1991

"Verordnung über anzeigepflichtige Tierseuchen in der Fassung der Bekanntmachung vom 3. November 2004 (BGBl. I S.2764), geändert durch Artikel 15 der Verordnung vom 20.Dezember 2005 (BGBl. I S. 3499)"

§ 1 Anzeigepflichtige Tierseuchen

Folgende Tierseuchen sind anzeigepflichtig:

1. Affenpocken,
1a. Afrikanische Pferdepest,
2. Afrikanische Schweinepest,
2a. Amerikanische Faulbrut,
3. Ansteckende Blutarmut der Einhufer,
3a. Ansteckende Blutarmut der Lachse,
4. Ansteckende Schweinelähmung (Teschener Krankheit),
5. Aujeszkysche Krankheit,
5a. Befall mit dem Kleinen Bienenbeutenkäfer (Aethina tumida)
5b. Befall mit der Tropilaelaps-Milbe,
6. Beschälseuche der Pferde,
7. Blauzungkrankheit,
8. Bovine Herpesvirus Typ 1-Infektion (alle Formen),
8a. Bovine Virus Diarrhoe,
9. Brucellose der Rinder, Schweine, Schafe und Ziegen,
9a. Ebola-Virus-Infektion,
9b. Epizootische Hämorrhagie der Hirsche,
10. Enzootische Leukose der Rinder,
11. Geflügelpest,
12. (weggefallen)
13. Infektiöse Hämatoopoetische Nekrose der Salmoniden,
14. Koi Herpesvirus-Infektion der Karpfen,
15. Lumpy-skin-Krankheit (Dermatitis nodularis),
16. Lungenseuche der Rinder,
17. Maul- und Klauenseuche,
18. (weggefallen)

8.3. Verordnung über meldepflichtige Tierkrankheiten (MtierkrhtV) (German Ordinance on notifiable animal diseases)

Verordnung über meldepflichtige Tierkrankheiten vom 20. Dezember 2005
(BGBl. I, S. 3517)

ANLAGE (zu § 1)

Meldepflichtige Tierkrankheiten/Erregernachweise

Spalte 2: Krankheit oder Erreger

1. Ansteckende GehirnRückenmarkentzündung der Einhufer (Bornasche Krankheit)
2. Ansteckende Metritis des Pferdes (CEM)
3. Bösartiges Katarrhaifieber des Rindes (BKF)
4. Campylobacteriose (thermophile Campylobacter)
5. Chlamydiose (Chlamydophila Spezies) ¹⁾
6. Echinokokkose
7. Ecthyma contagiosum (Parapoxinfektion)
8. Equine VirusArteritis Infektion
9. Euterpocken des Rindes (Parapoxinfektion)
10. (weggefallen)
11. GumboroKrankheit
12. Infektiöse Laryngotracheitis des Geflügels (ILT)
13. Infektiöse Pankreasnekrose der Forellen und forellenartigen Fische (IPN)
14. Leptospirose
15. Listeriose (Listeria monocytogenes)
16. Maedi
17. Mareksche Krankheit (akute Form)
18. Paratuberkulose
19. QFieber ²⁾
20. Rhinitis atrophicans
21. Säugerpocken (Orthopoxinfektion)
22. Salmonellose/Salmonella spp.
23. Stomatitis papulosa Rindes (Parapoxinfektion)
24. Toxoplasmose ⁴⁾
25. Transmissible Virale Gastroenteritis des Schweines (TGE)
26. Tuberkulose ⁵⁾
27. Tularämie
28. Verotoxin bildende Escherichia coli
29. Visna
30. Vogelpocken (Avipoxinfektion)

1) außer Psittakose

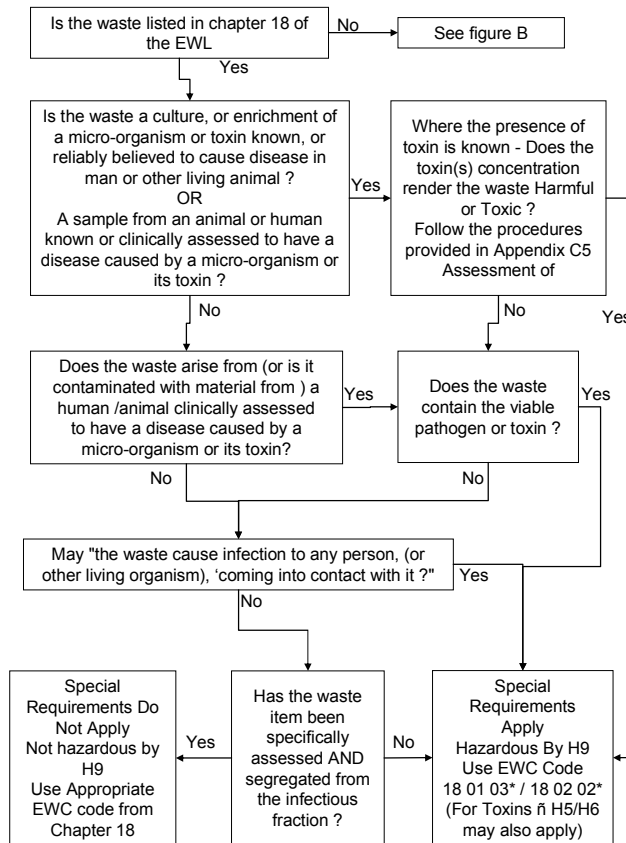
2) insbesondere andere Wiederkäuerarten

3) ausgenommen S. enteritidis und S. typhimurium beim Haushuhn, soweit die Mitteilungspflicht nach § 4 der HühnerSalmonellen Verordnung besteht, sowie Salmonellose und ihre Erreger des Rindes, soweit die Anzeigepflicht nach § 1 Nr. 28 der Verordnung über anzeigepflichtige Tierseuchen besteht

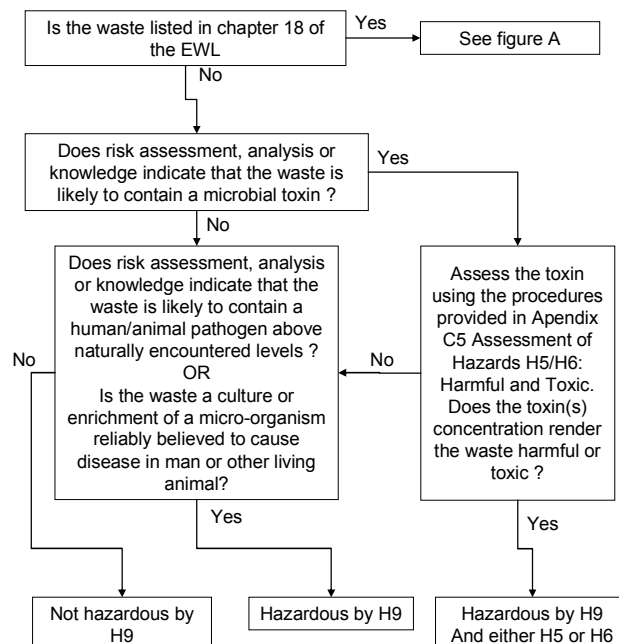
4) insbesondere alle der Lebensmittelgewinnung dienenden Säugetierarten

5) ausgenommen Mycobacterium bovis inklusive deren Subspeziesinfektionen, soweit die Anzeigepflicht nach § 1 Nr. 36 der Verordnung über anzeigepflichtige Tierseuchen besteht

8.4. Decision Tree for Healthcare Wastes according to Technical Guidance WM 2.1 Appendix C Figure A [UK 2006]



8.5. Decision Tree for potentially infectious wastes from other sources according to Technical Guidance WM 2.1 Appendix C Figure B [UK 2006]



8.6. Overview for classification of Healthcare wastes according to LAGA (2002)

Beispiel aus Anlage 1: Tabellarische Übersicht für die Zuordnung zu Abfallschlüsseln

Die nachfolgenden Tabellen sind nur im Zusammenhang mit der Richtlinie zu verwenden und können die Lektüre der Richtlinie – insbesondere Kapitel 2 – nicht ersetzen.

Hinweise zu den einzelnen Feldern:

- AVV Abfallschlüssel benennt Abfallschlüssel (AS) gemäß dem Anhang zur Abfallverzeichnis-Verordnung (sechstelliger Schlüssel)
- AVV-Bezeichnung benennt die Art des Abfall gemäß dem Anhang zur Abfallverzeichnis-Verordnung (zum AS zugehöriger Text)
- Abfalleinstufung gibt Auskunft über die Überwachungskategorie des Abfalls.
- Abfalldescription umschreibt die unter diesen Schlüssel fallenden Abfälle.
- EAKV 1996 nennt den alten Abfallschlüssel nach der außer Kraft getretenen "Verordnung zur Einführung des Europäischen Abfallkatalogs (EAK-Verordnung - EAKV) vom 13.09.1996. Die nach der "Verordnung zur Bestimmung von besonders überwachungsbedürftigen Abfällen – BestbÜAbfV" besonders überwachungsbedürftigen Abfälle sind durch "*" gekennzeichnet.
- LAGA Gruppe Hinweis auf die frühere Einteilung in die Gruppen A - E
- Anfallstellen benennt mögliche Anfallstellen des jeweiligen Abfalls.
- Bestandteile enthält beispielhafte Auflistung der Bestandteile des jeweiligen Abfalls.
- Sammlung-Lagerung enthält Hinweise zur Sammlung und Lagerung.
- Entsorgung enthält Hinweise zur Entsorgung.
- Hinweise enthält weiterführende Hinweise.

Anlage 1 zur Richtlinie über die ordnungsgemäße Entsorgung von Abfällen aus Einrichtungen des Gesundheitsdienstes

AVV Abfallschlüssel AS 18 01 01	AVV-Bezeichnung: spitze oder scharfe Gegenstände		Abfalleinstufung: überwachungsbedürftig bei Beseitigung
Abfalldefinition: Spitze und scharfe Gegenstände, auch als "sharps" bezeichnet.			EAKV 1996: 18 01 01 LAGA Gruppe: B
Anfallstellen	Bestandteile	Sammlung – Lagerung	Entsorgung
Gesamter Bereich der Patientenversorgung.	Skalpelle, Kanülen von Spritzen und Infu- sionssystemen, Gegenstände mit ähnlichem Risiko für Schnitt- und Stichverletzungen.	Erfassung am Abfallort in stich- und bruchfesten Einwegbehältnissen, kein Umfüllen, Sortieren oder Vorbehandeln.	Keine Sortierung !! Ggf. Entsorgung gemeinsam mit Abfällen des AS 18 01 04.
Hinweise: Eine sichere Desinfektion der Kanülen-Hohlräume ist schwierig. Analoge Anwendung auch auf AS 18 02 01.			

Anlage 1 zur Richtlinie über die ordnungsgemäße Entsorgung von Abfällen aus Einrichtungen des Gesundheitsdienstes

AVV Abfallschlüssel AS 18 01 03*	AVV -Bezeichnung: andere Abfälle, an deren Sammlung und Entsorgung aus infektionspräventiver Sicht besondere Anforderungen gestellt werden.		Abfalleinstufung: besonders überwachungsbedürftiger Abfall (bÜA)
Abfalldefinition: Abfälle, die mit meldepflichtigen Erregern behaftet sind, wenn dadurch eine Verbreitung der Krankheit zu befürchten ist (siehe Text!)			EAKV 1996: 18 01 03* LAGA Gruppe: C
Anfallstellen	Bestandteile	Sammlung – Lagerung	Entsorgung
z. B. Operationsräume, Isoliereinheiten von Krankenhäusern, mikrobiologische Laboratorien, klinisch-chemische und infektionsserologische Laboratorien, Dialysestationen und –zentren bei Behandlung bekannter Hepatitisvirus-träger, Abteilungen für Pathologie.	Abfälle, die mit erregershaltigem Blut, Sekret oder Exkret behaftet sind oder Blut in flüssiger Form enthalten. z.B.: mit Blut oder Sekret gefüllte Gefäße, blut- oder sekretgetränkter Abfall aus Operationen, gebrauchte Dialysesysteme aus Behandlung bekannter Virus-träger. Mikrobiologische Kulturen aus z.B. Instituten für Hygiene, Mikrobiologie und Virologie, Labormedizin, Arztpraxen mit entsprechender Tätigkeit.	Am Anfallort verpacken in reißfeste, feuchtigkeitsbeständige und dichte Behältnisse. Sammlung in sorgfältig verschlossenen Einwegbehältnissen (zur Verbrennung geeignet, Bauartzulassung). Kein Umfüllen oder Sortieren. Zur Vermeidung von Gasbildung begrenzte Lagerung.	Keine Verwertung !! Keine Verdichtung oder Zerkleinerung. Entsorgung als besonders überwachungsbedürftiger Abfall mit Entsorgungsnachweis : Beseitigung in zugelassener Abfallverbrennungsanlage, z.B. Sonderabfallverbrennung (SAV). oder: Desinfektion mit vom RKI zugelassenen Verfahren, dann Entsorgung wie AS 18 01 04. Achtung: Einschränkung bei bestimmten Erregern (CJK, TSE).
Hinweise: auch: spitze und scharfe Gegenstände, Körperteile und Organabfälle von Patienten mit entsprechenden Krankheiten. Analoge Anwendung auch auf AS 18 02 02*.			

8.7. Overview of answers to the questionnaire survey regarding H9

The following sections show the answers of the questionnaire survey with regard to the application of H9 by countries. For some countries there are

answers available from stakeholders but no official statements from the countries. The answers of the stakeholders are marked accordingly.

Definitions for H9 “infectious”

Question 23:

- *Does there exist a definition of the hazard criteria H9 ‘infectious’ in your country?*
 - *If yes, please give the definition*
 - *Are there specific definitions for different waste categories (e.g. health care waste, animal testing waste,...)? If yes, please specify.*

Answers:

Table 9: National definitions for Hazard Criteria H9 (answers to question 23)

Country	Definitions for H9
AT	<p>According to the (Ordinance on Waste Classification (Abfallverzeichnisverordnung) 2003/ 570 the hazard criteria H9 is presumed to be fulfilled for:</p> <ul style="list-style-type: none"> • Wastes contaminated with hazardous pathogens • Microbiological samples of risk group 2, 3 and 4 according to Directive 2000/54/EC on the protection of workers from risks related to exposure to biological agents at work • Waste contaminated with pathogens subject to reporting under veterinary legislation • Any waste regarded as infectious under community legislation.
DK	<p>No special definition established but origin of waste is stressed as the most important criteria in the official guideline. This guideline points out especially diseases related to blood-related micro organisms (like HIV and Hepatitis B) as the main problem (especially in connection with sharp and pointed items giving raise to infection through skin) whereas other infectious diseases could be coped with by proper hygienic precautions (mostly in contact with patients and less in relation to waste).</p> <p>Thus only bloody and sharp/pointed clinical waste is considered ‘infectious’ according to the Danish guideline in handling of clinical waste.</p>
EE	<p>The Estonian Waste Act gives for ‘infectious’ the same definition as Directive 91/689/EEC. For the classification of hazardous health care wastes Estonia refers to the wording of LoW-code 18 01 03*. However, there exists no clear definition of the “special requirements in view of the prevention of infection”. The Ministry of Environment has the position that this should be clarified by the Ministry of Social</p>

	<p>Affairs.</p> <p>If the definition of 'infectious' contains a clear aspect of probability [... which are known or reliably believed to cause disease...] then clearly the principle of precaution has to be used in practical implementation of this definition. And the methods of application must be same in every Member States.</p>
FI	<p>Finland has not set a binding definition or criteria for H9, apart from the general description given in Annex III of Directive 91/689/EEC.</p> <p>The Finnish Product Control Agency (STTV) has published in 2006 a guidance document which specifies the following wastes as infectious:</p> <ul style="list-style-type: none"> • Waste from patient treatment, contaminated with microbes classified in UN 2814, category A as listed in the Annex of the Basel Convention document UNEP/CHW.7/11/Add.1/Rev.1 (table on pages 10-11) http://www.basel.int/meetings/cop/cop7/docs/11a1r1e.pdf • Waste from patient treatment and contaminated with substances classified as infectious but not fulfilling the criteria for classification to category A (UN 3373, category B) • Laboratory cultures containing microbes classified in UN 2814, category A as listed in the Annex of the Basel Convention document UNEP/CHW.7/11/Add.1/Rev.1 (table on pages 10-11) http://www.basel.int/meetings/cop/cop7/docs/11a1r1e.pdf • Laboratory waste contaminated with infectious microbes classified into UN 3373, category B • Culture dishes made for diagnostic and clinical purposes.
FR (FNADE)	<p>Concerning the definition of H9 FNADE refers to a Decree of November 1997 without specifying neither the name of the Decree nor the definition included.</p>
DE	<p>DE refers to the German "Guidelines for the Application of the Waste Catalogue Ordinance" <i>which lays down that the criterion H9 essentially applies to chapter 18 of the LoW</i>. H9 is deemed to apply to the following material:</p> <ul style="list-style-type: none"> • Waste contaminated with hazardous pathogens subject to registration under § 17 of the 'Protection against Infection Act' (Infektionsschutzgesetz - IfSG)³. There, the respective diseases are listed in detail. • Waste containing pathogens (infectious substances) of the animal diseases mentioned in the 'Ordinance on notifiable

³ 2000, Federal Law Gazette I p. 1045, amended in 2003, Federal Law Gazette I p. 2954

	<p><i>animal epidemics</i>' (Verordnung über anzeigepflichtige Tierseuchen)⁴ and in Annex 1 to the '<i>Ordinance on notifiable animal diseases</i>' (Verordnung über meldepflichtige Tierkrankheiten)⁵.</p> <p>Special needs for the collection and disposal of these wastes result from the known contamination or due to medical experiment from the expected contamination with pathogens of notifiable disease if a distribution of this disease is suspected.</p> <p>Transmission paths, such as blood, stool, saliva are also considered (DE-SA)</p>
HU	<p>The Hungarian '<i>Decree on treatment of waste which is generated in the health care institutions</i>' provides a list of materials to be assigned to LoW code 18 01 03* wastes whose collection and disposal is subject to special requirements in order to prevent infection'. 18 01 03* includes:</p> <ul style="list-style-type: none"> (a) used sharp, pointed devices, which can cause prick or cut injury or polluted by infectious micro organism (hypodermic syringes, hypodermic syringe with needle, disposable hypodermic needle, scrap from infusion and transfusion, cut, pricking, sharp devices, ampoules, object-slide, other devices) (b) blood and blood preparation; unrecognisable human part of the body and organ's remain, discharges from operations or other medical action; and matters and remains from medical laboratory and pathological analysis (c) - all wastes from infectious or isolated departments <ul style="list-style-type: none"> ◦ wastes can be polluted or polluted by especially hazardous and/or resistant micro organism, which are generated by treatment of infectious illnesses (determined by other law) – EPIDEMIC ASPECT ◦ bandage, immobilization, disposable clothes, sheet, tampon, catheter, plastic bag for urine, prosthesis, incontinence sanitary pad, nappy (except the nappies of the healthy baby's , or the old person's incontinence sanitary pad) ◦ and other similar waste from medical attendance (d) Microbiological filter of air cleaner's (e) carcass, part of the body, dung and litter of experimental animals which contain infectious pathogen (f) waste of genetic engineering and microbiological

⁴ 2004, Federal Law Gazette I p. 2764

⁵ 2001, Federal Law Gazette I p. 540, amended in 2001, Federal Law Gazette I p. 2785

	<p>(g) polluted materials and devices (bed-clothes, clothes, bandage, gloves, plastic bag for urine, infusion bottle and other devices) by citostaticum</p> <p>(h) primary packaging: box, container which is used for collecting infectious waste in the generation place. The inside surface of this box or container touch with infectious waste</p> <p>(i) secondary packaging: container, box, packing case, or other device which is used for collection or inside moving or transportation of the waste in primary packaging</p> <p>(j) reused vessel: empty, cleaned and disinfected usually secondary packaging</p>
IT	<p>Italy refers to the definitions of Directive 91/689/EEC, Annex III and the wording of the LoW waste codes 18 01 03* and 18 02 02*. As these definitions are not sufficient to identify infectious waste in practice Italy has adopted a decree that regulates the management of health care waste (Decree no. 254 of July 15, 2003). The decree defines</p> <ul style="list-style-type: none"> • wastes that are generally considered to be infectious • criteria for infectiousness of biological liquids; • conditions under which health care waste may pose a risk (consideration of infection path; pathology). <p>The following wastes are generally considered to be infectious:</p> <ul style="list-style-type: none"> • all sharp and pointed devices from human and animal health care (generally considered hazardous) • wastes contaminated with pathogens from research and bacteriological diagnostics (e.g. culture media, containers, other devices) • non-identifiable organs and body parts. <p>For waste from animal health the veterinary has broader scope of discretion than is the case for human health care waste.</p>
NL	<p>In the National Waste plan section Hospital Care Waste is defined which waste should be considered as 18 01 03* and 18 02 02*:</p> <ul style="list-style-type: none"> • 180103*: all sharps and needles, all body fluids including blood (dried or absorbed blood excluded), all waste potentially contaminated with microorganisms originated from raising processes in laboratories, all waste which has been in direct contact with patients treated for a infectious disease listed as Cat. A (a “cultures only” category excluded) in the international transport legislation, all other waste originated from patients treated for a infectious disease which according to expert judgement can imply a risk in the waste chain. • 180202* all sharps and needles, the following waste if not regulated in Regulation 1774/2002 (Animal by products): blood

	<p>or excretes (dried or absorbed blood or excretes excluded), all waste potentially contaminated with micro organism originated from cultures in laboratories, all waste which has been in direct contact with animals treated for a infectious disease listed as Cat. A (a “cultures only” category excluded) in the international transport legislation, all other waste originated from animals treated for a infectious disease which according to expert judgement can imply a risk in the waste chain.</p>
RO	<p>In addition to the definition acc. to Directive 91/689/EEC, infectious waste is defined as waste which contains or came in contact with blood or other biological fluids, as well as viruses, bacteria, parasites and/or microorganisms toxins, like: syringes, needles, needles with purl, catheters, with tubes, recipients which contained blood or other biological fluids, gloves, and other unique usage materials, compresses, and other contaminated materials, dialysis membranes, plastic bags for collecting urine, used laboratory materials etc. (Ministerial Order no. 219/2002 for the approval of the technical norms regarding the healthcare waste management and the data collecting)</p>
SI	<p>Waste is considered infectious:</p> <ul style="list-style-type: none"> • if it contains germs hazardous to people of health, or • if it contains infectious material of animal origin.
ES	<p>The definition in the Spanish legislation (Real Decreto 952/97) is identical to Directive Directive 91/689/EEC, Annex III and to H6.2. in Basel Annex 3: “<i>Substances or wastes containing viable microorganisms or their toxins which are known or suspected to cause disease in animals or humans</i>”</p> <p>Further definitions of specific categories of infectious or cytotoxic wastes are given in the legislation of some regions that have promulgated specific legislation regarding the management of infectious and cytotoxic waste (e.g. Autonomous Communities of Madrid, Valencia and Navarre).</p>
SE	<p>According to the knowledge of the Swedish EPA there is no common national definition: Other national authorities than Swedish EPA is guiding in interpreting its definition</p>
UK	<p>UK refers to the definition of Directive 91/689/EEC and to the ADR. Definition is set out in Appendix C of UKs’ Technical guidance Waste Management 2.0. Any waste that is classified as infectious under the ADR (e.g. UN3291) and/or requires either incineration / disinfection / sterilisation to destroy pathogens will be classified as infectious H9.</p>

Methods for determination

Question 24:

- *Which methods are used to determine whether a waste should be classified as hazardous on account of the criterion H9? Please describe the decision criteria and/or other approaches used, if necessary for the different categories of waste.*

Answers

Table 10: Methods and approaches used in Member States for the application of H9 (answers to question 24)

Country	Description of methods and decision criteria
AT	Please refer to question 23
DK (Dakofa)	Infectious waste is classified on the basis of origin. This approach is followed up by an official guideline.
FI	Mainly a risk based approach is applied (source separation of waste known or suspected to be contaminated with infectious substances or microbes).
FR (FNADE)	<p>Waste is classified on the basis of origin or the knowledge of the activity that produces the waste, not by test methods.</p> <p>A French Standard "X30 5norme NF X 30 503: 2004 Réduction des risques microbiologiques et mécaniques par les appareils de pretraitement par désinfection des déchets d'activités de soins à risques infectieux et assimilés" is describing how to check the infectious character of the wastes</p>
DE	<p>The assignment of the collected waste to the waste types in chapter 18 01 and 18 02 can be derived from the LAGA Guideline on the proper disposal of waste from health care institutions (published in 2002) or the Technical guidelines on the environmentally sound management of biomedical and healthcare wastes, published by the Secretary of the Basel convention in 2003. The LAGA-Guideline provides information on all wastes arising in the institutions of the health care sector and in veterinary institutions from cradle to grave.</p> <p>In doubts an expert should classify a waste as hazardous or non-hazardous</p>
HU	<p>In Hungary there is a provision to perform biological laboratory testing of waste proving its non-hazardousness, if it was generated in sectors generally producing infectious waste (e.g. human and animal health care sector). The testing methods are standardised and there are limit values for assessment</p> <p>Microbiological (infectivity) studies (type of test to be selected by the authorised laboratory):</p>

	<ul style="list-style-type: none"> ◦ Faecalis coli count ◦ Streptococcus faecalis ◦ Salmonella ◦ Oncosphere ◦ Other pathogenic bacteria where appropriate <p>Infectious waste containing Salmonella and/or viable parasites, or F. coliform and F. streptococcus bacteria (>200 culture/g) shall be classified as hazardous</p>
IT	Application of H9 is based on the classification rules laid down in Decree no. 254 of July 15, 2003 on the management of health care waste. Testing is considered as inappropriate and too costly
NL	See answer to question 23
SI	SI uses microbiological methods. Currently, an amendment to the Slovenian regulation on waste treatment is being prepared which will prescribe the use of methods, described in Amendment V to Directive 67/548/EEC in the version amended by the EC Directive 84/449/EEC (OJ L 251, 19 Sept.1984, p. 1) or by any of the later EC directives adapting the Directive 67/548/EEC to the technical progress.
ES	In general, for classification only the origin is considered (human or animal healthcare waste or research). Classification is always based on prior knowledge of origin and, sometimes, on potential infectious organisms or toxins. Analytical determinations (microbiological) in waste are non-existent or very rarely done. Only, for example, in liquid waste emerging from large waste treatment autoclaves as part of their process monitoring.
UK	<p>Assessment is based primarily on clinical assessment rather than laboratory methods.</p> <p>Guidance is given by:</p> <ul style="list-style-type: none"> • WM2, Appendix C (http://publications.environment-agency.gov.uk/pdf/GEHO1105BJVU-e-e.pdf) • Safe Management of Healthcare Waste Appendix E (http://www.dh.gov/en/Publicationsandstatistics/Publications/PublicationsPolicyANDGUIDANCE/DH_063274) <p>These guidance documents set out the segregation requirements necessary to meet the requirement of the ADR, Hazardous Waste Directive, and in a manner that divides waste that requires incineration from that which could be disinfected/sterilised and from that which could be landfilled.</p>

Experience with applied methods

Question 25:

- *What is your experience with the definition and the methods applied? What are the advantages and shortcomings? Please give an assessment, in particular with regard to the relevance of the results and the (analytical) burden on the health care sectors and on companies.*

Answers

Table 11: Experience of Member States with the applied methods (answers to question 25)

Country	Description of advantages and problems
AT	Testing is not seen as a feasible approach
DK (Dakofa)	Classification on the basis of the origin of waste is considered as a good way of classifying.
EE	<p>The waste code 18 01 03*⁶ is applied differently by different hospitals because there is no clear definition of the “special requirements in view of the prevention of infection”. The Ministry of Environment has the position that this should be clarified by the Ministry of Social Affairs. According to Estonia, the codes is also applied differently in Member States.</p> <p>If the definition of ‘infectious’ contains a clear aspect of probability [...] which are known or reliably believed to cause disease...] then clearly the principle of precaution has to be used in practical implementation of this definition. And the methods of application must be same in every Member States.</p>
FR (FNADE)	Problems could appear where chemical wastes are contaminated by “prions” or legionellosis.
DE	Classification of the H9 relevant waste material is within the responsibility of the medical person, often based on a microbiological verification in compliance with the hygiene regulations (see question 23)
IT	The definition of classification rules has clearly improved and facilitated classification and the management of infectious wastes in health care institutions. Problems exist with the application in non-health-care-facilities where the acceptance of the regulations is not so high (e.g. in beauty care institutions)
LV	Latvia sees no problem with the application of H9
NL	It is a transparent method, easy to apply and to use by enforcement

⁶ 18 01 03* Waste whose collection and disposal is subject to special requirements in view of the prevention of infection”

	<p>because it describes materials, processes and treatment of diseases. It is easy to see which waste should be regarded as infectious. The analytical burden on healthcare and enforcement therefore is relatively low.</p> <p>The shortcoming is of course that it is easy to understand that not all sharps, blood etc. imply a infectious risk. This means that a lot of effort was needed to get an agreement with all stakeholders on an acceptable explanation of the definition.</p>
ES	Analytical approaches are not practical due to the difficulty to determine the hundreds of potential pathogens.
SE	A possible disadvantage is the perceived ambiguity about the scope of H9: It is unclear whether the scope includes waste from building materials containing mold toxins, called mycotoxins. The toxins may be present in the waste although the producing organisms have died.
UK	<p>We believe that analysis serves very little practical value as waste is often produced from the moment the patient enters the healthcare system. The waste is often transported and disposed of before the laboratory results are available. Holding this waste in order to wait for the analytical results, whilst maintaining individual patient identity, is often not practical in today's hospital environment. Relying on laboratory tests is therefore scientifically unsound, and is further compromised by the vast range of potential pathogens that would need to be screened for to provide a negative. We do not support the use of analysis as a key part of the assessment, and feel that it would be a significant and unjustifiable burden on the healthcare sector.</p> <p>Although we have provided procedures for H9, these are not EU wide so additional clarity might be useful.</p>

Relevant waste types

Question 26

- *For which waste types the property H9 might be relevant according to your experience? Please name the LoW-codes.*

Answers

The following table summarises the waste sections and waste types for which the hazard criteria H9 could be relevant. The countries that mentioned the specific waste are shown in the last column. The waste types/sections named in the questionnaires are shaded in grey; the waste chapters and sections without shading were included only to facilitate the understanding of the table by providing information on the next higher classification level.

From the answers in the questionnaire it is not always clear whether the named wastes were actually classified as hazardous on account of H9, or whether the responding institution reports wastes that might in principle be relevant. The table includes all answers, as a proper distinction was not possible

Table 12: Waste types for which the hazard property H9 might be relevant

LoW code	LoW designation	Countries
02	Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing	
02 01	Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing	EE, ES
02 01 02	Animal-tissue waste	DE-SA
02 01 06	Animal faces, urine and manure, effluent, collected separately and treated off-site	DE-SA
02 02	Wastes from the preparation and processing of meat, fish and other foods of animal origin	EE, ES
02 02 02	Animal-tissue waste	DE-SA
02 02 03	Materials unsuitable for consumption or processing	DE-SA
17	Construction and demolition wastes (including excavated soil from contaminated sites)	
17 05	Soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 05*	Dredging spoil containing dangerous substances (UK: canal dredgings contaminated with cyanobacterial algal toxins'; unlikely but theoretically possible.)	UK
17 09	Other construction and demolition wastes	
17 09 03*	other construction and demolition wastes containing dangerous materials (UK: horsehair plaster from historical buildings containing viable anthrax spores. there have been a number of instances where this has occurred)	UK
17 xx	Waste from building materials containing mold toxins, called mycotoxins. The toxins may be present in the waste although the producing organisms have died	SE
18	Wastes from human or animal health care and/ or related research	
18 01	Waste from natal care, diagnosis, treatment or prevention of disease in humans	DE, SI, ES
18 01 01	Sharps (except 18 01 03)	DE-SA, RO
18 01 03*	Wastes whose collection and disposal is subject to special requirements in order to prevent infection	FI, DE-SA, LV, IT, NL, RO, UK, DK, AT
18 01 04	Wastes whose collection and disposal is not subject to special requirements in order to prevent infection (for example dressings, plaster casts, linen, disposable clothing, diapers)	DE-SA
18 02	Waste from research, diagnosis, treatment or prevention of disease involving animals	DE, SI, EE, ES
18 02 01	Sharps (except 18 02 02)	DE-SA
18 02 02*	Wastes whose collection and disposal is subject to special requirements in order to prevent infection	FI, LV, IT, NL, RO, UK, DK, AT
18 02 03	Wastes whose collection and disposal is not subject to special requirements in order to prevent infection	DE-SA
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	ES
19 07	landfill leachate	ES
20	Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions	
20 01	Separately collected fractions	

20 01 99	Other fractions not otherwise specified UK: Municipal clinical wastes that do not arise from healthcare and cannot, therefore, be classified in chapter 18 (Examples: substance abuse litter and sharps from body art and body piercing)	UK
	Sewage sludge	EE, ES

9. Detailed information on H12

9.1. Examples of substances which may cause a waste to exhibit hazard H12 according to Technical Guidance WM 2.1 Appendix C Table C12.2 [UK 2006]

Substance name	Risk phrases	Equation	Threshold Conc. % ¹
Phosphorus pentasulphide	R29	$P_2S_5 + 8H_2O \rightarrow 5H_2S + 2H_3PO_4$	0.1
3,5-dichloro-2,4-difluorobenzoyl fluoride (DCDFBF)	R29	$DCDFBF + H_2O \rightarrow HF + \text{Prod.}$	1.0
Metam-sodium	R31	$CH_3NHCSSNa + H^+ \rightarrow CH_3NH_2 + CS_2 + Na^+$	0.5
Barium sulphide	R31	$BaS + 2H^+ \rightarrow H_2S + Ba^{2+}$	0.8
Barium polysulphides	R31	$BaS_n + 2H^+ \rightarrow H_2S + Ba^{2+} + S_{n-1}$	0.8
Calcium sulphide	R31	$CaS + 2H^+ \rightarrow H_2S + Ca^{2+}$	0.3
Calcium polysulphides	R31	$CaS_n + 2H^+ \rightarrow H_2S + Ca^{2+} + S_{n-1}$	0.3
Potassium sulphide	R31	$K_2S + 2H^+ \rightarrow H_2S + 2K^+$	0.5
Ammonium polysulphides	R31	$(NH_4)_2S_n + 2H^+ \rightarrow H_2S + 2NH_4^+ + S_{n-1}$	0.3
Sodium sulphide	R31	$Na_2S + 2H^+ \rightarrow H_2S + 2Na^+$	0.4
Sodium polysulphides	R31	$Na_2S_n + 2H^+ \rightarrow H_2S + 2Na^+ + S_{n-1}$	0.4
Sodium dithionite	R31	$Na_2O_2S_2 + 2H^+ \rightarrow 2Na^+ + SO_2 + H_2SO_4$	0.9
Sodium hypochlorite, solution % Cl active ²	R31	$2NaOCl + 2H^+ \rightarrow Cl_2 + 2Na^+ + H_2O$	2.9
Calcium hypochlorite % Cl active ²	R31	$Ca(OCl)_2 + 2H^+ \rightarrow Cl_2 + Ca^{2+} + H_2O$	0.6
Dichloroisocyanuric acid	R31	$C_3HCl_2N_3O_3 + 2H^+ \rightarrow C_3H_3N_3O_3 + Cl_2$	0.9
Dichloroisocyanuric acid, sodium salt of	R31	$C_3Cl_2N_3O_3Na + 3H^+ \rightarrow C_3H_3N_3O_3 + Cl_2 + Na^+$	1.0
Sodium dichloroisocyanurate, dihydrate	R31	$C_3Cl_2N_3O_3Na + 3H^+ + 2H_2O \rightarrow C_3H_3N_3O_3 + Cl_2 + Na^+ + 2H_2O$	1.1
Trichloroisocyanuric acid	R31	$2C_3Cl_3N_3O_3 + 6H^+ \rightarrow 2C_3H_3N_3O_3 + 3Cl_2$	0.7
Hydrogen cyanide, salts of (with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide)	R32	$NaCN + H^+ \rightarrow HCN + Na^+$	0.2

9.2. Examples of toxic gases which may cause a waste to exhibit hazard H12 according to Technical Guidance WM 2.1 Appendix C Table C12.1 [UK 2006]

Substance	Chemical Formula	By Risk Phrase(s)		
		R29	R31	R32
Hydrogen sulphide	H ₂ S	✓	✓	✓
Hydrofluoric acid / hydrogen fluoride	HF	✓		✓
Carbon disulphide	CS ₂		✓	
Sulphur dioxide	SO ₂		✓	
Chlorine	Cl ₂		✓	
Nitrogen dioxide	NO ₂			✓
Ammonia	NH ₃		✓	
Hydrogen cyanide	HCN			✓

9.3. Summary of relevant test methods for the applied risk phrases according to Technical Guidance WM 2.1 Appendix C Table C12.3 [UK 2006]

Phase	Risk Phrase	Test
Liquid/solid	R29	1. Directive 92/62/EEC, Test Method A12 (a similar test is used for classification under the Transport of Dangerous Goods legislation; details and guidance on the tests can be obtained from the Health and Safety Executive)
	R31	1. Modification of Directive 92/62/EEC Test Method A12 Replace water with an acid which will not cause a displacement reaction to occur. 2. Method for measuring SO ₂ evolved when a waste is in contact with an acid, see text box below.
	R32	Modification of Directive 92/62/EEC Test Method A12. Replace water with an acid which will not cause a displacement reaction to occur.

9.4. Outline of method developed for measurement of SO₂ evolved when a waste is in contact with an acid according to Technical Guidance WM 2.1 Appendix C12 Annex 1 [UK 2006]

- A known weight of the sample, approximately 10g, is placed in the reaction vessel.
- 250mls of 3% hydrogen peroxide in 0.1 molar sodium hydroxide are placed in an absorbing flask.
- The apparatus was connected together and nitrogen passed through the system.

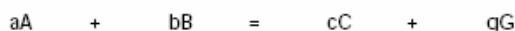
-
- 50mls of approximately 5 molar hydrochloric acid is introduced via a dropping funnel.
 - After one hour the contents of the absorbing flask is made up to 500mls.
 - A portion of this is then removed, acidified, placed in an ultrasonic bath to displace oxygen, made up to a known volume and analysed by ICP/OES against a sulphate standard.

The method gives a concentration of SO₂ evolved in mg/l. The result is calculated to obtain a volume of gas liberated by a litre of the waste. When looking at a reaction with acids, the toxic gas evolved could be quite small. This method has been devised specifically to determine; firstly, whether the waste releases toxic or very toxic gas (H12) and secondly, the actual concentration of sulphur dioxide evolved.

For liquid wastes the reaction is going to be rapid. Where sufficient gas is obtained in one hour to make it hazardous, the initial rate of gas production would be expected to be very high.

9.5. Calculation method for H12 according to Technical Guidance WM 2.1 Appendix C12 [UK 2006]

1. Write a balanced equation for the reaction that produces the gas. The general form of this equation should be as follows:



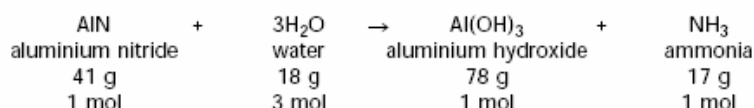
where: A, B, and C are the products and reactants with G being a toxic gas; and

a, b, c and g are the stoichiometric ratios between the products and reactants.

2. Attribute molecular weights and stoichiometric ratios to the substances in the equation.
3. Divide (a x molar weight of A) by (g x 22.4 (the volume of 1 mol of gas at standard temperature and pressure (STP 25°C and 1 atmosphere pressure)). This gives the mass of reactant A that will evolve 1 litre of gas G.
4. The limiting concentration for the substance in the waste with the potential to show hazard H12 is this amount (in grams) divided by 1,000 (to convert to kg) and multiplied by 100 (to give % by weight).

Example Calculation – The main constituents which may make aluminium drosses and slags hazardous are aluminium, aluminium nitride, aluminium carbide. Aluminium nitride is an R29 substance which may make the waste hazardous by H12. The aluminium nitride content may be 0-1% (slag) or 0-10% (dross). Applying this calculation method to the aluminium drosses and slags gives the following threshold limit for H12 (Note: other constituents may make the aluminium drosses and slags hazardous by H3A(v), See Appendix C3).

Aluminium nitride (R29) giving rise to hazard H12



Limiting concentration of aluminium nitride in waste

$$= [(1 \times 41) / (1 \times 22.4) / 1,000] \times 100 = 0.18\% \approx 0.2\%$$

9.6. Overview of answers to the questionnaire survey regarding H12

The following sections show the answers of the questionnaire survey with regard to the application of H12 by countries. For some countries there are answers available from stakeholders but no official statements from the countries. The answers of the stakeholders are marked accordingly.

Application of H12 in Member States

Question 27

- Is the criterion H12 applied in your country?

Answers

Table 13: Answers to question 27 concerning the application of H12

Criterion is applied in:	FI, UK, SI, HU, DE, AT, FR ¹ , DK ² , ES
--------------------------	--

No information available whether H12 is applied in:	EE, LT, RO, SE
H12 is not applied in:	IT

1) FR: Information from Arcelormittal and FNADE

2) DK: Information from DAKOFA

Methods for determination and concentration limits applied

Question 28

- Which methods are used to determine whether a waste should be classified as hazardous on account of the criterion H12?
 - Please describe the test methods and/or other approaches used.
 - If analytical methods are applied:
 - which parameters are analysed?
 - which concentration levels are applied

Question 29

- What is your experience with the applied methods? What are the advantages and shortcomings? Please give an assessment, in particular with regard to the relevance of the results and the (analytical) burden on companies.

Answers

The answers are summarised in Table 18.

Table 14: Methods and limit values limits for H12 (answers to questions 28 and 29)

Country	Description of methods, parameters and limit values
AT	<p>H12 applies for waste with a yield of purgeable sulphides and cyanides exceeding the following limits at pH4:</p> <p>S²⁻: 10,000mg/kg TM</p> <p>CN⁻: 1,000mg/kg TM</p> <p><i>Annex 3 of the Austrian Ordinance on Waste Classification 2003/570 (Anlage 3 der österreichischen Abfallverzeichnisverordnung 2003/570)</i></p>
DE	<p>Determination via R-phrases R29, R31 and R32</p> <p>Based on the "Guidelines on the Application of the Waste Catalogue Ordinance" the following constituents necessitate the assessment regarding a potential release of gas:</p> <ul style="list-style-type: none"> • aluminium nitride, aluminium phosphide, phosphorus(V) sulphide (R29), • sodium hypochlorite, chlorinated lime, alkali and alkaline earth sulphides and polysulphides, sodium dithionite (R31),

	<ul style="list-style-type: none"> salts of hydrocyanic acid, sodium azide (R32). <p>By analogy with the procedure for labelling with R15 (hazardous property H3-A, Annex V to the Dangerous Substances Directive, Method A-12), in the case of the above-mentioned R phrases a minimum quantity of 1 l/kg.h of toxic or very toxic gas released may be used to classify the waste as hazardous.</p>
DK (Dakofa)	Determination via R-phrases R29, R31, R32 or R15/R29. No methods or limit values defined.
FI	<p>H12 applies for waste that contains substances classified with the risk phrases R29, R31 or R32.</p> <p>In addition, instructions published by UK (WM2 Hazardous Waste, Appendix C) and by other countries are used to determine if a waste exhibits hazard characteristic H12. (The <i>other countries</i> are not specified in the questionnaire)</p>
HU	Determination via R-phrases in combination with concentration limits defined in the Hungarian Act XXV of 2000 on Chemical Safety.
LV	Determination via R-phrases R 29, R 31 or R 32. No test methods used.
UK	<p>Reference to chapter 12 of WM2 Hazardous Waste, Appendix C:</p> <ul style="list-style-type: none"> H12 applies for waste that contains substances classified with the risk phrases R29, R31, R32 or R15/29. UK proposes to apply test method A12 test according to Annex V of Directive 67/548/EEC for R29 and modified versions of A12 for R31 and R32 in combination with the limit value of 1m³ toxic gas in one hour. <p>As alternative a calculation method is proposed. Examples of substances which may cause a waste to exhibit hazard H12 and the calculated threshold concentrations are given in WM2.</p>
SI	<p>Determination by means of gas development methods (e.g. DIN 38 414 Teil 8), or by ECB (European Chemicals Bureau) testing methods (Annex V, Part A).</p> <p>Classification on the basis of the volume and composition of the gas.</p> <p>Assessment based on maximum exposure limits (MEL) and risk-analysis is carried out for each case individually.</p> <p>Waste is classified with H12 if the following limit values are exceeded.</p> <ul style="list-style-type: none"> Sulphide: 10,000 mg/kg Cyanide: 1,000 mg/kg
ES	<p>The national Ministerial Order 13/10/89 sets out that waste is hazardous if it presents the following "reactivity" characteristics: "It contains substances such as cyanides, sulphides or others that can, at pH between 2 and 12.5, generate toxic gases" (definition taken from USEPA, 40 CFR 261.24)</p> <p>Test methods include a combination of Method A 12 of Annex V of Directive 67/548/EWC (intended in principle for flammable gases) with other methods to</p>

	<p>determine hydrogen sulphide, hydrogen cyanide or other hazardous gases potentially released. “Other methods” include those described in USEPA SW846 (rev 3, 1996), Chapter 7.3, for distillation of reactive sulphide and cyanide, and in USEPA SW846 9014 and 9034 for quantitation of sulphide and cyanide in the absorbent solutions. (Note: Methods are still used in Spain although USEPA has withdrawn interim guidance).</p> <p>Spanish legislation does not provide concentration levels. USEPA criterion for reactive sulphide (500 mg/kg) and cyanide (250 mg/kg) are often used unofficially. In recent years a wide interpretation of the 1 L/kg/h threshold for flammable gases (Method A12 Directive 67/548/EC) has been applied to toxic gases evolved. In order to apply this criterion the mass determined is transformed to volume of the gas at standard temperature and pressure. This is also unofficial.</p> <p>None of the options described above is risk-based and, thereby quite useless. If no risk-based threshold, and associated “reactivity” methodology is agreed at the EU level it would be best to eliminate this criterion.</p>
--	--

Relevant waste types

Question 30:

- *For which waste types the property H12 might be relevant according to your experience? Please name the LoW-codes.*

Answers

Table 19 summarises the waste sections and waste types for which the hazard criteria H12 could be relevant. The countries that mentioned the specific waste are shown in the last column. The waste types/sections named in the questionnaires are shaded in grey; the waste chapters and sections without shading were included only to facilitate the understanding of the table by providing information on the next higher classification level.

From the answers in the questionnaire it is not always clear whether the named wastes were actually classified as hazardous on account of H12, or whether the responding institution reports wastes that might in principle be relevant. The table includes all answers, as a proper distinction was not possible.

Table 15: Waste types for which the hazard property H12 might be relevant (answers to question 30)

LoW code	LoW designation	Countries
01	wastes resulting from exploration, mining, quarrying, physical and chemical treatment of minerals	
01 03	wastes from physical and chemical processing of metalliferous minerals	
01 03 04*	acid-generating tailings from processing of sulphide ore	SI,
05	wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal	
05 01	wastes from petroleum refining	
05 01 03*	tank bottom sludges	AT
05 01 16	sulphur-containing wastes from petroleum desulphurisation	AT
05 07	wastes from natural gas purification and transportation	
05 07 02	wastes containing sulphur	AT
06	wastes from inorganic chemical processes	
06 01	wastes from the manufacture, formulation, supply and use (MFSU) of acids	
06 01 03*	hydrofluoric acid	SI
06 03	wastes from the MFSU of salts and their solutions and metallic oxides	DE
06 03 11*	solid salts and solutions containing cyanides	SI, LV, AT
06 06	wastes from the MFSU of sulphur chemicals, sulphur chemical processes and desulphurisation processes	DE
06 06 02*	wastes containing dangerous sulphides	SI, LV, AT
06 07 02*	activated carbon from chlorine production	LV
06 10	wastes from the MFSU of nitrogen chemicals, nitrogen chemical processes and fertiliser manufacture	DE
08	wastes from the manufacture, formulation, supply, and use (MFSU) of coatings (paints, varnishes, and vitreous enamels), adhesives, sealants and printing inks	
08 05	wastes not otherwise specified in 08	
08 05 01*	waste isocyanates	SI
10	wastes from thermal processes	
10 02	wastes from the iron and steel industry	
10 02 07*	solid wastes from gas treatment containing dangerous substances	ES
10 03	wastes from aluminium thermal metallurgy	DE
10 03 08*	Salt slags from secondary production	ES
10 03 15*	skimmings that are flammable or emit, upon contact with water, flammable gases in dangerous quantities	LV, DE-SA, ES
10 03 19*	flue-gas dust containing dangerous substances	FNADE (FR), ES
10 05	wastes from zinc thermal metallurgy	
10 05 10*	dross and skimmings that are flammable or emit, upon contact with water, flammable gases in dangerous quantities	DE-SA
10 08	wastes from other non-ferrous thermal metallurgy	DE
10 08 10*	dross and skimmings that are flammable or emit, upon contact with water, flammable gases in dangerous quantities	DE-SA
11	wastes from chemical surface treatment and coating of metals and other materials; non-ferrous hydrometallurgy	
11 01	wastes from chemical surface treatment and coating of metals and other materials	
11 01 09*	sludges and filter cakes containing dangerous substances	AT

11 03	sludges and solids from tempering processes	
11 03 01*	wastes containing cyanide	SI, LV, AT
11 03 02*	other wastes	LV
12	wastes from shaping and physical and mechanical surface treatment of metals and plastics	
12 01	wastes from shaping and physical and mechanical surface treatment of metals and plastics	
12 01 18*	metal sludge (grinding, honing and lapping sludge) containing oil	ES
19	wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	
19 02	wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)	
19 02 04	premixed wastes composed of at least one hazardous waste	SI
	lithium batteries	DAKOFA (DK), SE
	sediments, slags from thermal power plants, sludges from waste water treatment plants	ES

AT also provided national codes for which H12 might be relevant. The respective codes are shown in the following table.

Table 16: Austrian Waste Codes for which the hazard property H12 might be relevant

Austrian Code	Description
14401	sludge from liming
31221*	other slag from steel processing
39904	gas cleaning reaction mass
39907	residues containing elementary sulphur
39909*	other solid mineral wastes containing dangerous substances
51101*	cyanide containing electroplating sludge
51502*	skinning salts
51505*	liming chemicals (leather chemicals)
51528*	alkali and alkaline earth metals sulphides
51529*	heavy metal sulphides
51533*	cyanides
52722*	rinsing water, containing metal salts
52725*	aqueous concentrates
54715*	sludge from tank cleaning
54716*	iron sulphides
94801*	other water treatment sludges with hazardous constituents

10. Detailed information on H13

10.1. Limit values for different parameters for classification of H13 from different sources – Total content

Components	Country		
	Austria	Slovenia	DE [DE 2005]
Mercury	20 mg/kg DM	20 mg/kg DM ⁴	
Arsenic	5,000 mg/kg DM ¹	5,000 mg/kg DM ^{5,6}	
Cadmium	5,000 mg/kg DM ¹	5,000 mg/kg DM ^{5,6}	
Lead		10,000 mg/kg DM ^{5,6}	
PAH	300 mg/kg DM ²	100 mg/kg DM	
PCB (7 congeners)	30 mg/kg DM	100 mg/kg DM	
PCDD/PCDF	10,000 ng TE/kg DM	10,000 ng TE/kg DM ⁷	
POX	1,000 mg/kg DM	1,000 mg/kg DM	
HC (hydrocarbon index)	20,000 mg/kg DM ³		
Hydrocarbons		20,000 mg/kg DM ⁸	8,000 mg/kg
BTEX	500 mg/kg DM	500 mg/kg DM	
Phenols (free)	10,000 mg/kg DM	10,000 mg/kg DM	

1) The limit value does not apply to alloys

2) For tar containing B&D wastes a limit value of 50 mg/kg DM benzo[a]pyrene applies and a total content of PAH of 1,000 mg/kg DM.

3) Not applicable to bitumen/bituminous wastes

4) For solidified waste with difficulties to dissolve sulphide contents the limit values is 3000 mg/ kg DM

5) Does not apply to vitrified waste.

6) Does not apply to persistent alloys.

7) TE according to the Directive on emission to the air from incineration plants and for co-incineration.

8) Does not apply to asphalt and bitumen.

10.2. Limit values for different parameters for classification of H13 from different sources – Eluate

	Acceptance Criteria according to Landfill Directive (2003/33/EC)				AT		SI	DE [DE 2005]	DE 2007C
Source	Section 2.3.1		Section 2.4.1						
Description of applied method	Percolation test	L/S = 10 l/kg	Percolation test	L/S = 10 l/kg	L:S = 10:1	Concentration in liquids	Concentration in liquids		
Unit	mg/l	mg/ kg DM	mg/l	mg/ kg DM	mg/ kg DM	mg/l	mg/l	mg/l	mg/l
pH					6 ¹ – 13	2 - 11.5	6-13 ⁴		5.5-13.0
Sb	0.15	0.7	1	5	5	0.5	5	0.07	
As	0.3	2	3	25	25	2.5	5	0.02	0.5
Ba	20	100	60	300	300	30	50	10	
Be					5	0.5	0.5		
B					1000	100	100		
Pb	3	10	15	50	50	5	10	1	1
Cd	0.3	1	1.7	5	5	0.5	0.5	0.1	0.1
Cr (total)	2.5	10	15	70	70	7	50	1	
Cr (VI)					20	2	2		0.1
Co					100	10	10		
Cu	30	50	60	100	100	10		5	5
Mo	3.5	10	10	30	30	3		1	
Ni	3	10	12	40	40	4	50	1	1
Hg	0.03	0.2	0.3	2	0.5	0.05	0.05	0.02	0.02
Se	0.2	0.5	3	7	7	0.07		0.05	

Source	Acceptance Criteria according to Landfill Directive (2003/33/EC)				AT		SI	DE [DE 2005]	DE 2007C
	Section 2.3.1		Section 2.4.1						
Description of applied method	Percolation test	L/S = 10 l/kg	Percolation test	L/S = 10 l/kg	L:S = 10:1	Concentration in liquids	Concentration in liquids		
Unit	mg/l	mg/ kg DM	mg/l	mg/ kg DM	mg/ kg DM	mg/l	mg/l	mg/l	mg/l
Ag					50	5	5		
Tl					20	2	2		
V					200	20	20		
Zn	15	50	60	200	100	20	100	5	5
Sn					1000	100	100		
CN total					200	20	20		
CN free					20	2	2		0.5
S ²⁻					200	20	20		
Sulphate	7000	20000	17000	50000					
Cl ⁻	8500	15000	15000	25000					
F ⁻	40	150	120	500	500	50	50	15	25
NH ₄ ⁻					10000	1	1		200
NO ₂ ⁻					1000	100	30		
HC Index					1000 ²	100	100 ^{5,6}		
PAH					1.5	0.15	0.05 ⁶		
AOX					100	10	10		1.5
Phenols (index)					1	100	100		50
Drying residue							10000 ³		
DOC	250	800	320	1000					

	Acceptance Criteria according to Landfill Directive (2003/33/EC)				AT		SI	DE [DE 2005]	DE 2007C
Source	Section 2.3.1		Section 2.4.1						
Description of applied method	Percolation test	L/S = 10 l/kg	Percolation test	L/S = 10 l/kg	L:S = 10:1	Concentration in liquids	Concentration in liquids		
Unit	mg/l	mg/ kg DM	mg/l	mg/ kg DM	mg/ kg DM	mg/l	mg/l	mg/l	mg/l
TDS		60000		100000					
Sum of Selenium and Tellurium							5		

1) for natural soil 3.5

2) to soil a limit value of 50mg/ kg DM applies

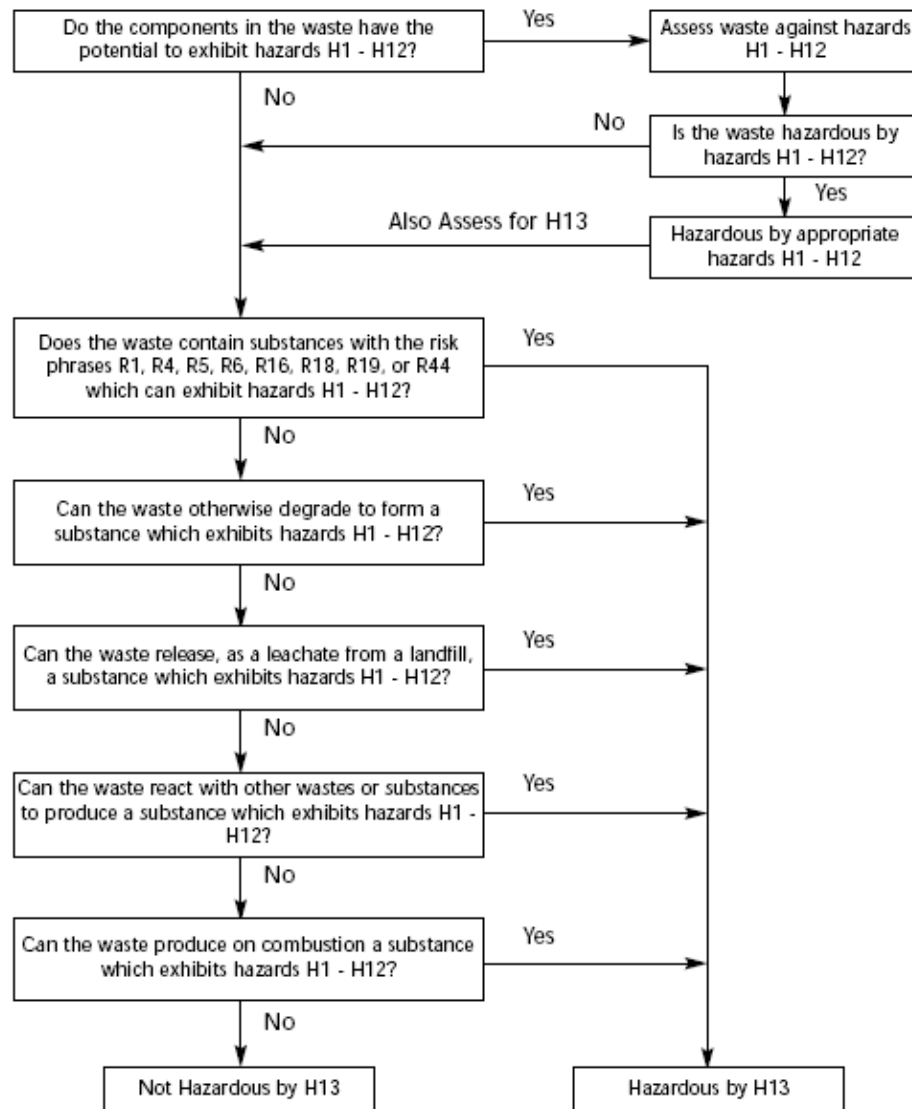
3) The value for liquid waste is 30000mg/l

4) The value for liquid waste is 2 –11.5

5) For ground polluted with oil and wastes from the production of petroleum the leachate value is 5 mg/l

6) Centrifugated leachate

10.3. Decision Tree for the assessment process for hazards H13 according to Technical Guidance WM 2.1 Appendix C Figure C13.1 [UK 2006]



10.4. Overview of answers to the questionnaire survey regarding H13

The following sections consider the responses concerning H13 from all questionnaires

Application of H13 in Member States

Question 31:

- *Is the criterion H13 applied in your country?*

Table 17: Answers to question 31 concerning the application of H13

Criterion is applied in:	AT, DE, DK ²⁾ , FI, HU, SI, UK, LV, ES
No information available whether H12 is applied in:	EE
H12 is not applied in:	NL, SE, IT, FR ¹⁾

1) FR: Information from Arcelor and FNADE

2) DK: Information from DAKOFA

Methods for determination and concentration limits applied

Question 32

- Which methods are used to determine whether a waste should be classified as hazardous on account of the criterion H13?
 - Please describe the calculation, the test methods and/or other approaches used.
 - If analytical methods are applied:
 - which parameters are analysed?
 - which concentration levels are applied

Question 33

- What is your experience with the applied methods? What are the advantages and shortcomings? Please give an assessment, in particular with regard to the relevance of the results and the (analytical) burden on companies.

Answers

Table 18: Methods and limit values limits for H13 (Answers to question 32)

Country	Description of methods, parameters and limit values
AT	<p>Methods and thresholds according Annex 3 of the Austrian Ordinance on Waste classification 2003/ 570 (Anlage 3 der österreichischen Abfallverzeichnisverordnung 2003/570).</p> <p>There are defined:</p> <ul style="list-style-type: none"> • Threshold values for total content of inorganic substances by using the aqua regia dissolution (Hg, As, Cd) • Threshold values for total content of organic substances, such as PAH, PCB, PCDD, POX, BTEX, phenols) • Threshold values for eluates

	<ul style="list-style-type: none"> Values for total contents for organic and inorganic substances in liquids
DE	<p>In Germany there is no comprehensive specification for H13 but an approach assessing the potential leachability of waste compounds by the use of eluate analysis is established (see 'Guidelines on the Application of the Waste Catalogue Ordinance').</p> <p>For the leaching process a bundle of methodology is available depending on properties of waste. The best established methods are batch leaching procedures with different ratios of solid/water phase. (The questionnaire DE-SA simply refers to DIN EN 12457-4)</p> <p>Recently a new method was set up and is currently evaluated by a ring test (short-time column percolation elution method for especially mineral waste material).</p> <p>Parameters and limit concentrations for eluates are defined in Annex III of the "Guidelines on the Application of the Waste Catalogue Ordinance" are applied. (Regarding the limit values Germany is in compliance with <i>the leaching limit values for waste that is acceptable at landfills for non-hazardous waste acc. to section 2.3.1 of Directive 2003/33/EC</i>).</p> <p>Additional limit value: total content of hydrocarbons > 8000mg/kg.</p>
DK	<p>According to DAKOFA, Denmark has not established specific methods or concentration levels. Waste producers are advised to determine whether the waste includes substances classified with R-phrases R1, R4, R5, R6, R16, R18, R19 or R44.</p>
FI	<p>The evaluation is made by using tests and criteria established for the acceptance of waste to landfills.</p>
HU	<p>HU applies the methods and concentration limits according to the Landfill Directive. In case of components for which no limit values exist in the Landfill Directive the Waste Classification Board of Hungary should decide on the classification.</p>
SI	<p>SI refers to the test methods, criteria and limit values as laid down in Directive 1999/31/EC and related Decisions. Leachate test are carried out according to the standard EN 12457.</p> <p>Limit values are set for the total content, for leaching values and for liquid wastes for heavy metals and organic parameters. The limit values are given in the Annex.</p> <p>According to Slovenia, the applied methods are too difficult and expensive due to a large number of measured parameters.</p>
UK	<p>UK refers to the definitions, methods and concentration limits described in Chapter C13 of "WM2 – Appendix C".</p> <p>UK does not limit the application of H13 to the leachability of waste but has a broad understanding of H13: "The hazard applies if the waste forms other</p>

	<p>substances e.g. through degradation, through reaction with other wastes or substances, through incineration or other forms of treatment. H13 does not cover reactions which yield materials which are ecotoxic (hazard H14).“</p> <p>Hazard H13 may arise from substances classified with R-phrases R1, R4, R5, R6, R16, R18, R19 or R44.</p> <p>The test methods and limiting concentrations for hazards H1–H12 are set out in Appendices C1–C12.</p> <p>For certain substances and preparations the limiting concentrations for hazard H13, may be calculated from the expected reaction and the likely concentration or production rate of new substance that will be produced. This can then be assessed against the available limits for hazards H1 to H12.</p> <p>In the case of waste combustion, the likely products may be evaluated and concentrations estimated. The combustion product of the waste can be assessed for hazards H1 to H12.</p>
ES	<p>ES applies leaching tests according to national Order 13/10/89 pto.7 Appendix 3 using two indicators according to Appendix IV: luminescence and inhibition (Daphnia test).</p> <p>In addition, the methods and parameters laid down in Decision 2003/33/EC are applied.</p>

Relevant waste types

Question 34

- *For which waste types the property H13 might be relevant according to your experience? Please name the LoW-codes.*

Answers

DE, SI and ES provided information on relevant waste types. The codes and descriptions are shown in Table 19. The table shows the waste sections and waste types named in the questionnaires shaded in grey; the waste chapters without shading were included only to facilitate the understanding of the table by providing information on the higher classification level.

Table 19: Waste types for which the hazard property H13 might be relevant (Answers to question 34)

LoW code	LoW designation	Countries
01	wastes resulting from exploration, mining, quarrying, physical and chemical treatment of minerals	
01 03	wastes from physical and chemical processing of metalliferous minerals	DE
01 04	wastes from physical and chemical processing of non-	DE

	metalliferous minerals	
01 05	drilling muds and other drilling wastes	DE
06	wastes from inorganic chemical processes	
06 03	wastes from the MFSU of salts and their solutions and metallic oxides	DE
06 06	wastes from the MFSU of sulphur chemicals, sulphur chemical processes and desulphurisation processes	DE
10	wastes from thermal processes	
10 01	wastes (from thermal processes) from power stations and other combustion plants (except 19)	DE
10 02	wastes from the iron and steel industry	DE
10 08	wastes from other non-ferrous thermal metallurgy	DE
10 09	wastes from casting of ferrous pieces	DE
10 10	wastes from casting of non-ferrous pieces	DE
10 11	wastes from manufacture of glass and glass products	DE
10 12	wastes from manufacture of ceramic goods, bricks, tiles and construction products	DE
11	wastes from chemical surface treatment and coating of metals and other materials; non-ferrous hydrometallurgy	
11 01	wastes from chemical surface treatment and coating of metals and other materials (for example galvanic processes, zinc coating processes, pickling processes, etching, phosphating, alkaline degreasing, anodising)	DE
11 02	wastes from non-ferrous hydrometallurgical processes	DE
17	Construction and demolition wastes (including excavated soil from contaminated sites)	
17 01	concrete, bricks, tiles and ceramics	DE
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	DE, SI
17 08	gypsum-based construction material	DE
17 09	other construction and demolition wastes	DE
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	
19 01	wastes from incineration or pyrolysis of waste	DE
19 02	Wastes from physico/ chemical treatment of waste (including dechromatation, decyanidation, neutralisation)	
19 02 05*	Sludges from physico/ chemical treatment containing dangerous substances	ES
	Any Type of sludge and other granular wastes	ES, SI
	All mineral waste	SI

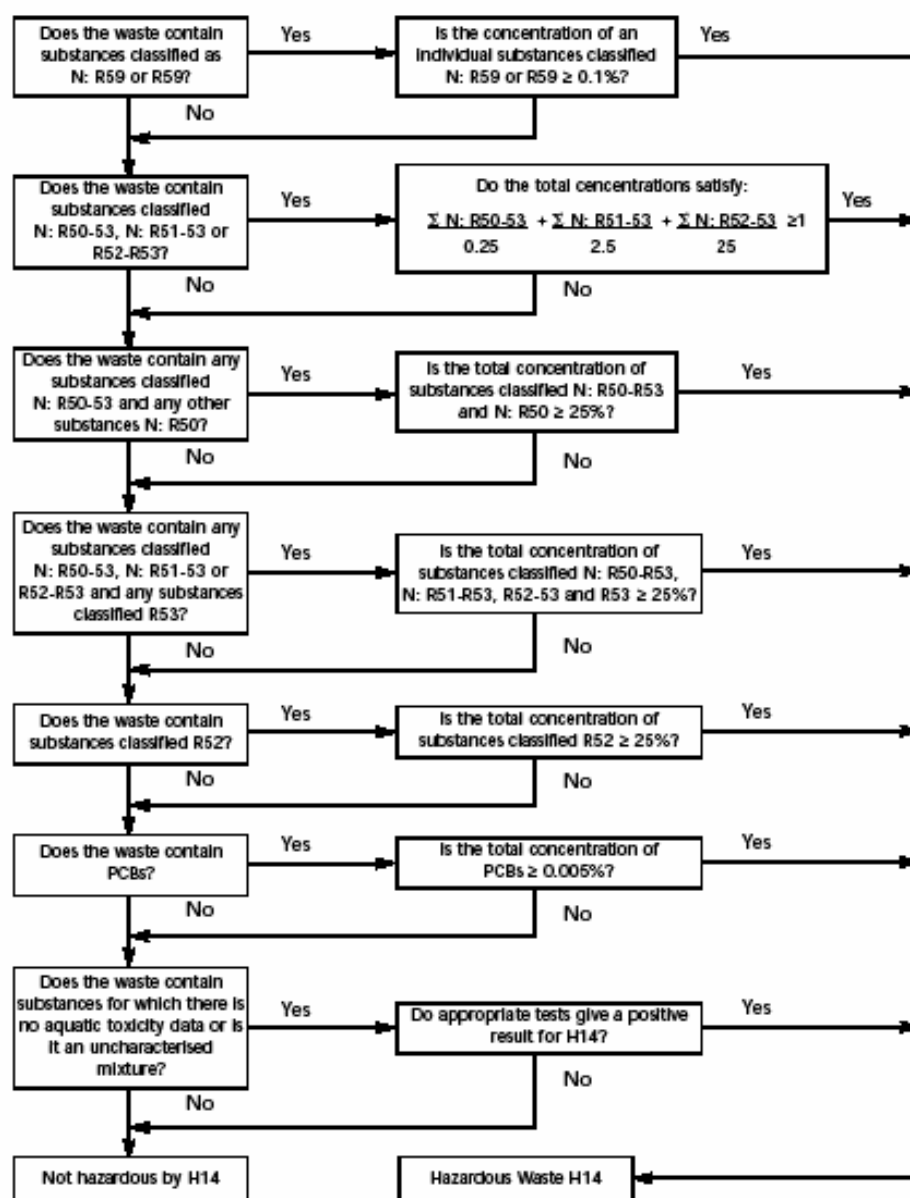
11. Detailed Information on H14

11.1. Assessment of H14 – limiting concentrations and calculation methods for the aquatic environment according to Technical Guidance WM 2.1 Appendix C [UK 2006]

There are six possible classification combinations:

N, R50: Very toxic to aquatic organisms	
Acute toxicity	96 hr LC ₅₀ (for fish): ≤ 1 mg/l; or 48 hr EC ₅₀ (for daphnia): ≤ 1 mg/l; or 72 hr IC ₅₀ (for algae): ≤ 1 mg/l
N, R50-53: Very toxic to aquatic organisms and may cause long-term effects in the aquatic environment	
Acute toxicity:	96 hr LC ₅₀ (for fish): ≤ 1 mg/l; or 48 hr EC ₅₀ (for daphnia): ≤ 1 mg/l; or 72 hr IC ₅₀ (for algae): ≤ 1 mg/l
	and the substance is not readily degradable or the log Pow (log octanol/water partition coefficient) ≥ 3.0 (unless the experimentally determined bioconcentration factor (BCF) ≤ 100).
N, R51-53: Toxic to aquatic organisms and may cause long-term effects in the aquatic environment	
Acute toxicity:	96 hr LC ₅₀ (for fish): 1 mg/l < LC ₅₀ ≤ 10 mg/l; or 48 hr EC ₅₀ (for daphnia): 1 mg/l < EC ₅₀ ≤ 10 mg/l; or 72 hr IC ₅₀ (for algae): 1 mg/l < IC ₅₀ ≤ 10 mg/l
	and the substance is not readily degradable or the log Pow ≥ 3.0 (unless the experimentally determined BCF ≤ 100).
R52-53 Harmful to aquatic organisms and may cause long-term effects in the aquatic environment	
Acute toxicity:	96 hr LC ₅₀ (for fish): 10 mg/l < LC ₅₀ ≤ 100 mg/l; or 48 hr EC ₅₀ (for daphnia): 10 mg/l < EC ₅₀ ≤ 100 mg/l; or 72 hr IC ₅₀ (for algae): 10 mg/l < IC ₅₀ ≤ 100 mg/l
	and the substance is not readily degradable.
R52 Harmful to aquatic organisms	
Substances not falling under the criteria listed above, but which on the basis of the available evidence concerning their toxicity may nevertheless present a danger to the structure and/or functioning of aquatic ecosystems.	
R53 May cause long-term effects in the aquatic environment	
Substances not falling under the criteria listed above, but which on the basis of the available evidence concerning their persistence, potential to accumulate, and predicted or observed environmental fate and behaviour may nevertheless present a long-term and/or delayed danger to the structure and/or functioning of aquatic ecosystems. For example, poorly water soluble substances, i.e. substances with a solubility of less than 1 mg/l, will be covered by these criteria if: the substance is not readily degradable; or the log Pow ≥ 3.0 (unless the experimentally determined BCF ≤ 100).	

**11.2. Decision Tree for the assessment process for hazards H14 according to Technical Guidance WM 2.1
Appendix C Figure C14.1 [UK 2006]**



11.3. Ecotoxical Approach according to methodological guide waste classification Appendix 3 [FNADE 2003]

Pillars of the Ecotoxical Approach [FNADE 2003]:

Basel agreement proposes to determine inherent danger of waste in connection with its ecotoxic character.

Evaluation strategy stands on :

- approach based on waste presence in the list of hazardous and non-hazardous waste of the agreement (see chapter 15, page 8). If waste is in no list, then stage 2 is applied.
- approach on the chemical substances content in waste (see chapter 2.2 stage 4, page 14).

Evaluation of the ecotoxic character is made by comparison with substances present in waste and ecotoxic characteristics, registered and available in OCDE recommendations of 1998, and for preparations (that is to say mixture of two or more components) , reference to classification system of chemical preparations for water toxicity may be done.

Uncompleted future approach ecotoxicologic tests.


Method in water:

Daphnia magna 48h (ISO 6341)
Daphnia magna 21 days (ISO 10706)
Alga 72 h (ISO 8692)
Methods on ground soil :
Higher plants emergence and growth 14 days (ISO 11269 1 & 2)
Earthworms 14 days (ISO 12 268-3)
Collembola (ISO 11267)

Methods on ground soil:

Higher plants emergence and growth 14 days (ISO 11269 1 & 2)
Earthworms 14 days (ISO 12 268-3)
Collembola (ISO 11267)

11.4. Exotoxicity tests on Waste according to methodological guide waste classification Stage 4 [FNADE 2003]

Stage 4	Ecotoxicity test with eluate obtained with X 30402-2 standard
<p>If all controls are negatives</p>  <p>Non-Hazardous waste</p>	<p>Reference value for acute toxicity tests : EC 50 < 10%</p> <p>TEST n°1: Microtox test ISO 11348-3 Eluate concentration determination which after 5, 15, and 30 minutes inhibits bacteria luminescence of 50% If EC 50 > 10% (negative response to the test) => applied TEST n°2 If EC 50 < 10% (positive response to the test) = HAZARDOUS WASTE</p> <p>TEST n°2: NF EN ISO 6341 immobilization test on Daphnia magna Concentration determination which in 24 h or 48 h immobilized 50% of Daphnias If EC 50 > 10% (negative test) => applied TEST n°3 If EC 50 < 10% (positive test) = HAZARDOUS WASTE</p> <p>.....</p> <p>Reference value for chronic toxicity tests : EC 20 < 1%</p> <p>TEST n°3: NF T90-375 inhibition test on growth algae Concentration determination which after 7 days inhibits algae growth of 20% If EC 20 > 1% (negative test) => applied TEST n°4 If EC 20 < 1% (positive test) = HAZARDOUS WASTE</p> <p>TEST n°4: NFT90-376 Cerio Daphnia dubia inhibition growth test Concentration determination which after 7 days inhibits 20% of population growth If EC 20 > 1% (negative test) => NO HAZARDOUS WASTE If EC 20 < 1% (positive test) = HAZARDOUS WASTE</p> <p>Or TEST n°4 bis: NFT90-377 Brachionus calyciflorus inhibition growth test Concentration determination which after 48 h inhibits population growth of 20% If EC 20 > 1% (negative test) => NON- HAZARDOUS WASTE If EC 20 < 1% (positive test) = HAZARDOUS WASTE</p>
STAGE 5	Test on raw waste
(Optionnal)	<p>TEST n°5: ISO 11269-2 effects of the pollutants on the emergence of higher plants Waste quantity determination in substratum which after 14 to 21 days inhibits seeds growth of 20%</p> <p>TEST n°6: X 31-251 effects of the pollutants on earthworms Waste quantity determination in substratum which is lethal for 50% of the population in 14 days</p>

11.5. Overview of answers to the questionnaire survey regarding H14

The following sections consider the responses concerning H14 from all questionnaires.

Application of H14 in Member States

Question 35:

- Is the criterion H14 applied in your country?

Answers

Table 20: Answers to question 35 concerning the application of H14

Criterion is applied in:	EE, SE, FI, UK, SI, LV, BG, HU, DE, NL, DK ¹ , AT, FR ² , ES
Criterion is not applied in:	IT
It is not known whether the criterion is applied in:	LT, RO

1) DK: Information was provided by DAKOFA

2) FR: Information provided by FNADE

Used definitions to define “ecotoxicity”

Question 36:

- Which definitions are used to define “ecotoxicity” and on which legal documents are they based?

Answers

Table 21: Answers to question 36 concerning the used definitions for H14

Definition	Legal document	Used by
“substances and preparations which present or may present immediate or delayed risks for one or more sectors of the environment”	Directive 91/689/EEC	EE ¹ , FI, LV, LT, BG, HU, NL ² , ES
“substances and preparations which are dangerous for the environment; substances and preparations which, were they to enter the environment, would or could present an immediate or delayed danger to the environment”	Dangerous Preparations Directive 1999/45/EC	SE, UK, DE
Other definitions	-	-

1) Estonia refers to Directive 91/689/EEC but seems to have adapted the definition by including the wording ‘dangerous for the environment’ from Directive 1999/45/EC (Wording of Estonian Definition: *Substances and preparations which are ecotoxic or dangerous for the environment and present or may present immediate or delayed risks for one or more sectors of the environment*)

2) NL refers to definition for H14 based on Directive 91/689/EEC and to R50/53 according to Directive 67/548/EEC

Methods for determination and concentration limits applied

Question 37:

- Which methods are used to determine whether a waste should be classified as hazardous on account of the criterion H14?
 - Please describe the test methods and/or other approaches used.
- If test methods are applied:
 - which parameters are analysed?
 - which concentration levels are applied

Answers

Table 22: Methods and approaches used in Member States for the application of H14

Country	Description of methods and decision criteria
AT	<p>H 14 applies for:</p> <ul style="list-style-type: none"> • wastes with a total yield of FCKWs, HFKWs, FKWs and Halones over 2000 mg/kg DM, and • environmental hazardous substances due to class 9, M6 and M7 ADR <p>(Annex 3 of Austrian Ordinance of Waste Classification 2003/570)</p>
BG	H14 is determined by means of fish ecotesting with <i>Poecillia Reticulata</i> , ecotesting with fluorescent micro organisms, ecotesting with phytocultures
DK	<p>Waste producers are advised to determine/detect whether their waste obtain substances classified with R50-53 in the official list of dangerous substances and then to follow the regulation on chemicals to determine whether it occur in concentrations exceeding the general limits (or if such exist the specific limit laid down in the list). The same goes for substances classified with R59 (ozone depletion).</p> <p>There are no official definitions as for other properties under 'Ecotoxic'</p>
EE	Principally the same methods described in EU chemical legislation (e.g. DIRECTIVE 1999/45/EC) for determination of ecotoxicity of substances and preparations can be applied and used for determination of the criterion H14.
FI	<p>In cases where a substance is classified as ecotoxic in the Chemicals Legislation, the limit values of Chemicals Legislation are used also for evaluation of ecotoxicity of the waste.</p> <p>Otherwise using of ecotoxicity tests such as <i>Vibrio fischeri</i> (ISO 11348-3), <i>Daphnia magna</i> (EC Directive 67/548/EEC annex V</p>

	method C2), algae test (EC Directive 67/548/EEC annex V method C3), various plant tests. It is recommended to use a combination of several tests.
FR (FNADE)	<p>For landfilling scenario, the H14 approach is described in the FNADE guidelines and is based on three types of test:</p> <ul style="list-style-type: none"> • On leachate <ul style="list-style-type: none"> ◦ 2 Acute toxicity test s: ISO 11348-3 and ISO 6341 ◦ 2 Chronic Toxicity test : inhibition of algal growth, Cerio daphnia dubia , or brachionus calyciflorus. • On raw material waste : <ul style="list-style-type: none"> ◦ ISO11269-2 and pollutants effects on worm <p>For more details please refer to the FNADE guidelines.</p> <p>The tests above were chosen after a common study SITA /ADEME on 10 mirror entries wastes. The most discriminating ones were retained. The methodology has also an economical approach: starting with acute test (the less expensive) to the chronic, more longer and more expensive. If for the 1. step the result is positive so wastes is hazardous</p>

DE	<p>At present, the criterion H14 is implemented by concentration limits for R-phrases to the category of danger “dangerous for the environment”</p> <p>Waste material is classified as hazardous by exceeding the following concentration limits (see 1999/45/EG):</p> <ul style="list-style-type: none">total concentration of $\geq 0.25\%$ of one or more substances classified as dangerous for the environment with R phrases R50 – R53.total concentration of $\geq 2.5\%$ of one or more substances classified as dangerous for the environment with R phrases R51 – R53.total concentration of $\geq 25\%$ of one or more substances classified as dangerous for the environment with R phrases R52 – R53.total concentration of $\geq 0.1\%$ of one or more substances classified as dangerous for the environment with R phrases R59. <p>For ecotoxicological characterisation of waste the use of biological test systems is recommended. The basis test battery includes aquatic and terrestrial biotests, for which test specific limit values are defined to identify an ecotoxic signal in the test system. In order to differ between hazardous and non hazardous waste, which means referring the test signal to a hazard classification, the determination of threshold values is intended.</p> <p>The recommendation is based on an evaluation study (Ringtest) of the ‘EN 14735: Characterization of waste – Preparation of waste samples for ecotoxicity test.</p> <p>Table: Overview of limit values for different ecotoxilogical tests</p> <table><tr><th>Basic test battery</th><th>Test organism</th><th>Reference</th><th>Limit values</th></tr><tr><td rowspan="3">Eluate testing</td><td>Algae</td><td>DIN EN ISO 8692</td><td>25%</td></tr><tr><td>Daphnids</td><td>DIN ISO 6341</td><td>20%</td></tr><tr><td>Salmonella typhimurium</td><td>ISO 13829</td><td>Dmin ≥ 2</td></tr><tr><td rowspan="2">Solid waste testing</td><td>Earth worm</td><td>ISO 11268-1</td><td>20%</td></tr><tr><td>Plants</td><td>ISO 11269-2</td><td>30%</td></tr></table>	Basic test battery	Test organism	Reference	Limit values	Eluate testing	Algae	DIN EN ISO 8692	25%	Daphnids	DIN ISO 6341	20%	Salmonella typhimurium	ISO 13829	Dmin ≥ 2	Solid waste testing	Earth worm	ISO 11268-1	20%	Plants	ISO 11269-2	30%
Basic test battery	Test organism	Reference	Limit values																			
Eluate testing	Algae	DIN EN ISO 8692	25%																			
	Daphnids	DIN ISO 6341	20%																			
	Salmonella typhimurium	ISO 13829	Dmin ≥ 2																			
Solid waste testing	Earth worm	ISO 11268-1	20%																			
	Plants	ISO 11269-2	30%																			
HU	<p>Ecological tests used by HU: fish test, daphnia magna, algae test, seedling test, soil tests.</p> <p>Used concentration limits: Waste harmful to the living organisms of the environment whose distilled water extract displays adverse effects in a dilution of >100 to 1 in the Daphnia magna and the seedling test</p>																					

	and of >50 to 1 in the bacteria, fish and algae test.
LV	The risk phrases R50 – R59 are taken into account. Not test methods are applied.
NL	<p>Parameters applied: (Heavy) metals, PAH, PCB, pesticides, cyanide, tetrachlorethene, trichlorethene</p> <p>As there are no specific concentration levels defined for H14 in decision 2000/532 the classification and concentration levels of H3-H8, H10 and H11 are applied.</p>
SI	<p>Waste is classified exotoxic:</p> <ul style="list-style-type: none"> • it contains ozone depleting substances or • If it contains substances classified in Chapter 9 and marked with 11 and 12 according to the regulations on road transport <p>Various toxicity tests (acute/chronic) are carried out.</p>
ES	<p>The Spanish Ministerial Order on the characterisation of waste defines two procedures to determine the ecotoxicity of waste and provides thresholds:</p> <ul style="list-style-type: none"> ◦ Acute toxicity to <i>Daphnia magna</i> (24h) LC50 = 750mg/L ◦ Acute toxicity to <i>Vibrio fischeri</i> (15min) LC50 = 3000mg/L <p>For the <i>Daphnia</i> test most laboratories use the corresponding method acc. to Annex V of Directive 67/548/EC) or the ISO method. For the <i>Vibrio</i> test most laboratories refer to the ISO method.</p>
SE	<p>SE applies definitions and concentration limits laid down in the “Substance Directive” 67/548/EEC and the “Preparations Directive 1999/45/EC”</p> <p>With regard to POPs reference is made to EC POPs-regulation, Annex 4 with regard to concentration limits.</p> <p>“Last resort”-option is the possibility to carry out relevant bioassays for assessing acute and subchronic toxicity in aquatic and terrestrial environment.</p>
UK	<p>H14 is applied through Appendix C14 of the UK Technical Guidance WM2. This uses the CHIP (Chemical Hazard Information for Packaging and Labelling Regulations: implements the DSD and the DPD into UK law) as its source.</p> <p>CHIP/DPD provide criteria, concentrations, and test methods only for the aquatic and ozone depleting risk phrases. UK has adopted these criteria, delivered primarily by the calculation method and chemical analysis of composition.</p> <p>UK is currently revising the Document to include additional criteria from CHIP (and therefore the DPD).</p>

Experience with applied methods

Question 38:

- *What is your experience with the applied methods? What are the advantages and shortcomings? Please give an assessment, in particular with regard to the relevance of the results and the (analytical) burden on companies.*

Answers

Table 23: Overview of experiences with methods for classification of H14 provided by the Member States

Information on experience provided:	EE, DE, FR ¹ , SE, UK
No information provided	BG, FI, HU, LV, LT, NL, PL, RO, AT ²

1) FR: Information provided by FNADE

2) AT: information from industry (Treibacher Industrie AG)

Table 24: Experience with the application of H14 in practice

Country	Description of methods and decision criteria
AT	<p>Since a classification in accordance with the ADR is necessary for the transport of wastes anyways the classification via ADR does not mean any additional burden for most wastes.</p> <p>The concentration of chlorofluorohydrocarbons is often known from the waste generating process and therefore no analysis is necessary.</p>
EE	Analytical assessment of ecotoxicity is not as complicated as of toxicity, carcinogenicity or similar factor affecting human health
SI	Test methods are considered to sometimes lengthy and expensive.
ES	<p>The applied toxicity tests (<i>Daphnia magna</i>, <i>Vibrio fischeri</i>) are relatively economic and simple. The <i>Daphnia</i> test is in general considered to be more ecologically relevant. As screening tests, however both seem suitable.</p> <p>Often there are problems due to the fact that wastes are complex matrices (coloured, oily, particulates, precipitates, etc). Considering that often the ecotoxicity test is the only real bioassay performed on waste, as it is by far the cheapest, it seems reasonable to use a test</p>

	battery.
SE	<p>The stringent exotox-hazard classification of zinc oxide has raised the question how suitable the reference to the chemical legislation is with regard to waste classification regarding ecotoxicity</p> <p>There are many practical problems applying the chemical legislation (dealing with separate metal compounds) in assessing hazards from metal containing solid waste, as its composition in its solid waste state in most case hardly can be analysed at a reasonable cost. Instead the stakeholder assessing his waste by leaching metals, has to cope with the problem of comparing metal concentrations in the leachate with the concentration limits for individual metal compounds to be found due to the hazard classification in the chemical legislation.</p>
UK	<p>Calculation methodology set forth in Chemical(Hazard Information for Packaging and Labelling) Regulations (CHIP) and the Dangerous Preparations Directive (DPD) supported by chemical analysis is clear and highly satisfactory. This aligns directly with chemical risk phrase classification systems and therefore with other hazardous properties</p> <p>The view on aquatic toxicity expressed by the OECD is correct. Animal testing of solid wastes is of little or no scientific value and generates results of debatable significance. Testing is often of poor quality, overlooks key criteria in relevant guidance, and results often suggest that the waste is non-hazardous where that is clearly not the case. In more than one case the analysis appears to have been undertaken principally because chemical analysis would show the waste to be hazardous, so ecotoxicity testing is being used (badly) in an attempt to obtain a different result.</p> <p>Thresholds for ecotoxicity, or reference to thresholds in the DPD, should be included in the LoW.</p>

Relevant waste types

Question 39:

- *Can you give examples of waste types that are classified as hazardous on account of criterion H14 but would not be considered as hazardous according to any other H-criteria? If yes, please name the LoW-codes.*

Answers

The following summarises the waste sections and waste types for which the hazard criteria H14 is or could be relevant. The countries that mentioned the respective waste are shown in the last column. The waste types/sections named in the questionnaires are shaded in grey; the waste chapters and

sections without shading were included only to facilitate the understanding of the table by providing information on the next higher classification level.

Table 25: Waste types for which the hazard property H14 might be relevant

LoW code	LoW designation	Countries
05	Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal	
05 06	Wastes from the pyrolytic treatment of coal	
05 06 97*	Oil-shale semi coke (additional Estonian waste code)	EE
10	Wastes from thermal processes	
10 01	Waste from power stations and other combustion plants(except 19)	DE
17	Construction and demolition wastes (including excavated soil from contaminated sites)	
17 06	Insulation materials and asbestos containing construction materials	
17 06 03*	Other insulation materials consisting of or containing dangerous substances	UK
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of waster intended for human consumption and water for industrial use	
19 01	Wastes from incineration or pyrolysis of waste	DE, SE
19 01 11*	Bottom ash and slag containing dangerous substances	SE
19 01 13*	Fly ash containing dangerous substances	SE
19 01 15*	Boiler dust containing dangerous substances	SE

Additional information on relevant waste types are given in the following table.

Table 26: Additional information on relevant waste types

Country	Description of methods and decision criteria
DE	<p>Based on the experience in Germany there is a manageable number of waste types, which needs to be classified exclusively according to H14. Most of the waste types are classified as hazardous according to other H-criteria</p> <p>Based on the experiences of the ecotoxicological characterization of waste, bottom ashes from the thermal treatment of municipal waste (section 19 01) is classified as hazardous according to H14 and none of the other hazard criteria are appropriate. This may also be the case for slugs from combustion, metallurgy and other ashes currently listed in mirror entries (section 10 01)</p>
UK	<p>Under the revised DPD that has yet to be fully implemented in the UK through revisions to CHIP, the thresholds for extremely ecotoxic substances have been lowered. These thresholds are now lower than for any other hazardous property. In future, any waste containing an extremely ecotoxic substance may therefore potentially be classified</p>

	<p>as hazardous solely on the basis of ecotoxicity.</p> <p>This is likely to include certain biocides/pesticides, certain medicines (anti-parasite), and perhaps a few metal compounds. These could conceivably occur in some sludges, treated wastes, contaminated land, as well as in off spec/ waste products. There are too many codes to list. However, 17 06 03* other insulation materials consisting of or containing dangerous substances might be an example - it is a mirror entry.</p>
--	--

12. Detailed information on H7

12.1. Definitions of categories for classification of H7 according to Council Directive 67/548/EEC

For the purposes of classification and labelling, carcinogens are divided into three categories:

Category 1:

Substances known to be carcinogenic to man. There is sufficient evidence to establish a causal association between human exposure to a substance and the development of cancer.

Category 2:

Substances which should be regarded as if they are carcinogenic to man. There is sufficient evidence to provide a strong presumption that human exposure to a substance may result in the development of cancer, generally on the basis of:

- (a) appropriate long-term animal studies*
- (b) other relevant information.*

Category 3:

Substances which cause concern for man owing to possible carcinogenic effects but in respect of which the available information is not adequate for making a satisfactory assessment. There is some evidence from appropriate animal studies, but this is insufficient to place the substance in Category 2.

The following risk phrases apply:

Categories 1 and 2:

R45 *May cause cancer*

R49 *May cause cancer by inhalation*

Category 3:

R40 *Limited evidence of a carcinogenic effect*

12.2. Concentration limits for metal compounds according to Table 7 [DE 2005]

Properties	H4		H5	H6		H8		H14				H7, H11		H10	
	R41	R36 R37 R38		very toxic	toxic	R35	R34	R50-53	R51- 53	R52 R53	R59	Cat. 1/2	Cat. 3	Cat. 1/2	Cat. 3
As				X			X1	X				X+			
Cd			X	X				X				X1		X7	
Cr VI	X1	X	X	X		X1		X				X			
Cu	X1	X1	X					X1							
Hg		X1	X1	X			X1	X							
Ni			X	X2				X1				X+		X2	
Pb			X	X1				X				X1,+	X+	X	
Sb			X		X		X1		X				X3,+		
Se					X			X							
Sn4	X1		X	X1			X1	X		X5			X1,+		X1
Tl		X1		X					X						
Zn		X	X1	X6			X1	X					X1,++		
Concentration limits in %	$\Sigma > 10$	$\Sigma > 20$	$\Sigma > 25$	$\Sigma > 0.1$	$\Sigma > 3$	$\Sigma > 1$	$\Sigma > 5$	$\Sigma > 0.25$	$\Sigma > 2.5$	$\Sigma > 25$	$\Sigma > 0.1$	$I > 0.1$	$I > 1$	$I > 0.5$	$I > 5$

Σ = total value

I = individual value

+ H7 only; ++ H11 only

1 specific compounds only, see Substances Directive

2 tetracarbonyl nickel only

3 Sb2O3 only

4 except zinc tetrachloride, only zinc organic compounds

5 zinc tetrachloride only

6 trizinc diphosphide only

7 cadmium fluoride only

12.3. Criteria for hazardous property H13 according to Annex III [DE 2005]

According to [DE 2005], hazardous property H13 can generally be considered fulfilled if one of the following concentration limits is exceeded:

Parameter	Criterion
Antimony	> 0.07 mg/l
Arsenic	> 0.2 mg/l
Barium	> 10 mg/l
Lead	> 1 mg/l
Cadmium	> 0.1 mg/l
Chromium, total	> 1 mg/l
Copper	> 5 mg/l
Molybdenum	> 1 mg/l
Nickel	> 1 mg/l
Mercury	> 0.02 mg/l
Selenium	> 0.05 mg/l
Zinc	> 5 mg/l
Fluoride	> 15 mg/l

Total contents

Hydrocarbons > 8,000 mg/kg

If it is established that at least one of these concentration limits has been exceeded, the waste can be considered as hazardous.

12.4. Testing methods for heavy metals and organic sum parameters in solids and in eluate according to [DE 2005]

Analysis procedure - solids

Table shows analysis methods for measuring arsenic and heavy metals – solids (DIN EN 13657 (January 2003 edition))

Analysis parameter	Analysis method	Edition
Arsenic	DIN EN ISO 11969	November 1996
Lead, cadmium, chromium, copper, nickel and zinc	E DIN ISO 11047 DIN EN ISO 11885	May 2003 April 1998
Thallium	DIN EN ISO 11885	April 1998
Mercury	DIN EN 1483	August 1997
Cyanide	LAGA Guideline CN 2/79	December 1983
Asbestos	Federal Environment Ministry publication: Publication of analytical methods for taking samples of and testing the substances and substance groups listed in the Annex to the Order banning certain chemicals [23]	2003
hydrocarbons	E DIN EN 14039 in conjunction with LAGA guideline KW 04	January 2005 November 2004
Creosotes, PAHs, benzo(a)pyrene	DIN ISO 13877	January 2000
PCBs	for oils: EN 12766-1 or EN 12667-2 other, solid wastes: DIN ISO10382 DIN 38414 Part 20	2002 February 1998 January 1996
Benzene	Contaminated Sites Manual, Hesse Office for Geology and the Environment, Volume 7 Part 4	2000
Highly volatile halogenated hydrocarbons / halons	Contaminated Sites Manual, Hesse Office for Geology and the Environment, Volume 7 Part 4	2000

Analysis procedure - Eluates

Producing eluates to measure the parameters according to DIN EN 12457-4 “Characterisation of waste - Leaching; Compliance test for leaching of granular waste materials and sludges – Part 4: One-stage batch test at a liquid to solids ratio of 10 l/kg for materials with particle size below 10 mm (with or without size reduction)” (January 2003)

Analysis parameter	Analysis method	Edition
Antimony	DIN EN ISO 11885	April 1998
Arsenic	DIN EN ISO 11969 or, alternatively, DIN EN ISO 11885	November 1996 April 1998
Barium	DIN EN ISO 11885 or, alternatively, DIN EN ISO 14911	April 1998 December 1999
Lead	DIN 38406-E6 or, alternatively, DIN EN ISO 11885	July 1998 April 1998
Cadmium	DIN EN ISO 5961 or, alternatively, DIN EN ISO 11885	May 1995 April 1998
Chromium (VI)	DIN 38405-D24	May 1987
Copper	DIN 38406-E7 or, alternatively, DIN EN ISO 11885	September 1991 April 1998
Molybdenum	DIN EN ISO 11885	April 1998
Nickel	DIN 38406-E11 or, alternatively, DIN 38406-E22	September 1991 March 1988
Selenium	DIN EN ISO 11885	April 1998
Mercury	DIN EN 1483	August 1997
Zinc	DIN 38406-E8-1 or, alternatively, DIN EN ISO 11885	October 1980 April 1998
Fluoride	DIN 38405-D4-1	July 1985

13. Proposal for additional waste codes/ sections and amendments of existing waste codes/ sections

13.1. Proposals from Member States and Stakeholders

Proposal for additional waste codes/ sections and amendments of existing waste codes/ sections from Member States

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
Chapter 01			
01 02 new section for waste from coal excavation and processing			Romania
01 02 01 waste from coal excavation			
01 02 02 waste from coal processing			
01 04 13 ... including wastes from treatment of limestone and dolomite	Limestone and dolomite are Estonians biggest source for this category	Amended LoW code	Estonia
01 04 07 should also cover waste from abrasion			Spain
Chapter 02			
02 01 xx* hazardous animal carcasses		18 02 xx	Hungary
02 01 Pesticides		e.g. 02 01 08*, 20 01 19*	[LT 2005]
02 01/ 02 02 need of entries for hazardous waste			[UK 2005]
02 01 Code for waste soil (e.g. from champignons, pot plants)			Slovenia
02 03 xx Glycerine from the production of biodiesel and fats or residues containing fats	Wastes arise in considerable quantities		Sachsen-Anhalt (Germany)

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
from the production of biodiesel			
02 03 Codes of this chapter should be more general to also cover sewage sludges			
02 04 04 Beet slice		02 04 99	Hungary
02 04 80 Beet pulp		Additional national code	Poland
02 05 98 Whey wastes	Entry is needed for keeping records	Additional national code	Estonia, Poland
02 07: Entry for a hazardous waste code e.g. ethanol-methanol-waste from spirits distillation	Section contains no entry for hazardous waste		Germany
Code for "stabilized material deriving from the processing of animal byproducts" such as meat and bone meal deriving from treatment plants			Spain
Codes for carcass meal and fats of animals			Sachsen-Anhalt (Germany)
Code for residues from decanting of wine and distillation in wineries		02 07 05, 02 07 99	Spain
Code for substrates of organic matrix used in hydroponics (e.g. greenhouses)		02 01 99	Spain
Chapter 03			
03 01 waste code for padded furniture manufacturing needed			Slovenia
03 01 05 should be split into different codes	Materials have a similar composition but different recovery/ disposal routes		UK
03 02 97* wood preservatives containing phenols	In Estonia wood preservatives containing phenols are often used	Additional national code	Estonia
03 02 98* sludges containing wood preservatives	Entry allows to consider preservatives waste in form of sludge	Additional national code	Estonia, Slovenia
03 03 05 needs a mirror entry	Need of classifying waste as hazardous under respective chapter and section		Sweden

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
New section for waste of paper and the polygraphic industry			Italy
03 04 01* Paper and cardboard from cardboard and polygraphic industry containing hazardous substances			
03 04 02 Paper and cardboard from cardboard and polygraphic industry, other than those mentioned in 03 04 01*			
03 04 03* Slabs of aluminium used in printing containing hazardous substances			
03 04 04 Slabs of aluminium used in printing, other than those mentioned in 03 04 04*			
New section for waste from production and/ or processing of plastic laminate and decorative panels			Italy
03 05 01* Resin waste containing hazardous substances			
03 05 02 Resin waste other than those mentioned in 03 05 01*			
03 05 03* Aqueous washing solutions containing hazardous substance			
03 05 04 Aqueous washing solutions other than those mentioned in 03 05 04			
03 05 05* Waste and scrap of impregnated Kraft paper			
03 05 06* Waste and scrap of impregnated decorative paper			
03 05 07 Scraps and paper waste other than those mentioned in 03 05 05* and 03 05 06*			
03 05 08* Scraps and waste from paper release and/ or finishing containing hazardous substances			
03 05 09 Scraps and waste from paper release and/ or finishing other than those mentioned in 03 05 08*			
03 05 10 Offcuts and waste from plastic film release and/ or finishing			
03 05 11 Laminate waste			
03 05 12 Waste from composite panels			
03 05 13 Powder, chips and scraps of laminate and composite panels			
03 05 14 Waste from extruded thermoplastic composite			

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
Code for dust and abrasion materials containing hazardous substances			Spain
Chapter 04			
04 02 Code for waste from confection and finishing of the textile industry			Italy
Mirror code of 04 02 19*			Italy
Code for wastes generated by leather, fur and textile production			Spain
Codes for waste from the production of textile fibres, leather, fur and wastes from the production of products from these materials	Wastes are not detailed enough		Slovenia
Chapter 05			
05 06 96* aqueous liquid waste containing phenols(phenol water)	Oil shale is the main category of solid fuel in Estonia. Therefore semicoke, phenol water and tarry waste are the main categories of waste	Additional national codes	Estonia
05 06 97* oil shale semicoke			
05 06 98* tarry waste from oil shale ('fuses')			
05 07 Extension to also include gas from pyrolytic treatment of coal and oil shale	Oil shale is the main category of solid fuel in Estonia	National Amendment	Estonia
Code for wastewater of on site sludge treatment containing hazardous substances			Spain
Chapter 06			
06 03 14 concerns solid salts and solutions but not sludge Proposal: to split this code into three codes for solid salts, salt solutions and salt sludges.		Sludges from calcium chloride production are classified in 06 03 99	Finland
Chapter 07			
Chapter 7: waste codes for products should be included	Waste codes are entirely restricted to wastes arising from the manufacturing process		UK
07 01 xx: Schlempe aus der Herstellung technischer Alkohole	Wastes arise in considerable quantities		Sachsen-Anhalt (Germany)
01 01 xx: Huminsäuren			
07 01 07 should also cover sludges from distillation of solvents			
Wastes from biodiesel production have no code			Spain

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
07 02 code for scrap rubber needed		07 02 99	Italy
07 04 14* Liquid wastes containing hazardous substances	Missing codes for liquid wastes and expired products		Italy
07 04 15* Expired or unusable products containing hazardous substances			
07 04 16 Expired or unusable products, other than those of heading 07 04 14*			
07 05 15* Liquid wastes containing hazardous substances			
07 05 16* Unusable or expired medicines containing hazardous substances			
07 05 17 Unusable or expired medicines other than those of heading 07 05 16*			
Waste mycelium (fungus) from the production of pharmaceuticals in 07 05			Slovenia
07 06 13* Liquid wastes containing hazardous substances			Italy
07 06 14 Expired or unsuable products			
07 06 needs a code for the waste resulting from physical separation processes: Amendmneds of 07 06 07* and 07 06 08* are necessary			
Chapter 08			
In 08 03 "aqueous suspensions that contain hazardous substances" are not included			Spain
08 03 14* should be more general to include further kinds of sludge			
08 05 02* Filtering materials containing hazardous substances			Italy
08 05 03 Filtering materials, other than those of heading 08 05 02*			
Poly alcohols which make way for the Polyurethane foams			Spain
Print cartridges and other consumables from offices don't have a code			
Chapter 09			
09 01 xx mixed waste from developer and fixer of the photographic industry	Lack of code leads to burden due to correct classification according to OECD	16 10 01	Poland, Spain
Chapter 10			

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
10 01 01 ..., excluding 10 01 96 and 10 01 97	Oil shale is a huge industry in Estonia. Bottom and fly ash from oil shale power plants are the most voluminous categories of waste in Estonia	Additional national codes	Estonia
10 01 95 wastes from fuel storage and preparation of oil shale-fired power plants			
10 01 96* bottom ash, slag and boiler dust from combustion of heavy fuel oil			
10 01 97* oil shale bottom ash			
10 01 98* oil shale fly ash			
10 01 03 needs a mirror entry	Need of classifying waste as hazardous under respective chapter and section		Sweden
10 12 13 should have a hazardous mirror-entry			Spain
Specific code for wastes from biomass combustion plants			
Specific code for waste generated by rock wool manufacturing			
Code for "the slag merger of the aluminium salt"		10 10 03	Spain
Chapter 11			
11 01 17* Exhausted concentrated electrolytic baths			Italy
Galvanising slab zinc bottom dross			Slovenia
Chapter 12			
Mirror codes for 12 01 02, 12 01 03, 12 01 05 are needed			Spain
Code for dust and contaminated metal chips is needed			
12 01 18* needs a mirror code			Italy
12 01 22 Waste and scrap of ferrous materials			
12 01 23 Waste and scrap of non-ferrous materials			
12 01 24 Offcuts and waste plastics			
12 01 25 Offcuts and waste rubber			

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
Chapter 13			
Code for used fats generated by maintenance procedures is needed			Spain
Code for oil or oil-mixtures of compressors are needed			
Non-hazardous mirror entries for some codes	Some wastes might not be hazardous in all cases		UK
Chapter 15			
More detailed entries for 15 01 10*	Treatment of these waste can vary a lot; therefore there is a need for further codes		Hungary, Spain
More detailed entries for 15 01 11*			
More detailed entries for 15 02 02*	Codes are too superficial		Hungary
More detailed entries for 15 02 03			
Chapter 16			
Introduction of two codes for filters from ELV: - filters from vehicles containing dangerous substances (fuel and oil filters classified as 16 01 07) - filters from vehicles except filters containing dangerous substances	LoW contains an entry for oil filters but not for fuel and air filters.	Fuel and air filters are classified as 16 02 21*	Poland, [LT 2005]
16 01 23* Engines and engine parts which contain hazardous substances		16 01 17	Italy
16 01 24 Engines and engine parts, other than those of heading 16 01 23*			
End –of-life vehicles and all types of waste from demolition and maintenance of vehicles are currently identified by the same codes although two chapters would be useful to differ. The following additional section is proposed: 16 12 Machinery and equipment damaged and/ or obsolete (other than those identified under 16 02 16 12 01* Machinery abnnd equipment damaged and/ or obsolete containing dangerous substances 16 12 02 Machinery and equipment damaged and/ or obsolete other than those mentioned in 16 12 01		16 01	Italy
16 02 should also include other discarded equipment than WEEE		National amendment	Finland

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
16 02 should be expanded to other equipment and apparatus	Difficulties to classify equipment and apparatus not containing electronic or electrical components	National amendment	Estonia
16 02 18* Fluorescent lamps	Additional codes for waste coming from electrical and electronic equipment are needed		Italy
16 02 19* Cathode Ray tube (CRT)			
16 02 20* LCD screens			
16 02 21* Residues and mixed waste glass from CRT containing hazardous substances			
16 02 22 Residues and waste glass, other than those mentioned in item 16 01 23			
16 02 23* Motherboard and printed circuit boards containing hazardous substances			
16 02 24 Motherboard and printed circuits, other than those mentioned in 16 02 23*			
16 02 25 Cables			
16 02 26* Devices with radioactive elements			
16 02 27* Plastic components containing hazardous substances			
16 02 28 Plastic components, other than those mentioned in 16 02 27			
16 02 29* Engines from discarded equipment containing hazardous substances			
16 02 30 Engines from discarded equipment, other than those mentioned in 16 02 29*			
16 02 31* Compressors from discarded equipment containing hazardous substances			
16 02 32 Compressors from discarded equipment, other than those mentioned in 16 02 31*			
16 02 97* other discarded equipment containing hazardous components	Difficulties to classify equipment and apparatus not containing electronic or electrical components	Additional national codes	Estonia, Finland
16 02 98 other discarded equipment and apparatus other than those mentioned in 16 02 97*			
16 03 07 edible oils and fats			Italy
16 05 xx containers	There are codes for chemicals and gases in containers but not for containers		Hungary

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
16 05 10* Dust in pressure containers containing hazardous substances			Italy
16 05 11 Dust in pressure in containers, other than those mentioned in 16 05 10*			
16 06 07 Ni-Mh-batteries	The differentiation between lead-acid batteries for starting and industrial would be necessary in the light of the provisions of the directive 66/2006/CE which provides a breakdown between portable batteries, starter batteries, industrial batteries		Italy
16 06 08 Lithium batteries			
16 06 09* industrial lead batteries			
16 06 10* Plate waste or exhausted accumulators of lead, resulting from production processes and recycling			
16 06 11* Sludge from dough for the processing of plates, arising from the production processes of lead accumulators			
16 07 10* Tar residues from cleaning tanks			Italy
16 10 05* Rainwater collected and intended for off-site treatment, containing dangerous substances			
16 10 06 Rainwater collected and intended for off-site treatment, other than those mentioned in 16 10 05*			
Section for demolition waste from ship and other means used for the maritime transport	This wastes can only be coded with general or irrelevant codes		Italy
Chapter 17			
17 01 xx Gas and porous concrete		17 01 07	Sachsen-Anhalt (Germany)
17 02 04* should be divided into different codes for wood, plastics and glass	A separate code is needed in particular for contaminated wood which is an important waste stream in terms of quantity.	17 02 04*	Sachsen-Anhalt (Germany)
17 03 ... coal or oil shale tar and tarred products	Tars from oil shale products are equalised with coal tar	Amended LoW codes	Estonia
17 03 01* definition extended to oil shale tar			
17 03 03* definition extended to oil shale tar			
17 04 10* definition extended to oil shale tar			
17 02 04* need of a non-hazardous mirror-entry	Most of these materials are non-hazardous		UK

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
Ammunition scrap iron containing dangerous substances		17 04 09*	Germany
Chapter 18			
18 01 94 used curative seamud (sapropel)	No direct entries exist to classify these wastes	Additional national codes	Estonia
18 01 95* antibiotics			
18 01 96* Medicines with narcotic and psychotropic effect			
18 01 97* medicines containing other dangerous active ingredients			
18 01 98* unsorted batches of medicines			
More codes for hazardous waste are needed in chapter 18	In HU, 80% of the human health care waste is allocated to 18 01 03*. On the basis of inspectorates supervision activity HU proposes to specify this code.	18 01 03*	Hungary
18 02 should include the same entries as 18 01, e.g. codes for animal tissue, blood from veterinary practice, animal carcasses			UK
Chapter 19			
19 05 xx Compost from sewage sludge	The current practice to classify such composts to 19 08 05 is not adequate.	19 08 05	Sachsen-Anhalt (Germany)
19 05 04 stabilised biological waste from mechanical biological treatment plants	The inclusion of these codes would complete the section on waste from aerobic treatment of solid waste that is currently lacking		Italy
19 05 06 waste from biofilters			
19 05 07* Leachate treatment wastes containing hazardous substances			
19 05 08 Leachate treatment waste, other than those mentioned in 19 05 07*			
Codes for waste from biological treatment of hazardous waste	Such wastes are not covered yet		Hungary
19 06 07 waste from anaerobic (methanogene) fermentation of organic waste		19 06 99	Italy
Section 19 12 should distinguish between urban and industrial waste			Spain
19 12 98 Mixed non-hazardous manufacturing wastes, excluding municipal wastes (mixed manufacturing waste)	No possibilities to classify mixed industrial or manufacturing wastes which are not similar to household wastes	Additional national code	Estonia

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
Liquid waste from physico/ chemical treatment		19 02 11*	Hungary
Major fractions of 19 12 12 should have separate codes			Sachsen-Anhalt (Germany)
19 13 09* Soil and rocks from contaminated sites containing hazardous substances			Italy
19 13 10 Soil and rocks from contaminated sites, other than those mentioned in 19 13 09*			
19 13 11* River sediments, marine and lake containing hazardous substances			
19 13 12 River sediments, marine and lake, other than those mentioned in 19 13 11*			
Separate heading for physical treatment	Waste codes are too wide and wastes are treated too differently to sum them up	Wastes from physico/ chemical treatment	UK
Chapter 20			
Mirror entry for 20 01 39 plastics	Need of classifying waste as hazardous under respective chapter and section		Sweden
Mirror entry for 20 01 40 metals			
Mirror entry for 20 01 41 wastes from chimney sweeping			
20 01 42* Exhausted toner cartridges containind hazardous substances			Italy
20 01 43 Exhausted toner cartridges other than those mentioned in 20 01 42*			
20 01 44 Waste from combined multimaterial colletion (mixed waste?)			
20 01 95* antibiotics	No direct entries exist to classify these wastes	Additional national codes	Estonia
20 01 96* medicines with narcotic and psychotropic effect			
20 01 97* medicines containing other dangerous active ingredients			
20 01 98* unsorted batches of medicines			
20 03 03 should be split into different codes	Wastes have a similar composition but different recovery/ disposal routes		UK

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
20 03 08 waste from cleaning of beaches			Italy
20 03 09 waste from cleaning of containers			
20 03 10 waste from cleaning of canals			
20 03 98 Sorting residues of mixed municipal waste	These are wastes remaining after sorting of mixed municipal waste in specialised sorting facilities or after separate collection; does not belong to chapter 19	Additional national code	Estonia
Mirror entry for 20 03 03 street-cleaning residues			Sweden
20 03 03 street cleaning wastes should be split in two codes: - gully waste - street sweepings	These materials have quite different characteristics.	20 03 03	UK
Hygiene type wastes	No such entries exist		UK
Nappies from childcare facilities			
Feminine hygiene bins			
Dog collection bins			
20 03 xx code for separately collected biowaste from households and a code for separately collected commercial waste			Sachsen-Anhalt (Germany)
Code for construction and demolition waste from urban areas			Spain
Code for dead domestic animals			
Unclassified additional codes			
Not enough codes for the classification of WEEE		16 02	Bulgaria, Lithuania, UK, Poland
Codes for mixed waste are needed in all chapters and many sections of the LoW with the exception of chapters 17 and 20.	Otherwise huge amounts of mixed commercial and industrial waste being classified in chapter 20	20 03 01	UK
Sludge from on-site waste water treatment in different sections		e.g. 02 01 06	Bulgaria, Italy
Plastics (without PET) and PET (Packaging Directive)			Lithuania
Food, textile, etc. wastes generated during trading, transportation, etc. (out-of-date			

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
damaged, forfeited goods)			
Oil contaminated soil taken from other sites than indicated in LoW			
Air filters, oil shock-absorbers indicated in end-of-life vehicles directive			
Mixed waste category in every chapter of the LoW	Otherwise huge amounts of mixed commercial and industrial waste being classified in chapter 20	20 03 01 17 09 04	UK
Printer cartridges		08 03 18	UK, Slovenia
Sanitary waste		18 01 04	UK
Raw meat from retail butcher shops			UK
Asbestos arising from households			
Sludges (hazardous and non-hazardous)			Italy
XX XX 98* other waste in different sections: 02 01, 02 02, 04 01, 04 02, 08 02	Need of classifying waste as hazardous under respective chapter	Classification as 99-code or in other sections	Sweden, Germany, Hungary
Code for waste from treatment of autoclave			Poland
Code for wastes containing solvents			Poland
Code for products with exceeded expiration dates			Slovenia
Codes for wastes from services (such as catering, padded furniture manufacturing, education, public administration)			Slovenia

Proposed waste code/ sections and amendments	Reasons	Current classification	Proposed by
Codes for spent rubber	Codes exist only for tyre rubber		Slovenia
Code for styrofoam			Slovenia
Classification of waste machinery			Slovenia
Single-use diapers			Slovenia
Consumables for computers			Slovenia
Audio and video equipment			Slovenia
New section for wastes from on-site waste water treatment facilities	All wastes from on-site effluent treatment could be consolidated in one new section either in chapter 16 or chapter 19.		MLU Sachsen-Anhalt(Germany)
New section for waste generated by the Sewing of textile materials and fabrics industry			Bulgaria
New section for waste generated during trading, transportation, export of goods			Lithuania
New chapter for "Wastes from off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use"		Chapter 19	Estonia
New section for waste arising from the retail and commercial sector (restriction of chapter 20 to municipal waste)		In Chapter 20	UK
Code for films and photographic paper containing silver compounds			Spain
Code for films and photographic paper not containing silver compounds			Spain

Table: Proposal for additional waste codes and amendments of existing waste codes from stakeholders

Proposed waste code / amendment	Reasons	Current classification	Proposed by
Chapter 02			
02 01 xy* out-dated seeds	These seeds generally contain pesticides and should be treated in hazardous waste plant	02 01 99	Eucopro

Proposed waste code / amendment	Reasons	Current classification	Proposed by
Chapter 03			
03 03 03 Bleaching sludges from hypochlorite and chlorine processes	Fibre rejects and sludges that derive from bleaching with hypochlorite and chlorine processes have a content of chlorine which is rather different from other fibre rejects		Assocarta
03 03 07 to "...from pulping of recovered paper and cardboard other than 03 03 XX"	Amendment cording to the European technical classification EN 643		Assocarta
03 03 XX mechanically separated metals wire from pulping of waste paper and cardboard		03 03 99	Assocarta
03 03 XY fabric, felts and belts from paper machine maintenance			
Chapter 10			
Inclusion of fly ash from other biomasses in code 10 01 03	Waste codes on ash from straw does not exist; just for wood		EURELECTRIC
10 02 16 mixes exclusively composed of non-hazardous wastes			Arcelormittal - Corporation
Chapter 16			
Separate code for non-recoverable mixed waste from sorting operations is needed under 16 XX XX			FNADE
Chapter 19			
Code for mixed non-recoverable waste from sorting of non-hazardous waste on site & code for non-recoverable waste from external sorting plants in chapter 19 is needed		20 01 99	FEAD
More detailed classification of WEEE in section 19 12			FNADE
Chapter 20			
Non-recoverable wastes of an external sorting plant could be named as 20 XX XX		20 01 99	FNADE
Missing codes for aerosols should be re-introduced in chapter 20 (hazardous and non-hazardous)	In the 2000 version of the Commission decision (2000/532/EC) , aerosols were classified as 20 01 22 but did not appear in the current version as amended in 2001		FEAD
Unclassified additional codes			

Proposed waste code / amendment	Reasons	Current classification	Proposed by
98-codes should be introduced as mirror entries for all 99-codes			FEAD
Detailed classification of WEEE	A detailed classification system is proposed by the WEEE-Forum		WEEE Forum
Calamine (zinc mineral)			Arcelormittal Industeel Loire
Animal meal falling outside the scope of the Animal By-Products Regulation – 2002/1774/EC			FEAD
Distinction should be made between filter cakes and sludge according to their inorganic/ organic, hazardous/ non-hazardous characteristic			FEAD

13.2. Proposals concerning WEEE provided by WEEE Forum

Current classification	Proposal for additional division of the current classification
Chapter 16 Wastes not otherwise specified in the list	
16 02 wastes from electric and electronic equipment	
16 02 11* discarded equipment containing chlorofluorocarbons, HCFC, HFC	appliances containing CFC/ HCFC foam insulation
	cabinets containing CFC/ HCFC foam insulation
16 02 13* discarded equipment containing hazardous components other than those mentioned in 16 02 09 to 16 02 12	codes for each fraction such as:
	CRT appliances
	flatscreen appliances
	...
16 02 14 discarded equipment other than those mentioned in 16 02 09 to 16 02 13*	codes for each fractions (see proposal for 16 02 13*)
16 02 15* hazardous components removed from discarded equipment	Codes for relevant fractions such as:
	mercury components
	toner cartridges
	plastics
16 02 16 components removed from discarded equipment other than those mentioned in 16 02 15*	...
	metal fractions
	metal fractions containing non-metal compounds
16 06 batteries and accumulators	non-metal fractions
	16 06 xx mix of batteries
	16 06 xx new kinds of batterie such as NiMH, Li-containing batteries
Chapter 19 Wastes from waste management facilities, off-site waste water treatment plants and preparation of water intended for human consumption and water for industrial use	
19 10 wastes from shredding of metal containing wastes	
19 10 01 iron and steel waste	shredder fraction (>2% impurity)
	Other iron and steel waste
19 10 02 non-ferrous waste	shredder non-ferrous fraction,
	metal/ plastics mixture
	other shredder non-ferrous waste fractions
19 10 05* other fractions containing dangerous substances	codes for different fractions such as:
	mix of non-ferrous metal shredder fractions with components to be removed and/ or hazardous substances,
	heavy shredder waste
	plastics
	...
19 10 06 other fractions other than those mentioned in 19 10 05*	same proposal as for 19 10 05* but without hazardous substances
19 12 wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
19 12 02 ferrous metal	iron fraction
	stainless steel fraction
19 12 03 all non-ferrous metals	Codes for different fractions such as:
	non-ferrous metal containing Fe substances

Current classification	Proposal for additional division of the current classification
	non-ferrous metal fractions
	aluminium fractions
	...
19 12 04 plastic and rubber	plastics
	rubber
	mixtures of plastics and rubber
19 12 11* other waste (including mixtures of materials) from mechanical treatment of waste containing dangerous substances	Codes for specific fractions such as:
	glass
	plastics
	metal/ non-metal compounds
	...
19 12 12 other waste (including mixtures of materials) from mechanical treatment of waste other than those mentioned in 19 12 11	residues from separation
	shredder/ separation waste
	dismantling/ shredder/ separation waste

14. Proposals of unnecessary waste codes

Redundant code	Description of the code	Reasons for deletion	Proposed by
Chapter 05	Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal		
05 01	Wastes from petroleum refining		
05 01 13	boiler feedwater sludges	Waste from water preparation is classified under 19 09. There is no reason why a specific code would be necessary for the petroleum refining. (For other industrial sectors such a codes does not exist although waste from water preparation will arises in most sectors).	PL
Chapter 09	Wastes from the photographic industry		
09 01	Wastes from the photographic industry		
09 01 10	single-use cameras without batteries	The definition of three different codes for single-use cameras seems overly detailed because of: - low amounts; - increasing importance of digital cameras - difficult distinction with regard to batteries. Proposal: to delete all three codes and to assign single-use cameras to code 16 02 14 (discarded equipment other than those mentioned in 16 02 09 to 16 02 13) or to keep only one of the three entries.	PL
09 01 11*	single-use cameras containing batteries included in 16 06 01, 16 06 02 or 16 06 03		
09 01 12	single-use cameras containing batteries other than those mentioned in 09 01 11		
Chapter 10	Wastes from thermal processes		
10 01	Wastes from power stations and other combustion plants (except 19)		
10 01 26	wastes from cooling-water treatment	Waste could be assigned to section 19 09. There is no reason why a specific code would be necessary for power stations. (other than in the metal industry where the cooling water comes in contact with materials)	PL
10 xx xx	wastes from cooling-water treatment	Wastes for which the determining components are mostly independent from their origin could be summarised in one section within chapter 10. The wastes mentioned in the adjoining column are (non-exhaustive) examples.	DE-SA
10 xx xx	fluegas dusts and solid wastes from gas treatment		
10 09 / 10 10	wastes from casting of ferrous pieces / wastes from casting of non-ferrous pieces	The two sections could be consolidated in one section. The only difference is the casted material (ferrous/non-ferrous) which is not relevant for the classification of the waste.	DE-SA
Chapter 13	Oil wastes and wastes of liquid fuels (except edible oils, and those in chapters 05, 12 and 19)		
13 08	oil wastes not otherwise specified		
13 08 99*	wastes not otherwise specified	A 99-code with asterisk is not consistent with the concept of the LoW; the code should be changes into 13 08 98*.	PL
16	wastes not otherwise specified in the list	The respective waste types should be reintegrated into the substance-related waste codes	DE
16 03	off-specification batches and unused products	could possibly be deleted	LV
16 09	oxidising substances	The codes of this section are rarely used and the amounts are low. It is assumed that the respective waste types can by assigned to sector-specific	PL
16 09 01*	permanganates, e.g. potassium permanganate		

16 09 02*	chromates, e.g. potassium chromate, potassium or sodium dichromate	codes. Proposal: to integrate section 16 09 into section 16 04 waste explosives (because such wastes often are explosive and because explosives generally contain oxidising substances)	
16 09 03*	peroxides, e.g. hydrogen peroxide		
16 09 04*	oxidising substances, not otherwise specified		
16 10	aqueous liquid wastes destined for off-site treatment	The relevant wastes can be classified under other more specific codes	DE-SA
16 10 01*	aqueous liquid wastes containing dangerous substances		
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01		
16 10 03*	aqueous concentrates containing dangerous substances		
16 10 04	aqueous concentrates other than those mentioned in 16 10 03		
Chapter 20	Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions		
20 01	Separately collected fractions (except 15 01)		
20 01 31*	cytotoxic and cytostatic medicines	An identical waste code exists in chapter 18 (18 02 07* cytotoxic and cytostatic medicines). The code in chapter 20 should be deleted it as it is unlikely that cytostatic wastes should be used in households or other institutions outside of medical institutions (DE, PL). Furthermore, a separate collection would hardly be possible as such medicine is not marked. (PL).	DE-SA, PL
Codes that are repetitions for the same type of waste			SE

15. Classification of Batteries

AUSTRIAN ARGUMENTS

CLASSIFICATION OF ALL TYPES OF BATTERIES AS HAZARDOUS WASTES

Introduction:

Presently in the European Waste List the following batteries are classified as hazardous wastes (procedure of notification and consent in case of transfrontier shipment – future entry: A1170 unsorted batteries excluding mixtures of only list B batteries. Waste batteries not specified on list B containing Annex I constituents to an extent to render them hazardous):

EWL:

16 06 01* lead batteries

16 06 02* Ni-Cd batteries

16 06 03* mercury-containing batteries

20 01 33* batteries and accumulators included in 16 06 01*, 16 06 02* or 16 06 03* and unsorted batteries and accumulators containing these batteries

Consequently the following entry for single use cameras with hazardous batteries can be found in the European Waste List (notification requirement in case of transfrontier shipment – non-listed waste)

EWL:

09 01 11* single-use cameras containing batteries included in 16 06 01*, 16 06 02* or 16 06 03*

Furthermore there is a relevant note in the EWL referring to hazardous components from electrical and electronic equipment, which may include accumulators and batteries mentioned in 16 06 and marked as hazardous; etc.

Presently all other batteries, not explicitly mentioned in a specific entry on the European Waste List are considered to be non-hazardous waste a priori and therefore could be classified as Green Listed wastes in the meaning of Annex III of the future Waste Shipment Regulation, entry B1090: waste batteries conforming to a specification, excluding those made with lead, cadmium or mercury (remark: e.g. Nickel metal hydride batteries, alkaline batteries, zinc-carbon batteries):

EWL:

16 06 04 alkaline batteries (except 16 06 03*)

16 06 05 other batteries and accumulators

**20 01 34 batteries and accumulators other than those mentioned in
20 01 33***

Consequently there is also the following entry for single-use cameras containing non-hazardous batteries (Green Listed wastes in the meaning of Annex III of the future Waste Shipment Regulation, entry B4030 Used single use cameras, with batteries not included on list A)

EWL:

09 01 12 single-use cameras containing batteries other than those mentioned in 09 01 11*

On the other hand all types of electrolytes are classified as hazardous wastes in the present European Waste List:

16 06 06* separately collected electrolyte from batteries and accumulators

The Austrian Federal Ministry for Agriculture, Forestry, Environment and Water Management takes the view that in practise all batteries are to be classified as hazardous waste when applying the EC-hazard criteria, either due to their electrolytes or due to their anode/cathode materials. The relevant hazard criteria for different types of batteries are: H 13 leachate, H14 ecotoxic, H4 irritant, H5 harmful and H8 corrosive, when applying all EU-hazard criteria and their testing procedures.

Furthermore the classification of batteries under the transport regulations for dangerous goods should be borne in mind as well:

UN-class 9 (ECOTOXIC), UN-No: 3090 Lithium batteries

UN-class 9 (ECOTOXIC), UN 3091 Lithium batteries contained in equipment or lithium batteries packed with equipment

UN-class 8 (CORROSIVE), UN-No: 3028 batteries dry, containing potassium hydroxide solid (electric storage)

UN-class 8 (CORROSIVE), UN-No: 2800 batteries, wet, non-spillable (electric storage)

UN-class 8 (CORROSIVE), UN-No: 2794 batteries, wet, filled with alkali

UN-class 8 (CORROSIVE), UN-No: 2795 batteries wet filled with acid

UN-class 4.3 (EMITTING HAZARDOUS GASES IN CONTACT UPON WATER OR AIR), UN-No: 3292 batteries containing sodium or cells containing sodium

The following overview on various important battery systems (non-exhaustive listing; there are a huge amount of battery systems for special applications) and their chemical composition shall demonstrate that all batteries have to be classified as hazardous waste when applying the relevant EC-legislation.

Relevant battery types and their composition

1 . Zinc batteries

Zinc Carbon battery

Alkaline Battery

Zinc-Air battery

Zinc chloride battery

Zinc-Silver battery

2. Magnesium batteries

3. Lithium Batteries (Primary Cells)

Lithium Manganese dioxide battery

Carbon-Monofluoride Lithium battery

Lithium-Iron disulfide battery

Lithium-Sulphur dioxide battery

Lithium-Thionyl Chloride battery

Lithium-Iodine Cells

4. Lithium-Ion Batteries (Secondary Cell)

Lithium Carbon battery

Lithium-Polymer battery

Lithium-Cobalt oxide battery and Lithium-Nickel oxide battery

Lithium-Vanadium battery

Lithium-Silver chromate battery

5. Nickel batteries (Secondary Cells)

Nickel-Iron battery

Nickel-Metal hydride battery

Nickel Zinc battery

6. Ammonia battery

7. Redox Batteries (Flow Cells)

8. Thermal Batteries

Sodium sulphur cells

Zebra Cells

9. Flow Batteries

1. ZINC BATTERIES

Zinc-carbon battery

Anode: zinc (zinc can).

Cathode: mixture of manganese dioxide and carbon powder.

Electrolyte: mixture of zinc chloride and ammonium chloride dissolved in water.

Typical composition of such batteries (safety data sheet of a producer):

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Acetylene Black (CAS# 1333-86-4)	3.5 mg/m ³ TWA (as carbon black)	3.5 mg/m ³ TWA (as carbon black)	3-7
Ammonium Chloride (CAS# 12125-02-9)	None established	10 mg/m ³ TWA (fume) 20 mg/m ³ STEL (fume)	0-10
Manganese Dioxide (CAS# 1313-13-9)	5 mg/m ³ CEILING (as Mn)	0.2 mg/m ³ TWA (as Mn)	15-31
Zinc (CAS# 7440-66-6)	15 mg/m ³ TWA (total dust as particulates not otherwise regulated) 5 mg/m ³ TWA (respirable fraction as particulates not otherwise regulated)	10 mg/m ³ TWA (inhalable particulate) 3 mg/m ³ TWA (respirable particulate)	7-42
Zinc Chloride (CAS# 7646-85-7)	1 mg/m ³ TWA (fume)	1 mg/m ³ TWA (fume) 2 mg/m ³ STEL (fume)	2-10

HAZARDOUS CHARACTERISTICS: ECOTOXIC, HARMFUL, CORROSIVE

- **MnO₂** EG-No: 215-202-6, CAS: 1313-13-9 – Xn; R20/22; harmful by inhalation or ingestion – (limit: 25 % - Xn)
- **Ammonium chloride** EG-No: 235-186-4; CAS: 12125-02-9 – Xn: R 22, Xi:36 (limit 20% Xi irritant, limit: 25%- Xn)
- **ZnCl₂**: EG –No: 231-592-0, CAS: 7646-85-7 corrosive, irritant causes burns. Harmful if swallowed/inhaled and in contact with skin, Xn: R22; C: R34; N: R50/ R53.

Concentrations:

2,5 < c > 5% - N (ecotoxic), R51/53

5 < c > 10% - Xn (harmful), N (ecotoxic) R36-37-38-51/53

- **Acetylene black (carbon black)**: CAS No: 1333-86-4, EINECS: 215-609-9, not found in EC list of hazardous chemicals; IARC evaluation: possible human carcinogen (Group 2B). May be harmful by ingestion or inhalation. Respiratory irritant.

Alkaline battery (Alkaline Manganese Dioxide-Zinc Battery)

Anode: zinc metal as a powder.

Cathode: manganese dioxide and carbon mixture (often, the carbon is in a graphite or acetylene black form)

Electrolyte: caustic potassium hydroxide (KOH); The gelling agents are usually starch, polyacrylates, or ethylene maleic anhydride copolymers.

Typical composition of such batteries (safety data sheet of a producer):

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Graphite (CAS# 7782-42-5)	15 mg/m ³ TWA (total dust) 5 mg/m ³ TWA (respirable fraction)	2 mg/m ³ TWA (respirable fraction)	2-6
Manganese Dioxide (CAS# 1313-13-9)	5 mg/m ³ Ceiling (as Mn)	0.2 mg/m ³ TWA (as Mn)	30-45
Potassium Hydroxide (CAS# 1310-58-3)	None established	2 mg/m ³ Ceiling	4-8
Zinc (CAS# 7440-66-6)	15 mg/m ³ TWA PNOR* (total dust) 5 mg/m ³ TWA PNOR* (respirable fraction)	10 mg/m ³ TWA PNOC** (inhalable particulate) 3 mg/m ³ TWA PNOC** (respirable particulate)	12-25

* PNOR: Particulates not otherwise regulated

**PNOC: Particulates not otherwise classified

HAZARDOUS CHARACTERISTICS: IRRITANT/CORROSIVE, HARMFUL, ECOTOXIC

- **Potassium hydroxide:** EC-No: 215-181-3, CAS: 1310-58-3 harmful, corrosive R22-35; Concentrations:
25%<c>100% -C(corrosive), R22-35
5%<c<25% - C (corrosive), R35
2%<c<5% - C (corrosive), R34
0,5%<c<2% ; Xi (irritant) R36/38
- **Manganese dioxide MnO₂** EG-No: 215-202-6, CAS: **1313-13-9** – Xn; R20/22; harmful by inhalation or ingestion – (limit: 25 % - Xn, sum of harmful substances)
- **Zinc powder** - zinc dust (pyrophoric); EC-No: 231-175-3, CAS: 7440-66-6
F (flammable); R15-17, N (ecotoxic); R50-53,

Zinc-air battery

Zinc-air batteries, also called "zinc-air fuel cells" (non-rechargeable) are powered by the oxidation of zinc with oxygen from the air.

Electrolyte: usually potassium hydroxide solution

Water and oxygen from the air react at the cathode and form hydroxyls which migrate into the zinc paste and form zincate, at which point electrons are released that travel to the cathode. The zincate decays into zinc oxide and water is released back into the system. The water and hydroxyls from the anode are recycled at the cathode; thus the water only serves as a catalyst.

Typical composition of such batteries (safety data sheet of a producer):

INGREDIENT NAME	CAS #	%	TLV*
Zinc	7440-66-6	30 - 40	2 mg/m ³ (ZnO, Dust, TWA)
Steel	7439-89-6	30 - 40	---
Nickel	7440-02-0	3 - 7	1.5 mg/m ³ (Elemental, TWA)
Copper	7440-50-8	1 - 5	1 mg/m ³ (TWA)
Chromium	7440-47-3	1 - 5	0.5 mg/m ³ (Metal, TWA)
Graphite	7782-42-5	1 - 3	2 mg/m ³ (TWA)
Potassium Hydroxide	1310-58-3	1 - 3	C 2 mg/m ³ (STEL)
Mercury	7439-97-6	< 1**	0.025 mg/m ³ (Inorganic, TWA)
Water, paper, plastic, other	---	Balance	---

*Source: ACGIH Threshold Limit Values for Chemical Substances and Physical Agents, 2003.

** Zinc Air Batteries contain less than 25 mg/cell of mercury.

HAZARDOUS CHARACTERISTICS: IRRITANT/CORROSIVE, ECOTOXIC

- **Potassium hydroxide:** EC-No: 215-181-3, CAS: 1310-58-3
harmful, corrosive R22-35;
Concentrations:
5%<c<25% - C (corrosive), R35
2%<c<5% - C (corrosive), R34
0,5%<c<2% ; Xi (irritant) R36/38
- **Zinc powder - zinc dust (pyrophoric); EC-No: 231-175-3, CAS: 7440-66-6**
F (flammable); R15-17, N (ecotoxic); R50-53,
- **Mercury** EC-no: 231-106-7, CAS:7439-97-6, R23-33-50/653, T (toxic), N (ecotoxic)

Zinc-chloride battery

The Zinc Chloride battery is a beefed up version of the general purpose Carbon Zinc battery.

Typical composition of such batteries (safety data sheet of a producer):

INGREDIENT NAME	CAS #	%	TLV*
Steel **	7439-89-6	8 – 14	--
OR			
Plastic **	--	8 – 14	--
Manganese Dioxide	1313-13-9	28 – 32	0.2 mg/m ³ (TWA)
Zinc	7440-66-6	16 – 20	2 mg/m ³ (ZnO, Dust, TWA)
Acetylene Black	1333-86-4	7 – 13	3.5 mg/m ³ (Carbon Black, TWA)
Zinc Chloride	7646-85-7	6 - 10	1 mg/m ³ (Fume, TWA)
Lead	7439-92-1	< .02	0.05 mg/m ³ (TWA)
Water, paper, plastic, other	---	Balance	---

*Source: ACGIH Threshold Limit Values for Chemical Substances and Physical Agents, 2003.

Data of another producer:

Chemical Name	CAS No.	Percentage %
Manganese Dioxide	1313-13-9	28
Zinc Metal	7440-66-6	22
Carbon Black	1333-86-4	6.1
Zinc Ammonium and Chloride Solution	2842-90-0	15.4
Others	N/A	.15

HAZARDOUS CHARACTERISTICS: ECOTOXIC, HARMFUL, CORROSIVE

- **MnO₂ EG-No: 215-202-6, CAS: 1313-13-9** – Xn; R20/22; harmful by inhalation or ingestion – (limit: 25 % - Xn, sum of harmful substances)
- **Ammonium chloride EG-No: 235-186-4; CAS: 12125-02-9** – Xn: R22, Xi:36 (limit 20% Xi irritant, limit: 25%- Xn, sum of harmful substances)
- **ZnCl₂ EG –No: 231-592-0, CAS: 7646-85-7** corrosive, irritant causes burns. harmful if swallowed/inhaled and in contact with skin, Xn: R22; C: R34; N: R50/ R53.

Concentrations:

2,5< c >5% - N (ecotoxic), R51/53

5<c>10% - Xn (harmful), N (ecotoxic) R36-37-38-51/53

- **Acetylene black (carbon black):** CAS No: 1333-86-4, EINECS: 215-609-9, not found in EC list of hazardous chemicals; IARC evaluation: possible human carcinogen (Group 2B). May be harmful by ingestion or inhalation. Respiratory irritant.

Silver Zinc Batteries

Anode: zinc

Cathode: silver oxide

Electrolyte: alkaline electrolyte, usually **sodium (NaOH) or potassium hydroxide (KOH)**

→ can cause serious chemical burns to the skin and/or eyes

Mercury has been used in the past to suppress the corrosion, despite its harmful effects on the environment (limitations nowadays)

Typical composition of such batteries (safety data sheet of a producer):

INGREDIENT NAME	CAS #	%	TLV*
Silver	7440-22-4	<0.5	0.1 mg/m ³ (Metal, TWA)
Steel	7439-89-6	37 – 41	--
Zinc	7440-66-6	30 – 40	2 mg/m ³ (ZnO, Fume, TWA)
Potassium Hydroxide	1310-58-3	1 – 3	C 2 mg/ m ³ (STEL)
Graphite	7782-42-5	<0.25	2 mg/ m ³ (TWA)
Mercury	7439-97-6	<0.9**	0.025mg/ m ³ (Inorganic, TWA)
Manganese Dioxide	1313-13-9	<2.5	0.2 mg/ m ³ (Mn, TWA)
Water, paper, plastic, other	---	Balance	---

Other producer's information : components in % weight

Silver Oxide (20667-12-3)	27-40
Zinc (7440-66-6)	7-11
Potassium Hydroxide (35%) (1310-58-3)	0-10
Sodium Hydroxide (20-30%) (1310-73-2)	0-10
Manganese Dioxide (1313-13-9)	0-3
Mercuric Oxide (21908-53-2)	<1

HAZARDOUS CHARACTERISTICS: IRRITANT/CORROSIVE, ECOTOXIC

- **Potassium hydroxide:** EC-No: 215-181-3, CAS: 1310-58-3 harmful, corrosive R22-35; Concentrations:
 5%<c<25% - C (corrosive), R35
 2%<c<5% - C (corrosive), R34
 0,5%<c<2% ; Xi (irritant) R36/38
- **Sodium hydroxide -No: 215-185-5, CAS: 1310-73-2**
 (corrosive : limit 1% of corrosive R34, 5 % of R35)
 5%<c<100% - C (corrosive) , R35
 2%>c>5% - C (corrosive), R34
 0,5%<c<2% - Xi (irritant), R36/38
- **Mercuric oxide** HgO CAS No: 21908-53-2, EC No: 244-654-7
 May be fatal if inhaled, swallowed or absorbed through the skin.
 Possible teratogen. Highly toxic. Danger of cumulative effects.
 Neurological hazard. R26 R27 R28 R63 R33 R36 R37 R38. Harmful in the environment. Toxic to aquatic organisms.

2. MAGNESIUM BATTERIES

Anode: magnesium

Cathode: manganese dioxide

Electrolyte: aqueous solution of **magnesium bromide or magnesium perchlorate**. These chemicals can emit highly toxic fumes when heated.

Typical composition:

Hazardous & Nonhazardous Components (Chemical Name, (Symbol), and [CAS#])	Exposure Limits*		Other Recommended Limits	% by Item Weight
	OSHA PEL	ACGIH		
Magnesium-aluminum alloy		---		~10-15
Manganese dioxide (MnO ₂)[1313-13-9]		0.2		~25-35
Magnesium perchlorate (Mg(ClO ₄) ₂)[10034-81-8]		---		~5-10
Barium Chromate (BaCrO ₄)[10294-40-3]		0.05		~0.5-1.5
Lithium Chromate (Li ₂ CrO ₄)[14307-35-8]		0.05		<0.01
Carbon, black (C), [1338-86-4]		3.5		~5-10
* All values reported in mg/m ³ unless otherwise specified.				

HAZARDOUS CHARACTERISTICS: HARMFUL, ECOTOXIC

- **MnO₂** EG-No: 215-202-6, CAS: 1313-13-9 – Xn; R20/22; harmful by inhalation or ingestion – (limit: 25 % - Xn, sum of harmful substances)
- **Bariumchromate** BaCrO₄ CAS No: 10294-40-3 , Harmful if inhaled or swallowed. May be harmful by skin contact. Chronic exposure may cause cancer, liver and CNS damage. R20 R22 R45 possible carcinogenic; In the EC list of chemicals - barium compounds; EC – No:056-002-00-7; Xn R 20/22; 1%<c<100% -Xn
- **Magnesium perchlorate**: Mg(ClO₄)₂ , CAS No: 10034-81-8 oxidizind and irritant (O,Xi) R: 8-14/15-36/37/38; moisture sensitive.; oxidizer - Skin, eye and respiratory irritant. Risk phrases R8 R36 R37 R38; UN No 1475., class 5.1. Very hazardous in case of ingestion, hazardous in case of skin contact (irritant), of inhalation. Prolonged exposure may result in skin burns and ulcerations. – no entry in EC list of hazardous chemicals
- **Lithium chromate**, CAS Number: 14307-35-8 EC-No: 238-244-7; German Water Pollution Class 3; Carcinogen; - no entry in the EC-list of hazardous chemicals; R: 45-46-8-36/37/38_
- **Acetylene black (carbon black)**: CAS No: 1333-86-4, EINECS: 215-609-9, not found in EC list of hazardous chemicals; IARC evaluation: possible human carcinogen (Group 2B). May be harmful by ingestion or inhalation. Respiratory irritant

3. LITHIUM BATTERIES (PRIMARY CELLS)

Lithium - Manganese Dioxide Battery

Anode: lithium foil

Cathode: manganese dioxide

Electrolyte: **organic solvent** (propylene carbonate-solvent and 1,2 dimethoxyethane solvent) solution of lithium perchlorate (in coin cells) or Lithium triflate –salt Li CF₃So₃

Typical composition of Lithium / manganese oxide batteries:

Lithium	7439-93-2	2.4
Propylene Carbonate	16606-55-6	9
Manganese Dioxide	1313-13-9	22
Dimethoxymethane	109-87-5	5.8
Lithium per Chlorate	N/A	1
Graphite	7784-42-5	5.5
Stainless Steel	N/A	50.5
Other	N/A	3.8

Other data:

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Carbon Black (CAS# 1333-86-4)	3.5 mg/m ³ TWA	3.5 mg/m ³ TWA	0-1
1,2-Dimethoxyethane (CAS# 110-71-4)	None established	None established	0-6
1,3-Dioxolane (CAS# 646-06-0)	None established	None established	0-8
Graphite (CAS# 7782-42-5)	15 mg/m ³ TWA (total dust) 5 mg/m ³ TWA (respirable fraction)	2 mg/m ³ TWA (respirable fraction)	0-3
Lithium or Lithium Alloy (CAS# 7439-93-2)	None established	None established	1-6
Lithium Perchlorate (CAS# 7791-03-9)	None established	None established	0-3

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Lithium Trifluoromethanesulfonate (CAS# 33454-82-9)	None established	None established	0-3
Lithium Trifluoromethanesulfonimide (CAS# 90076-65-6)	None established	None established	0-3
Manganese Dioxide (CAS# 1313-13-9)	5 mg/m ³ Ceiling (as Mn)	0.2 mg/m ³ TWA (as Mn)	12-42
Propylene Carbonate (CAS# 108-32-7)	None established	None established	0-8

HAZARDOUS CHARACTERISTICS: HARMFUL, ECOTOXIC

- **MnO₂** EG-No: 215-202-6, CAS: 1313-13-9 – X_n; R20/22; harmful by inhalation or ingestion – (limit: 25 % - X_n, sum of harmful substances)
- **Lithium perchlorate** LiClO₄ : CAS No: 7791-03-9, O, Xi strong oxidizer - contact with combustible material may cause fire. Incompatible with organic materials, combustible materials, strong reducing agents. Skin, eye and respiratory irritant. – R36 R37 R38.
- **1,2-dimethoxyethane**: F flammable, T CAS11071- 4; R11 Harmful by inhalation, ingestion and through skin contact. Possible teratogen. May impair fertility; highly flammable; R11 R19 R20 R60 R61; not found in EC list of hazardous chemicals
- **1,3, dioxolane** CAS 646-06-0– F flammable, , R: 11, UN 1166 3/PG 2, German Water Pollution Class 1
- **Acetylene black (carbon black)**: CAS No: 1333-86-4, EINECS: 215-609-9, not found in EC list of hazardous chemicals; IARC

evaluation: possible human carcinogen (Group 2B). May be harmful by ingestion or inhalation. Respiratory irritant

- **Propylene carbonate** (carbonic acid cyclic methylethylene ester, carbonic acid propylene ester, cyclic 1,2-propylene carbonate), CAS No: 108-32-7 , EC No: 203-572-1, EC Index No: 607-194-00-1 , Xi Irritant. May be harmful by inhalation, ingestion or skin contact. Risk phrases - R36.

Carbon monofluoride lithium batteries Li (CF)_x

Application: aerospace, military and cardiac pacemakers

Cathode: Carbon monofluoride

Carbon monofluoride (CF, CF_x, or (CF)_x), also called polycarbon monofluoride, polycarbon fluoride, and poly(carbon monofluoride), is a material formed by high-temperature intercalation of fluorine gas into graphite, charcoal, or pyrolytic carbon powder; It is a graphite intercalation compound.

Anode: lithium

Electrolyte: **Lithium tetrafluoroborate LiBF₄ in propylene carbonate, 1,2 dimethoxyethane and/or gamma-butyrolactone)**

Typical composition:

INGREDIENT NAME	CAS #	%	TLV*
Stainless Steel	--	70 - 80	--
Carbon Monofluoride	51311-17-2	6 - 12	3.5 mg/m ³ (Carbon Black, TWA)
Propylene Carbonate	108-32-7	2 - 6	None Established
Polypropylene	9003-07-0	2 - 6	None Established
Dimethoxyethane (1,2)	110-71-4	2 - 4	None Established
Lithium	7439-93-2	1 - 3	None Established

HAZARDOUS CHARACTERISTICS: ECOTOXIC

- **1,2-dimethoxyethane**: F flammable, T; CAS 110-71-4; Harmful by inhalation, ingestion and through skin contact; possible teratogen. May impair fertility; highly flammable; R11 R19 R20 R60 R61; Not found in EC list of hazardous chemicals
- **Carbon monofluoride**: CAS number is [51311-17-2] [1].- no entry in EC list of hazardous chemicals
- **Propylene carbonate** (carbonic acid cyclic methylethylene ester, carbonic acid propylene ester, cyclic 1,2-propylene carbonate)CAS No: 108-32-7 , EC No: 203-572-1, EC Index No:

607-194-00-1 ,Irritant. May be harmful by inhalation, ingestion or skin contact. Risk phrases - R36. (limit for irritant: 20%)

- **Lithium tetrafluoroborate**, C corrosive, R: 20/21/22-31-34, UN 3260 class 8, Water Pollution Class 3
- **γ-Butyrolactone** CAS Number 96-48-0, EG/EC Number 2025095, Xn, R:22-36

Lithium iron disulfide battery Li-FeS₂

Anode: lithium foil

Cathode: iron disulfide with aluminium cathode contact

Electrolyte: **propylene carbonate, dioxolane, dimethoxyethane**

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Carbon Black (CAS# 1333-86-4)	3.5 mg/m ³ TWA	3.5 mg/m ³ TWA	0-4
1,2-Dimethoxyethane (CAS# 110-71-4)	None established	None established	2-4
1,3-Dioxolane (CAS# 646-06-0)	None established	20 ppm	5-9
Graphite (CAS# 7782-42-5)	15 mg/m ³ TWA (total dust) 5 mg/m ³ TWA (respirable fraction)	2 mg/m ³ TWA (respirable fraction)	0-4
Iron Disulfide (CAS# 1309-36-0)	None established	None established	24-35
Lithium or Lithium Alloy (CAS# 7439-93-2)	None established	None established	5-8
Lithium Iodide (CAS# 10377-51-2)	None established	None established	0.5-3

HAZARDOUS CHARACTERISTICS: ECOTOXIC

- **1,3, dioxolane** – F flammable, CAS 646-06-0
- **1,2-dimethoxyethane**: F flammable, T; CAS 110-71-4; Harmful by inhalation, ingestion and through skin contact; possible teratogen. May impair fertility; highly flammable; R11 R19 R20 R60 R61; Not found in EC list of hazardous chemicals
- **Lithium**: flammable, corrosive R:14/15; R 34 - (5% R 34 – corrosive)
- **Lithium iodide**: Xi irritant, R 36/38
- **Iron disulfide**
Iron compounds have varying toxicity. Acute exposure to excessive levels of ferrous compounds can cause liver and kidney damage, altered respiratory rates and convulsions (Sax, Dangerous Properties of Industrial Materials, eighth edition).
- **Acetylene black (carbon black)**: CAS No: 1333-86-4, EINECS: 215-609-9, not found in EC list of hazardous chemicals; IARC evaluation: possible human carcinogen (Group 2B). May be harmful by ingestion or inhalation. Respiratory irritant

Lithium sulphur dioxide Li-SO₂

service life of 15 to 20 years.

Anode : lithium

Cathode : sulfur dioxide on Teflon bonded carbon (liquid cathode)

Electrolyte: in the case of lithium-sulfur dioxide, the electrolyte is also an **organic solvent (acetonitrile)** solution with **lithium bromide and sulphur dioxide**

HAZARDOUS CHARACTERISTICS: ECOTOXIC, TOXIC

Lithium-sulfur dioxide batteries contain **pressurized sulfur dioxide** gas which vaporizes upon exposure to air, -- **highly toxic**. The batteries require safety ventilation; **acetonitrile forms cyanide** and can form **hydrogen cyanide** in high temperatures.

- **Acetonitrile**: CAS Number :75-05-8, EG/EC Number 2008352, F, Xn; R 11-20/21/22-36; UN 1648, class 3

Lithium Thionyl Chloride Cell: Li-SOCl₂

Anode : lithium

Cathode : liquid mixture of a non-aqueous thionyl chloride and lithium tetrachloroaluminate acts as the cathode (liquid cathode) and the a electrolyte, respectively .A porous carbon material serves as a cathode current collector, which receives electrons from the external circuit. (use in commercial/industrial applications; low temperature applications → toxic)

HAZARDOUS CHARACTERISTICS: ECOTOXIC, CORROSIVE

- **Thionylchloride, SOCl₂**, CAS Number: 7719-09-7, EG/EC Number : 2317488
corrosive C, Risk: 14-20/22-29-35 , UN 1836 class 8
- **Lithium tetrachloroaluminate AlCl₄Li**, CAS Number 14024-11-4, Hazard Codes : C, R: 14-20/21/22-34, UN 3260 class 8

Lithium Iodine Cell

A lithium-iodine cell comprising a cathode including a charge transfer complex of an organic donor component and iodine, an anode including a lithium element having a surface operatively contacting the charge transfer complex material, and a coating on the lithium surface of an organic electron donor material, preferably but not necessarily the organic donor component of the charge transfer complex. The organic electron donor material preferably comprises polyvinyl pyridine polymer and in particular two-vinyl pyridine polymer. A solution of two-vinyl pyridine polymer in benzene is brushed onto the anode lithium surface and then exposed to a desiccant. A number of coatings preferably are applied successively to provide a resulting or finished coating of increased thickness.

Used for the majority of implanted cardiac pacemakers.

Cathode: iodine

Electrolyte: **solid organic charge transfer complex** (e.g. poly-2-vinylpyridine P2VP) (solid electrolyte)

HAZARDOUS CHARACTERISTICS: ECOTOXIC

- **Iodine** : Hazard Codes Xn, N; Risk Statements 20/21-50; UN 1759 8/PG 2, German Water Pollution Class 1
- **Details about the solid organic charge transfer complex are not known.**

4. LITHIUM ION BATTERY (RECHARGEABLE CELL (LI-ION))

Lithium-carbon battery

Cathode: carbon to which lithium cations are intercalated or deintercalated during the charge-discharge process.

A particularly important element for activating Li-ion batteries is the solid electrolyte interphase (SEI).

Liquid electrolytes: consist of solid lithium-salt electrolytes, such as LiPF₆, LiBF₄, or LiClO₄, and organic solvents, such as ether. Lithium-ion batteries can easily rupture, ignite, or explode when exposed to high temperatures, or direct sunlight.

Typical compositions of lithium ion batteries

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Acetylene Black (CAS# 1333-86-4)	3.5 mg/m ³ TWA (as carbon black)	3.5 mg/m ³ TWA (as carbon black)	0-2
Biphenyl (CAS# 92-52-4)	1 mg/m ³ TWA 0.2 ppm TWA	0.2 ppm TWA	0-15
Diethyl Carbonate (CAS# 105-58-8)	None established	None established	0-15
Dimethyl Carbonate (CAS# 616-38-6)	None established	None established	0-15
Ethyl Methyl Carbonate (CAS# 623-53-0)	None established	None established	0-15
Ethylene Carbonate (CAS# 96-49-1)	None established	None established	0-15

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Graphite (CAS# 7782-42-5)	5 mg/m ³ TWA (respirable fraction) 15 mg/m ³ TWA (total dust)	2 mg/m ³ TWA (respirable fraction)	7-22
Lithium Cobalt Oxide (CAS# 12190-79-3)	0.1 mg/m ³ TWA (as Co)	0.02 mg/m ³ TWA (as Co)	15-30
Lithium Hexafluorophosphate (CAS# 21324-40-3)	None established	None established	0-5
Lithium Tetrafluoroborate (CAS# 14283-07-9)	None established	None established	0-5
n-Methyl Pyrrolidinone (CAS# 872-50-4)	None established	None established	0-1

Oxalic Acid (CAS# 144-62-7)	1 mg/m ³ TWA	1 mg/m ³ TWA 2 mg/m ³ STEL	0-1
Propylene Carbonate (CAS# 108-32-7)	None established	None established	0-15

Other producer's data:

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Carbon Black (CAS# 1333-86-4)	3.5 mg/m ³ TWA	3.5 mg/m ³ TWA	0-1
1,2-Dimethoxyethane (CAS# 110-71-4)	None established	None established	0-6
1,3-Dioxolane (CAS# 646-06-0)	None established	None established	0-8
Graphite (CAS# 7782-42-5)	15 mg/m ³ TWA (total dust) 5 mg/m ³ TWA (respirable fraction)	2 mg/m ³ TWA (respirable fraction)	0-3
Lithium or Lithium Alloy (CAS# 7439-93-2)	None established	None established	1-6
Lithium Perchlorate (CAS# 7791-03-9)	None established	None established	0-3

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Lithium Trifluoromethanesulfonate (CAS# 33454-82-9)	None established	None established	0-3
Lithium Trifluoromethanesulfonimide (CAS# 90076-65-6)	None established	None established	0-3
Manganese Dioxide (CAS# 1313-13-9)	5 mg/m ³ Ceiling (as Mn)	0.2 mg/m ³ TWA (as Mn)	12-42
Propylene Carbonate (CAS# 108-32-7)	None established	None established	0-8

Lithium ion rechargeable battery – other producer's data : weight %

Lithium Cobalt Oxide (12190-79-3)	30-40
Mesophase Carbon Microbeads (7440-44-0)	20-25
Copper (7440-50-8)	10-15
Ethylene Carbonate (96-49-1)	5-10
Dimethyl Carbonate (616-38-6)	5-10
Aluminum (7429-90-5)	1-5
Lithium Hexafluorophosphate (21324-40-3)	1-5
Acetylene Black (1333-86-4)	1-5

Other producer's data

INGREDIENT NAME	CAS #	%	TLV*
Steel	7439-89-6	15-30	--
Lithium Cobalt Nickel Dioxide	12031-55-1 12031-65-1	<25	0.02 mg/m ³ (Co, TWA) 0.1 mg/m ³ (Ni, Soluble Compounds, TWA)
Lithiated Manganese Dioxide	12057-17-9	<25	0.2 mg/m ³ (Mn, TWA)
Graphite	7782-42-5	3 - 5	2 mg/m ³ (TWA)
Copper	7440-50-8	5-15	0.2mg/m ³ (Fume, TWA)
Aluminum	7429-90-5	2-8	2 mg/m ³ (Soluble Salts, TWA)
Nickel	7440-02-0	2-5	1.5 mg/m ³ (Elemental, TWA)
Lithium Hexafluorophosphate	21324-40-3	1-5	2.5 mg/m ³ (F, TWA)
Ethylene Carbonate	96-49-1	<15	None Established
Methyl Ethyl Carbonate	623-53-0	<15	None Established
Dimethyl Carbonate	616-38-6	<15	None Established
Diethyl Carbonate	105-58-8	<15	None Established
Methyl Acetate	79-20-9	<15	200 ppm (TWA)
Plastic, Ceramic, Other	--	<20	--

HAZARDOUS CHARACTERISTICS: IRRITANT, ECOTOXIC

General: Contents of an open battery can cause serious chemical burns; N-methyl pyrrolidinone, ethylene carbonate, ethyl methyl carbonate, dimethyl carbonate, and biphenyl may be absorbed through the skin causing localized inflammation.

- **Manganese dioxide MnO₂** EG-No: 215-202-6, CAS: 1313-13-9 – Xn; R20/22; harmful by inhalation or ingestion – (limit: 25 % - Xn, sum of harmful substances)
- **Biphenyl:** EC Nr 202-163-5; CAS: 92-52-4, R36/37/38-50/53, Xi, N (irritant – limit 20%) ,Water Pollution Class 2
- **N-Methyl-2-pyrrolidinone:** CAS Number 872-50-4, EG/EC Number 2128281
Hazard Codes , Xi; R 36/38
- **Ethylene carbonate: CAS 96-49-1** EG/EC Number: 2025100, Hazardous in case of skin contact (irritant). Slightly hazardous in case of ingestion, of inhalation (lung irritant). Non-hazardous in

case of inhalation. Synonym : 1,3-Dioxolan-2-one; Xi – R 36/37/38

- **Propylene Carbonate** (carbonic acid cyclic methylethylene ester, carbonic acid propylene ester, cyclic 1,2-propylene carbonate) CAS No: 108-32-7 , EC No: 203-572-1, EC Index No: 607-194-00-1 Xi, Irritant. May be harmful by inhalation, ingestion or skin contact. Risk phrases - R36. (limit for irritant: 20%)
- **Dimethyl carbonate:** CAS Number 616-38-6; EG/EC Number 2104784
Hazard Codes F; flammable, Water Pollution Class Germany 1
- **Acetylene black and cobalt compounds are listed as possible carcinogens** by the International Agency for Research on Cancer (IARC).
- **Lithium tetrafluoroborate LiBF₄**
CAS No: 14283-07-9, EC No: 238-178-9, corrosive - causes burns. Harmful, if swallowed or inhaled, and in contact with skin. Very destructive of mucous membranes. Toxicology not fully investigated. R20 R21 R22 R31 R34. UN No 3260. Packing group II. Major hazard class 8
- **Lithium hexafluorophosphate** : LiPF₆ , CAS No: 21324-40-3, Harmful if swallowed, inhaled or absorbed through the skin. Very destructive of mucous membranes – C, corrosive; R20 R21 R22 R34. UN No 3260 - class 8
- **Lithium trifluoromethanesulfonate**, CAS no: 33454-82-9, Xi , irritant, R 36/37/38 Irritating to eyes, respiratory system and skin.
- **Lithium cobalte oxide** CAS-Nr. 12190-79-3, EINECS-Nr. 235-362-0: Xn; R: 42/43
- **Lithium perchlorate** LiClO₄ : CAS No: 7791-03-9, strong oxidizer - contact with combustible material may cause fire. Incompatible with organic materials, combustible materials, strong reducing agents. Skin, eye and respiratory irritant. – R36 R37 R38

Lithium Polymer battery

The lithium-polymer battery differs from other battery systems in the type of electrolyte used. The polymer electrolyte replaces the traditional porous separator, which is soaked with electrolytes. The dry polymer design offers simplifications with respect to fabrication, safety, there is no danger of flammability, because no liquid or gelled electrolyte is used.

Common chemical name / General name	CAS number	Concentration / Concentration range	Classification and hazard labeling
Lithium Cobaltate (LiCoO ₂)	12190-79-3	10-20%	-
Lithium Manganate (LiMn ₂ O ₄)	12057-17-9	10-20%	-
Aluminum	7429-90-5	10-40%	-
Graphite (Natural graphite) (Artificial graphite)	7782-42-5 7740-44-0	10-20%	-
Copper	7440-50-8	5-10%	Sensitization of the skin group No.2
Polymer electrolyte	-	5-20%	Inflammable Solid

Other producer lithium polymer battery

Hazardous Components	Contents, %	CAS No.
Aluminum Foil	3-12	7429-90-5
Transition Metal Oxide	20-50	-
Carbon(Graphite, Proprietary)	15-35	7440-44-0
PVDF(Poly Vinylidene Fluoride)	<8	24937-79-9
Copper Foil	3-12	7440-50-8
Electrolyte (Proprietary)	10-20	-
Al Film Cover	Remainder	N/A

Other producer lithium polymer battery

Chemical Name	CAS No.	Percentage %
Lithium Cobalt Oxide	12190-79-3	25 – 30
Carbon	7440-44-0	10 – 15
Polymer		5 – 15
Copper	7440-50-8	7 – 11
Aluminum	7429-90-5	8 - 12
Other	N/A	27- 46

HAZARDOUS CHARACTERISTICS: HARMFUL, ECOTOXIC

General : The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract. The electrolyte skin contact causes a sore and the stimulation on the skin. If the electrolyte contacts with water, it may generate detrimental hydrogen fluoride. The leaked electrolyte is inflammable liquid

- **Lithium manganate:** Water Pollution Class 3
- **Lithium cobalte oxide** CAS-Nr. 12190-79-3, Xn; R: 42/43
Lithium hydroxide R: 22-35; C- corrosive
- **Lithium cobalte oxide** CAS-Nr. 12190-79-3, Xn; R: 42/43
- **Polymer electrolyte** – flammable liquid
- **(CH₂CF₂)_nPoly(vinylidene fluoride)** CAS Number 24937-79-9.,
EG/EC Number : 2008677, Water Pollution Class 3

Lithium - Cobalt oxide battery (rechargeable)

The lithium/cobalt oxide cathode battery (LiCoO_2) is very light and has an energy density about three times higher than that of the conventional rechargeable batteries (for portable or mobile IT instruments)

Positive electrode; Lithium cobalt oxide 20 - 35wt%

Negative electrode; Carbon 5 - 20wt%

Electrolyte; Organic electrolyte mainly composed of **alkyl carbonate 10 - 20wt%**

HAZARDOUS CHARACTERISTICS: HARMFUL, ECOTOXIC

- **Lithium cobalte oxide** CAS-Nr. 12190-79-3, Hazard Codes : Xn; R: 42/43
- **alkyl carbonate** – irritant or flammable

Lithium - Nickel oxide battery

The lithium / nickel oxide positive electrode (LiNiO_2), has a capacity almost 40% over currently mass-produced batteries.

HAZARDOUS CHARACTERISTICS: HARMFUL, ECOTOXIC - Nickel salts – carcinogenic

Lithium - Vanadium battery (rechargeable)

Vanadium pentoxide ($\text{Li/V}_2\text{O}_5$) is a solid cathode material into which lithium ions are inserted. The system is low pressure, so low rate cells do not need to have a safety vent. Vanadium pentoxide is mainly used in reserve batteries but it is likely to be of more importance in rechargeable lithium batteries in the future.

Chemistry	Cathode	Electrolyte	Application
Li- $\text{Ag}_2\text{V}_4\text{O}_{11}$, Li-SVO, Li-CSVO	Silver oxide+vanadium pentoxide (SVO)	lithium hexafluorophosphate or lithium hexafluoroarsenate in propylene carbonate with dimethoxyethane	Used in medical applications, eg. implantable defibrillators, neurostimulators. Also projected for use in other electronics, eg. emergency locator transmitters. Addition of copper oxide to the cathode material results in the Li- CSVO variant.

HAZARDOUS CHARACTERISTICS: HARMFUL, ECOTOXIC

- **Vanadium pentoxide: V_2O_5** CAS Number 1314-62-1, EG/EC Number 2152398, T, N, : 20/22-37-48/23-51/53-63-68, UN 2862 class 6.1, Water Pollution Class 3
- **Lithium hexafluorophosphate** : LiPF_6 , CAS No: 21324-40-3, Harmful if swallowed, inhaled or absorbed through the skin. Very destructive of mucous membranes -corrosive ; R20 R21 R22 R34 UN No 3260, class 8.

- **1,2-dimethoxyethane:** F, flammable, CAS11071- 4; R11
Harmful by inhalation, ingestion and through skin contact.
Possible teratogen. May impair fertility; highly flammable; R11
R19 R20 R60 R61; not found in EC list of hazardous chemicals
- **Propylene carbonate** (carbonic acid cyclic methylethylene ester, carbonic acid propylene ester, cyclic 1,2-propylene carbonate)CAS No: 108-32-7 , EC No: 203-572-1, EC Index No: 607-194-00-1 Xi ,Irritant. May be harmful by inhalation, ingestion or skin contact. Risk phrases - R36. (limit for irritant: 20%)

Chemistry	Cathode	Electrolyte	Notes
Li-Ag ₂ CrO ₄	Silver chromate	Lithium perchlorate solution	Very high reliability. Has a 2.6V plateau after reaching certain percentage of discharge, provides early warning of impending discharge. Developed specifically for medical applications, eg. implanted pacemakers.

HAZARDOUS CHARACTERISTICS: TOXIC, ECOTOXIC

- **Silver chromate:** Ag₂CrO₄, CAS Number 7784-01-2, EG/EC Number 2320438, Hazard Codes O,T,N, R 49-8-43-50/53, Water Pollution Class 3
- **Lithium perchlorate** LiClO₄ : CAS No: 7791-03-9, strong oxidizer - contact with combustible material may cause fire. Incompatible with organic materials, combustible materials, strong reducing agents. Skin, eye and respiratory irritant. – R36 R37 R38.

5. NICKEL BATTERIES

Nickel-iron battery

Cathode: Nickel(III) oxide-hydroxide (main component)

Anode: iron

Electrolyte: **potassium hydroxide**

HAZARDOUS CHARACTERISTICS: CORROSIVE , ECOTOXIC

- **Ni-dioxide, Dinickeltrioxide** carc. cat 1 – 0,1% limit and **Nickel oxides** – carc. Cat 3, Xn
- **Potassium hydroxide:** **EC-No: 215-181-3, CAS: 1310-58-3** harmful, corrosive R22-35; (corrosive : limit 1% of corrosive R34, 5 % of R35)
- 5%<c<25% - C (corrosive), R35
- 2%<c<5% - C (corrosive), R34
- 0,5%<c<2% ; Xi (irritant) R36/38
-

Nickel-Hydrogen Batteries

Cathode: nickel oxide

Anode: hydrogen - hydrogen electrodes utilize a teflon-bonded platinum black catalyst

Hydrogen gas in the negative electrode becomes oxidized to water at discharge, only to be reformed at charge via electrolysis. Oxygen is formed at the positive electrode at overcharge, and there is no alteration of the potassium hydroxide (KOH) or water level in the battery during continuous overcharge. The positive electrode makes hydrogen during reversal, which in turn is consumed at the same rate at the negative electrode. In addition, hydrogen reacts electrochemically but not chemically, and reduces the nickel oxyhydroxide.

The sintered positive electrode is made up of a sintered porous nickel plaque, which contains active material of nickel hydroxide. The plaque conducts the battery's electric current, and retains the active material. The battery can use two types of separators in aerospace cells: fuel-grade cell asbestos paper (old cells) and untreated knit Zircar cloth.

Nickel metal hydride battery

Chemical Name	CAS No.	Percentage %
Nickel	7440-02-0	30 – 40
Cobalt	7440-48-4	4 – 8
Manganese	7439-96-5	<2
Potassium Hydroxide	1310-58-3	10 – 15
Sodium Hydroxide	1310-73-2	4
Lithium Hydroxide	1310-65-2	0 – 4
Other	N/A	<13

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Aluminum (CAS# 7429-90-5)	15 mg/m ³ TWA (total dust) 5 mg/m ³ TWA (respirable fraction)	10 mg/m ³ TWA	< 2
Cobalt as cobalt metal (CAS# 7440-48-4) as cobalt oxide (CAS# 1307-96-6) as cobalt hydroxide (CAS# 21041-93-0)	0.1 mg/m ³ TWA (as Co)	0.02 mg/m ³ TWA (as Co)	2.5-6.0
Lithium Hydroxide (CAS# 1310-65-2)	None established	None established	0-4

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Manganese (CAS# 7439-96-5)	5 mg/m ³ Ceiling	0.2 mg/m ³ TWA (as Mn)	< 3
Mischmetal including: Lanthanum (CAS# 7439-91-0) Cerium (CAS# 7440-45-1) Neodymium (CAS# 7440-00-8) Praseodymium (CAS# 7440-10-0)	15 mg/m ³ TWA (particulates not otherwise regulated-total dust) 5 mg/m ³ TWA (particulates not otherwise regulated-respirable fraction)	10 mg/m ³ TWA (particulates not otherwise classified-inhalable) 3 mg/m ³ TWA (particulates not otherwise classified-respirable)	< 13

Nickel as nickel hydroxide (CAS# 12054-48-7) as nickel oxide (CAS# 1313-99-1) as nickel powder (CAS# 7440-02-0)	1 mg/m ³ TWA (as Ni)	1.5 mg/m ³ TWA (as inhalable Ni) 0.2 mg/m ³ TWA (as inhalable Ni, insoluble compounds) [changed 3 format to be consistent with rest of the numbers]	30-50
Potassium Hydroxide (CAS# 1310-58-3)	None established	2 mg/m ³ Ceiling	< 7
Sodium Hydroxide (CAS# 1310-73-2)	2 mg/m ³ TWA	2 mg/m ³ Ceiling	0-4
Zinc as zinc metal (CAS# 7440-66-6) as zinc oxide (CAS# 1314-13-2) as zinc hydroxide (CAS# 20427-58-1)	15 mg/m ³ TWA (total dust: zinc oxide) 5 mg/m ³ TWA (respirable fraction: zinc oxide)	10 mg/m ³ TWA (total dust: zinc oxide)	< 3

HAZARDOUS CHARACTERISTICS: CORROSIVE, CARCINOGENIC, ECOTOXIC

- **Ni-dioxide, Dinickeltrioxide** carc. cat 1 – 0,1% limit
- **Nickel oxide and nickel powder** – carc Cat 3 , Xn
-
- **Potassium hydroxide:** EC-No: 215-181-3, CAS: 1310-58-3 harmful, corrosive R22-35; (corrosive : limit 1% of corrosive R34, 5 % of R35)
 - 5%<c<25% - C (corrosive), R35
 - 2%<c<5% - C (corrosive), R34
 - 0,5%<c<2% ; Xi (irritant) R36/38
- **Sodium hydroxide** -No: 215-185-5, CAS: 1310-73-2, (corrosive : limit 1% of corrosive R34, 5 % of R35)
 - 5%<c<100% - C (corrosive) , R35

- 2%>c>5% - C (corrosive), R34
- 0,5%<c<2% - Xi (irritant), R36/38
- **LiOH lithium hydroxide** CAS Number 1310-65-2, C; R: 22-35; UN 2680 class 8, Water Pollution Class 2
- **Zinc oxide** : CAS 1314-13-2, ECNo: 215-222-5; R50/53 – N (Ecotoxic)
- **Zinc hydroxide** CAS No: 20427-58-1 - No toxicological data available
- **Zinc** (powder stabilized) CAS: 7440-66-6; EC No: 231-175-3; R59/53; N (Ecotoxic)

Nickel zinc battery

Cathode: nickel (nickel oxihydroxide) electrode (pocket plate electrode, the sintered-nickel electrode, the non-sintered nickel electrode)

Anode: zinc electrode built using zinc oxide, additives, and a plastic binder

These types of electrodes are built by loading nickel hydroxide hydrate, which is the active material, and a conductive additive like graphite or nickel flakes into flat tube pockets, which are eventually made into electrodes. The sintered-nickel electrode is made by sintering high bulk density carbonyl nickel powder, thus transforming it into a porous plaque. Non-sintered nickel electrodes reduce the amount of nickel used.

Electrolyte: is usually a **potassium hydroxide**, though some use lithium hydroxide as additive material to improve semiconductive properties.

Description:		Approximate % of total weight	
Lead	:	0.004	Wt%
Mercury	:	0.0001	Wt%
Cadmium	:	0.0003	Wt%
Manganese Dioxide	:	15	Wt%
NiOOH	:	23	Wt%
Potassium hydroxide	:	6	Wt%
Zinc Power	:	18	Wt%

HAZARDOUS CHARACTERISTICS: CORROSIVE, CARCINOGENIC, ECOTOXIC

- **Potassium hydroxide:** EC-No: 215-181-3, CAS: 1310-58-3 harmful, corrosive R22-35; (corrosive : limit 1% of corrosive R34, 5 % of R35)
 - **5%<c<25% - C (corrosive), R35**
 - **2%<c<5% - C (corrosive), R34**
 - 0,5%<c<2% ; Xi (irritant) R36/38

-
- **Manganese Dioxide**, EG-No: 215-202-6, CAS: 1313-13-9 – Xn; R20/22; harmful by inhalation or ingestion – (limit: 25 % - Xn, sum of harmful substances)
 - **Nickel (II) hydroxide, nickelous hydroxide**, Ni(OH)₂ CAS No: 12054-48-7
Poison. May act as a carcinogen. Harmful if swallowed, inhaled or absorbed through the skin. May act as a sensitizer. Skin, eye and respiratory irritant. R20 R21 R22 R43 R49.
 - **Ni-dioxide, Dinickeltrioxide** carc. cat 1 – 0,1% limit
 - **Nickel oxide and nickel powder** – carc Cat 3 , Xn

6. AMMONIA BATTERIES

Use of the **magnesium/meta-dinitrobenzene (Mg/m-DNB)** system.

Anode: consists of magnesium

Cathode: uses a meta-dinitrobenzene active ingredient,

Electrolyte salt system: ammonium thiocyanate (NH₄SCN) and potassium thiocyanate (KSCN).

The dry salts are kept in the electrode stack. KSCN, a neutral salt, is positioned in the separator. The cathode itself consists of pads that press paper pulp, carbon, m-DNB, and NH₄SCN together. NH₄SCN ensures ionic conductivity and provides an acid environment to enhance anode activity, as well as reducing the ammonia's vapor pressure.

In this design, dry electrolyte salts separate the electrodes, and the ammonia vapor in the electrode compartment activates the battery.. Ammonia batteries operate anywhere between -55 and 74 degrees Celsius due to the high conductivity of ammonia electrolytes. Because of excessive internal pressure, ammonia batteries require hermetic seals.

HAZARDOUS CHARACTERISTICS: IRRITANT, ECOTOXIC

- **Ammonium thiocyanate** (rhodanide), CAS No: 1762-95-4
Harmful if swallowed, inhaled or absorbed through the skin. Eye, skin and respiratory irritant. R20 R21 R22 R37 R37 R38.
- **Potassium thiocyanate**, CAS No: 333-20-0, Harmful if swallowed. Irritant. Skin contact may lead to ulceration, discolouration or eczema, R22 R36 R37 R38.
- **1,3-dinitrobenzol**, CAS No: 99-65-0, EC No: 202-776-8
extremely toxic - may be fatal if swallowed, inhaled or absorbed through the skin. May cause reproductive disorders. Possible mutagen. Rapidly absorbed through the skin. Severe irritant – 0,1% limit; R26 R27 R28 R33 R50 R53. Very toxic to aquatic organisms - may cause long-term harm in the environment.

7. REDOX BATTERY

The vanadium redox battery stores energy in a liquid **electrolyte solution of vanadium pentoxide dissolved in sulphuric acid**. The electrolyte can be charged or discharged by pumping it through the battery stack and either supplying electric power to the stack or taking power from the stack. It can also be recharged by having the spent electrolyte pumped out and a fresh charge of electrolyte pumped in. The spent electrolyte can then be recharged in another battery with electricity from the mains or from renewable energy sources. This raises the opportunity for the establishment of refuelling stations so that electric vehicles could exchange their electrolyte and then continue on their way with no more delay than if refuelling with petrol or diesel.

The Vanadium Redox Flow Battery employs the V(V)/V(IV) and V(III)/V(II) redox couples in sulphuric acid as the positive and negative half-cell electrolytes respectively.

Typically, the electrolyte for the vanadium battery is 2 M **vanadium sulphate in 2.5 M H₂SO₄**, the vanadium sulphate (initially 1 M V (III) + 1 M V (IV)) being prepared by chemical reduction or electrolytic dissolution of V₂O₅ powder.

HAZARDOUS CHARACTERISTICS: CORROSIVE, ECOTOXIC

- **Sulfuric acid:** CAS 7664-93-9; EC: 231-639-5; R 35 C, corrosive 15% >c<100% C, R35; 5%<C>15% - Xi, R 36/38
- **Vanadium(IV) sulfate** toxic; skin, eye and respiratory irritant

8 . THERMAL BATTERIES

Almost exclusively military applications.

Anode: calcium

Cathode: calcium chromate

Electrolyte: **solid lithium chloride and potassium chloride** electrolyte which are strong oxidizers or caustics capable of causing skin irritation. These batteries also contained asbestos in former times. If batteries show signs of leakage, proper eye and skin protection is recommended during handling.

Molten salt batteries are a class of primary cell and secondary cell high temperature electric battery that use molten salts as an electrolyte..Operating temperatures of 400 to 700°C however brings problems of thermal management and safety .

Referred to as thermal batteries the electrolyte is solid and inactive at normal ambient temperatures..The battery is only activated when it is actually needed by introducing the electrolyte into the active cell area and elevated to high temperatures by the application of heat from an external source, generally a pyrotechnic charge. This is achieved by burning electrically fired pellets of gas-less thermite. Older batteries used calcium or magnesium anodes, but lithium anodes are now common. Typical chemistry is lithium iron disulphide. The electrolyte is normally a eutectic mixture of lithium and potassium chlorides.

HAZARDOUS CHARACTERISTICS: ECOTOXIC

- **Calcium chromate**, CAS 13765-19-0 Calcium chromate (VI): skin and eye irritant; calcium chromate is considered a human carcinogen. Large doses of chromates can cause kidney damage, water insoluble hexavalent chromium compound;
- **Lithium chloride** , CAS Number 7447-41-8, EG/EC Number 2312123 Xn, R: 22-36/37/38, Water Pollution Class 1
-

Sodium-Sulfur battery

A **sodium-sulfur battery** is a type of battery constructed from sodium (Na) and sulfur (S). The operating temperature of 300 to 350 °C and the highly corrosive nature of sodium make it suitable only for large-scale non-mobile applications.

The entire cell is enclosed by an inert metal container and sealed at the top with an airtight alumina lid. During the discharge phase, molten metallic sodium at the core acts as the anode, separated by a beta-alumina solid electrolyte (BASE) cylinder from a sulfur container made from an inert metal acting as the cathode. The sulfur is absorbed in a carbon sponge. Alumina is a good conductor of sodium ions but a bad conductor of electrons, avoiding self-discharge. When sodium gives off an electron, the Na^+ ion migrates to the sulfur container. The electron travels through the molten sodium to the contact and through the electric load to the sulfur container. Here, the electron reacts with sulfur to form S^- , which then forms sodium polysulfide. As the cell discharges the sodium level drops. During the charging phase the reverse process takes place. Once running, the heat produced by charging and discharging cycles is enough to maintain operating temperatures and no external source is required.

Pure sodium presents dangers because it spontaneously burns on contact with water. Therefore, the system must be protected from moisture. In modern NaS cells, sealing techniques make fires unlikely.

HAZARDOUS CHARACTERISTICS: ECOTOXIC; FLAMMABLE, CORROSIVE

- **Sodium metal** is highly reactive. It is flammable in a normal atmosphere, corrosive, and exothermically reactive with water, releasing hydrogen gas that is ignited by the heat of the reaction. It presents internal and external health hazards, including the risk of burns and irritation to the mucous membranes and respiratory tract. Sodium fires burn violently and may be accompanied by explosions that splatter the molten metal. **Sodium, Na:** CAS Number 7440-23-5, EG/EC Number 2311329, risks: flammable and corrosive F, C, R14/15-34, UN 1428 class 4.3, Water Pollution Class 1

Sodium-Nickelchloride battery

The **zebra (Zeolite Battery Research Africa Project) battery**, which operates at 250°C, utilizes molten sodium chloroaluminate, (NaAlCl_4) which has a melting point of approximately 160°C, as the electrolyte.

Negative electrode: molten sodium.

Positive electrode: nickel in the discharged state and nickel chloride in the charged state.

Because nickel and nickel chloride are nearly insoluble in neutral and basic melts, intimate contact is allowed, providing little resistance to charge transfer. Since both **NaAlCl_4 and Na are liquid** at the operating temperature, a sodium-

conducting beta-alumina ceramic is used to separate the liquid sodium from the molten NaAlCl_4 .

HAZARDOUS CHARACTERISTICS: ECOTOXIC, FLAMMABLE, TOXIC

- **Nickel metal and nickel chloride** are considered hazardous; **Nickel** (7718-54-9), carcinogenic – category 1, investigated as a tumorigen, mutagen, reproductive effector.
- **Sodium-Alumina Ceramic Electrolyte**
- Sodium -alumina ($\text{Na}_{1.7}\text{Li}_{0.3}\text{Al}_{10.7}\text{O}_{17}$) is incombustible, non-reactive, and is not known to present any health hazards beyond irritation to the eyes and respiratory system upon exposure to high concentrations of dust
- **Sodium metal** is highly reactive. It is flammable in a normal atmosphere, corrosive, and exothermically reactive with water, releasing hydrogen gas that is ignited by the heat of the reaction. It presents internal and external health hazards, including the risk of burns and irritation to the mucous membranes and respiratory tract. Sodium fires burn violently and may be accompanied by explosions that splatter the molten metal. **Sodium, Na:** CAS Number 7440-23-5, EG/EC Number 2311329, risks: flammable and corrosive F, C, R14/15-34, UN 1428 class 4.3, Water Pollution Class 1
- **Additives : Sodium fluoride** can irritate tissue if inhaled or ingested. NaF , CAS Number 7681-49-4, EG/EC Number 2316678 , toxic T R: 25-32-36/38, UN 1690 class 6.1, Water Pollution Class

9. FLOW BATTERIES

Zinc bromide battery

Flow batteries are a special class of battery where additional quantities of electrolyte are stored outside the main power cell of the battery, and circulated through it by pumps or by movement. (marine applications, gaining popularity in grid energy storage applications).

A solution of **zinc bromide** is stored in two tanks. When the battery is charged or discharged the solutions (electrolytes) are pumped through a reactor and back into the tanks. One tank is used to store the electrolyte for the positive electrode reactions and the other for the negative.

The electrolyte also contains a **bromine complexing agent (quaternary ammonium salt – $\text{NR}_4\text{-Br}$; R= a morpholinederivate)** that immediately reacts with the produced bromine

HAZARDOUS CHARACTERISTICS: at least ECOTOXIC, IRRITANT

- **Zinc bromide** CAS No: 7699-45-8 , EINECS No: 231-718-4 Corrosive and exotoxic, C, N- causes burns. harmful if swallowed. Respiratory, eye and skin irritant. R: R22, R34, R36 R37 R38, R50/53. **R 34** – 5% limit for corrosive; UN 3260 class 8, Water pollution class 3

---000---
