



# **Targeted amendment of the European List of Waste - Battery waste**

## **MEETING OF THE EXPERT GROUP ON WASTE**

**8 May 2024**

DG Environment, Unit B3

# Proposal to amend Decision 2000/532/EC

- The Annex of Decision contains the European List of Waste
- Last amended by Commission Decision 2014/955/EU in December 2014
- A targeted amendment is proposed to address battery waste
- Based on recommendations provided by the JRC



Brussels, XXXX  
[...](2024) XXXX draft  
ANNEX

ANNEX

to the  
Commission Delegated Decision

amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council

#### Disclaimer

This draft is a working document supporting the development of a targeted amendment of the list of waste to take account of the emergence of new battery chemistries and evolving manufacturing and recycling processes in the context of the new Batteries Regulation. It sets out an initial draft of the text to support the stakeholders' consultation process, in particular the Waste Expert Group meeting of 8 May 2024.

Please note that this draft has not been adopted or endorsed by the European Commission. Any views expressed are the preliminary views of DG ENV and JRC staff and may not in any circumstances be regarded as stating an official position of the European Commission.

## Purpose

- Supports implementation of the new **Batteries Regulation (EU) 2023/1542**. Its recital 116 states: “[Commission Decision 2000/532/EC] *should be revised to reflect all battery chemistries, in particular the codes for lithium-based waste batteries, in order to enable proper sorting and reporting of such waste batteries*”
- The Communication on a **secure and sustainable supply of critical raw materials** in support of the twin transitions [COM(2023) 165 final] states that “*The Commission will propose in 2024 the inclusion of waste codes for Lithium-ion batteries and intermediate waste streams (“black masses”) under the European List of Waste to ensure their proper recycling*”
- Aims to:
  - Improve identification and classification of battery waste streams
  - Support statistical control and traceability / improve control of shipments
  - Provide level playing field and increased legal certainty

## Overview – what changes?

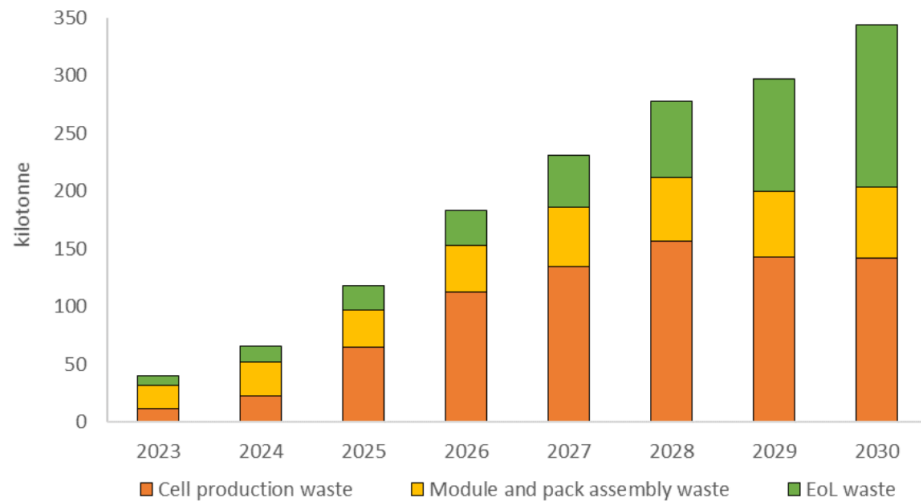
- 44 LoW entries addressed – amended or new
- New codes for battery manufacturing waste for all chemistries proposed to be added to sub-chapter 16 06
- New codes for waste batteries proposed under 16 06 – mostly hazardous
- Alignment of terminology to the Battery Regulation
- New specific intermediate fraction (black mass) codes proposed for all chemistries – hazardous
- Slags and salts also addressed

## Current sub-chapter 16 06

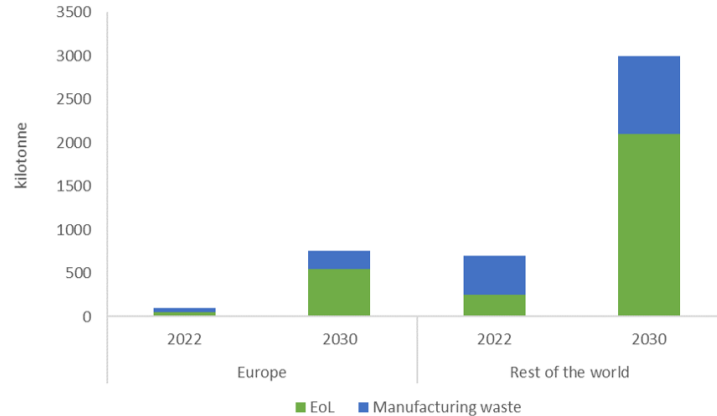
16 06	<b>batteries and accumulators</b>
16 06 01*	lead batteries
16 06 02*	Ni-Cd batteries
16 06 03*	mercury-containing batteries
16 06 04	alkaline batteries (except 16 06 03)
16 06 05	other batteries and accumulators
16 06 06*	separately collected electrolyte from batteries and accumulators

# Battery manufacturing waste

**Figure 6.** Development and forecast for End-of-life EV batteries and battery manufacturing waste until 2030



**Figure 7.** Waste lithium-based batteries available for recycling, 2022 and 2030 (adapted from Avicenne Energy (2023))



# Battery manufacturing waste

<b>16 06</b>	<b>Wastes from the manufacture, supply and use of batteries</b>
16 06 21*	Lead-acid battery manufacturing waste containing hazardous substances (for example lead paste, lead scrap)
16 06 22	Lead-acid battery manufacturing waste other than those mentioned in 16 06 21
16 06 23*	Lithium-based battery manufacturing waste containing hazardous substances (for example cathode cut-offs, cathode slurry)
16 06 24	Lithium-based battery manufacturing waste other than those mentioned in 16 06 23 (for example anode cut-offs)
16 06 25*	Nickel-based battery manufacturing waste containing hazardous substances (for example liquid and solid cathode material)
16 06 26	Nickel-based battery manufacturing waste other than those mentioned in 16 06 25
16 06 27*	Alkaline-based battery manufacturing waste containing hazardous substances
16 06 28	Alkaline-based battery manufacturing other than those mentioned in 16 06 27
16 06 29*	Zinc-based battery manufacturing waste containing hazardous substances
16 06 30	Zinc-based battery manufacturing waste other than those mentioned in 16 06 29
16 06 31*	Sodium-based battery manufacturing waste containing hazardous substances
16 06 32	Sodium-based battery manufacturing waste other than those mentioned in 16 06 31
16 06 33*	Battery manufacturing waste containing hazardous substances other than those mentioned in 16 06 21, 16 06 23, 16 06 25, 16 06 27, 16 06 29 and 16 06 31
16 06 34	Battery manufacturing waste other than those mentioned in 16 06 22, 16 06 24, 16 06 26, 16 06 28, 16 06 30 and 16 06 32

Name of sub-chapter adapted to Battery Regulation

New mirror entries introduced for battery manufacturing waste covering multiple battery chemistries

For most chemistries, information for manufacturing waste deduced from information on battery composition.

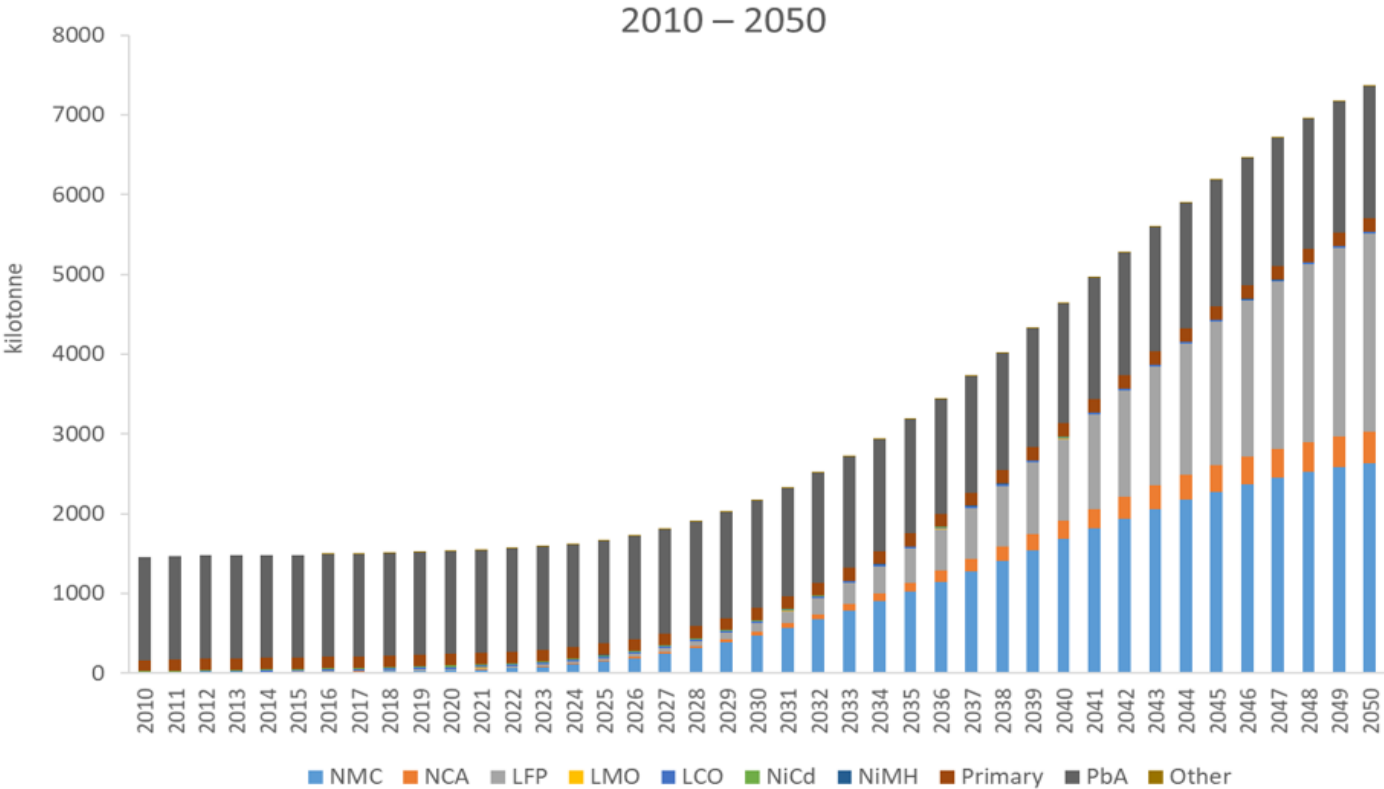
Other chemistries / future chemistries addressed under mirror entries 160633\* / 160634

Battery type	Battery chemistry
Lead-based	PbA: Lead-acid battery
Lithium-based	LCO: Lithium-Cobalt-Oxide LMO: Lithium-Manganese-Oxide NMC: Lithium-Nickel-Manganese-Cobalt-Oxide NCA: Lithium-Nickel-Cobalt-Aluminium-Oxide LTO: Lithium-Titanium-Oxide LFP: Lithium-Iron-Phosphate LiSOCl <sub>2</sub> : Lithium-Thionyl-Chloride
Nickel-based	NiMH: Nickel-Metal-Hydride Na-NiCl <sub>2</sub> : Sodium-Nickel-Chloride
Alkaline-based	
Zinc-based	Zn-C: Zinc-Carbon Zn-Cl: Zinc-Chloride Zn-air Ag-Zn: Silver-Zinc Ag-O: Silver-Oxide
Sodium-based	Na-S: Sodium-Sulphur Na-ion: Cathode made of Prussian white, layered oxide or polyanion

## Waste batteries - scope



**Figure 8.** Total weight of battery waste generated in the EU-27, UK, Switzerland and Norway, 2010–2050 grouped by battery chemistry (NMC: nickel manganese cobalt; NCA: nickel cobalt aluminium; LFP: lithium iron phosphate; LMO: lithium manganese oxide; LCO: lithium cobalt oxide; NiCd: nickel-cadmium; NiMH: nickel–metal hydride; Primary: non-rechargeable (alkaline, Zinc-, Silver- and Lithium-based portable batteries); PbA: lead-acid)



Waste  
batteries

## Example: Lithium-based batteries - composition

**Table 7.** Variability of the main battery components for the different lithium-based battery chemistries under scope

Battery components	Component/s	LCO, LMO, NMC <sup>44</sup> , NCA	LTO	LFP
		Weight (% total battery)		
Cathode material	Metal salts, other lithium compounds	20–50 %	20–50 %	20–50 %
Cathode current collector	Aluminium foil	8–15 %	6–8 %	6–8 %
Anode material	Graphite, Silicon dioxide, Carbon black	10–30 %	10–30 %	10–20 %
Anode current collector	Copper foil	7 %	10–12 %	10–20 %
Electrolyte	Lithium salts, Organic solvents	10–20 % (thereof 1–3 % lithium salts)	10–20 % (thereof 1–3 % lithium salts)	10–20 % (thereof 1–3 % lithium salts)
Binder	e.g. PVDF	1–8 %	1–8 %	0.5–1 %
Separator	Polymeric membranes (e.g. PE or PP), Non-woven fabric mats, Styrene Butadiene Rubber (SBR)	3–5 %	3–5 %	3–5 %
Case and tab	Steel, plastic	15–30 %	15–30 %	15–30 %

# Example: Li-based batteries – cathode material classification

**Table 9.** Overview on cathode materials for different commercial lithium battery composition with hazard identification according to CLP (1272/2008)

Battery chemistry	Chemical compound	Weight (% total battery)	CAS No.	Source	Hazard statement code, hazard class and category code		Conc. Limit	Haz. Class. (Y/N/°)	H (WFD Annex III)
LCO	LiCoO <sub>2</sub>	20–50 %	12190-79-3	REACH registration C&L	H360Fd	Repr. 1B	≥ 0.3 %	Y	HP 10
NMC	LiNi <sub>x</sub> Mn <sub>y</sub> Co <sub>z</sub> O <sub>2</sub> <sup>45</sup>		various CL entries considering the elemental composition <sup>46</sup>	Notified C&L	H317	Skin Sens. 1	≥ 10 %	Y	HP 13
					H330	fatal if inhaled	≥ 0.1 %	Y	HP 6
					H334	Resp. Sens. 1	≥ 10 %	Y	HP 13
					H350	Carc. 1A	≥ 0.1 %	Y	HP 7
					H360	Repr. 1B	≥ 0.3 %	Y	HP 10
					H372	STOT RE 1	≥ 1 %	Y	HP 5
					H412	Aquatic Chronic 3	≥ 25 %	°Y	HP 14
LMO	Li <sub>x</sub> Mn <sub>y</sub> O <sub>4</sub>	20–50 %	12057-17-9	Notified C&L	H302	Acute Tox. 4	≥ 25 %	°Y	HP 6
					H332	Acute Tox. 4	≥ 22.5 %	°Y	HP 6
			12057-17-9	Notified C&L	H413	Aquatic Chronic 4	≥ 25 %	°Y	HP 14
NCA	LiNi <sub>x</sub> Co <sub>y</sub> Al <sub>z</sub> O <sub>2</sub>	20–50 %	177997-13-6; 193214-24-3	REACH registration C&L; Notified C&L	H314	Skin Corr. 1B	≥ 5 %	Y	HP 8
					H317	Skin Sens. 1	≥ 10 %	Y	HP 13
					H318	Eye Dam. 1	≥ 10 %	Y	HP 14
					H330	Acute Tox. 2	≥ 0.1 %	Y	HP 6
					H334	Resp. Sens. 1	≥ 10 %	Y	HP 13
		20–50 %	177997-13-6; 193214-24-3	REACH registration C&L; Notified C&L	H350	Carc. 1A	≥ 0.1 %	Y	HP 7
					H360	Repr. 1B	≥ 0.3 %	Y	HP 10
					H372	STOT RE 1 (lungs)	≥ 1 %	Y	HP 5
					H412	Aquatic Chronic 3	≥ 25 %	°Y	HP 14
LTO	Li <sub>2</sub> TiO <sub>3</sub>	20–50 %	12031-82-2	REACH registration C&L	-	not classified	-	-	-
LFP	LiFePO <sub>4</sub> , Phosphoric acid, iron(2+) lithium salt (1:1:1) (FeLiO <sub>4</sub> P)		15365-14-7 1199808-36-0	Notified C&L REACH registration C&L	- -	not classified not classified	- -	- -	- -

# Waste batteries – amended codes

Current Waste Code		Proposal for Waste Code amendment	
<b>16</b>	<b>Waste not otherwise specified in the list</b>		
<b>16 06</b>	<b>Batteries and accumulators</b>	<b>16 06</b>	<b>Wastes from the manufacture, supply and use of batteries</b>
16 06 01*	Lead batteries (Pb-Acid)	16 06 01*	Waste lead-acid batteries
16 06 02*	Ni-Cd batteries (Ni-Cd)	16 06 02*	Waste nickel-cadmium batteries
16 06 03*	Mercury-containing batteries	16 06 03*	Waste mercury-containing batteries
16 06 04	Alkaline batteries (except 16.06.03*)	16 06 04*	Waste alkaline-based batteries (except 16 06 03)
16 06 05	Other batteries and accumulators	16 06 05	Waste batteries not otherwise specified other than those mentioned in 16 06 07
16 06 06*	Separately collected electrolyte from batteries and accumulators	16 06 06*	Separately collected electrolyte from waste batteries
<b>20</b>	<b>Municipal wastes</b>		
<b>20 01</b>	<b>Separate collected fractions (except 15 01)</b>		
20 01 33*	Batteries and accumulators included in 16 06 01*, 16 06 02* or 16 06 03* and unsorted batteries and accumulators containing those batteries	20 01 33*	Waste batteries included in categories 16 06 01 to 16 06 04, 16 06 07 to 16 06 11, 16 06 13 and unsorted waste batteries containing those waste batteries
20 01 34	Batteries and accumulators other than those mentioned in 20 01 33*	20 01 34	Waste batteries other than those mentioned in 20 01 33

- Wording changed to stress the waste status of the batteries listed
- Reference to “accumulators” removed in line with BR terminology
- Waste alkaline batteries reclassified as hazardous waste (absolute)

# Alkaline battery re-classification

**Table 19.** Overview on battery components, their chemical compound and % weight of waste alkaline-based batteries with hazard identification according to CLP (1272/2008)

Battery components	Chemical compound	Weight (% total battery)	CAS No.	Source	Hazard statement code, hazard class and category code		Conc. limit	Haz. Class. (Y/N/°)	H (WFD Annex III)
Cathode	MnO <sub>2</sub>	25–50 %	1313-13-9	Harmonised C&L	H302 H332	Acute <del>Tox.</del> 4 Acute <del>Tox.</del> 4	≥ 25 % ≥ 22.5 %	Y Y	HP6 HP6
	Mn <sub>2</sub> O <sub>3</sub>	unknown	1317-34-6	REACH registration C&L	-	not classified	-	-	-
	BaSO <sub>4</sub>	unknown	7727-43-7	REACH registration C&L	-	not classified	-	-	-
Anode	Zn metallic (Zinc powder – zinc dust)	10–25 %	7440-66-6	Multiple harmonised classifications	H260 H400 H410	Water-react. 1 Aquatic Acute 1 Aquatic Chronic 1	0.3 % ≥ 25 % ≥ 0.25 %	Y °N Y	HP3 HP14 HP14
	ZnO	unknown	1314-13-2	Harmonised C&L	H400 H410	Aquatic Acute 1 Aquatic Chronic 1	≥ 25 % ≥ 0.25 %	- -	HP14 HP14
Carbon	Graphite	2–6 %	7782-42-5	REACH registration C&L	-	not classified	-	-	-
Electrolyte	KOH	5–15 %	1310-58-3	Harmonised C&L	H302 H314	Acute <del>Tox.</del> 4 Skin Corr. 1A	≥ 25 % ≥ 5 %	N Y	HP6 HP8
Binder	PAA <sup>53</sup>	0–1 %	9003-01-4	REACH registration C&L	H302 H318 H335 H412	Acute <del>Tox.</del> 4 Eye Dam. 1 STOT SE 3 Aquatic Chronic 3	≥ 25 % ≥ 10 % ≥ 20 % ≥ 25 %	N N N N	HP6 HP4 HP5 H14
	PAA <sup>54</sup>	0–1 %	9003-01-4	Notified C&L	-	not classified	-	-	-
Reaction compound	K <sub>2</sub> CO <sub>3</sub>	unknown	584-08-7	REACH registration C&L	H315 H319 H335	Skin Irrit. 2 Eye Irrit. 2 STOT SE 3	≥ 20 % ≥ 20 % ≥ 20 %	- - -	HP4 HP4 HP5



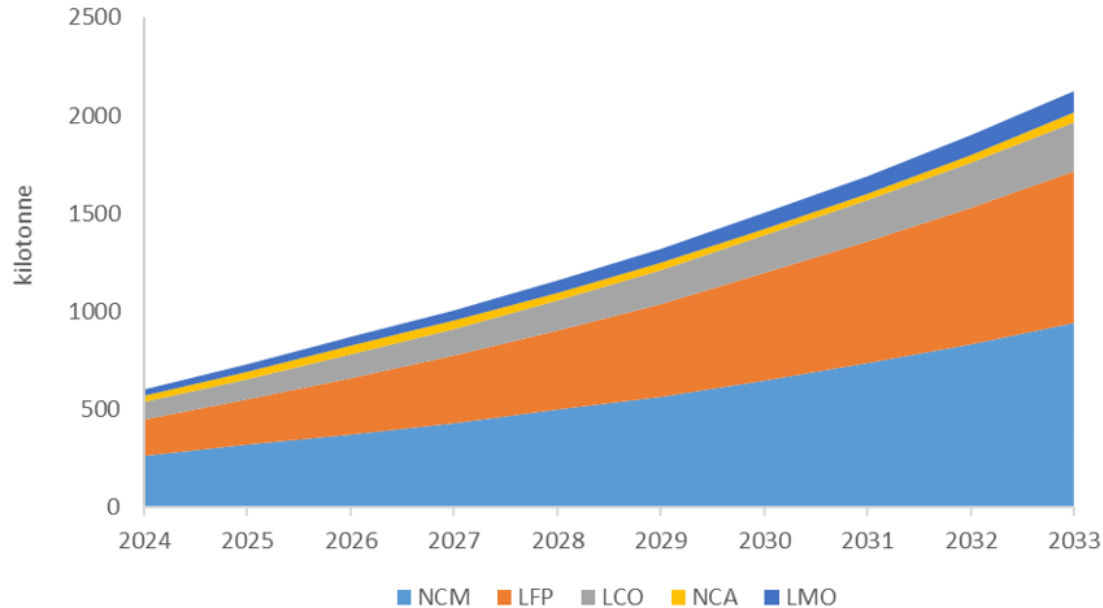
## Waste batteries – new codes

16 06 07*	Waste batteries not otherwise specified containing hazardous substances
16 06 08*	Waste lithium-based batteries
16 06 09*	Waste nickel- based batteries other than those mentioned in 16 06 02 (e.g. NiMH, Na-NiCl <sub>2</sub> )
16 06 10*	Waste zinc-based batteries, including silver oxide batteries
16 06 11*	Waste sodium-based batteries containing hazardous substances (except 16 06 13)
16 06 12	Other waste sodium-based batteries
16 06 13*	Waste sodium sulphur batteries

- Covers all relevant battery chemistries not previously addressed
- Hazardous code 16 06 07\* introduced (mirror to 16 06 05) → **catch-all**

# Intermediates from waste battery recycling – “black masses”

**Figure 9.** Global Lithium-based batteries black mass production forecast by chemistry. NMC: nickel manganese cobalt; LFP: lithium iron phosphate; LCO: lithium cobalt oxide; NCA: nickel cobalt aluminium; LMO: lithium manganese oxide



By 2035 waste lithium-based batteries be ca. 50 % of all battery waste generated in the EU;

by 2040 this is projected to reach 75 %;

→ **Will correlate with black mass generation**

# Classification of black mass from Li-based batteries

**Table 28.** Chemical compounds, their weight (percent) share in black mass recovered from lithium-based batteries with hazard identification according to CLP (1272/2008)

Black mass	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	BM9	BM10	Hazard statement code, hazard class and category code		Conc. limit
Input batteries	Unspecific, mix	LCO, NMC, NCA	NMC	NMC	Unspecific, mix	NMC	Unspecific, mix	LFP	LFP	LFP			
Additional treatment to mechanical treatment	unknown	unknown	unknown	unknown	unknown	pyrolysis	pyrolysis	pyrolysis	pyrolysis	vacuum drying			
Weight (%)													
Mixed metal oxides	10–75 %	–	–	–	–	–	45–50 %	–	–	–	With the exception for LTO and LFP, the various metal oxides trigger a hazardous classification due to their characteristics and the high concentration within the black mass (see <b>Table 9</b> )		
Li-oxide	< 10 %	–	–	–	< 70 %*	–	–	–	–	–			
Li-, Ni-oxides	–	–	–	–		–	–	–	–				
Li-, Co-oxides	–	1–50 %	–	–		–	–	–	–				
Li-, Ni-, Co-, Al-oxides	–	1–50 %	–	–		–	–	–	–				
Li-, Ni-, Co-, Mn-oxides	–	1–50 %	60–65 %	30–50 %		≥ 60 %	–	–	–	–			
Li-, Fe-phosphate	–	–	–	–	–	–	–	≥ 60 %	60–70 %	60–70 %			
Aluminium	< 10 %	–	1–2 %	< 10 %	< 10 %	< 5 %	10 %	< 5 %	< 5 %	< 5 %	not classified		
Copper powder	< 10 %	–	1–2 %	< 5 %	< 10 %	< 5 %	3–4 %	< 5 %	< 2.5 %	< 5 %	H411	Aquatic Chronic 2	≥ 2.5 %
Graphite	< 40 %	30–50 %	30 %	25–40 %	10–40 %	< 40 %	–	≤ 40 %	≤ 40 %	30–40 %	not classified		
KOH, caustic potash	–	–	–	–	–	< 5 %	–	–	–	–	H302 H314	Acute Tox. 4 Skin Corr. 1A	≥ 25 % ≥ 5 %
Lithium fluoride	–	–	–	–	< 5 %	–	–	< 10 %	< 10 %	–	H302 H319	Acute Tox. 4 Eye Irrit. 2	≥ 25 % ≥ 20 %
PVDF	–	2–7 %	–	–	–	–	–	–	–	< 2 %	H315 H319 H335	Skin Irrit. 2 Eye Irrit. 2 STOT SE 3	≥ 20 % ≥ 20 % ≥ 20 %
Lithium salts (e.g. LiPF <sub>6</sub> , LiBF <sub>4</sub> )	–	1–4 %	1–2 %	–	< 10 %	–	–	–	–	not detectable	LiPF <sub>6</sub> (Specific Target Organ Toxicity) and LiBF <sub>4</sub> (Suspected of causing genetic defects) have a concentration limit of ≥ 1 % for waste to be classified as hazardous (see <b>Annex 6. Overview on electrolytes used in lithium-based batteries Table 44</b> ) Several organic solvents are (highly) flammable. Furthermore, a hazardous classification could be triggered with a concentration of 5–10 %.		
Organic solvents	–	–	–	5–10 %	–	–	–	–	–	not detectable			
Water	10–30 %	–	–	–	–	–	–	–	–	–	–		

\*lithium carbonate: < 10 %; cobalt oxide: < 30 %; manganese oxide: < 15 %; nickel oxide: < 15 %



## Intermediates from waste battery recycling – “black masses”

19	<b>Waste from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use</b>
19 12	<b>Wastes from the mechanical treatment of waste</b>
19 12 13*	Intermediate fraction from the thermal/mechanical treatment of waste lead-acid batteries and lead-acid battery manufacturing waste containing a mixture of electrode materials
19 12 14*	Intermediate fraction from the thermal/mechanical treatment of waste lithium-based batteries and lithium-based battery manufacturing waste containing a mixture of electrode materials
19 12 15*	Intermediate fraction from the thermal/mechanical treatment of waste nickel-based batteries and nickel-based battery manufacturing waste containing a mixture of electrode materials
19 12 16*	Intermediate fraction from the thermal/mechanical treatment of waste alkaline-based batteries and alkaline-based battery manufacturing waste containing a mixture of electrode materials
19 12 17*	Intermediate fraction from the thermal/mechanical treatment of waste zinc-based batteries and zinc-based battery manufacturing waste containing a mixture of electrode materials
19 12 18*	Intermediate fraction from the thermal/mechanical treatment of waste sodium-based batteries and sodium-based battery manufacturing waste containing a mixture of electrode materials
19 12 19*	Intermediate fraction from the thermal/mechanical treatment of waste batteries and battery manufacturing waste containing a mixture of electrode materials, not otherwise specified in 19 12 13 to 19 12 18

## Other intermediates – salts, slags and alloys

<b>19</b>	<b>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</b>		
<b>19 02</b>	<b>Wastes from physical/chemical treatments of waste</b>		
19 02 12*	Solid salts and solutions containing heavy metals from battery recycling		
<b>10</b>	<b>Wastes from thermal processes</b>		
<b>10 04</b>	<b>Wastes from lead thermal metallurgy</b>		
10 04 01*	Slags from primary and secondary production		
<b>10 08</b>	<b>Wastes from other non-ferrous thermal metallurgy</b>		
10 08 21*	Slags from waste lithium-based battery recycling containing hazardous substances		
10 08 22	Slags from waste lithium-based battery recycling other than those mentioned in 10 08 21		
10 08 23*	Slags from waste nickel-based battery recycling containing hazardous substances		
10 08 24	Slags from waste nickel-based battery recycling other than those mentioned in 10 08 23		
10 08 25*	Slags from other waste battery recycling containing hazardous substances except 10 04 01		
10 08 26	Slags from other waste battery recycling other than those mentioned in 10 08 25		
10 08 27	Alloys from waste battery recycling [in massive form]		



# Alloys

Cu, Co and Ni are present in alloys in concentrations **exceeding limits** for the classification as hazardous waste in Annex III of WFD.

The Annex of Decision 2000/532/EC specifies that for waste constituted by pure metal alloys, these are specifically exempt from the classification as hazardous.

*“The concentration limits defined in Annex III to Directive 2008/98/EC **do not apply to pure metal alloys in their massive form** (not contaminated with hazardous substances). Those waste alloys that are considered as hazardous waste are specifically enumerated in this list and marked with an asterisk (\*) ”*

This is consistent with approach used under the Basel Convention for Annex IX entries B1010 and B1020 which refer to **metal and metal-alloy wastes in metallic, non-dispersible form**, and for waste metals under A1020 which **excludes “metal waste in massive form”**.

## Other wastes already covered by the LoW

Steel fraction (19 12 02: ferrous metal)

Aluminium fraction (19 12 03: non-ferrous metal)

Plastics (19 12 04: plastic and rubber)

**Electronic parts** (several waste codes from the sub-chapter 16 02: wastes from electrical and electronic equipment, e.g. 16 02 14 discarded equipment other than those mentioned in 16 02 09 to 16 02 13; 16 02 15\* hazardous components removed from discarded equipment; 16 02 16 components removed from discarded equipment other than those mentioned in 16 02 15)

Graphite (19 12 09 minerals (for example sand, stones))

Copper and aluminium foils (19 12 03: non-ferrous metal)

## Impacts

- Increased protection of human health and environment
- Increased legal certainty, better identification and control of battery waste
- EU harmonization → level playing field / clarity towards shipments

### BUT:

- More battery wastes classified as hazardous waste
- Limitations on the shipment of hazardous waste apply
- Need to update permits for waste operators → new codes / amended codes
- Initially, additional costs and administrative efforts to adapt
- Impacts expected to be limited given many battery related waste streams already managed as hazardous waste

**Some time to adapt to new codes needed**

## Discussion

- Do you agree with the structure and granularity of the entries proposed?
- Do you agree with the classifications proposed?
- Do you envisage any difficulties in implementation?
- What are your views regarding a suitable application date for the new waste codes? 12 months after publication of the Decision?
- Any other issues

## Next Steps

- Comments should be sent to:  
[ENV-WASTE-BATTERIES@ec.europa.eu](mailto:ENV-WASTE-BATTERIES@ec.europa.eu) by **5 June 2024**
- Publication in Have Your Say and TBT notification – Q3 2024
- Envisaged adoption by Commission – Q4 2024

# Thank you

Learn more here:

[https://ec.europa.eu/environment/circular-economy/index\\_en.htm](https://ec.europa.eu/environment/circular-economy/index_en.htm)



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