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EUROBAT Feedback on the draft delegated act supplement the Batteries Regulation establishing the methodology for calculation and verification of rates for recycling efficiency and recovery of materials from waste batteries, and the format for the documentation

EUROBAT recommendations for the finalisation of the delegated act

- Aside from the metal-specific material recovery targets (Pb, Cu, Co, Li, Ni) and the tracking of safe destination given to mercury and cadmium, the existing templates from the old Batteries Directive should be the basis for the new templates and should not be complexified[1].
- The list of elements or compounds that are part of the input fractions and for which the output needs to be reported by the first recyclers needs to be streamlined for purposes of simplicity and accuracy (see section I of the position paper)
- The "input" and "results" blocks of the documentation sheets relative to the first recycler should be supplemented with a series of rows to report the weight of dismantled materials that are not passed on to the first recycler (e.g., casings, cables, external parts not included in the battery).
- The reporting in each documentation sheet should cover the input and output by process (e.g., lead-acid battery recycling, lithium-ion battery recycling) and facility; any other information, specifically location-dependent information, would be irrelevant to fulfill the Art. 71 requirement.
- The "negative list" of elements authorizing the exclusion of e.g., carbon, iron and sulphur should be made more visible and incorporated in the definitions of input and output fractions, in points (2) and (4) of section 1, to ensure regulatory certainty.
- Slag as output fraction should be excluded. However, if slag is still considered as output, then there should be formal documentation on how to exclude slag forming agent for calculating rRE

EUROBAT calls on the Commission to urgently address three key aspects of the draft Delegated Regulation establishing the calculation and verification methodology of rates for recycling efficiency and recovery of materials of waste batteries: namely the absence of rows to report elements or compounds that are the product of dismantling and the unnecessary requirements to report materials by geography. As it stands in the draft delegated act, the methodology goes beyond the requirements of the Regulation and would not be applicable in practice.

Besides, we thank the Commission for establishing a negative list of six substances (e.g., carbon sources at cell level, phosphorus, chlorine) that recyclers may take out of the recycling efficiency formula, at their discretion. However, as noted in a comment already submitted by Volvo Group, this clause should be given more visibility by being integrated directly in the definition of inputs and outputs in section 1 of the Annex.

EUROBAT's recommendations can be grouped in 7 main categories.

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I. *Streamlining the list of elements and compounds in the "input" and "results" section of each documentation sheet*

In Part 1 of each documentation sheet, the element- and compound-specific rows describing the "input fraction" should be adjusted to better reflect recycling practices for each main category of battery and subsume elements of lower importance into the "other" category, to increase simplicity. The same should be done for the "results" section. We also suggest removing the section "elements or components **not part of** the input fraction" as this information has no practical value for RE or rM calculation purposes.

In detail, we propose the following changes for each of the 4 categories of waste batteries laid down in the Annex:

Lead acid batteries

First, elements that are the products of dismantling activities and which are not passed on to the first recyclers (e.g. cables, casings, screens, printed circuited boards) should be reported under rows that would be fitted under a stand-alone sub-block of the "elements or compounds" block for both the input and the output fractions. That sub-block should bear the heading "**(a) Elements or compounds that are the product of dismantling (fractions not handed over to the first recycler by the dismantler)**". Specifically, one row should be added for "cables"[1], one for "external parts included in the battery"[2], one for "waste battery casings", and another for "other products of dismantling activities".

The row "total lead (pb)" should be replaced with "total lead metal (Pb)"; that row should be displayed as part of a sub-block with the heading "**(b) Elements or compounds for which the material recovery rate must be calculated**" .

In addition, two rows should be added for "oxygen" and "carbon from carbon sources at cell level", with the equivalent of the footnote (7) used for lithium-ion batteries ((7) If not taken into account in calculating recycling efficiency in accordance with section 2, point 5, leave empty). Other optional elements or compounds listed in point (5) of Section 2 (e.g., sulphur and chlorine) should be left out of the documentation sheet as they are not present in lead-acid batteries. The "oxygen" and "carbon from carbon sources at cell level" rows should be displayed as part of sub-block with the heading "**(c) Elements or compounds that may be taken into account in the calculation**".

The other element-specific rows (plastics, dry sulphuric acid, and steel) would stay the same but should be displayed as part of a sub-block with the heading "**(d) Other elements or compounds**".

The final table and its footnotes would be as follows:

[1] A footnote could be added with the following wording: "cables that are integral part of the battery as made available on the market and necessary to its operation, excluding the cables required to connect the battery to the final equipment;"

[2] A footnote could be added with the following wording: "any external part included in the battery as made available on the market, such as screens and printed circuit boards;"

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Elements or compounds part of the input fraction	mass %	minput [t/a] (5)
Elements or compounds that are the product of dismantling (fractions not handed over to the recycler by the dismantler)		
Cables (6)		
Any external part included in the battery (7)		
Waste battery casings		
Other (please specify)		
Elements or compounds for which the material recovery rate must be caculated		
Total lead metal (Pb)		
Elements or compounds that may be taken into account in the caculation		
Oxygen (02) (8)		
Carbon from carbon sources at cell level (c) (8)		
Other elements or compounds		
Dry sulphuric acid (H2SO)		
Steel		
Plastics (9)		
Other (please specify) (10)		
Total	100	

Notes

([6]) cables that are integral part of the battery as made available on the market and necessary to its operation, excluding the cables required to connect the battery to the final equipment

([7]) any external part included in the battery as made available on the market, such as screens and printed circuit boards

([8]) If not taken into account in calculating recycling efficiency in accordance with section 2, point 5, leave empty

([9]) Plastics that are recycled and for which the minput as well as the moutput are measured, are indicated in the list separately from carbon

([10]) Add other cells if necessary to specify other elements or compounds

The same structure should be introduced for the “results” section of the documentation sheet. Since we are suggesting removing the geographical breakdown from the “Results” section (see section II below), we also recommend that the “Elements or compounds part of the Input Fraction” data as well as the “Results” data be all placed in the same rows, to facilitate readability.

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Lithium batteries

As with lead-acid batteries, elements that are the products of dismantling activities and which are not passed on to the first recycler (e.g. cables, casings, screens, printed circuited boards) should be reported under rows that would be fitted under a stand-alone sub-block of the "elements or compounds" block for both the input and the output fractions. That sub-block should bear the heading "**(a) Elements or compounds that are the product of dismantling (fractions not handed over to the first recycler by the dismantler)**". Specifically, one row should be added for "cables"[3], one for "external parts included in the battery"[4], one for "waste battery casings", and another for "other products of dismantling activities".

The rows corresponding to cobalt, copper, lithium and nickel should be displayed as part of a sub-block with the heading "**(b) Elements or compounds for which the material recovery rate must be calculated**" .

The "oxygen", "carbon from carbon sources at cell level", "iron", "phosphorus", "chlorine" and "sulphur" rows should be displayed as part of sub-block with the heading "**(c) Elements or compounds that may not be taken into account in the calculation**".

The other element-specific rows (plastics, dry sulphuric acid, and steel) should be displayed as part of a sub-block with the heading "other elements or compounds". The "manganese" and "list all metals" rows should be removed for the sake of simplicity: manganese and other similar metals should be reported under "**(d) Other elements or compounds**".

[3] A footnote could be added with the following wording: "cables that are integral part of the battery as made available on the market and necessary to its operation, excluding the cables required to connect the battery to the final equipment;"

[4] A footnote could be added with the following wording: "any external part included in the battery as made available on the market, such as screens and printed circuit boards;"

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Elements or compounds part of the input fraction	mass %	minput [t/a] (5)
Elements or compounds that are the product of dismantling (fractions not handed over to the recycler by the dismantler)		
Cables (6)		
Any external part included in the battery (7)		
Waste battery casings		
Other (please specify)		
Elements or compounds for which the material recovery rate must be caculated		
Cobalt (Co)		
Copper (CU)		
Lithium (Li)		
Nickel (Ni)		
Elements or compounds that may be taken into account in the caculation		
Oxygen (02) (8)		
Carbon from carbon sources at cell level (c) (8)		
Iron from iron sources at cell level (Fe) (8)		
Phosphorus (P) (8)		
Chlorine (Cl) (8)		
Sulphur (S) (8)		
Other elements or compounds		
Aluminium (Al)		
Steel		
Plastics (9)		
Other (please specify) (10)		
Total	100	

Notes

([6]) Cables that are integral part of the battery as made available on the market and necessary to its operation, excluding the cables required to connect the battery to the final equipment

([7]) Any external part included in the battery as made available on the market, such as screens and printed circuit boards

([8]) If not taken into account in calculating recycling efficiency in accordance with section 2, point 5, leave empty

([9]) Plastics that are recycled and for which the minput as well as the moutput are measured, are indicated in the list separately from carbon

([10]) Add other cells if necessary to specify other elements or compounds

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The same structure should be introduced for the "results" section of the documentation sheet. Since we are suggesting removing the geographical breakdown from the "Results" section (see section II below), we also recommend that the "Elements or compounds part of the Input Fraction" data as well as the "Results" data be all placed in the same rows, to facilitate readability.

Nickel-cadmium batteries

As with lead-acid and lithium-ion batteries, elements that are the product of dismantling activities and which are not passed on to the first recycler (e.g. cables, casings, screens, printed circuited boards) should be reported under rows that would be fitted under a stand-alone sub-block of the "elements or compounds" block for both the input and the output fractions. That sub-block should bear the heading "**(a) Elements or compounds that are the product of dismantling (fractions not handed over to the first recycler by the dismantler)**". Specifically, one row should be added for "cables"[5], one for "external parts included in the battery"[6], one for "waste battery casings", and another for "other products of dismantling activities".

The rows corresponding to cobalt, copper, lithium and nickel should be displayed as part of a stand-alone sub-block with the heading "**(b) Elements or compounds for which the material recovery must be calculated**" .

The "oxygen", "carbon from carbon sources at cell level", "iron from iron sources at cell level", "phosphorus", "chlorine" and "sulphur" rows should be displayed as part of sub-block with the heading "**(c) Elements or compounds that may not be taken into account in the calculation**".

The other element-specific rows (e.g., plastics, steel, as well as cadmium) should be displayed as part of a sub-block with the heading "**(d) other elements or compounds**". The "manganese" and "metal 1 (e.g. Fe)" , (group of) metal 2 (e.g. REE) and *list of metals" rows should be removed for the sake of simplicity: manganese and other similar metals should be reported under "other". We would also like to call the Commission attention to the fact that nickel-cadmium batteries, as opposed to nickel metal hydride batteries, do not contain rare earth elements. The "electrolyte" row should be replaced with "dry electrolyte", as water is not meant to be tracked (which is why the documentation sheet for lead-acid batteries refers to "dry sulphuric acid").

[5] A footnote could be added with the following wording: "cables that are integral part of the battery as made available on the market and necessary to its operation, excluding the cables required to connect the battery to the final equipment;"

[6] A footnote could be added with the following wording: "any external part included in the battery as made available on the market, such as screens and printed circuit boards;"

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Elements or compounds part of the input fraction	mass %	minput [t/a] (5)
Elements or compounds that are the product of dismantling (fractions not handed over to the recycler by the dismantler)		
Cables (6)		
Any external part included in the battery (7)		
Waste battery casings		
Other (please specify)		
Elements or compounds for which the material recovery rate must be caculated		
Cobalt (Co)		
Copper (CU)		
Lithium (Li)		
Nickel (Ni)		
Elements or compounds that may be taken into account in the caculation		
Oxygen (02) (8)		
Carbon from carbon sources at cell level (c) (8)		
Iron from iron sources at cell level (Fe) (8)		
Phosphorus (P) (8)		
Chlorine (Cl) (8)		
Sulphur (S) (8)		
Other elements or compounds		
Aluminium (Al)		
Steel		
Plastics (9)		
Cadmium (Cd)		
Dry electrolyte (KOH)		
Other (please specify) (10)		
Total	100	

Notes

([6]) cables that are integral part of the battery as made available on the market and necessary to its operation, excluding the cables required to connect the battery to the final equipment

([7]) any external part included in the battery as made available on the market, such as screens and printed circuit boards

([8]) If not taken into account in calculating recycling efficiency in accordance with section 2, point 5, leave empty.

([9]) Plastics that are recycled and for which the minput as well as the moutput are measured, are indicated in the list separately from carbon

([10]) Add other cells if necessary to specify other elements or compounds

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The same structure should be introduced for the "results" section of the documentation sheet. Since we are suggesting removing the geographical breakdown from the "Results" section (see section II below), we also recommend that the "Elements or compounds part of the Input Fraction" data as well as the "Results" data be all placed in the same rows, to facilitate readability.

Other waste batteries

As with lead-acid, lithium-ion and nickel-cadmium batteries, elements that are the product of dismantling activities and which are not passed on to the first recycler (e.g. cables, casings, screens, printed circuited boards) should be reported under rows that would be fitted under a stand-alone sub-block of the "elements or compounds" block for both the input and the output fractions. That sub-block should bear the heading "**(a) Elements or compounds that are the product of dismantling (fractions not handed over to the first recycler by the dismantler)**". Specifically, one row should be added for "cables"[7], one for "external parts included in the battery"[8], one for "waste battery casings", and another for "other products of dismantling activities".

The rows corresponding to cobalt, copper, lithium and nickel should be displayed as part of a stand-alone sub-block with the heading "**(b) Elements or compounds for which the material recovery must be calculated**" .

The "oxygen", "carbon from carbon sources at cell level", "iron", "phosphorus", "chlorine" and "sulphur" rows should be displayed as part of sub-block with the heading "**(c) Elements or compounds that may not be taken into account in the calculation**".

The other element-specific rows (e.g., plastics, steel) should be displayed as part of a sub-block with the heading "**(d) Other elements or compounds**". The "manganese" and "metal 1 (e.g. Fe)" , (group of) metal 3 (e.g. REE) and "list of metals" rows should be removed for the sake of simplicity: manganese and other similar metals should be reported under "other". The "electrolyte" row should be replaced with "dry electrolyte" (without reference to KOH), as water is not meant to be tracked (which is why the documentation sheet for lead-acid batteries refers to "dry sulphuric acid").

In addition, the "mercury" row needs to moved up under those elements that are part of the input fraction.

[7] A footnote could be added with the following wording: "cables that are integral part of the battery as made available on the market and necessary to its operation, excluding the cables required to connect the battery to the final equipment;"
[8] A footnote could be added with the following wording: "any external part included in the battery as made available on the market, such as screens and printed circuit boards;"

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Elements or compounds part of the input fraction	mass %	minput [t/a] (5)
Elements or compounds that are the product of dismantling (fractions not handed over to the recycler by the dismantler)		
Cables (6)		
Any external part included in the battery (7)		
Waste battery casings		
Other (please specify)		
Elements or compounds for which the material recovery rate must be caculated		
Cobalt (Co)		
Copper (CU)		
Lithium (Li)		
Nickel (Ni)		
Elements or compounds that may be taken into account in the caculation		
Oxygen (02) (8)		
Carbon from carbon sources at cell level (c) (8)		
Iron from iron sources at cell level (Fe) (8)		
Phosphorus (P) (8)		
Chlorine (Cl) (8)		
Sulphur (S) (8)		
Other elements or compounds		
Aluminium (Al)		
Steel		
Plastics (9)		
Mercury (Hg)		
Other (please specify) (10)		
Total	100	

Notes

([6]) cables that are integral part of the battery as made available on the market and necessary to its operation, excluding the cables required to connect the battery to the final equipment

([7]) any external part included in the battery as made available on the market, such as screens and printed circuit boards

([8]) If not taken into account in calculating recycling efficiency in accordance with section 2, point 5, leave empty

([9]) Plastics that are recycled and for which the minput as well as the moutput are measured, are indicated in the list separately from carbon

([10]) Add other cells if necessary to specify other elements or compounds

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The same structure should be introduced for the "results" section of the documentation sheet. Since we are suggesting removing the geographical breakdown from the "Results" section (see section II below), we also recommend that the "Elements or compounds part of the Input Fraction" data as well as the "Results" data be all placed in the same rows, to facilitate readability.

II. *Removing location-specific columns from both the "output" and "input" sections of the documentation sheets*

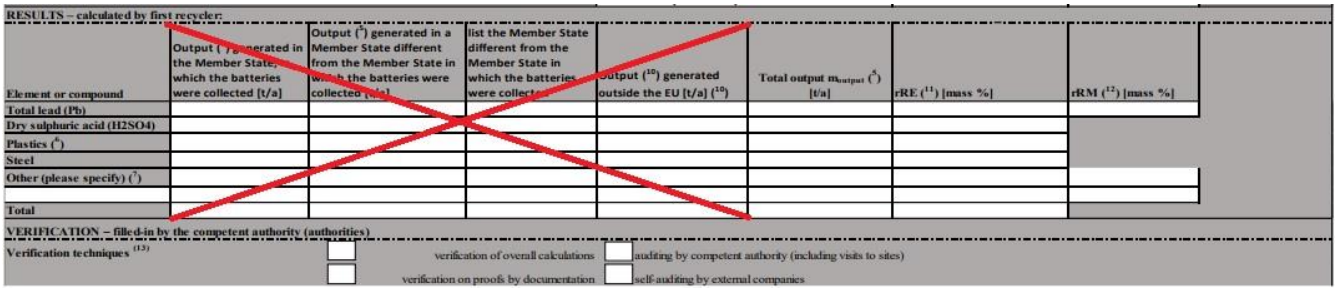
An important inconsistency comes from the fact that the documentation sheet require tracking the output generated in the Member State in which the batteries were collected separately from the output generated in a Member State different from the Member State in which the batteries were collected: indeed, no such a distinction is required in the "input" block: this makes geographic tracking of recycling efficiencies for each battery source impossible, as the granularity required when documenting the output is not matched for the input.

More generally, Art. 71 of the Batteries Regulation defines recycling efficiency by the characteristics of the process, which has not been defined as being dependent on the geographical origin of the waste; this is a process-specific attribute. Therefore, the location-specific columns of the "results" section of Part 1 of each documentation sheet should be removed. The same should be done with the location-specific columns of Part 2 of each sheet .

Furthermore, the columns which tracks the "Output generated outside of the EU" is unnecessary, as this information will already be recorded in the "Electronic Submission and Exchange of Information" system mandated in article 27 of Regulation (EU) 2024/1157 on Shipment of Waste, which, based on the upcoming classification of intermediate waste fractions, will be shipped under a 'prior written notification'.

Indeed, the reporting should cover the input and output by process (lead-acid waste battery recycling, Ni-Cd waste battery recycling, lithium waste battery recycling, other waste battery recycling) and facility; any other information would be irrelevant to fulfil the Art. 71 requirements.

Aside from the metal-specific material recovery targets (Pb, Cu, Co, Li, Ni) and the tracking of safe destination given to mercury and cadmium in line with Annex XII, the existing templates from the old Batteries Directive have withstood the test of time and should not be complexified[9].



RESULTS – calculated by first recycler:

Element or compound	Output ( ) generated in the Member State, which the batteries were collected [t/a]	Output ( ) generated in a Member State different from the Member State in which the batteries were collected [t/a]	list the Member State different from the Member State in which the batteries were collected	Output ( ) generated outside the EU [t/a] ( )	Total output m_{output} ( ) [t/a]	rRE ( ) [mass %]	rRM ( ) [mass %]
Total lead (Pb)							
Dry sulphuric acid (H2SO4)							
Plastics ( )							
Steel							
Other (please specify) ( )							
Total							

VERIFICATION – filled-in by the competent authority (authorities)

Verification techniques ( )

☐ verification of overall calculations ☐ auditing by competent authority (including visits to sites)
☐ verification on proofs by documentation ☐ self-auditing by external companies

[9] Commission Regulation 493/2012 laying down the of 11 June 2012 laying down, pursuant to Directive 2006/66/EC of the European Parliament and of the Council, detailed rules regarding the calculation of recycling efficiencies of the recycling processes of waste batteries and accumulators

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(2) Outputs that account for rRE and rRM calculations (8)								
Element or compound, targeted	Non-waste fraction containing the element or compound	Concentration of the element or compound in the fraction: [mass %]	Output generated in the Member State in which the batteries were collected [t/a]	Output generated in a Member State different from the Member State in which the batteries were collected [t/a]	list the Member State different from the Member State in which the batteries were collected	Output (9) generated outside the EU [t/a] (10)	Total mass of the output generated [t/a]	Destination and yield of the fraction
Total lead (Pb)								
Dry sulphuric acid (H2SO4)								
Plastics (9)								
Steel								
Other (please specify) (10)								
	m_{output} from step N (11) [t/a]							

III. *Definitions that are specific to "recycling efficiency" should be moved to Section 2*

Section 1 of the draft Annex mixes two definition categories. First, definitions that are only relevant to the calculation of recycling efficiency rates (e.g., black mass, intermediate fraction). Second, definitions that are relevant to the calculation of both recycling efficiency and materials recovery rates (i.e. "lithium-based batteries, impurities, first recycler, input fraction, output fraction").

Definitions that are only relevant to the calculation of recycling efficiency rates should be moved to Section 2 (method for calculating the rate of recycling efficiency for waste batteries in relation to a recycling process).

IV. *Towards a more positive definition of first recycler*

In order to ensure more regulatory predictability, the definition of "first recycler" should clarify that the first recycler is the entity breaking the cell open and does the first step and possibly subsequent steps of the process that allows the extraction of materials within the cells. The definition as it is currently proposed, pointing to the first entity that recycles[10] and excluding those which separate fractions that are not part of the waste battery[11] itself, does not bring the necessary clarity.

V. *Lacking reporting mechanisms for materials that are the product of dismantling*

The documentation sheets omit to include rows for the materials extracted at the dismantling stage, which, as noted in point (2) of Part 1 of the Annex, include, among other elements, cables that are integral part of the battery and necessary for its operation, any external part included on the battery, such as screens and printed boards, and the mass of the battery casing.

Therefore, as explained in part I of this position paper, the "input" block of the documentation sheets should be supplemented with rows to report the weight of dismantled materials, as such materials are not passed on to the first recycler by the dismantler but handed over to other parties that the first recycler is not aware of. Indeed, as acknowledged by definition (7), "a waste management operator who only conducts preparation for recycling, including the storage, handling and dismantling of battery packs or the separation of fractions that are not part of the waste battery itself, cannot be the first recycler". This should be reflected in the output block as well. Since it cannot be ensured that those fractions generated by the dismantlers can be recycled with a 100 % recycling

[10] As the start of recycling has not been defined as the opening of the cells, this first part of the definition is circular.
[11] Dismantling operators separate fractions that are part of the battery: casings, internal cables (…), however the intent is not to consider them as the first recycler.

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efficiency rate, it is advisable to introduce output fraction rows to report the recycling efficiency of those fractions, as is already the case for other fractions (e.g., plastics, copper, alluminium…).

This information should be embedded in a block bearing the heading: "**(a) Elements or compounds that are the product of dismantling (fractions not handed over to the first recycler by the dismantler)".**

Without rows covering the materials that are the product of dismantling only, components like copper cables and aluminum casings would be left out of the input fraction, artificially lowering the outcome of the recycling efficiency calculation - indeed, the recycling of these two metals are well-established businesses.

VI. Calculating the rate for recycling efficiency: incorporating the "negative list" of elements that can be left out of the formula in Section 1 of the Annex.

EUROBAT considers that the extended negative list of substances laid out in the October version of the draft delegated act is a workable compromise solution to ensure that waste battery producers do not find themselves in a situation where there do not find recycling facilities with the technical capabilities to process their waste batteries in a way compliant with the recycling efficiency targets of Parts B and C of Annex XII.

Indeed, Point (5) of Section 2 of Annex I would allow recyclers not to include oxygen, carbon from carbon sources at cell level, iron from iron sources at cell level, phosphorus, chlorine, and/or sulphur in the recycling efficiency formula. However, this clause should be made more visible and incorporated in the definitions of input and output fractions, in points (2) and (4) of section 1, to ensure regulatory certainty.

It also needs to be clarified that the decision whether to include or leave out carbon from carbon sources at cell level, oxygen, iron from iron sources at cell level, phosphorus, chlorine, and sulphur is solely at the recycler's discretion.

VII. Excluding slag as output fraction or if slag is still considered as output, then there should be formal documentation on how to exclude slag forming agent for calculating rRE

Slag should be excluded from output fraction. Slag is not the target output for recovery efficiency. Slag is a by-product of pyrometallurgical recycling, which has very low utilization value, and can only be used as an inert material for construction or treated as waste. In addition, slag still contains certain key metals, such as lithium, and classifying slag as an output product will reduce the enthusiasm for recycling, which in turn hinders the development and innovation of slag recovery technology.

If slag insists on being counted in the recovery efficiency as an output, there should be official documentation of how to exclude the slag forming agent. The slag forming agent and reducing agent containing silicon, calcium and magnesium added in the slag formation process are not simply one plus one equals two, and the weight of the slag cannot be calculated by directly subtracting the weight of the added components, which will make the pyrometallurgical recovery efficiency high above normal value.

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About EUROBAT

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EUROBAT is the association for the European manufacturers automotive, industrial and energy storage batteries. EUROBAT has more than 50 members from across the continent comprising more than 90% of the automotive and industrial battery industry in Europe. The members and staff work with all stakeholders, such as battery users, governmental organisations and media, to develop new battery solutions in areas of hybrid and electro-mobility as well as grid flexibility and renewable energy storage.