OCAD3E

Approved Coordinating Body for Waste Electrical and Electronic Equipment

Technical guidance

Simplified assessment of the recyclability of EEE meeting the requirements of Decree No. 2022-748

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Cancels and replaces any previous version

Context

The AGEC law (2020) created a new obligation for producers to inform consumers about the environmental qualities and characteristics of products placed on the market (Article 13). This obligation is established in the Environmental Code (translation with no legal value):

> ***Art. L. 541-9-1**. - In order to improve consumer information, **producers and importers of waste-generating products shall inform consumers**, **by means of marking, labelling, display or any other appropriate process**, of their environmental qualities and characteristics, in particular the incorporation of recycled material, the use of renewable resources, durability, compostability, repairability, reusability, **recyclability** and the presence of hazardous substances, precious metals or rare earths, in accordance with European Union law. [...]*
>
> ***The information provided for in this paragraph must be visible or accessible to the consumer at the time of purchase**. The producer or importer shall be responsible for making the data relating to the aforementioned qualities and characteristics available to the public **electronically**, in a format that is easily reusable and usable by an automated processing system in an aggregated form. Centralised access to this data may be set up by the administrative authority in accordance with procedures specified by decree. [...]*
>
> ***A decree in the Council of State shall lay down the procedures for implementing this article**, in particular the definition of environmental qualities and characteristics, the procedures for establishing them, the categories of products concerned and the procedures for providing information to consumers. [...]*

Decree **No. 2022-748** of 29 April 2022 specifies the terms of application of these obligations, through Articles **R 541-220 to R541-223 of the Environmental Code.** The decree also establishes that the information on recyclability is communicated to the producer by the Producer Responsibility Organisation ("PRO") to which it belongs, if necessary with the provision of a calculation tool using a harmonised method.

A Frequently Asked Questions (FAQ) has been published by the Ministry of Ecology: Framework for environmental claims and consumer information on products. It states in particular that "*a period of tolerance in the controls will be applied, until 1 July 2023, for the transmission by the Producer Responsibility Organisations of the methods for calculating recyclability. Producers will have a maximum of 3 months from the date of transmission of the calculation methodology to implement this information in their "product sheets"*". Producers are invited to consult this FAQ in addition to the present note.

Purpose of this document

This Technical Guidance, produced jointly by Ecologic and ecosystem Producer Responsibility Organisations ("PROs" in the following text), provides a **harmonised methodology** that enables producers of electrical and electronic equipment ("EEE" in the following text) to **characterise the recyclability of their products in order to inform the consumer in accordance with the requirements set out in Decree No. 2022-748**. This methodology does not allow for a numerical rate to be displayed in the form of a mass percentage of recyclability. This document is accompanied by a simplified calculation tool and an FAQ, designed to facilitate application of the methodology.

This methodology may be revised and improved in order to take into account the evolution of technical knowledge, to specify certain methodological rules and to make the evaluations more reliable. Any update of this Technical Guidance will be communicated by the PROs to their members in a concerted manner.

Content

List of tables:

1. Regulatory framework

1.1. Producers and products subject to the information obligation

According to the decree **n°2022-748**, the obligation to provide information on the recyclability of products concerns **producers and importers who declare an annual turnover of more than 10 M€** for products subject to EPR placed **on the French market** and who are responsible for **placing more than 10,000 units per year of these products on the market**. Producers whose turnover from EPR products placed on the French market does not exceed €10 million **or** whose number of EPR products placed on the market in France is less than 10,000 units are therefore not affected by the obligation.

Decree **n°2022-748** also establishes a progressive application according to the number of units placed on the French market (MSM) and the associated turnover (CA):

- 1 January 2023[1] : producers with a turnover > 50 M€ **and** MSM > 25 000 units / year
- 1 January 2024: producers with a turnover > 20 M€ **and** MSM > 10 000 units / year
- 1 January 2025: producers with a turnover > 10 M€ **and** MSM > 10 000 units / year

Article 13 of the AGEC law and decree N°2022-748 concerning consumer information, **only household EEE are concerned by** this obligation.

1.2. Regulatory criteria and statements

The decree n°2022-748 establishes **5 criteria to characterise the recyclability of an EEE**:

1. The capacity to be efficiently collected on a territorial scale, through the population's access to local collection points;
2. The ability to be sorted, i.e. directed to the recycling channels for recycling;
3. The absence of elements or substances that disrupt sorting, recycling or limit the use of the recycled material;
4. The ability of the recycled material produced by the recycling processes implemented to represent more than 50% by mass of the waste collected ;
5. The capacity to be recycled on an industrial scale and in practice, in particular by guaranteeing that the quality of the recycled material obtained is sufficient to ensure the sustainability of the application markets, and that the recycling chain can justify a good capacity to take on products that can be integrated into it.

According to the decree, several statements can be displayed:

- if the 5 criteria are not met: no mention should be displayed[2] ,
- if the product's recyclability is greater than 50%: "*produit majoritairement recyclable*[3]" label
- if the product's recyclability is greater than 95%: "*produit entièrement recyclable*[4]*"* label
- when "the capacity to be recycled corresponds to the recycling of materials that are mostly reincorporated into products of an equivalent nature that have an identical use and purpose without functional loss of the material", the information may be completed by the words "*produit recyclable en produit de même nature*"

However, given the current state of knowledge and the WEEE sector, given the complexity of the EEE composition, of the recycling processes and the diversity of outlets, it is not possible to claim "*produit entièrement recyclable*" or "*produit recyclable en produit de même nature*" for EEE (although this point may be reconsidered in the future).

[1] The FAQ published by the public authorities indicates that a tolerance period will be applied until 1 July 2023 for the transmission of calculation methods by the PROs, with manufacturers having a period of 3 months from this transmission to implement the information in the product sheets.

[2] This is confirmed by the FAQ published by the public authorities, consulted on 26/01/2023

[3] Can be translated by “product mainly recyclable”

[4] Can be translated by “product entirely recyclable”

2. Harmonised methodology

2.1. Evaluation procedure

1/ Prerequisites for battery removal

For all products containing a battery or accumulator, the producer must ensure that it can be removed from the appliance for safe recycling. The conditions to be checked are explained in section 2.2.1. If the product does not contain batteries, this requirement is *de facto* validated. The recyclability of batteries and accumulators as such cannot be assessed by this document[5].

2/ Simplified assessment for products assumed to be predominantly recyclable

For certain sub-categories of products whose composition is globally stable over time and homogeneous between models, and which are, apart from exceptions, mostly recyclable within the meaning of this methodology, **the producer may carry out a simplified assessment and display the statement "mostly recyclable product" provided that he verifies that** :

- the composition of the model in question does not differ significantly from the reference composition on the basis of which the presumption of recyclability was established,
- the model in question does not contain any particular disruptive elements that limit its recyclability, when such elements are identified in this guidance.

Section 2.2.2 provides the list of products eligible for this presumption of recyclability, with the associated average compositions and tolerances.

3/ Recyclability assessment

If the product does not qualify for the presumption of recyclability referred to in point 2/, a quantified assessment of the recyclable portion of the product must be carried out on the basis of the parameters provided in section 2.2.3. This assessment can be carried out in an iterative way, starting the assessment with the main recyclable materials (according to section 2.2.3) present in the product:

- the statement "produit majoritairement recyclable" may be displayed as soon as the recyclability of the product exceeds 60% on the basis of this assessment (the rest of the materials may then be neglected). This condition is validated if the product contains a proportion greater than or equal to 50% of metallic materials
- where the recyclability of the product is assessed to be between 50% and 60% on the basis of the material balance, the absence of irreversible linkages that could disrupts the recycling of these materials must be verified (see step 4 below and section 2.2.4)
- when the recyclability of the product is assessed to be less than 50%, the product cannot be labelled as "produit majoritairement recyclable"

The balance should be completed until more than 50% of the product is assessed as "recyclable" or "non-recyclable". This assessment should be carried out according to the following formula:

$$\boldsymbol{product\ recyclability}\ \% = \frac{\sum_i \left(\boldsymbol{mass\ of\ recyclable\ materials}(i)\right)}{\boldsymbol{total\ product\ mass}}$$

*NB: "Total product mass" **excludes batteries and accumulators** and packaging.*

[5] The recyclability of batteries and accumulators must be assessed in accordance with the information provided by the approved PROs for these sectors.

4/ Checking absence of linkages that disrupt recycling

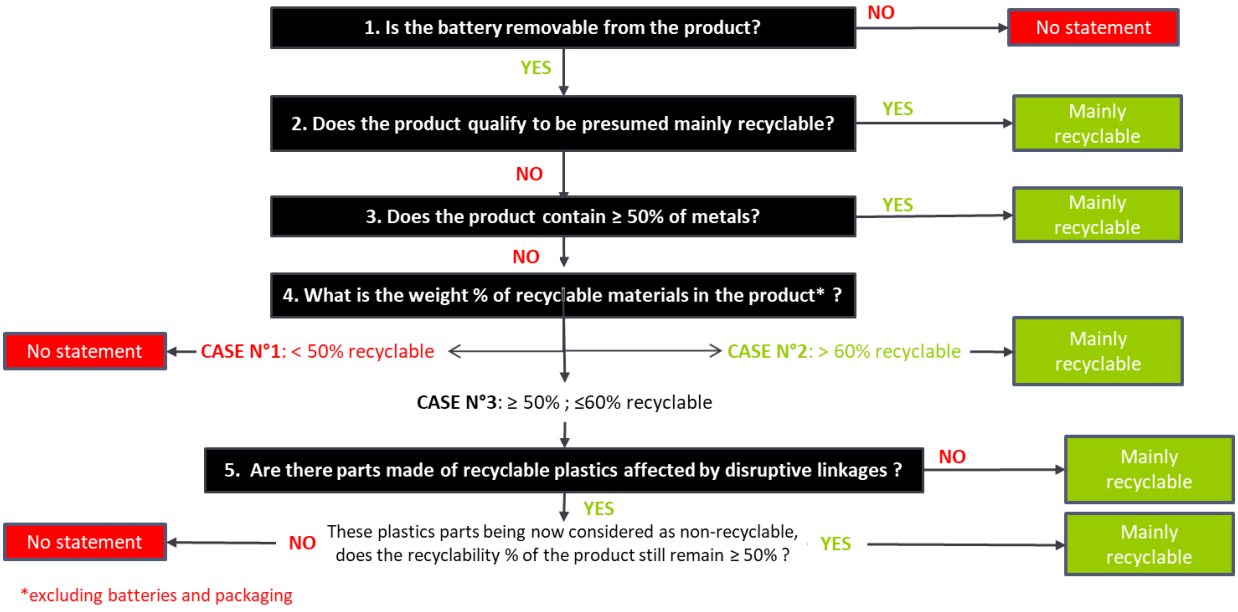
If, after completing the balance as described above, the recyclable part of the product is between 50 and 60%, a final check must be made on the impact of linkages in the product. This check is described in section 2.2.4. If, after verification, the recyclable part of the product is more than 50% of the total mass of the product, the product can be labelled as "produit majoritairement recyclable". If this is not the case, the product cannot be labelled as " produit majoritairement recyclable ".

5/ Extrapolation by product line

Once a representative product within a wider range of references is eligible for the "majoritairement recyclable" statement, it is possible to extrapolate this environmental quality to the other references in this range and consider that they are also eligible for the same statement, as long as the difference in composition between these references and that of the representative product is not likely to reverse the result of the assessment.

Each producer is responsible for the internal rules setting the modalities of extrapolation (identification of the "representative" product, identification of the products considered to be part of the same range, tolerances ensuring that each of the references is actually eligible for the same statement as the representative product).

The following flow chart summarises the methodology.



*excluding batteries and packaging

2.2. Evaluation parameters

2.2.1. Requirement for battery extraction

To qualify as a "produit majoritairement recyclable", electrical and electronic equipment must meet the following requirement:

"The battery or accumulator must be able to be removed from the device safely by an operator, without damaging the battery or accumulator in a way that increases the risk of a thermal or chemical incident, with commercially available tools as defined in EN45554. [6]"

Therefore, equipment containing one or more batteries or accumulators encapsulated, overmoulded or crimped into the device is not considered recyclable. If a battery or accumulator is attached by an easily reversible mean (e.g. adhesive) or attached to a component that can itself be easily removed (e.g. battery soldered to an electronic board that can be safely removed), the requirement is considered to be met. This requirement does not apply to mobile phones[7] .

2.2.2. Products presumed to be mainly recyclable

The table below provides a list of products eligible for this "presumption of recyclability", with the associated average compositions and tolerances.

Table 1: Products assumed to be predominantly recyclable

Products	Reference composition	Tolerance
refrigerator	≥ 60% metals, ≥15% unfilled and BFR-free ABS/PS/PE/PP, ≥ 2% glass	+/- 20% variation on each material
washing machine	≥ 35% metals, ≥ 25% concrete, ≥ 15% of unfilled and BFR-free ABS/PS/PE/PP	
dishwasher	≥ 60% metals, ≥ 5% unfilled and BFR-free ABS/PS/PE/PP	
gas hob	≥ 80% metals	
central unit (without accessories)	≥ 70% metals	
blender	≥ 80% metals	
ventilation unit (collective humidity sensitive or self-regulating single flow, tertiary double flow with hot water coil)	≥ 90% metals	
air handling unit	≥ 90% metals	
biomass (wood log, pellet) or oil boiler	≥ 70% metals	
gas boiler (collective or individual)	≥ 80% metals	
chiller (water chiller)	≥ 90% metals	
heat pump	≥ 80% metals	

[6] This criterion is slightly different from the one used to modulate eco-fees, which aims to ensure that the battery can be separated by the user.

[7]Mobile phones are a special case in that they can still be treated for recycling by certain processes despite the presence of the battery. However, the ability to remove the battery from these devices remains important to extend their useful life and to optimise the choice of recycling processes for the battery on the one hand and for the rest of the device on the other.

(air-to-air, air-to-water, dual service air-to-water, geothermal)		
hot water radiator (towel dryer, static)	≥ 90% metals	
reversible roof unit (rooftop)	≥ 90% metals	
indoor or outdoor DRV air-to-air heat pump unit	≥ 80% metals	
thermodynamic water heater	≥ 70% metals	

This list may be revised if new technologies appear on the market, or at the request of producer organisations wishing to add new products. For this purpose, the following information must be consolidated and provided to the eco-organisations:

- name and scope of the sub-category of products,
- average composition and standard deviation of models placed on the market for this subcategory, using a list of materials such as that provided in section 2.2.3,
- identification of possible recycling disruptors that may be present in certain models

2.2.3. Recyclability of materials

The table below qualifies the recyclability of the main materials and components used in order to carry out a material balance of the product's recyclability (see FAQ for more information).

The green list corresponds to the materials meeting the 5 criteria of the Decree, for all product categories: **these materials can therefore be sought as a priority in the composition of the product to initiate the recyclability assessment**.

The orange list corresponds to materials which can meet the 5 criteria of the Decree depending on the product category concerned.

The red list corresponds to materials which does not currently meet the 5 criteria of the Decree, regardless of the product category concerned. If all these materials represent more than 50% of the mass of a product, it cannot be labelled "mainly recyclable".

Table 2: Recyclability of materials according to Decree n°2022-748

	Materials recyclability			
Green list				
All metals and metal alloys	YES			
ABS not filled with BFR and density < 1.1	YES			
PS not filled with BFR and density < 1.1	YES			
PE not filled with BFR and density < 1.1	YES			
PP not filled with BFR and density < 1.1	YES			
Orange list				
Products categories	cat. 1	cat. 4 & 8 (if > 50 cm)	cat. 5, 6 & 8 (if < 50 cm)	cat. 2
WEEE collection flow	LHA-cold	LHA-non-cold	SHA	Screens
ABS-PC not filled with BFR and density < 1.1	NO	NO	YES	YES
PMMA not filled with BFR	NO	NO	NO	YES
Concrete	NO	YES	NO	NO
Glass	YES	NO	NO	NO
Red list				
All plastics filled with BFR or with density > 1.1 (excepted PMMA)	NO			
All BFR-filled plastics	NO			
Expanded foams	NO			
Rubbers, silicones, elastomers	NO			
Ceramic	NO			
Glass ceramics	NO			
Wood	NO			
Textiles	NO			
Gas	NO			
All materials not listed elsewhere	NO			

For some complex components, where **their detailed material composition is unknown to the producer at the time of the assessment**, default ratios are proposed below to model these components, based on average compositions. **In the case where the detailed material composition of these components is known by the manufacturer, the material recyclability rates presented in table 2 above should be applied**.

Table 3: Default ratios of recyclable materials in some complex components

	Default ratios for complex components			
Product categories	cat. 1	cat. 4 and 8 (if > 50 cm)	cat. 5, 6 and 8 (if < 50 cm)	cat. 2
WEEE flows	LHA-cold	LHA-non cold	SHA	SCREENS
Electric motors	95%	95%	95%	95%
Compressors	95%	95%	NA	NA
HDDs	NA	NA	95%	95%
Printed circuit boards (generic)	30%	30%	30%	30%
Printed circuit boards (rich)[8]	NA	NA	50%	50%
Electrical cables	30%	30%	30%	30%
LCD panels - excluding metal parts	0%	0%	0%	0%
Capacitors	0%	0%	0%	0%
Mercury-containing components	0%	0%	0%	0%

2.2.4. Disruptive linkages for recycling

When the material balance calculated according to the parameters provided in section 2.2.3 results in a product recyclability between 50% and 60%, it is necessary to verify **the absence of recycling disrupting linkages,** which could limit the product recyclability below the 50% threshold. According to current knowledge, this verification is only required for recyclable plastic parts linked to other materials (other recyclable plastic or other material: metals, etc.)[9].

The following table classifies different types of linkage according to whether or not they disrupt recycling processes:

Table 4: Types of disruptive linkages

Disruptive linkages	Non-disruptive linkages
gluing, overmoulding, co-injection, crimping, heat or ultrasonically insertion	screwing, clipping, riveting

[8] The ratio provided for "rich" PCBs can only be used for the following products: smartphones, laptops, printers, monitors, televisions, tablets, CPUs.

[9] Obtaining certain labels (e.g. EPEAT, Blue Angel) may require documents justifying the absence of disruptive recycling linkages. Provided that the requirements set by these labels are aligned with this methodology, the proof of obtaining these labels may be used to justify the absence of disruptive linkages within the meaning of this methodology.

If the material balance calculated according to section 2.2.3 is between **50% and 60%:**

- If the product contains a proportion of metallic materials equal to or greater than 50% by mass: the product can display the statement "Produit majoritairement recyclable";
- If the product contains less than 50% by weight of metallic materials:
    - In the absence of information on the presence and nature of such disruptive linkages, the product cannot be labelled as "Produit majoritairement recyclable";
    - If the product does not contain a disruptive linkage: the product can be labelled as "majoritairement recyclable";
    - If the product contains one or more disruptive bonds, the mass of irreversibly linked plastics must be considered non-recyclable. Other recyclable materials other than plastics (metals, for example) remain recyclable.
        - if the percentage of recyclability of the product is then less than 50%, the product cannot be labelled as "Produit majoritairement recyclable"
        - if the percentage of recyclability of the product remains above 50%, the product can be labelled "Produit majoritairement recyclable"

In order to assess the mass of materials rendered non-recyclable due to irreversible linkage, the producer may consider only the portion of these materials taken up by the linkage (estimates on a case-by-case basis on the basis of weight or surface ratios).

The Frequently Asked Questions accompanying this guidance provide examples that can be used for applying the rules set out above.

3. Glossary

ABS: acrylonitrile butadiene styrene

non-cold LHA: non-cooling large household appliances

cold LHA: cooling large household appliances

IT: computer equipment

SHA: small household appliances

PE: polyethylene

PMMA: polymethyl methacrylate

PP: polypropylene

PS: polystyrene

PUR: polyurethane

BFRs: brominated flame retardants