



International Material Data System

IMDS Recommendation	IMDS 025
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Evaluate the recycled and bio-based content of materials

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**Evaluate the recycled and
bio-based content of materials****IMDS 025****1 Purpose**

In the EU Green Deal framework, circular economy and resource efficiency have been identified as key contributors to achieving climate neutrality by 2050 and decouple economic growth from resource use. To fulfil this ambition the EU needs to reduce its consumption footprint and **increase its circular material use rate in the coming decade.**

In this context, the EU Commission has developed the CEAP (Circular Economy Action Plan) which presents a set of interrelated initiatives to establish a strong and coherent product policy framework. The CEAP is triggering, amongst other initiatives, the review of ELV directive, the proposal of a new regulatory framework for batteries, the Eco-design for Sustainable Products Regulation (ESPR) or the definition of mandatory requirements for recycled plastic content including bio-based content. Among others, these mentioned initiatives **will require an uptake of recycled or bio-based content as well as the reporting thereof.**

In addition to the mentioned EU framework, France has implemented a national legislation (Law N°2020-105 of 10 February 2020) to fight waste and promote circular economy. This new legal national obligation will enter into force by 1 January 2024 for the vehicles categories M1 and N1 and will require importers and/or producers to communicate on environmental performances including recycled content.

To address these upcoming obligations, the IMDS Steering Committee has decided to enhance the already existing functionality to facilitate and enable the communication of recycled and bio-based content in materials and (semi-) components throughout supply chains. While IMDS Release 14 will provide the infrastructure to report and store the corresponding data from supply chains, it however it does not describe how the values are to be calculated.

This recommendation aims at closing this gap while ensuring data consistency and reliability by providing

- the terminology to be used by the stakeholders and
- common methodology for defining and calculating recycled and bio-based content

If deemed feasible, additional adaptations of the IMDS reporting system will be done when existing legal requirements are updated and new ones will be introduced in the future.

Deviations from this recommendation might be agreed between partners as long as they are not in direct contradiction with the present document.

If needed, OEM specific requirements must be taken into consideration for further specific explanation and clearer guidance in terms of reporting.

Nevertheless, there may be additional customer-specific requirements that cannot be harmonized. Customer-specific IMDS requirements are published in the respective customer specifications.



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2 References

- EN 45557:2020 - General method for assessing the proportion of recycled material content in energy-related products
- Guidelines on the interpretation of key provisions of Directive 2008/98/EC on waste: https://ec.europa.eu/environment/pdf/waste/framework/guidance_doc.pdf
- ISO 14021:2016 - Environmental labels and declarations
- ISO 22095:2020 - Chain of custody - General terminology and models
- Methodological guide to evaluate the content of recycled materials in a vehicle (PFA Guidance on recycled content_EN - V4, 221208)
- Recommendation IMDS001
- Waste Framework Directive 2008/98/EC

3 Definitions

3.1 Definitions in ISO 14021:2016

This recommendation is based on the definitions in ISO 14021:2016, an essential terminology framework for determining the recycled content of products.

The most relevant terminologies can be summarized as following:

3.1.1 Recycled content

Proportion, by mass, of recycled material in a product or packaging. Only pre-consumer and post-consumer materials shall be considered as recycled content, consistent with the following usage of terms.

3.1.2 Post-Industrial Recyclate (PIR)

Definition according to ISO 14021:2016: Pre-Consumer Material

Material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

3.1.3 Post-Consumer Recyclate (PCR)

Definition according to ISO 14021:2016: Post-Consumer Material

Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

3.1.4 Recycled material

Material that has been reprocessed from recovered [reclaimed] material by means of a manufacturing process and made into a final product or into a component for incorporation into a product.

3.1.5 Interpretation of ISO 14021 According to EN 45557 standard

EN 45557 standard provides a series of clarifications and specific guidelines on how to interpret and use ISO 14021. These additions make the calculation of recycled content more robust and will allow for easier comparison between the data from different stakeholder/suppliers.

For further guidance please refer to the latest version of EN 45557:2020 standard.



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3.2 Definitions from the European Regulatory Framework, including the Waste Framework Directive 2008/98/EC

In addition to the definitions of ISO 14021:2016, definitions from the European regulatory framework, including the Waste Framework Directive 2008/98/EC, has been taken into account in the development of this guide:

3.2.1 Waste

Any substance or object which the holder discards or intends or is required to discard.

3.2.2 Recycling

Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

3.2.3 By-product

Member States shall take appropriate measures to ensure that a substance or object resulting from a production process the primary aim of which is not the production of that substance or object is considered not to be waste, but to be a by-product if [all of]¹ the following conditions are met:

- a) further use of the substance or object is certain;
- b) the substance or object can be used directly without any further processing other than normal industrial practice;
- c) the substance or object is produced as an integral part of a production process; and
- d) further use is lawful, i.e. the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

For further explanations and distinction between waste and by-products please refer to the “Guidelines on the interpretation of key provisions of Directive 2008/98/EC on waste” from 2012, chapter 1.2 The concept of “by-product”.

3.2.4 Definition for End of Waste

Member States shall take appropriate measures to ensure that waste which has undergone a recycling or other recovery operation is considered to have ceased to be waste if it complies with [all of]² the following conditions:

- a) the substance or object is to be used for specific purposes;
- b) a market or demand exists for such a substance or object;
- c) the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and

¹ Interpretation based on the European Commission “Guidelines on the interpretation of key provisions of Directive 2008/98/EC on waste” published in 2012

² Interpretation based on the European Commission “Guidelines on the interpretation of key provisions of Directive 2008/98/EC on waste” published in 2012



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- d) the use of the substance or object will not lead to overall adverse environmental or human health impacts.

Reference: Article 6 WFD (2008/98/EC)

3.3 Definitions about source of material including circular materials in IMDS³

3.3.1 Content of inorganic or fossil-based material

Material content based on inorganic matter such as ores and minerals or fossil fuels (e.g., mineral oil)

3.3.2 Content of bio-based material

To constitute a material as bio-based, it must be of biological origin. Inorganicized materials or materials found in geological formations (e.g., metals) cannot be bio-based.

3.3.3 Content of primary bio-based material

Content of material made from primary renewable raw materials (e.g., natural rubber, cotton, flax, sugar cane).

3.3.4 Content of secondary bio-based material

Content of material made from waste or residues of renewable raw materials (Used Cooking Oil (UCO), agricultural waste).

3.3.5 Content of mechanical recyclate

Mechanical recycling: This recycling technology recovers collected waste via mechanical and physical processes, typically sorting, grinding, washing, separating materials, drying, and re-crystallisation to produce material input which retains the chemical identity of the collected waste material.

Derived from: Commission Regulation (EU) 2022/1616 of 15 September 2022 on recycled plastic materials and articles intended to come into contact with foods, and repealing Regulation (EC) No 282/2008.

3.3.6 Content of chemical recyclate

Chemical Recycling: Conversion to monomer or production of new raw materials by changing the chemical structure of waste streams through cracking (pyrolysis), gasification or depolymerization, excluding energy recovery and incineration.

3.3.7 For mechanical and/or chemical recyclate:

a) Content of pre-consumer recyclate thereof

Pre-Consumer Recyclate that has been diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials, such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.
(Please refer as well to chapter 3.1.2 *Post-Industrial Recyclate (PIR)* and 3.1.5 *Interpretation of ISO 14021 According to EN 45557 standard*)

³ Introduced in IMDS Release 14.0, 05/2023



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Post-Consumer Recyclate has been generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

(Please refer as well to chapter 3.1.3 *Post-Consumer Recyclate (PCR)* and 3.1.5 *Interpretation of ISO 14021 According to EN 45557 standard*)

3.3.8 Mass balanced

Mass balance is a chain-of-custody approach to account for materials entering and leaving a system. In the chemical industry, e.g., renewable or recycled feedstock is mixed in a continuously operating production process with fossil-based feedstock and attributed to specific end products after chemical transformations have taken place. It is a key characteristic in existing certification schemes (also in comparison to 'book and claim') that a physical link between input and output material exists.

The basic definitions of chain of custody models including Mass Balance are described in ISO 22095 standard. An additional ISO standard with the target to describe more details and clarify the exact distinction versus 'book and claim' is in development (expected to become valid 2025/2026).

Regarding allocation chemical industry prefers the non-proportional allocation (credit method).

The starting scenario in the credit mass balance method is the same: an alternative feedstock used in a production is mixed in processes and the exact amount fed in the system often fluctuates over time. In the credit method the input over a defined period is attributed to specific products that are produced by the production organization considering all losses and conversion factors. It allows to claim a recorded output amount equivalent to the physical input over a defined period. Due to the attribution of the input to only specific outputs, selected products of the organization are allowed to carry a circular raw material label, while others are not allowed to carry it.

3.3.9 Certifications

To ensure that produced materials fulfill certain standards different certifications were established. For example, ISCC or RedCERT are sustainability certification systems to guarantee that feedstocks and processes fulfill defined criteria. Depending on the specific requirements different sub-certification system like "ISCC PLUS" can be chosen. The drop-down list provides a list of the basic schemes. In case the certification scheme you are using is not mentioned, please inform the IMDS Service Desk and it will be added to the list.

**4 Data entry for source of material including circular materials in
IMDS****4.1 Overview**

The *MDS Ingredients* detail screen displays the source of a material (e.g., bio-based or recycled content). Further details are available in the dialog shown after pressing the "Edit" or "View" button in the top right corner.



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Source of material, including circular materials ✎ Edit

Does the material contain recycle? Yes

Mechanical (pre-consumer) 72.0 - 76.0 %

Mechanical (post-consumer) 0.0 - 0.0 %

Chemical (pre-consumer) -

Chemical (post-consumer) -

Certified according to -

Is the material (partially) bio-based? Yes

Content of secondary bio-based material 5.0 - 10.0 % mass-balanced

Certified according to ISCC+

This section in the *MDS Ingredients* detail screen is available when creating or modifying any material except for metals (classifications 1 – 4).

For metals and materials of other classifications released prior to IMDS Release 14 (May 10th, 2023), the section is not available for the material itself, but is only shown when the material is referenced inside a semi-component or component.

In the future it might be necessary to allow input on recycled content for metals also for material suppliers.

Polymer materials (classification 5), which have been released since IMDS Release 13 (May 19th, 2021) are an exception to this as sourcing information is already attached to the material itself.

4.2 Data entry related to material classifications

To modify the information about the source of the material, open the wizard dialog by clicking the “Edit” button. To save your changes click the “Apply” button in the dialog. Once closed, the system will automatically calculate the values shown in the details section of the ingredients screen (see illustration under 3.4.1) based on your input (see below).

The fields available in the dialog depend on the classification of the material. There are three types of secondary sources for which you can enter information:

Source	Classifications
Mechanical recycle	1 – 5, 7.1, 7.2
Chemical recycle	all classifications
Bio-based content	5 – 6, 9.1 – 9.4

The following fields are provided in the dialog depending on the available sources. The fields only appear if their parent field is filled.

For example, the field “content of recycle” is only shown if “yes” has been selected as the answer to “Does the material contain recycle?”

In case the total “bio-based content” is greater than 0% the fields for “Content of primary bio-based content” and “Content of secondary bio-based content” are shown. Therefore, the dialog will appear much smaller when opened for the first time than in the following overview:



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Mechanical and chemical recyclate

Mechanical recyclate

Chemical recyclate

Bio-based content

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Source of material, including circular materials

Content of inorganic or fossil-based material
0.0 * - 100.0 * % ?

Does the material contain recyclate?
Yes

Content of primary inorganic or fossil-based material
0.0 * - 100.0 * %

Content of recyclate
0.0 * - 100.0 * %

Content of mechanical recyclate thereof
0.0 * - 100.0 * % ?

Content of pre-consumer recyclate thereof
0.0 * - 100.0 * % ?

Content of post-consumer recyclate thereof
0.0 * - 100.0 * % ?

Content of chemical recyclate thereof
0.0 * - 100.0 * % ?

Content of pre-consumer recyclate thereof
0.0 * - 100.0 * % ? mass-balanced No * ?

Content of post-consumer recyclate thereof
0.0 * - 100.0 * % ? mass-balanced No * ?

Certified according to
?

Content of bio-based material
0.0 * - 100.0 * % ?

Content of primary bio-based material
0.0 * - 100.0 * % ?

Content of secondary bio-based material
0.0 * - 100.0 * % ? mass-balanced No * ?

Certified according to
?

Apply Cancel

4.3 Recyclate and bio-based content percentage calculation on material level

Portions are always entered with both a minimum and a maximum value. If you want to enter a fix value (e.g., 100%) you have to enter “100% – 100%”.

All values are relative to their parent values. That means that the sum of two values on the same level always adds up to 100% of their parent. For example, the sum of mechanical recyclate and chemical recyclate makes up 100% of the total recycled content.

To assist you when entering these values, changing one value will automatically recalculate the opposite values. For example, when changing the “Content of pre-consumer recyclate” to 20% – 30%, the “Content of post-consumer recyclate” will be set to 70% – 80% automatically.



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Closing the dialog will calculate the total portion of the different sources within the whole material and display them in the material's details by multiplying all relevant minimum- and maximum values. For example, the minimum portion of pre-consumer mechanical recyclate in the whole material is calculated by multiplying the minimum values of the following fields: "Content of inorganic or fossil-based material" × "Content of recyclate" × "Content of mechanical recyclate thereof" × "Content of pre-consumer recyclate thereof"

Following, an example for PP GF20 with 80 % pre-consumer recyclate from mechanical recycling in the data entry wizard and MDS detail view:

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Source of material, including circular materials

All values entered here refer to the entire material, not only the polymer content. E.g., in case of filled polymers the recyclate content can only be 100% if the filler material is also 100% recyclate.

Content of inorganic or fossil-based material
100.0 * - 100.0 * % ?

Does the material contain recyclate?
Yes

Content of primary inorganic or fossil-based material
20.0 * - 20.0 * %

Content of recyclate
80.0 * - 80.0 * %

Content of mechanical recyclate thereof
100.0 * - 100.0 * % ?

Content of pre-consumer recyclate thereof
100.0 * - 100.0 * % ?

Content of post-consumer recyclate thereof
0.0 * - 0.0 * % ?

Content of chemical recyclate thereof
0.0 * - 0.0 * % ?

Content of bio-based material
0.0 * - 0.0 * % ?

Apply Cancel



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☑ **Source of material, including circular materials** ✎ Edit

Does the material contain recycle?	Yes
Mechanical (pre-consumer)	80.0 - 80.0 %
Mechanical (post-consumer)	0.0 - 0.0 %
Chemical (pre-consumer)	-
Chemical (post-consumer)	-
Certified according to	-
Is the material (partially) bio-based?	No
Content of secondary bio-based material	-
Certified according to	-

Recycled content: Non-recycled fillers are not included in the calculation of recycled content (RC). However, legacy fillers will be included as they cannot be accounted for accurately. For example, non-recycled glass fibers added to a recycled resin must not be taken into account in the RC calculation. The same reasoning applies to additives.

4.4 Data entry rules and related checks

The following checks are in place regarding the information about the source of the material:

1. A check message is shown in case the minimum and maximum value of any of the following fields for mechanical recycle deviate more than 20% from each other:
 - a. Dialog fields
 - i. Content of mechanical recycle thereof
 - ii. Content of pre-consumer recycle thereof
 - iii. Content of post-consumer recycle thereof
 - b. Calculated fields in the details section of the ingredients screen
 - i. Mechanical (pre-consumer)
 - ii. Mechanical (post-consumer)

In case the material is a polymer, this message is an error message. Else it is a warning. There is no such check for chemical recycling or secondary bio-based content.

2. For polymers, an error message is shown in case the question "Does the material contain recycle?" has not been answered yet. For polymers released before IMDS release 13, which do not have information about the material source attached to themselves, but entered upon referencing, this error is not shown in case the polymer is referenced in a component and assigned a weight of less than 5g.

If the MDS recipient is an OEM a "Modify source of material, including circular materials" section is available under Recipient Data. The values in this section are pre-populated with all values shown in the ingredients which cannot be modified by the sender themselves. The Tier1 supplier may overwrite these values as recipient-specific data via pop-up menu. A reset will allow resetting to the original values from the Material in the tree. An 'Apply to all recipient OEMs' is available in this screen so changes may be added to the company-specific data of all OEMs in the recipient list of this MDS.



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**Evaluate the recycled and
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The recommendation was approved and released May 10, 2023.

5.2 Revision

Rev.	Date	Description / Reason	Originating Organization / Committee
0.1	04/03/2023	Initial Creation	IMDS SC with input from: PFA, AIAG, CLEPA, and JAPIA
0.2	20/04/2023	Final Draft	Working group of representatives and experts from the IMDS Steering Committee and the Supplier Associations (AIAG, CLEPA, JAPIA).
1.0	25/04/2023	Final Version, approved by the Working Group and the IMDS SC	Working group of representatives and experts from the IMDS Steering Committee and the Supplier Associations (AIAG, CLEPA, JAPIA).