

RSB – ROUNDTABLE ON SUSTAINABLE BIOMATERIALS

RSB Guidance on

Advanced Products Category III – Calculating fossil feedstock substitution claims

RSB Standard for Advanced Products

RSB-STD-02-001

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1. Objective

The objective of this document is to provide guidance to auditors, certification bodies and participating operators about the rules for calculating fossil feedstock substitution claims for *Category III Products*.

2. Relevant standard references

The rules for calculating the impact on reducing fossil depletion are defined in RSB Standard for Advanced Products (RSB-STD-02-001)

Section F3.3. Requirements for Category III Products:

The operator shall demonstrate that the advanced product reduces the risk of fossil depletion compared to the fossil reference product:

- 3.3.1 The operator shall assess the impact of the fossil reference product related to the depletion of fossil resources by determining the fossil feedstock needed as a material for the production. The assessment shall follow the rules as specified in ISO 14044 (2006).
- 3.3.2 Where more than one fossil feedstock type is required, the operator shall
 - normalise the amount of fossil feedstock required based on the chemical value of the different feedstock types, and
 - express the amount of fossil feedstock needed in one common unit (feedstock equivalent)

The chemical value of the feedstocks shall be determined based on the quantity of this feedstock that is required to produce one unit of product, in relation to other feedstocks. In determining the chemical values, the operator shall account for differences in product yields as well as additional inputs such as energy or other chemicals, which may be required when using this feedstock.
- 3.3.3 The operator shall document the amount of bio-based feedstock and the amount of feedstock based on non-biobased end-of-life products or production residues that is used as material in the system. The following feedstock shall not be considered in balance:
 - Feedstock that is used as energy or other auxiliaries, which will not be present in a final product (e.g. solvents, catalysts)
 - Feedstock that is used for the production of bio-based products.
- 3.3.4 The operator shall normalise the amount of feedstock from 3.3.3 based on the chemical value of the different types of feedstock and express the amount of new feedstock in the same common unit used in 3.3.2. (e.g. alternative feedstock equivalent)
- 3.3.5 The operator shall ensure at least 25% of the fossil feedstock equivalents needed for the production of the Advanced Product are substituted by alternative feedstock equivalents.
- 3.3.6 Operators shall have a documented book-keeping system in place to monitor the balance of alternative feedstock equivalents that have been added to the system and advanced products withdrawn from the system (i.e. sold to customers).
- 3.3.7 Operators shall ensure that alternative feedstock equivalents and advanced product claims are balanced within a 3-month period. Within the balancing period, a deficit may occur, as long as balance is achieved over the 3-months-period. A positive balance may be reported into the next reporting period
- 3.3.8 The boundary of the assessment shall be
 - one site, or
 - several sites at the same geographic location which are connected with pipelines or other means of transport, or
 - sites at different geographic locations if the operator can ensure and demonstrate for all sites that double-booking does not occur, e.g. by limiting the boundary to one legal entity or by having specific contractual relationships in place.

3. Guidance

The requirements in section F 3.3. are aimed at substantiating the claims for Advanced Products related to the reduced use of fossil resources. They include the rules to calculate how much alternative feedstock is to be sourced to make a claim. The claim refers to the amount of fossil feedstock that is replaced by alternative feedstock. The rules are based on an LCA approach for the fossil resource depletion impact category.

- **Requirement 3.3.1 The operator shall assess the impact of the fossil reference product related to the depletion of fossil resources by determining the fossil feedstock needed as a material for the production. The assessment shall follow the rules as specified in ISO 14044 (2006).**

Guidance:

This requirement asks the operator to calculate how much feedstock is needed for the production of the fossil reference product.

This can be evidenced, for example, with the production formula (also called production recipe or bill of materials). The production formula should show, based on actual production data, how much feedstock the operator needs to process to produce a defined amount of product. Changes of the production formula over time have to be considered in the calculation, either by adjusting the calculation retrospectively (in which case an adequate buffer would be necessary) or on a rolling basis (i.e. applying the average actual production data of a defined period in the following period).

The calculation should always be conducted for the amount of product that is intended to be sold with an RSB on-product claim, i.e. not for the amount of the entire production. Whenever non-biobased auxiliaries (e.g. solvents, catalysts) are re-used in the process, only the losses need to be taken into account. Residues or wastes of the production that have not a further use as a material have to be considered in the calculation as a loss. Co-products or by-products of the process that have a further use as a material (evidence has to be shown to the auditor) do not have to be considered as a loss. They can be treated as a credit in the system. It is, however, not acceptable to calculate the credit on a mass basis. This is because different product/co-product types may have different chemical values for which the mass would be an inappropriate measure. The chemical value of co-products or by-products has therefore to be considered. In some cases (for example for steam cracker processes and other processes to produce base chemicals) the lower heating value is a good proxy for the chemical value. In other cases, the definition of chemical value in 3.3.2 has to be applied.

- **Requirement 3.3.2 Where more than one fossil feedstock type is required, the operator shall**
 - normalise the amount of fossil feedstock required based on the chemical value of the different feedstock types, and
 - express the amount of fossil feedstock needed in one common unit (feedstock equivalent)

The chemical value of the feedstocks shall be determined based on the quantity of this feedstock that is required to produce one unit of product, in relationship to other feedstocks. In determining the chemical values, the operator shall account for differences in product yields as well as additional inputs such as energy or other chemicals, which may be required when using this feedstock.

Guidance:

This requirement is relevant in the case that the production formula shows more than one feedstock, for example:

100 kg certified product: 40 kg ingredient A, 60 kg ingredient B, 4 kg ingredient C

In order to make a claim that states, for example, that 100% of the fossil feedstock has been replaced, the operator has the following options to produce 100kg of certified product:

- Option 1: Source 40kg A, 60kg B and 4kg C as certified feedstocks
- Option 2: Source only A as certified feedstock, and cover the demand of B and C with A
- Option 3: Similar to option 2 with sourcing only B and C respectively

To calculate option 2, it is not acceptable to calculate the overall demand with the mass of the feedstocks only (i.e. it would not be acceptable to source 60 kg + 4 kg of certified A to cover B and C) but the different chemical values of A, B and C have to be considered. This is because the claim for the certified product refers to the amount of fossil resources substituted.

Therefore, it is necessary to correctly calculate how different feedstocks relate to each other based on their varying demand for fossil feedstock:

- Step 1:
The calculation requires the information about the fossil feedstock that is needed to produce A, B, and C, for example:
 - 100 kg of A requires 100 kg of naphtha and 20 kg of natural gas
 - 100 kg of B requires 90 kg of naphtha and 15 kg of crude oil
 - 100 kg of C requires 110 kg of naphtha

Further down the supply chain, this information might not be available as actual production data. In this case, scientific peer reviewed literature values or values based on chemical reaction pathways may be used.
- Step 2:
For products that are made of more than one ingredient, again, the different chemical values have to be considered. As the fossil feedstocks above are either cracker feedstocks or feedstocks to produce base chemicals, it is accepted by RSB to calculate with the lower heating value for the chemical value (see above). One way to calculate the amount of feedstock standard units is to normalise the different feedstocks based on the lower heating value of Naphtha. For this calculation the LHV for the exact

specification of the material has to be taken into account, the following presents only an example calculation:

Lower heating values

- Naphtha: 45 MJ/kg → number of standard units / kg naphtha = 1
- Natural gas: 47 MJ/kg → number of standard units / kg natural gas = 1 kg * 47 MJ/kg / 45 MJ/kg = 1,04
- Crude Oil: 42 MJ/kg → number of standard units / kg crude oil = 1 kg * 42 MJ/kg / 45 MJ/kg = 0,93

Based on those equivalencies, the number of naphtha equivalents can be calculated as follows:

- Feedstock demand for A in Naphtha equivalents = 100 kg + 20 kg * 1,04 = 120,8 kg
- Feedstock demand for B in Naphtha equivalents = 90 kg + 15 kg * 0,93 = 103,95 kg
- Feedstock demand for C in Naphtha equivalents = 110 kg

- Step 3:

The calculation of the total amount of A that is needed to cover the demand of B and C is based on the different feedstock demands in naphtha equivalents:

- Amount of A to cover B: 60 kg * 103,95 kg / 120,8 kg = 60 kg * 0,86 = 51,63 kg
- Amount of A to cover C: 4 kg * 110 kg / 120,8 kg = 4 kg * 0,91 = 3,64 kg

As a simplification, for one or more ingredients that are in total below 5% (of mass) instead of calculating the feedstock demand, the same demand for naphtha equivalents can be assumed as the average of the 95% of the known demand.

If the feedstock demand for ingredients of more than 5% is not known, the calculation cannot be made and the claim on the % of fossil feedstock substituted cannot be made on the total product.

In the case that A is sourced as certified, and the feedstock demand for B and C is not known, the operator can still relate the claim to the product ingredient A, e.g. 100% / x% of the fossil feedstock needed for the production of A was substituted by alternative feedstock.

- **Requirement 3.3.3** The operator shall document the amount of bio-based feedstock and the amount of feedstock based on non-biobased end-of-life products or production residues that is used as material in the system. The following feedstock shall not be considered in balance:
 - Feedstock that is used as energy or other auxiliaries, which will not be present in a final product (e.g. solvents, catalysts)
 - Feedstock that is used for the production of bio-based products.

Guidance: This requirement means that operators have to evidence the amount of alternative feedstock that is entering the system. This could be for example through a weighbridge document or a calibrated flow meter documentation. Only those feedstocks are eligible that are used as a material. The evidence of the use as a material has to be available for the auditor. Feedstocks for other purposes (e.g. energy generation) are not eligible, also feedstocks that are used for the production of bio-based products. Feedstocks can be considered in the book-keeping system only once they have physically been received at a site that is listed in the scope of certification. Eligible alternative feedstocks have to meet the sustainability related criteria. Therefore, there must be a system in place to verify that all necessary documentation (i.e. certificate of the direct supplier, delivery note with the relevant sustainability information) has been delivered by the supplier.

- **Requirement 3.3.4** The operator shall normalise the amount of feedstock from 3.3.3 based on the chemical value of the different types of feedstock and express the amount of new feedstock in the same common unit used in 3.3.2. (e.g. alternative feedstock equivalent).

Guidance: Please see explanation in 3.3.2.

- **Requirement 3.3.5** The operator shall ensure at least 25% of the fossil feedstock equivalents needed for the production of the Advanced Product are substituted by alternative feedstock equivalents.

Guidance:

In the definition of the certification scope, the operator has to clarify to which product or product component the claim refers to. The minimum of 25% refers to the defined product or product component (see example above, where either the entire product may be certified or only the component A). The operator may choose to substitute and claim more than 25%. In this case, the book-keeping system of the operator has to ensure that the necessary feedstocks equivalent to this claim are sourced in time.

- **Requirement 3.3.6 Operators shall have a documented book-keeping system in place to monitor the balance of alternative feedstock equivalents that have been added to the system and advanced products withdrawn from the system (i.e. sold to customers).**

Guidance:

A documented book-keeping system consists of two main elements:

- Roles, responsibilities, procedures that describe the book-keeping system
- Book-keeping tool. RSB is not prescriptive on the format, it can be, for example, an excel-calculation or it can be based on SAP

The book-keeping system has to include the following aspects:

- Documentation about incoming material and product sold as RSB-certified
- All relevant calculations and information about data sources
- Description how data are updated

- **Requirement 3.3.7 Operators shall ensure that alternative feedstock equivalents and advanced product claims are balanced within a 3-month period. Within the balancing period, a deficit may occur, as long as balance is achieved over the 3-months-period. A positive balance may be reported into the next reporting period**

Guidance:

The operator has to ensure that the necessary alternative feedstocks equivalent to the selected claim are sourced and delivered in time. This requirement implies that the operator has two choices: 1) Either ensure a positive balance at all times or 2) Ensure a positive balance over a 3-months balancing period.

This means that RSB certified operators following option 2 may start to sell RSB certified material before the certified feedstock is sourced, as long as a balance is achieved over the 3 months balancing period. Operators have to define the option they choose as well as their balancing period (start date) in their book-keeping documentation.

The operator has to implement a system that ensures that the selected option is met. Option 2 offers more flexibility to the operator, but may be more difficult to implement in systems such as SAP. If more alternative feedstock is sourced than certified product is sold, there is a positive balance that can be transferred to the next balancing period. Positive balances do not expire. The positive balance (or stock) can be documented either as feedstock, intermediate or as product stock.

- **Requirement 3.3.8 The boundary of the assessment shall be**
 - **one site, or**
 - **several sites at the same geographic location which are connected with pipelines or other means of transport, or**
 - **sites at different geographic locations if the operator can ensure and demonstrate for all sites that double-booking does not occur, e.g. by limiting the boundary to one legal entity or by having specific contractual relationships in place.**

Guidance:

This requirement relates to the boundary of the book-keeping system. The standard allows the system to be set up as a multi-site system, as long as it is ensured that double-booking does not occur. If the scope includes two sites at different geographic locations (for example one in Europe and one in the US), the standard allows that the product is produced at one site and sold at the other site. The conditions for this transfer are:

- Both sites are covered by the scope of certification;
- The material is identical;
- Measures are in place to ensure that there is no double booking;
- Auditors must have access to both sites and their documentation to verify that the claim is only made once.

Please note: There may be restrictions to this transfer model, for example is this the case for the calculation of national recycling quota. It is the responsibility of the operator to ensure that there are no legal restrictions when applying this model.