

RSB – ROUNDTABLE ON SUSTAINABLE BIOMATERIALS

RSB Standard for the Certification of Bio-Based Products and Bio-Based Processes

Version 2.0

Draft for consultation

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Introduction

The RSB Standard enables producers and users of biomaterials to demonstrate responsible practices throughout their supply chain. The RSB Standard is not restricted to biofuels and bioenergy, but also covers other forms of bio-based products and bio-based processes.

Bio-based products are derived from biomass, i.e. material from biological origin produced through agricultural processes and forestry, as well as by-products and residues from the food, feed, timber, paper and other industries. Bio-based products include plastics, textiles, pharmaceuticals, packaging, compostable/biodegradable tableware, cosmetics, nutritional supplements, food*, feed and many others (see a more detailed list below and in Annex I).

Bio-based processes use biomass as a feedstock in an integrated production site or a supply chain and generate products with a physical bio-based content which can potentially be zero.

Similarly to biofuels, bio-based products and bio-based processes are being increasingly used as an alternative to petrol-based manufactured products. The upstream supply chain of bio-based products and processes is similar if not in most cases identical to biofuel supply chains for the upstream production of biomass. This is also the case for the conversion and processing steps. Participants in the biofuel and bio-based product supply and production chains are often the same operator thereby serving a number of market segments. Therefore, the supply chains for bio-based products and processes quite often overlap with biofuels and therefore generate the same environmental and social impacts which are covered by the RSB Standard.

This standard enables producers and users of biomass, bio-based intermediates, bio-based products as well as operators of bio-based processes to receive RSB certification to demonstrate responsible practices throughout the supply chain.

This standard describes sustainability requirements for operators involved in the supply chain of bio-based products, as well as requirements related to chain of custody and bio-based carbon content. It provides clarity with respect to claims that operators may make for the bio-based products and co-products they may offer to alternative market sectors.

This standard is articulated around the existing RSB certification system, which was primarily designed for the certification of biofuel supply chains. Thus, this standard includes references to other RSB standards and other types of Participating Operators. Wherever relevant, *Participating Operators*, *Certification Bodies* and other stakeholders involved in the certification process should interpret this standard and other RSB standards related to bio-based products in line with the vision and mission of the RSB.

* The addition of food products in the list of examples is not intended to suggest that the RSB should actively certify food manufacturers. The purpose is simply to give recognition that RSB-certified operators may produce biofuels as well as various non-biofuel co-products (e.g. taste/texture enhancers, protein concentrates, flavours, emulsifiers, oil and sugar, etc.) out of the same processing facilities. Since such co-products are derived from the same raw material and processing chain as biofuels, the proposed extension simply allows feedstock/products that sell into the food sector (among others) to carry an RSB sustainability claim.

Main changes from the previous version (Version 1.4)

- a. A clarification was included that bio-products derived from end-of-life products, by-products and residues shall meet RSB Standard RSB-STD-01-010
- b. A section on calculating GHG emissions and GHG emission reduction thresholds was included
- c. The option to determine the bio-based content was included
- d. Clarifications on the requirement regarding the threshold for a bio-based (carbon) content were included
- e. The option to use a mass balance system for the bio-based input to processes and supply chains was included
- f. Specifications for communication and claims were included

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A. Intent of this standard

The intent of this standard is to describe the conditions under which Participating Operators producing, converting, processing or trading bio-based products may receive RSB certification and produce associated claims of compliance.

B. Scope of this standard

This is an international standard which is valid worldwide for all Participating Operators producing, converting, processing or trading bio-based products or products derived from bio-based processes or supply chains. It applies to producers of biomass-based products of a variety of types, including, but not limited to, bio-chemicals, bio-plastics, compostable/biodegradable tableware, cosmetics, nutritional supplements, pharmaceutical, and feed.

C. Status and effective date

The version 2.0 of the RSB Standard for Certification of Bio-Based Products and Bio-Based Processes shall be effective on DDMMYYYY.

D. Note on use of this standard

All aspects of this standard are considered to be normative, including the intent, scope, standard effective date, references, terms and definitions, tables and annexes, unless otherwise stated.

Users implementing this standard shall ensure that the intent is met, through implementing all of the requirements specified in this standard, and any and all additional measures necessary to achieve the intent of this standard.

E. Terms and definitions

1. For the purposes of this standard, the terms and definitions given in RSB-STD-01-002 RSB Glossary of Terms shall apply. Relevant terms for this standard as defined in RSB-STD-01-002 are:
 1. 1. **Bio-based**
Derived from biomass.
 1. 2. **Bio-based carbon content**
Fraction of carbon derived from biomass in a product.
 1. 3. **Bio-based content**
Fraction of a product that is derived from biomass.

1. 4. **Bio-based product**

Product wholly or partly derived from biomass.

2. In addition, the following terms and definitions shall apply

2. 1. **Global Warming Potential (GWP)**

Characterisation factor describing the radiative forcing impact of one mass-based unit of a given greenhouse gas relative to that of carbon dioxide over a given period of time (Source: ISO 13065).

2. 2. **Mass balance**

Relationship between input and output of a specific substance within a system, in which the output from the system cannot exceed the input into the system (Source: EN 16575).

2. 3. **Bio-Based Process**

Set of interrelated or interacting activities which transform bio-based inputs into outputs with a physical bio-based content which can potentially be zero (Adapted from ISO 17065).

F. Requirements

1. General requirements

The following standards shall apply to the participating operator:

1. 1. RSB Standard for Participating Operators (RSB-STD-30-001).

Please note: As part of the certification scope, the operator shall clearly describe the product or the product component the certification is sought for.

1. 2. RSB Standard for Risk Management (RSB-STD-60-001).

1. 3. RSB Procedure on Communication and Claims (RSB-PRO-50-001).

2. Sustainability requirements

The RSB Principles & Criteria (RSB-STD-01-001) shall apply to any biomass producer and industrial operator in the scope of certification.

3. Traceability requirements

The RSB Standard for Traceability of RSB Certified Material (Chain of Custody) (RSB-STD-20-001) shall apply to any operator in the scope of certification.

4. End-of-life products, residues and by-products

Operators using end-of-life products, residues or by-products shall apply in addition RSB-STD-01-010.

5. Greenhouse gas emissions

5. 1. Operators shall calculate lifecycle cradle-to-gate GHG emissions of certified biomass and intermediary products by applying the RSB GHG Calculation Methodology (RSB-STD-01-003-01) or the EU Renewable Energy Directive methodology.

Please note: Cradle-to-gate refers to the boundary of the certification scope.

5. 2. The functional unit shall be 1 dry-ton of product. GHG emissions shall be reported in the unit CO_{2eq}/dry-ton of raw materials or (intermediary) products.
5. 3. Operators may use the RSB GHG Tool or conduct an individual calculation. All input data and all calculations shall be available for the auditor in the certification process.
5. 4. Whenever certified products are intended to replace fossil derived products, certified products shall achieve 10% lower lifecycle greenhouse gas emissions calculated on a cradle-to-grave basis relative to the lifecycle greenhouse gas emissions of a comparable fossil product.

Please note: Certified products that are not intended to replace fossil derived products (e.g. food, feed related products) are exempt from requirement 5.4

5. 4. 1. The operator shall demonstrate that the systems being compared are equivalent; the system shall be compared using the same functional unit and equivalent methodological considerations such as system boundary and allocation procedures.
5. 4. 2. Following EN 16760 the CO₂ uptake by biomass shall be included in the calculation with negative GWP values in the growth phase and positive GWP values as it is emitted at end-of-life.

The net quantity of atmospheric carbon dioxide fixed in a product shall be determined by using stoichiometry or the biogenic carbon content.

Example: The carbon content in polylactic acid is 50%. In this case a ¹⁴C analysis can demonstrate that the carbon is 100% biogenic, the quantity of atmospheric carbon dioxide fixed in the product is: $0,5 * \frac{1}{12} * 44 = 1,83 \text{ kg CO}_2/\text{kg PLA}$

Whenever greenhouse gases are removed over more than 100 years, these removals shall be calculated as if they were stored indefinitely.

Greenhouse gases that are stored for less than 100 years shall be calculated according to the ILCD Handbook as follows:¹

$$e_{temp.Storage} = \sum m_i * t_s * GWP_{IPPC,i} / 100$$

e_{temp.Storage}: Emission savings of temporarily stored GHG species i

m_i: Mass of greenhouse gas i removed

For CO₂: $m_{CO_2} = m_c * M_{CO_2}/M_c$

with

m_c being the mass of carbon stored in a product released as carbon dioxide within a 100 year timeframe

M_{CO2}, *M_c* being the molecular weights of CO₂ and carbon, respectively

For CH₄: $m_{CH_4} = m_c * M_{CH_4}/M_c$

with

m_c being the mass of carbon that is temporarily stored in e.g. a landfill and released as methane within a 100 year timeframe

M_{CH4}, *M_c* being the molecular weights of methane and carbon respectively

t_s: Time of temporal removal / storage in years

GWP_{IPCC,i}: IPCC GWP for 100-year time horizon for greenhouse gas i

¹ European Commission -Joint Research Centre -Institute for Environment and Sustainability: International Reference Life Cycle Data System (ILCD) Handbook -General guide for Life Cycle Assessment -Detailed guidance. First edition March 2010. EUR 24708 EN. Luxembourg. Publications Office of the European Union; 2010

Table A: GWP 100-year

(Source: https://www.ipcc.ch/pdf/assessmentreport/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf)

Common Name	Chemical Formula	GWP100
Carbon dioxide	CO ₂	1
Methane	CH ₄	28
Nitrous oxide	N ₂ O	265

Example: Determination of temporal accounting of 10 kg bio-based product (embedded carbon: 4 kg) that sequesters carbon for 80 years in the use phase.

$$e_{temp.Storage} = \sum m_i * t_s * GWP_{IPPC,i} / 100 = -4 * \frac{44}{12} kg CO_{2eq} * 80 * \frac{1}{100} = -11,73 kg CO_{2eq}$$

5. 5. For forest-based products, the requirements of RSB Principles & Criteria (RSB-STD-01-001) Criterion 3b apply.

6. Requirements regarding the bio-based content of products or bio-based input to processes

Please note: Products may be produced of several feedstocks to achieve the desired specifications. A product is called 100% bio-based if all feedstocks are of biogenic origin. Many products are partly bio-based and partly fossil-based. The bio-based content indicates the ratio between material derived from biomass and total material.

In the case that the certified product is partly bio-based and partly fossil-based, the operators shall use either one of the following options described in 6.1. (bio-based product) or the option described in 6.2 (bio-based process):

6. 1. Bio-based content of the product

6. 1. 1. The operator shall determine the bio-based content of certified products by using one of the following options:

6. 1. 1. 1. Determination of the bio-based carbon content through ¹⁴C measurement according to EN 16640 or ASTM D6866.

The bio-based carbon content shall be expressed as percentage of the total carbon content of the certified product.

Documented sampling procedures shall be used to ensure that the samples are representative for the product under consideration.

6. 1. 1. 2.

Determination of the bio-based content using the radiocarbon analysis and elemental analysis according to EN 16785-1.

Documented sampling procedures shall be used to ensure that the samples are representative for the product under consideration.

The bio-based content shall be expressed as the percentage of the total mass of the product.

6. 1. 1. 3.

Determination of the bio-based content by using the material balance method according to EN 16785-2.

As required in EN 16785-2 the operator shall establish a traceability system capable of providing the necessary information and to ensure the validity of all needed data required by this method and the representativeness of the product batch considered.

The bio-based content shall be expressed as the percentage of the total mass of the product.

6. 1. 2. Minimum bio-based content

6. 1. 2. 1.

The operator shall ensure that the bio-based carbon content or the bio-based content of the certified product or product component is not less than 25%.

6. 1. 2. 2.

In the case of fluctuations of the bio-based (carbon) content over time, the operator shall ensure that

- a) a bio-based (carbon) content of not less than 25% is achieved at any time and
- b) the on-product claim states the bio-based (carbon) content that can be ensured at any time during the production process

6. 2. Bio-based input to a process or a supply chain

Please note: Operations that have fluctuations of the bio-based content over time or

operate an integrated production site might not be able to measure a bio-based content in a product. As an alternative, these operations may measure the bio-based input to a process or a supply chain and apply claims on a mass balance basis to products that might have a physical bio-based content which can potentially be zero. Please see section 7 for further information on acceptable claims.

6. 2. 1. Operators shall document the input of certified bio-based feedstock that is used as material to the system. Feedstock that is used as energy shall not be considered in the mass balance.
6. 2. 2. Operators shall document the conversion rates or the production formula that is needed to produce the certified product.
6. 2. 3. Operators shall apply a documented mass balance system to monitor the balance of certified bio-based material that has been added to the system and withdrawn from the system.
6. 2. 4. The mass balance shall be site specific.
6. 2. 5. Operators shall ensure that bio-based inputs to the process and mass balance claims are balanced within a 3-month period.
6. 2. 6. Operators shall not apply on-product claims if less than 50% of the fossil material needed to produce the certified product (or product component) has been replaced by renewable materials.
6. 2. 7. In addition, operators shall meet all requirements of the RSB Mass Balance Procedure for Bioproducts.

Please note: RSB will develop a mass balance procedure to further specify the requirements that operators have to fulfill under this approach.

7 Communication and Claims

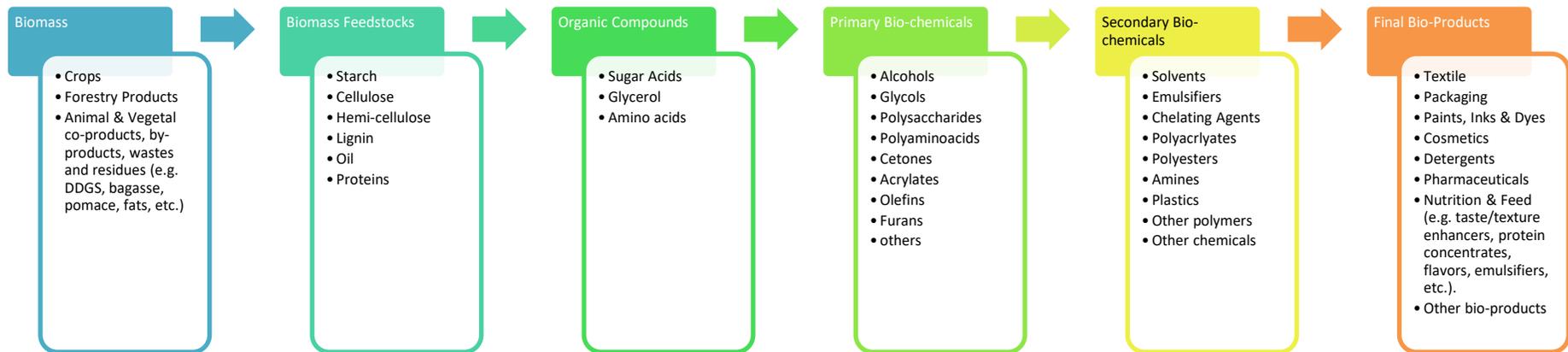
7. 1. Participating Operators shall comply with the RSB Procedure on Communication and Claims (RSB-PRO-50-001).

Please note: The term biomass / biofuels shall be adapted for the use of the bio-based product in the scope of certification

7. 2. Operators using the approaches listed in 6.1 (bio-based products) shall add the following information to the on-product claims:

- 7.2. 1. Minimum bio-based carbon in relation to the total carbon (in %). The standard used for measuring or calculations shall be stated; or
- 7.2. 2. Minimum biomass in relation to the total mass of the product (in %). The standard used for measuring or calculation shall be stated
- 7.3. Operators using mass balance approaches (see 6.2) shall not refer to a bio-based content or a bio-based carbon content. On-product claims for mass-balance products may instead refer to the amount of fossil resources saved by the input of bio-based material in the production system.

ANNEX I: Examples of bio-based supply chains



Annex II – Scope of RSB documents applicable at the audit

	RSB Principles & Criteria (RSB-STD-01-001)	GHG Calculation (RSB-STD-01-003-01)	Standard for Participating Operators (RSB-STD-30-001)	Chain of Custody Standard (RSB-STD-20-001)	Procedure for Communication & Claims (RSB-PRO-50-001)	Standard for Risk Management (RSB-STD-60-001)	Standard for certification of bio-products (RSB-STD-02-001)	For waste or residues based bio-products: RSB-STD-01-010 or RSB-STD-11-001-01-010
Biomass Producer*	√	√√	√√	√√	√√	√√	√√	√√
Industrial Operator**	√	√√	√√	√√	√√	√√	√√	√√
Trader***			√√	√√	√√	√√	√√	√√

√ : Main audit

√: Surveillance audit

* The term “Biomass Producer” refers to farmers and plantation or forest managers

** The term “Industrial Operator” refers to Feedstock processors, intermediary producers, biofuel or biomaterial producers

*** The term “Trader” refers to Trading companies (including companies selling to end-consumers) and blenders