
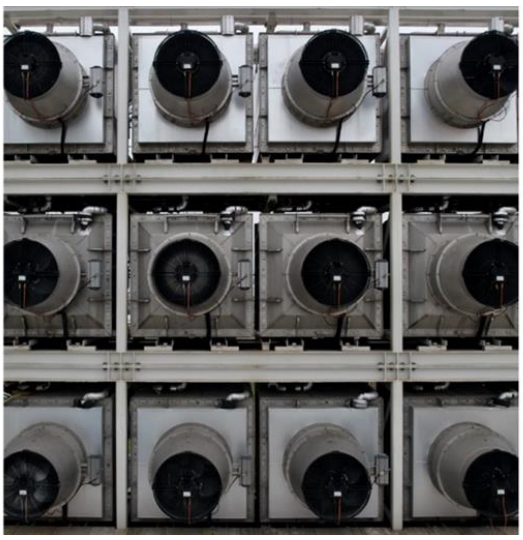


OK renewable

Certification Scheme OK 30

Rev A – 01.04.2025

PD-BA-TABE-CERT-REN-CS-030_OKRC_EN

1. Introduction

The development of renewable carbon-based materials is considered to be a key concern for the future as it reduces reliance on virgin fossil resources.

This specification proposes an objective method, developed by the "Renewable Carbon Initiative" [1], for determining the renewable carbon share of raw materials, intermediates, additives and finished products, and a logo to communicate this value to the end users, whatever process is used to achieve this goal: bio-based, Carbon Capture and Utilisation (CCU)[2] or recycling.

This technical specification considers solely the renewable carbon share and does not give any judgement about the other sustainability aspects such as energy use, end-of-life treatment, water use, hazardous substances content, or any other green claims.

A class system for the different products and materials is used to make it easier to convey information about renewable carbon share but is not meant to be a ranking system.

2. Scope

All products (partially or completely) made of materials and/or polymers with renewable carbon are eligible for this certification scheme (fuels, in solid, gaseous or liquid form, are exempted from this scope). All companies along the supply chain of the production of a product may apply to this scheme (from the raw material producer to the brand owner).

The evaluation of these materials is based on existing certification schemes (see §10). Self-declarations without a third-party evaluation cannot be accepted. The acceptability of a certification is decided solely by TÜV AUSTRIA Belgium.

3. Normative references

There is currently no standards.

4. Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1. Renewable carbon

Renewable carbon entails all carbon sources that avoid or substitute the use of any additional fossil carbon from the geosphere. Renewable carbon can come from the biosphere (bio-based), atmosphere (CO_2-based) or technosphere (Carbon Capture and Utilisation (CCU) (including carbon oxide capture) and recycling) – but not from the geosphere.

Renewable carbon is carbon from above the ground in contrast to carbon from below the ground (oil, natural gas, coal). Renewable carbon circulates between biosphere, atmosphere or technosphere, creating a carbon circular economy.

[1] The "Renewable Carbon Initiative" is an interest group group founded in 2021 and represented by the nova Institute, Leyboldstraße 16, 50354 Hürth / Germany

[2] The use of the term CCU generally refers to the utilisation of carbon dioxide (CO_2), but can also include industrial carbon monoxide (CO) sources prior to flaring or other conversions to CO_2 before release to the atmosphere.

4.2. Renewable Carbon Share (RCS)

Renewable Carbon Share (RCS) of x% means that

- the proportion of mass containing Renewable Carbon is x% of the total carbon-containing mass (renewable-based)

and/or

- the equivalent amount of feedstock of the mass containing fossil carbon has been replaced by feedstock containing Renewable Carbon in the production plant (renewable-attributed),

as documented by established certificates.

Note : in the framework of this definition, every mass can only contain one type of carbon. If a mass contains several types of carbon, the mass has virtually break down to several mass containing one type of carbon.

4.3. Mass balance

Consists of the reconciliation of inputs and outputs of the certified product through the manufacturing process, including all product variants or derivatives resulting from the original certified product [3].

4.4. Attribution

In mass balance models, at both batch, site and group level there may be several co-products that result from a process. The concerned input may therefore be attributed to single products (despite it being evenly distributed throughout all of the co-products). This is a form of accounting known as mass balance and attribution with fuel exempt.

4.5. Share in composition (SIC)

Of the intermediate or product expressed as a percentage (%) of the total mass of carbon-containing components, integrated components and/or constituents.

Constituents , components and/or integrated components not containing carbon (like water, glass, some inorganic fillers, …) are not taken into account in the total mass used for calculations

4.6. Bio-based Carbon (BB)

Share in percent (%), certificate based on TC. The European standard EN 16640 defines the bio-based carbon share to be reported as a fraction of total carbon (TC) in the products. This includes also non-organic carbon, usually consisting of mineral fillers.

4.7. Bio-attributed (BA)

Share in percent (%), certificate based on an established Mass Balance & Attribution standard or scheme.

4.8. Bio-CO_2-based (BCB)

Share in percent (%) for CO_2 from biogenic sources or atmosphere (direct air capture). Method identical to that for BB (TC).

[3] From ISEAL Chain of custody models and definitions, September 2016

4.9. Fossil-carbon-based (FCB)

Share in percent (%) for carbon from Carbon Capture and Utilisation (CCU)[4] captured from fossil emissions, e.g. from fossil-fueled power plants.

4.10. CO_2-attributed (CA)

Share in percent (%), certificate based on an established Mass Balance & Attribution standard or scheme.

4.11. Recycling-based (RB)

Share in percent (%), RB = **PCR + PIR**, based on an established standard or scheme.

4.12. Recycling-attributed (RA)

Share in percent (%), accepted standards & schemes for chemical recycling, established Mass Balance & Attribution standard or scheme with fuel exempt.

4.13. Not Renewable (NR)

Share in percent (%) of not renewable carbon

4.14. Not certified (NC)

Share in percent (%) of renewable carbon not covered by a recognized certificate

4.15. Organic carbon

Carbon from organic material. Organic material is a carbon-based compound in which the carbon element is attached to other carbon atoms, hydrogen, oxygen, or other elements in a chain, ring, or three-dimensional structure.[5]

4.16. Inorganic carbon

Carbon from inorganic material. Inorganic compounds are mainly synthesised via inanimate, geological systems (mineral origin) or by oxidisation of molecules into the open environment. Inorganic compounds typically take the form of small molecules or of large geometrical grids.

4.17. Total carbon content (TC)

Quantity of carbon present in a sample / part in the form of organic, inorganic and elemental carbon as a percent of the weight (mass).[6]

[4] The use of the term CCU generally refers to the utilisation of carbon dioxide (CO_2), but can also include industrial carbon monoxide (CO) sources prior to flaring or other conversions to CO_2 before release to the atmosphere.
[5] CEN/TS 16137 - see § 13
[6] ISO 16620-1 - § 3

4.18. Bio-based content / Biomass content

Fraction of a product that is derived from biomass, expressed as a percentage of the total mass of the product.

4.19. Bio-based carbon content

Amount of carbon derived from biomass present in the product, expressed as a fraction of the total carbon content (TC).

4.20. Pre-consumer or post-industrial waste (PIR)

Material diverted from the waste stream during a manufacturing process. Excluded is reutilization of solid materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.[7]

4.21. Post-consumer waste (PCR)

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.[8]

4.22. Underlying certificate

The current scheme is based on a selection of international certification schemes, owned and operated by different associations and/or certification bodies.
In the context of this certification scheme, these certificates are called underlying certificates.

4.23. Relevant supplier

Supplier of a constituent, component and/or integrated component whose (non-zero) renewable carbon content is such as to alter the renewable carbon content of the product to certify in which it is incorporated.

4.24. Part

Constituent or component, or combination of constituents and components that represents less than 100% of the basic material, intermediate or finished product that is presented to be certified.

4.25. Component

Part that can be separated by hand or by using simple physical means.
Note : The methodology used to determine if a part can be considered as a component or not is described in document ref. TS-OK-17.

4.26. Integrated component

Part that can (easily) be differentiated, but not (easily) separated by hand or simple physical means

[7] ISO 14021 - see § 13
[8] ISO 14021 – see § 13

4.27. Constituent

All pure chemical materials and substances of which a material is composed.

4.28. Reference mass

As general rule, the reference mass corresponds to the dry mass of the product.

Liquids, products containing solvents or products stored under special conditions (e.g. frozen) are exempt from this rule: their reference mass is the mass as they are packed when sold under normal conditions.

Liquids, products containing water as solvent, follow the general rule as the reference mass corresponds to the dry mass.

4.29. Raw material – basic material

Basic substances found in their natural, modified, or semi processed state, used as an input to a production process for subsequent modification or transformation into an intermediate or a finished product

4.30. Intermediate - semi-finished products

Intermediate products are referred to as those that are used by businesses in producing finished products.

A component is an intermediate.

4.31. Finished product

Product resulting from the transformation and/or the assembly of raw materials and/or intermediate materials and/or semi-finished products, destined for the end user.

Finished products are referred to as those goods which do not require further processing

A component is not considered as a finished product.

5. Marking & logos

The *OK renewable* logo is owned by TÜV AUSTRIA Belgium and this conformity mark can be applied to a product or packaging or used for any commercial and information purposes only if this product is formally certified by TÜV AUSTRIA Belgium.

The logo may be used for different purposes depending on the type of material that is covered by the certificate. An overview of the authorised use of the logo is featured below:

Type of product	**on the certified product**	**on the packaging of a certified product**	**for commercial and information purposes[9]**
Raw material & Intermediate product	Not allowed	Allowed (B2B packaging)	Allowed
Finished product	Allowed	Allowed (B2C packaging)	Allowed

The featured logo corresponds to the class that has been assigned (see §6) and contains the licensee code.

By default, the logo is not affixed on an intermediate if aimed at B2C communication. Nevertheless, some exemptions are possible and defined by TÜV AUSTRIA Belgium.

The logo may not be modified and this prohibition applies in particular to the number, the position, the shape and the legibility of the class allocated to the specific product. The logo application technique (printing, embossing, …) must allow the class obtained to be clearly visible. The logo featured on the finished product or on a packaging must show the range of RCS for the certified product.

If a logo is used, it must be clearly and explicitly indicated, in the immediate vicinity of said logo, that this logo refers to what is certified.

More details in the in Annex 2.1 "*Graphical Chart logos*" of the "General Product Certification Rules" listed in §13.3.

6. Classification :

A classification is established on the basis of the Renewable Carbon Share.
This classification is featured in the logo and goes from class 1 to 5.

- Class 1: $20\% \leq RCS < 40\%$
- Class 2: $40\% \leq RCS < 60\%$
- Class 3: $60\% \leq RCS < 80\%$
- Class 4: $80\% \leq RCS < 100\%$
- Class 5: $RCS = 100\%$

The final RCS percentage is rounded up to the integer dependent on one digit after the decimal point: 0,1,2,3,4 round down, and 5,6,7,8 and 9 round up. A percentage of 79.5% will be rounded up to 80% and a percentage of 79.4% will be rounded down to 79%. For example: 99.5% will be rounded up to 100% and 99.4% will be rounded down to 99%.

[9] on flyers, websites, information panels, … but not on promotional articles like key chains

7. Application for certification

7.1. Documents to be supplied

Identification and characterization of the product, notably:

- Trade name of the product
- Product description: product type
- Material composition (weight concentrations in percentages and identifications of all constituents and (integrated) components - including all additives like e.g. printing inks, colorants, processing agents, fillers, … - this identification can be in format of CAS-number, Safety Data Sheet, name of the relevant supplier and reference code/name of the material by the supplier). Solvents have to be specified if applicable, alternatively when sharing weight percentages dry or wet weight should be specified. All product variations and different suppliers have to be included in the material composition.
- Liquid & gas
    - Colour(s) of the material
    - density (measured by the relevant method)

      or any other relevant characteristic
    - description of the packaging
    - presence or absence of solvents (including water and humidity) have to be specified. Whether it's in mass or molar percentage also has to be specified.
- Solid product
    - Colour(s) of the material and if applicable printing inks
    - Thickness, and where applicable, also grammage or density (measured by the relevant method) or mass and surface / volume (3D objects)

      or any other relevant characteristic
    - For finished and/or semi-finished products: dimensions, photos and technical drawings.
- Other relevant specifications
- Production site(s)
- In case of different internal production sites: OCO-appointment document, description of the tracking system and manufacturers agreement for each production site
- In case of different external production sites (sub-contractors or third party): description of the tracking system and manufacturers agreement for each production site
- In case of sublicense certification: permission letter of the original certificate holder
- Description of the quality system
- Certificates of underlying certifications.
- Available and relevant assessment reports used to issue of underlying certifications
- Optional (on request by TÜV AUSTRIA Belgium): A representative sample for each product (family) to be certified

7.2. Underlying certification schemes

The product submitted for RCS certification must already be certified according to at least one of the certification schemes listed in PD-BA-TABE-CERT-BIO-TS-030_underlying_schemes (see §10).

8. Evaluation

8.1. Pre-assessment

In some cases, especially in the case of complex products or product families, TÜV AUSTRIA Belgium can carry out a pre-assessment to determine what information, if any, is missing.
Where appropriate, this phase ends with a report specifying the information that needs to be obtained before the formal assessment can continue.

8.2. Underlying certificates

The RCS certificate is an image at time "t" based on one or more underlying certificate(s).
The accepted underlying certificate certification schemes are listed in PD-BA-TABE-CERT-BIO-TS-030_underlying_schemes.

TÜV AUSTRIA uses the reported values of the underlying certification schemes.

If an underlying certificate is withdrawn, cancelled or for whatever reason is no longer valid (which includes non-prolongation or suspension) and if this affects the outcome of the certification, then the Licensee should contact TÜV AUSTRIA Belgium immediately in order to adapt the certificate accordingly.

8.3. Calculation of the Renewable Carbon Share (RCS)

The Renewable Carbon Share is defined as

$$\begin{aligned} RCS &= SIC_{BB} * BB \\ &+ SIC_{BA} * BA \\ &+ SIC_{BCB} * BCB \\ &+ SIC_{FCB} * FCB \\ &+ SIC_{CA} * CA \\ &+ SIC_{RB} * RB \\ &+ SIC_{RA} * RA \\ &+ SIC_{NR} * 0 \\ &+ SIC_{NC} * 0 \end{aligned}$$

Where SIC : Share in composition of the product in % for :

- bio-based (SIC_{BB})
- bio-attributed (SIC_{BA})
- bio-CO2-based (SIC_{BCB})
- captured fossil-carbon-based (SIC_{FCB})
- CO2-attributed (SIC_{CA})
- recycling-based (SIC_{RB})
- recycling-attributed (SIC_{RA})
- not renewable (SIC_{NR})
- not certified (SIC_{NC})

Where $\sum SIC_{xx} = 100\ \%$

Constituents and (integrated) components not containing carbon (like water, glass, some inorganic fillers, …) are not taken into account in the total mass used for calculations

Note: the definition of the shares can be found in §4 and informative examples are shown in §14.

8.4. Eligibility

Products must contain an RCS of at least 20% to qualify for certification.

Carbon-containing part must represent more than 50% of the total mass

8.5. Total carbon measurement

The total share of renewable carbon of certified products is calculated as a percentage of the total carbon of the product. This means that if the total carbon of the product and/or its constituents has not been measured by an independent lab and has to be determined to give a harmonized output, then the total carbon has to be measured for these constituents and/or the product.

The TC is measured according to ISO 16948 : " Solid biofuels — Determination of total content of carbon, hydrogen and nitrogen ". The total carbon of the certified parts and uncertified parts has to be determined in certain scenarios to give a harmonized output.

8.5.1. Acceptance of test reports on total carbon

TÜV AUSTRIA Belgium will handle the samples and send them to a laboratory that is officially approved by TÜV AUSTRIA Belgium to perform the TC analysis.

Alternatively, reports from independent laboratories that are not officially registered by TÜV AUSTRIA Belgium for the measured parameter, but are accredited according to ISO 17025 can be accepted after a positive detailed evaluation of all the requirements of the relevant test standard.

If the test report from a registered laboratory, is over 3 years old, the report can be accepted for evaluation only according to the following two conditions:

- independent analysis of the tested material has to show that the composition hasn't changed;
- the applicant has to provide a statement that the tested sample is completely consistent with the sample submitted in the framework of the certification process.

8.6. Uncovered parts

Constituents that are not certified will be considered as having a RCS of 0%.

The uncovered parts do not need to be fully identified, but their function (e.g. printing ink, colorant, anti-block agent, …) and weight must be clearly described.

Note: There is no maximum limit on uncovered parts, but because of the 0% RCS this will be self-limiting: the higher the shared of uncovered parts, the lower the RCS percentage.

8.7. Exceptions and extension to the general approach

Interpretation is necessary for decisions on cases such as qualitative certifications that do not provide a clearly quantified conclusion or result.

Note : Interpretations are assessed and registered by the Certification Committee and the Advisory Committee

8.8. Possible extension of the certification

Any modification of a certified constituent that was not previously described in the product description of the certification report must be notified to TÜV AUSTRIA Belgium and may require a new evaluation.

8.9. Market monitoring

The validity of underlying certificates is re-evaluated on an annual basis.

If one or more certificates are expired, not renewed or cancelled, either

- the certificate will be suspended until the customer provides the documents to lift the suspension;
- the Renewable Carbon Share will be recalculated taking into account the missing share in the calculation.

In both cases, the contractual non-conformity fees will be applied after confirmation by the customer.

9. Certification

9.0. Foreword

The purpose of the certification scheme is to use the results of underlying certificates (see §8.2), but if the scope of the assessment of these certificates do not cover the product to be assessed (for example because there is an additional production step), an additional (remote) audit may have to be performed.

9.1. Audit

An audit is required if the underlying certifications of the product to be assessed are insufficient to certify the renewable carbon share of the product to be assessed. This audit may be performed remotely.

The decision of the necessity of an audit is decided solely by the TÜV AUSTRIA Belgium. An audit is not required if the product to be assessed is already fully certified by one of the underlying certification schemes or if the modifications are deemed to be low-risk by the TÜV AUSTRIA Belgium.

9.2. Audit requirements (remote)

- When the audit is performed remotely the production site should be equipped with an online camera to allow visual inspection of the premises and technical installations during the audit. The staff should be prepared to exchange the documents with the auditor in real time.
- Description of the Quality Management System of the production site and document evidence of compliance requirements by way of observations, measurements, tests or other means.
- Review of procedures, work sheets and calculation sheets with the methods' uncertainty.
- Review of available assessment reports and materials' certificates used to issue the underlying certifications.
- Evaluation of supply chains, traceability systems and storages.
- Qualification of personnel, including their training and evaluation records.
- Verification of the equipment, including calibration certificates and test reagent management.
- Management review of non-conformities, deviations, corrective and preventive actions.
- Follow-up of internal audits.
- Facilities plan.
- Process flow chart

9.3. Supply chain and production sites

Separate production sites will be audited separately.

Top-down approach: in case there is another transformation step (reformulation) between the certified material and the manufacturer that influences the composition, an additional audit is required.

Transportation does not have to be assessed.

List of documents related to the custody chain and processing of material / products (TÜV AUSTRIA Belgium will select the pertinent document to provide from the list):

- (electronic) Traceability system implemented by the candidate company.
- Quality system (ISO 9001) – procedures, instructions, calculations forms (CO_2 equivalent) – separated traceability for the considered finished product.
- Production and stocks records (example of document showing which data is available).
- Annual report of activity: extracts related to the finished products.
- Conformity reports to standards / other labels.
- Any other document.

10. Link to other schemes

See list of recognised certification schemes in PD-BA-TABE-CERT-BIO-TS-030_underlying_schemes.

11. Validity of the certificate

Unless otherwise specified, a certificate is valid for one (1) year.

If the validity of an underlying certificate ends before the end-date of the *OK renewable* certificate, the applicant has to provide the prolonged certificate to TÜV AUSTRIA Belgium in due time in order to maintain the validity of the certification.

Note: If the underlying certificate has been modified in any way this has to be declared to TÜV AUSTRIA Belgium (see §8.2).

12. Revision history

The following list provides a key-word-based overview of the changes made to this document over time.

Revision	Date	Change
A	01-04-2025	Initial version

13. Informative annex : References & Bibliography

13.1. European Standards

- EN 16640: " Bio-based products - Bio-based carbon content - Determination of the bio-based carbon content using the radiocarbon method "
- EN 16575: "Environmental labels and declarations Self-declared environmental claims (Type II environmental labelling) "
- EN 16785-1: " Bio-based products - Bio-based content - Part 1: Determination of the bio-based content using the radiocarbon analysis and elemental analysis "
- EN 16785-2: " Bio-based products - Bio-based content – Part 2: Determination of the bio-based content using the material balance method "
- EN 17035: " Surface active agents - Bio-based surfactants - Requirements and test methods "

13.2. International Standards

- ISO 16948: " Solid biofuels - Determination of total content of carbon, hydrogen and nitrogen "
- ISO 14021: " Environmental labels and declarations Self-declared environmental claims (Type II environmental labelling) "
- ISO 16620-1: " Plastics - Biobased content - Part 1: General principles "
- ISO 16620-2: " Plastics - Biobased content - Part 2: Determination of biobased carbon content "

13.3. American standards

- ASTM 6866: : " Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis "

13.4. TÜV AUSTRIA Belgium documents

These documents are available on request.

- TÜV AUSTRIA Belgium "General Product Certification Rules"
- TÜV AUSTRIA Belgium "Graphical chart for the use of the logos"
- TÜV AUSTRIA Belgium PD-BA-TABE-CERT-BIO-TS-017_component_approach
- TÜV AUSTRIA Belgium PD-BA-TABE-CERT-BIO-TS-030_underlying_schemes

14. Informative annex : examples for calculation of the renewable carbon share (RCS)

14.1. Example 1

A composite consisting of :

- 28% natural fibres (certified 100% bio-based),
- 20% PLA (certified 100% bio-based),
- 20% certified bio-attributed PP (100% allocation)
- 30% PP with a certified recycled content of 25%.
- 2% not certified fossil-based additives

Material	Type of carbon	Mass	Certified value	SIC	RCS
natural fibers	BB - bio-based	28,0	100%	28,0%	28,0%
PLA	BB - bio-based	20,0	100%	20,0%	20,0%
PP	BA - bio-attributed	20,0	100%	20,0%	20,0%
rPP	RA - recycled-attributed	30,0	25%	30,0%	7,5%
additives	NR - not renewable	2,0		2,0%	0,0%
	Total mass product	100,0		100,0%	
	Total carbon-containing parts	100,0			
				total RCS	**75,5%**
				Class 3	**60 - 80%**

14.2. Example 2

Same composite but where the bio-based natural fibers is not certified

Material	Type of carbon	Mass	Certified value	SIC	RCS
natural fibers	**NC - not certified**	28,0		28,0%	0,0%
PLA	BB - bio-based	20,0	100%	20,0%	20,0%
PP	BA - bio-attributed	20,0	100%	20,0%	20,0%
rPP	RA - recycled-attributed	30,0	25%	30,0%	7,5%
additives	NR - not renewable	2,0		2,0%	0,0%
	Total mass product	100,0		100,0%	
	Total carbon-containing parts	100,0			
				total RCS	**47,5%**
				Class 2	**40 - 60%**

Note : Compared with the previous example, the RCS falls sharply because a carbon-containing fraction is not certified.

14.3. Example 3

Same composite, but whit the bio-based natural fibers being by glass fibers

Material	Type of carbon	Mass	Certified value	SIC	RCS
glass fibers	**NCA - no carbon**	28,0		0,0%	0,0%
PLA	BB - bio-based	20,0	100%	27,8%	27,8%
PP	BA - bio-attributed	20,0	100%	27,8%	27,8%
rPP	RA - recycled-attributed	30,0	25%	41,7%	10,4%
additives	NR - not renewable	2,0		2,8%	0,0%
	Total mass product	100,0		100,0%	
	Total carbon-containing parts	**72,0**			

total RCS	**66,0%**

Class 3	**60 - 80%**

Note : Compared with the previous example, the RCS has a higher value because (carbon-free) glass fibres are excluded from the SIC calculation.