CARBON STANDARDS international

BIOCHAR C-SINK

Positive list of permissible matrices for the establishment of biochar C-sinks (H/Corg < 0.4)

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For biochars presenting an H to Corg ratio below 0.40. For biochars assigned to the Upper Persistance class %GPC 90% and %SPC = 10%. Biochars with H/Corg <0.4 but not assiged to the Upper Persistence class show %GPC = 75 % and %SPC = 25%. For biochars with an H to Corg ratio above and equal to 0.40, please refer to the indications in the standard.

Category	Matrix	ID	Controlling period in years	Diffuse C-sink authorized	Leakage margin to be deduced before registration	C remaining during temporary C- sink	C remaining after > 1000 y	SPC fraction with half-life of 50 years	Conditions	EBC-FeedPlus	EBC-Feed	EBC-AgroOrganic	EBC-Agro	EBC-Urban	EBC-Materials	EBC-Basic	WBC Premium	WBC Agro	WBC Materials	Global Artisan C-Sink
Biological Matrix	Compost	B-01		✓			% GPC	% SPC	Product must be marketed as soil amendment product. When used to produce potting soil, it has to be declared as matrix B-09.	✓		✓	✓	(✓)*1			✓	✓		✓
	Solid Manure	B-02		✓			% GPC	% SPC	The use as soil amendment must be proven. It must not be pyrolysed, combusted. If the manure is treated by anaerobic digestion, non combustive use of the solid digestate must be guaranteed.	✓		✓	✓	(✓)*1			✓	✓		✓
	Liquid Manure	B-03		✓			% GPC	% SPC	The use If the manure is treated by anaerobic digestion, non combustive use of the solid digestate must be guaranteed.	✓		✓	✓	(✓)*1			✓	✓		✓
	Anaerobic Digestate	B-04		✓			% GPC	% SPC	The use as soil amendment must be proven, must not used as feedstock for pyrolysis.	✓		✓	✓	(✓)*1			✓	✓		✓
	Biochar Based Fertilizer	B-06		✓			% GPC	% SPC	The fertilizer does not reduce the permenance but biochar may increase emissions during manufacturing and storage. A GHG balance of the production must be provided.	✓		✓	✓	(✓)*1			✓	✓		✓
	Animal feed	B-07		✓			% GPC	% SPC	Only lifestock feed with guaranteed end-of-life as soil amendment. Horse and chicken manure are often used for energetic purposes, which must be excluded. Pet feed products are generally excluded as pet execreta end up mainly in waste treatment plants.	✓	✓						✓	not recommended		
	Seed coating	B-08		✓	10%		% GPC	% SPC	An accounting for waste seed management must be provided and deduced from C-sink. 10% margin because expired seeds are often combusted.	✓		✓	✓				✓	✓		✓
	Potting soil / growing media / substrates for horticulture	B-09		✓	<> 20%		% GPC	% SPC	Life cycle data and statitistcs must prove that the end of life is in soil (e.g., via composting) for a relevant share of the total volume produced. This share defines the security margin.	✓		✓	✓				✓	✓		✓
	Potting soil / growing media / substrates for ornamental plants	B-10		✓	<> 20%		% GPC	% SPC	Must not be used to grow plants that are used for food or feed production. Life cycle data and statitistcs must prove that the end of life is in soil (e.g., via composting) for a relevant share of the total volume produced. This share defines the security margin.	✓		✓	✓	✓			✓	✓		✓

Category	Matrix	ID	Controlling period in years	Diffuse C-sink authorized	Leakage margin to be deduced before registration	C remaining during temporary C - sink	C remaining after > 1000 y	SPC fraction with half-life of 50 years	Conditions	EBC-FeedPlus	EBC-Feed	EBC-AgroOrganic	EBC-Agro	EBC-Urban	EBC-Materials	EBC-Basic	WBC Premium	WBC Agro	WBC Materials	Global Artisan C-Sink
Mineral Matrix	Concrete	Min-01	100 years	✓		100%	% GPC		To avoid exposing biochar particles during shredding of construction debris, and to ensure they remain sufficiently protected by the mineral matrix, biochar used in construction materials should be milled to a particle size below 1 mm. Tracking to the construction site is obligatory when the biochar C-sink is intended to be used unter the Global Construction C-sink Standard.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	(✓)*2
	Cement, cement mortar	Min-02		✓		100%	% GPC			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	(✓)*2
	Lime, lime mortar, gypsum	Min-03		✓		100%	% GPC			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	(✓)*2
	Clay, clay plaster, mudbricks and clay drywall	Min-04		✓		100%	% GPC			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	(✓)*2
	Asphalt	Min-05		✓	5%	100%	% GPC		To avoid exposing biochar particles during shredding of construction debris, and to ensurethey remain sufficiently protected by the mineral matrix, biochar used in construction materials should be milled to a particle size below 1 mm. Pyrolysis treatment of used asphalt causes the removal from the C-sink register.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Materials	Composite	Mat-01	individual	✓		100%			The temporary C-sink period depends on the expected life span of each respectiv product or product class and expected recycling pathways determind by statistics. It is governed by the Global Material C-Sink standard. High securtiy margins are due to variation between use scenarios and difficulty of tracking and control.						✓		✓		✓	
	Plastics	Mat-03	individual	✓		100%									✓		✓		✓	
	Textiles	Mat-04	individual	✓		100%									✓		✓		✓	
	Paints	Mat-05	individual	✓		100%									✓		✓		✓	
Landfill	Waste disposal	LF-01					% GPC	% SPC	Only authorized when mixed to cover soil or any other mineral matrix at a ratio < 1:5 to avoid any risk of smoldering.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Ash	LF-02					% GPC	% SPC	If the biochar is homogeneously mixed to pyrolysis ash at a ratio < 1 : 1.5, the biochar is efficiently protected from biological or chemical oxidation when applied to a landfill even in cases of landfill fire. The biochar persistence can thus be certified as for biochar soil application.The biochar-ash must be certified at least as EBC- or WBC-Materials.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Waste water	Waste water treatment / Sewage Sludge	W-05		✓	10%		% GPC	% SPC	Documenting of the treatment and sludge needed to exclude that the amended sludge ends up as feedstock for pyrolysis or combustion. The margin was set as the sludge amendment and use is sometimes obscured.	✓		✓	✓				✓	✓		✓
Geological storage		G-01			5%		100%	0%	Geological storage requires application deep below the soil in geological horizons, where no biological activity is sustained, protected from water and air, and where it cannot be recovered because of a sealed cover or because of its embedding in a C-sink matrix. For storages above 10,000 m3 continous monitoring of temperature and gas evolution must be set up.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

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Soil	Agricultural soil	S-01		✓			% GPC	% SPC	Tracking and prove of soil application must be provided. Wetlands (S 04) must be excluded.	✓		✓	✓				✓	✓		✓
	Urban soil	S-02		✓			% GPC	% SPC	Tracking and proof of soil application must be provided. Blending with mineral material (as for the Stockholm model) is permitted for diffuse C-sinks as last tracking point if there is evidence of its use in urban construction.	✓	✓	✓	✓	✓			✓	✓		✓
	Mine reclamation	S-03					% GPC	% SPC	Tracking or reporting and prove of soil application must be provided.	✓	✓	✓	✓	✓			✓	✓		
	Wet lands	S-04	✓		100%		% GPC	% SPC	Biochar may lead to accelerated mineralization of wetlands. Too few scientific data available. Not accepted as C-sink matrix today.	not allowed as C-Sink Matrix (yet)							not allowed as C-Sink Matrix (yet)			
	Forest	S-05			0-20%		% GPC	% SPC	Biochar may lead to accelerated mineralization of certain boreal forests where a higher security margin is applied. The soil of natural forests should better not be disturbed by machines and substrates.The safety margin can be reduced to zero if the soil is proven to be degraded with a low SOC content or if the biochar is used as a concentrated root zone application during planting.	✓		✓	✓				✓	✓		✓
	Foundation and compacted ground under constructions (e.g. roadbeds)	S-06					% GPC	% SPC	Depending on the subsoil analysis (SOC) and depth, reduced degradation of SPC can be expected but not yet guaranteed. Once sufficient scientific data are provided, a correction of the SPC degradation can be registered retroactively.	✓	✓	✓	✓	✓			✓	✓		
	Clay subsoil	S-07					% GPC	% SPC	Depending on the clay-soil analysis (SOC) and depth, reduced degradation of SPC can be expected but not yet guaranteed. Once sufficient scientific data are provided, a correction of the SPC degradation can be registered retroactively.	✓	✓	✓	✓	✓			✓	✓		
	Sediments	S-08					% GPC	% SPC	Depending on the sediment analysis (SOC), depth, and location, reduced degradation of SPC can be expected but not yet guaranteed. Once sufficient scientific data are provided, a correction of the SPC degradation can be registered retroactively.	✓	✓	✓	✓				✓	✓		

*1 The use of biochar with certification class EBC-Urban in the biological substrates is only permitted when the substrate packaging indicates that it is for urban use only and must not be used for agricultural/horticultural purposes. The following are also accepted: A declaration from the end user confirming that the biochar is not applied on fields where food is produced or where livestock grazes. Or photographic evidence showing that the biochar was applied, for instance, on a football field, in a park, or for rooftop greening.

*2 Only applicable for biochar produced by Artisan Pro's

%GPS = geologically persistent carbon fraction of biochar
%SPC = semi-persistent carbon fraction of biochar

For the inclusion of other matrices not included yet in the present positive list an official request can be sent to Carbon Standards.

The decision about the inclusion in the positive list as well as possible additional requirements will be made by the scientific advisory board of Carbon Standards. All decisions are justified and published on the Carbon Standard website.

Regulation by Matrix Types

Biological Matrices

- For products with a clear application recommendation on the label (e.g., fertilizer or feed additive), this recommendation is sufficient as evidence of diffuse application.
- For intermediate products, (B-02, B-03, B-04, B-07) documentation must provide that the matrix will ultimately end up in a soil-based application. E.g. disposal contract, legal obligations, statement of group of end users with field of activity.

Mineral Matrices

- Once biochar has been incorporated into the matrix, the carbon sink can be registered as a diffuse carbon sink.
- Important: If the biochar is intended to be used under the Global Construction C-sink Standard, it must be tracked through to the building.

Materials

- Tracking up to the point of application is sufficient.
- Further tracking is voluntary but recommended.

Waste Water:

- Tracking up to the point of application (waste water treatment plant)
- Additional documentation required to proof that the matrix will ultimately end up in a soil-based application (e.g. disposal contract)

Geolocation Requirement:

Geolocation is mandatory for the following cases:

- Direct soil application of biochar,
- Landfilling,
- Geological storage

Note:

1. If the biochar is already embedded in a biological matrix (e.g., feed, fermentation residues) and is applied according to dosage recommendations, it is considered a diffuse sink – even in the case of later soil application.
2. Unprocessed biochar can also be recognized as incorporated into a matrix if the First C-sink Owner provides annual proof that there is no risk of alternative use other than soil application.

   This means:

   - There is no economic incentive to apply the biochar differently, since its price is significantly higher than the market price for charcoal. For this, detailed knowledge of the group of recipients and their fields of activity is required.
   - The delivery note can be combined with this documentation and serves as proof of incorporation into the matrix.
3. A signed statement or digital confirmation of non-improper use must be matrix-specific.

   For example:

   This is not acceptable:
   "The biochar has been brought into a stable matrix and will not be burnt."

   This would be acceptable:

   "The biochar has been brought into the matrix "liquid manure, B-03". The manure is not treated by anaerobic digestion, but directly used for application to the field."