Positive list of permissible matrices for the establishment of biochar C-sinks

Global Biochar C-Sink

For biochars presenting an H to Corg ratio below 0.40. A new persistence evaluation system based on hydro-pyrolysis analysis is in preparation. The latter mainly concerns the proportions of the PAC and SPC fractions.

Matrix

Origin	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 MRT of 50 years	Conditions
Biological Matrix - Only for diffuse C-sinks. For all packaging units > 0.5 m3 biochar, the biochar and its C-sink matrix must be tracked to the location of soil application.	Compost	B-01		✓			75%	25%	The use of compost as soil amendment must be proven. When used to produce potting soil, it has to be declared as matrix B-09.
	Solid Manure	B-02		✓			75%	25%	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.
	Liquid Manure	B-03		✓			75%	25%	If the manure is treated by anaerobic digestion, non combustive use of the solid digestate must be guaranteed.
	Anaerobic Digestate	B-04		✓			75%	25%	The use as soil amendment must be proven, must not used as feedstock for pyrolysis
	Biochar Based Fertilizer	B-06		✓			75%	25%	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.
	Animal feed	B-07		✓			75%	25%	Only lifestock feed with guaranteed end-of-life as soil amendment. Horse and chicken manure are often used for energetic purposes. Tracking or reporting of manure to soil must be provided. Pet feed products are generally excluded as pet execreta end up mainly in waste treatment plants.
	Seed coating	B-08		✓	10%		75%	25%	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%		75%	25%	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.
Mineral Matrix	Concrete	Min-01	30 years for the first period, then every 10 years.			100%			After biochar addition, these matrixes must not be subject to thermal treatment beyond drying. Following demolition, the biochar-containing mineral matrix should be recycled for use in new building materials or as gravel for road consturction or lanscaping to preserve the matrix. In the case of Global Material C-sink certified constructions, demolition must be communicated to the Global C-Sink Registry so that the registered matrix and geolocation can be modified accordingly. The certifier establishes a controlling period for the construction, which is monitored by satellite imagery. If the construction is removed or signifincantly altered without proper notification to the registry, the C-sink certification will be revoked.
	Cement mortar	Min-02		✓		100%			
	Lime mortar & gypsum	Min-03		✓		100%			
	Clay plaster, mudbricks and clay drywall	Min-04		✓		100%			
	Asphalt	Min-05				100%			Lost of pyrogenic carbon during the different recycling process are not yet investigated. Currently 80% of asphalt is recycled at temperatures that do not cause biochar degradation (< 300 °C). However, pending the results of those investigations, a control period of 30 years is set. 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%			
Soil	Agricultural soil	S-01		✓			75%	25%	Tracking and prove of soil application must be provided. Wetlands (S-04) must be excluded.
	Urban soil	S-02		✓			75%	25%	Tracking or reporting and prove of soil application must be provided.
	Mine reclamation	S-03					75%	25%	Tracking or reporting and prove of soil application must be provided.
	Wet lands	S-04	✓		100%		75%	25%	Biochar may lead to accelerated mineralization of wetlands. Too few scientific data available. Not accepted as C-sink matrix today.
	Forest	S-05			0-20%		75%	25%	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					75%	25%	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					75%	25%	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					75%	25%	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.
Landfill	Waste disposal	LF-01					75%	25%	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					75%	25%	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%		75%	25%	Tracking 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 subsoils without SOC below the zone of sustained biological activity, e.g. in abondoned mining sites. For storages above 10,000 m3 continous monitoring of temperature and gas evolution must be set-up.

* 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.