

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

### Global Biochar C-Sink

#### Matrix

Origin	Feedstock	ID	Controlling period	Diffuse C-sink authorized	Security margin to be deduced before registration	C remaining after 100 y	C remaining after > 1000 y	PAC fraction	MRT of SPC in y	Conditions
Biological Matrix	Compost	B-01	-	✓	-	82%	75%	25%	50	The use of compost as soil amendment must be proven. Potting soil cannot be certified as most of it end up in waste treatment plants.
	Solid Manure	B-02	-	✓	-	82%	75%	25%	50	The use as soil amendment must be proven, must not be pyrolysed or combusted
	Liquid Manure	B-03	-	✓	-	82%	75%	25%	50	
	Anaerobic Digestate	B-04	-	✓	-	82%	75%	25%	50	The use as soil amendment must be proven, must not used as feedstock for pyrolysis
	Waste water treatment / Sewage Sludge	B-05	-	✓	10%	82%	75%	25%	50	Tracking of the treatment and sludge needed to exclude that the amended sludge ends up as feedstock for pyrolysis or combustion
	Biochar Based Fertilizer	B-06	-	✓	-	82%	75%	25%	50	The fertilizer does not reduce the permanence but biochar may increase emissions during manufacturing and storage. A GHG balance of the production must be provided.
	Animal feed	B-07	-	✓	5%	82%	75%	25%	50	Only livestock 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 excreta end up mainly in waste treatment plants.
	Seed coating	B-08	-	✓	10%	82%	75%	25%	50	An accounting for waste seed management must be provided and deduced from C-sink.
	Potting soil / growing media / substrates for horticulture	B-09	-	✓	20%	82%	75%	25%	50	Life cycle assessment / statistics must prove an end-of-life usage/recycling as soil amendment.
Mineral Matrix	Concrete	Min-01	-	✓	5%	95%	95%	25%	50	After demolition, the biochar-containing mineral matrix should be recycled for use in new building materials or as gravel for road construction or landscaping to preserve the matrix. In the case of C-sink certified constructions, it is important to report the demolition to the Global Carbon Register 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 significantly altered without proper notification to the registry, the C-sink certification will be revoked.
	Cement mortar	Min-02	-	✓	5%	95%	95%	25%	50	
	Lime mortar	Min-03	-	✓	5%	95%	95%	25%	50	
	Clay plaster and bricks	Min-04	-	✓	5%	95%	95%	25%	50	
	Asphalt	Min-05	30 y	✓	10%			25%		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 20 years is set. Pyrolysis treatment of used asphalt causes the removal from the C-sink register.

<b>Materials</b>	Composite	Mat-01	✓	✓	15%			25%		Controlling period depend on expected life span of each respective product or product class and expected recycling pathways. Depending on the Global Material C-Sink Standard. High security margin due to variation between use scenarios and difficulty of tracking and control.
	Plastics	Mat-03	✓	✓	15%			25%		
	Tissues	Mat-04	✓	✓	15%			25%		
	Paints	Mat-05	✓	✓	15%			25%		
<b>Soil</b>	Agricultural soil	S-01	-	non		82%	75%	25%	50	Tracking and prove of soil application must be provided.
	Urban soil	S-02	-	non		82%	75%	25%	50	Tracking or reporting and prove of soil application must be provided.
	Mine reclamation	S-03	-	non		82%	75%	25%	50	Tracking or reporting and prove of soil application must be provided.
	Wet lands	S-04	✓	non	100%	82%	75%	25%	50	Biochar may lead to accelerated mineralization of wetlands. Too few scientific data available. Not accepted as C-sink matrix today.
	Forest	S-05	-	non	0-20%	82%	75%	25%	50	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.
	Foundation and construction ground (e.g. roadbeds)	S-06	-	non	-	82%	75%	25%	50	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	-	non	-	82%	75%	25%	50	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	-	non	-	82%	75%	25%	50	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.
<b>Landfill</b>	Landfill / waste disposal	W-01	10 y	non	-	82%	75%	25%	50	Only authorized when mixed to cover soil at a ratio < 1:5 to avoid any risk of smoldering. GPS tracking of application must be provided. A government approved action plan on how the outbreak of fire in the area of the landfill is efficiently prevented must be presented. Every 10 years the site must be controlled to exclude the occurrence of any fire during the controlling period.
<b>Geological storage</b>		G-01	-	non	5%	100%	100%	0.75	1000	Geological storage requires soils without SOC below the zone of sustained biological activity, e.g. in abandoned mining sites.

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

The decision about the inclusion in the positive list as well as possible additional requirements will be made by the scientific advisory board of CSI.

All decisions are justified and published on the CSI website.