

Carbon sink certificate – for CO₂eq potential

ID of C-sink certificate: cs-8xlw-ejna-xxbj-qe1k-2
(replacement of cs-8xlw-ejna-xxbj-qe1k)

Interholco AG
Neuhofstrasse 25
6340 Baar
Switzerland

EBC Producer ID: co-cg-244
GPS of production: 1.428571,16.174816

The Carbon sink potential of the mentioned batch is certified according to the following standard:



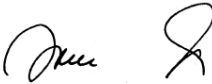
BIOCHAR BASED CARBON SINKS

Data of batch:

EBC Batch ID	ba-cg-244-1-2
Amount of produced biochar (dry matter)	2006 t
C-sink potential of biochar (dry matter)	86.4 %
C-sink potential per ton of biochar (dry matter)	3.17 t CO ₂ eq
C-sink potential of total amount of produced biochar (dry matter)	6353.05 t CO ₂ eq

Frick, 19.09.2023




Peter Jossen
President of board of
directors


Ueli Steiner
Director

Certification details of Carbon sink potential

Biomass	Type of biomass (EBC feedstock ID)	F01,F02,F03 (A1)	
	Total amount of biomass (DM) used for the certified batch	6363 t	
	Emissions due to fertilization	0.00 t	CO ₂ eq
	Transportation of biomass to pyrolysis site	0.43 t	CO ₂ eq
	Preparation of feedstock	110.15 t	CO ₂ eq
	Emissions for drying of feedstock	0.00 t	CO ₂ eq
	Feedstock storage emissions	0.00 t	CH ₄
	Total biomass related GHG emissions without CH₄ per batch	110.58 t	CO₂eq
Pyrolysis	Source of electric energy used on site	Non-renewable	
	Emissions due to electricity consumption for entire pyrolysis plant incl. post pyrolysis treatment	0.00 t	CO ₂ eq
	Emissions due to LPG and other external fuel for reactor heating	0.38 t	CO ₂ eq
	Emissions due to carrier gas	0.00 t	CO ₂ eq
	CH ₄ -emissions of pyrolysis unit	60.18 t	CH ₄
	Total pyrolysis related GHG emissions without CH₄ per batch	0.38 t	CO₂eq
Methane	Total methane emissions	60.18 t	CH ₄
	Amount of compensated methane emissions	60.18 t	CH ₄
	Type of methane compensation	Avoiding open wood burning	
	Total non-compensated CH ₄ emissions per batch	0.00 t	CH ₄
	Total non-compensated CH₄ emissions in CO₂eq per batch (@GWP20 of 86)	0.00 t	CO₂eq
Margin of security	3% of the total amount of biochar contained carbon per batch	199.9 t	CO₂eq
Total emissions	Total GHG emissions in CO₂eq per batch	310.9 t	CO₂eq
	Total GHG emissions in C per ton of biochar (DM)	0.042 t	C
Energy	Carbon neutral thermal energy per batch	0.00	MWh
	Carbon neutral electricity per batch	0.00	MWh
Biochar	Amount of biochar (DM) produced per certified batch	2006 t	
	H/Corg ratio	0.20	
	C-content	90.60 %	
	C-sink potential	86.4 %	of DM
Data per ton of biochar	Total GHG emissions per t biochar (DM)	0.15 t	CO ₂ eq
	CO ₂ eq content per t of biochar (DM) [gross C-sink]	3.32 t	CO ₂ eq
	C-sink potential in t CO ₂ eq per t of biochar (DM) [net C-sink]	3.17 t	CO ₂ eq
Data of batch	C-sink potential in t CO ₂ eq of total amount of produced biochar (DM)	6353.05 t	CO₂eq

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The biochar batch ba-cg-244-1-2 produced by Interholco AG has carbon sink potential of 86.4 %. Each ton of biochar from the certified batch has a carbon sink potential of 3.17 t CO₂eq.

The carbon sink potential of 86.4 % provides the percentage of a mass unit of biochar that, on a dry matter base, can be considered as a temporal carbon sink. For example, a big bag containing 131 kg biochar (dry matter) has a carbon sink potential of (131 kg * 86.4 % CS) = 113.18 kg C which is the equivalent of 415 kg CO₂eq per big bag.

The 113.18 kg carbon of a 1 m³ big bag of biochar is the amount of carbon that can be considered a carbon sink once the biochar is applied to soil, to compost, to digestate, to animal feed or to any other durable product or protective matrix. Depending on the intended use of the biochar, the amount of persistent carbon varies after 100 years. If the biochar applied to soil the persistent Carbon of the sink after 100 years is 74 % (@P100=74%).

The production of 1 t of biochar (dry matter) caused emissions of 154 kg CO₂eq (42 kg C) due to feedstock production, transportation, storage, preparation and operation of the pyrolysis plant and methane emissions during both biomass storage and the combustion of the pyrolysis gases. These emissions were deduced from the carbon sink value of the biochar. A security margin of 3% of the C content of the biochar is levied to account for emissions such as the diminution of the biomass feedstock, the provision and pumping of quenching water, and the collection of biochar as well as for uncertainties and analytical deviation regarding dry matter and carbon content due to the heterogeneity of the feedstock.

The CO₂ emissions of the combustions of the pyrolysis gases used for energy production are considered as carbon neutral as the feedstock for the pyrolysis originated from forest management residues.

CH₄ emissions resulting from biochar production are offset by the prevention of equivalent CH₄ emissions previously caused by the unregulated burning of wood waste, a common practice prior to the initiation of forest residue pyrolysis. The time frame to account for this emission offset is three years. The feedstock is processed within 30 days, thus eliminating the risk of CH₄ emissions due to self-heating.

Neither the carbon expenditures necessary to transport the biochar from the production site to the location of the final C-sink (via a merchant and/or processor) nor the carbon expenditures when manufacturing or blending the biochar into a carbon sink product are considered so far. These emissions must be deducted as soon as a C-sink certificate or an offset service is generated for an end customer based on this C-sink potential certificate. Equally, when applied to soil, only the carbon fraction that is persistent after 100 years (C_{sink100}) or any other EBC-defined sequestration period should be traded as C-sink certificate.

The present EBC carbon sink certificate for CO₂eq potential at factory gate is valid for the biochar batch ba-cg-244-1-2 and can be used for carbon sink certification and trade procedures.