Certificate

q.inspecta

Carbon sink certificate – for CO_2eq 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:

EBC carbon sink

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 CO2eq
C-sink potential of total amount of produced biochar (dry matter)	6353.05 t CO2eq

Frick, 19.09.2023

Peter Jossen
President of board of directors

Ueli Steiner
Director

EBC producer ID: co-cg-244 **ID of C-sink certificate:** cs-8xlw-ejna-xxbj-qe1k-2

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_2eq
	Transportation of biomass to pyrolysis site	0.43 t	CO_2eq
	Preparation of feedstock	110.15 t	CO_2eq
	Emissions for drying of feedstock	0.00 t	CO_2eq
	Feedstock storage emissions	0.00 t	CH_4
	Total biomass related GHG emissions without CH_4 per batch	**110.58 t**	**CO_2eq**
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_2eq
	Emissions due to LPG and other external fuel for reactor heating	0.38 t	CO_2eq
	Emissions due to carrier gas	0.00 t	CO_2eq
	CH_4-emissions of pyrolysis unit	60.18 t	CH_4
	Total pyrolysis related GHG emissions without CH_4 per batch	**0.38 t**	**CO_2eq**
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 CH_4 emissions in CO_2eq per batch (@GWP20 of 86)	**0.00 t**	**CO_2eq**
Margin of security	**3% of the total amount of biochar contained carbon per batch**	**199.9 t**	**CO_2eq**
Total emissions	**Total GHG emissions in CO_2eq per batch**	**310.9 t**	**CO_2eq**
	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_2eq
	CO_2eq content per t of biochar (DM) [gross C-sink]	3.32 t	CO_2eq
	C-sink potential in t CO_2eq per t of biochar (DM) [net C-sink]	3.17 t	CO_2eq
Data of batch	C-sink potential in t CO2eq of total amount of produced biochar (DM)	**6353.05 t**	CO_2eq

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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 CO_2eq.

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 CO_2eq per big bag.

The 113.18 kg carbon of a 1 m^3 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 CO_2eq (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 CO_2 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.

CH_4 emissions resulting from biochar production are offset by the prevention of equivalent CH_4 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 CH_4 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 (Csink100) or any other EBC-defined sequestration period should be traded as C-sink certificate.

The present EBC carbon sink certificate for CO_2eq 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.