CARBON STANDARDS international

Endorsement of Laboratories – European Biochar Certificate (EBC) and World Biochar Certificate (WBC)

Laboratories seeking approval to conduct analyses for certification purposes must undergo a quality control process. The quality and reliability of the analyses performed by a laboratory are validated through participation in a laboratory approval process organized by an external and independent quality assurance organization. DCC Delta Coal Control GmbH, based in Herten, Germany, is our partner for laboratory approval procedures.

This document aims to provide a clear understanding of the steps involved and the requirements needed to obtain the endorsement as laboratory for EBC and WBC by Carbon Standards International.

The endorsement is valid for EBC, WBC and Global Artisan C-Sink and for 1 year. To obtain re-endorsement each year, the ring trial must be repeated.

1. Endorsement process

Step	Description	Responsible party
1	Laboratory reaches out to Carbon Standards International (CSI) for a first introduction call.	Laboratory
2	The Laboratory registers for the endorsement process. Registration can be done through this link. With this step the annual fee will be invoiced.	CSI / Laboratory
3	The laboratory registers at Delta Coal Control.	Laboratory
4	Delta Coal Control will send a standardized sample to the "applicant" laboratory with the request to perform an analysis required for certification using the testing methods specified in the applicable standard.	Delta Coal Control
5	The laboratory will analysis the samples and send the results to DCC.	Laboratory
6	The laboratory hands in the laboratory accreditation confirmation, e.g. ISO 17025, to CSI, the signed three-party agreement and the final results of the ring trial from DCC.	Laboratory
7	Upon successful completion, the laboratory will receive a certificate designating them as an "Endorsed Laboratory". The laboratory will be listed on the website of CSI. After the audit the costs for the endorsement process will be invoiced. If the endorsement is not successful, the laboratory has the chance to improve their processes and start the endorsement process again. The costs for the endorsement will be invoiced in any case.	CSI

2. General requirements

In the following table, general requirements of Carbon Standards International for System provider are listed. Those aspects are additional to the specific requirements of the EBC/WBC standard.

Requirement	Description
Analysis parameters	• See Annex 1-4 of EBC Guidelines, using the testing methods specified in the guidelines. • DCC Delta Coal Control GmbH will provide a detailed description about the parameters and the analysis methods.
Margin of error	• The analysed parameters must not exceed a "**zu-score of +/- 2"** for each respective biochar. For the endorsement all analysis must pass.
Results sharing	• The laboratory is required to share any analysis report of a biochar sample for EBC/WBC assessment with CSI, third parties stated in the corresponding standard and other parties of the signed agreement.
Ring trial	• The ring trial must be conducted annually. • Upon successful completion, the endorsement will be renewed.
Offering of analysis	• If a laboratory cannot carry out all analyses required by the EBC/WBC guidelines, they can subcontract analyses for specific parameters, provided the subcontractor has also passed the ring trial. But at least 50% of the analysis must be caried out inhouse.

3. Analysis requirements

The analysis parameters need to be presented in accordance with the specified criteria outlined below:

Requirement	Description
File format	• The analysis must be provided as a PDF report. • Additionally, it must be provided as an XML document.
Naming	• All Parameters must be named according to the table in chapter 4. • The wet basis must be called "as received", the dry basis must be called "dry basis". Shortcuts are allowed.
Analysis Packages	• The laboratory must offer full packages named as follows for the different Standards: ○ EBC: ▪ EBC basic package ▪ EBC feed package ▪ REACH package ○ WBC: ▪ WBC basic package ○ Global Biochar C-Sink Package ○ Additional parameters

4. Analysis packages

This chapter outlines the various packages that an accredited laboratory should provide to its Biochar clients. It details the terminology and units associated with the parameters.

4.1 EBC basic package

Analytical requirements are mentioned in Annex 1 of the EBC-Guidelines.

Parameter	Unit
C_{tot}	% (w/w)
C_{org}	% (w/w)
H N O S	% (w/w)
ash at 550°C (inkl. Si)	% (w/w)
H/C_{org}	-
O/C_{org}	-
water content (at delivery)	% (w/w)
dry matter	% (w/w)
bulk density @ < 3mm particle size	kg/m^3
WHC	%
pH content	-
salt content	g/kg & g/l
electrical conductivity	mS/cm
N P K Mg Ca Fe	g/kg
heavy metals: Pb Cd Cu Ni Hg Zn Cr As Ag	mg/kg
16 EPA PAH	mg/kg
8 EFSA PAH	mg/kg
PCB, PCDD/F	ng/kg, pg/g
Benzo(e)pyren, Benzo(j)fluoranthen	mg/kg
bulk density (at delivery)	kg/m^3

4.2 EBC feed package

Analytical requirements are mentioned in Annex 2 of the EBC-Guidelines

Parameter	Unit
C_{tot}	% (w/w)
C_{org}	% (w/w)
H N O S	% (w/w)
ash at 550°C	% (w/w)
H/C_{org}	-
O/C_{org}	-
water content (at delivery)	% (w/w)
dry matter	% (w/w)
bulk density @ < 3mm particle size	kg/m^3
WHC	%
pH content	-
salt content	g/kg & g/l
electrical conductivity	mS/cm
N P K Mg Ca Fe	g/kg
heavy metals: Pb Cd Cu Ni Hg Zn Cr As Ag	mg/kg
16 EPA PAH	mg/kg
8 EFSA PAH	mg/kg
PCB, PCDD/F, coplanare PCB	ng/kg, pg/g, µg/kg
Benzo(e)pyren, Benzo(j)fluoranthen	mg/kg
Fluor	mg/kg
HCl-insoluble ash	mg/kg
bulk density (at delivery)	kg/m^3

4.3 REACH package

Additional parameters to meet the requirements for the REACH registration, which is mandatory for European producers.

Parameter	Unit
XRD (structural analysis of charcoal)	-
Benzene (BTX)	mg/kg

4.4 WBC basis package

Analytical requirements are mentioned in Annex 1 of the WBC Guidelines.

Parameter	Unit
C_{tot}	% (w/w)
C_{org}	% (w/w)
H N O S	% (w/w)
ash at 550°C	% (w/w)
H/C_{org}	-
O/C_{org}	-
water content (at delivery)	% (w/w)
dry matter	% (w/w)
bulk density @ < 3mm particle size	kg/m^3
WHC	%
pH content	-
salt content	g/kg & g/l
electrical conductivity	mS/cm
N P K Mg Ca Fe	g/kg
heavy metals: Pb Cd Cu Ni Hg Zn Cr As Ag **Se**	mg/kg
16 EPA PAH	mg/kg
8 EFSA PAH	mg/kg
PCB, PCDD/F	ng/kg, pg/g, µg/kg
bulk density (at delivery)	kg/m^3

4.5 Global Biochar C-Sink package

Parameter	Unit
lower heating value	MJ/kg

4.6 Additional parameters

Parameter	Unit
TGA	-
protein, fiber, fat	% (w/w)
chrom (VI)	mg/kg
BET spec. surface area	m^2/g