EBC and WBC – Clarification for endorsement of laboratories

Preamble

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.

Aim of the document

This document aims to provide a clear understanding of the steps involved and the requirements needed to obtain the endorsement as laboratory for the European Biochar Certificate (EBC) and the World Biochar Certificate (WBC) standard by Carbon Standards International.

The endorsement is valid for EBC, WBC and Global Artisan C-Sink standard 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 an introduction call.	Laboratory
2	The Laboratory registers for the endorsement process. Registration can be done through this link. With this step the annual CSI 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 analyse 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 Laboratories under Global Artisan C-Sink are listed. Those aspects are additional to the specific requirements of the EBC, WBC and Global Artisan C-Sink 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 analyses must pass.
Results sharing	The laboratory is required to share any analysis report of a biochar sample for EBC,WBC or Global Artisan C-Sink assessment with CSI, third parties stated in the corresponding standard and other parties of the signed agreement. If the laboratory fails to comply with the agreement, the endorsement may be revoked at any time.
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.
Offers and Packages	The laboratory must submit a standard offer and a list of offered packages. In the offers, non-mandatory analyses must be clearly marked, along with parameters for which the lab is not endorsed.
Laboratory report	The laboratory must submit a standard laboratory report for comparison reasons. If the laboratory offers additional analyses for which they are not endorsed by CSI, these must be clearly marked and shared in a separate report.

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 "at delivery", the dry basis must be called "dry basis". Shortcuts are allowed.
Analysis Packages	The laboratory must offer full packages named as follows: **EBC:** • EBC basic package • EBC feed package • REACH package **WBC:** • WBC basic package **Global Biochar C-Sink package** **Additional parameters** **Artisan System Provider package** **Artisan Basic package** **Artisan Pro retention sample package**

4. Analysis packages

This chapter outlines the various packages that an endorsed 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
total carbon (C_{tot})	% (w/w)
organic carbon (C_{org})	% (w/w)
Hydrogen (H), Nitrogen (N), Oxygen (O), Sulphur (S)	% (w/w)
ash content (at 550°C)	% (w/w)
H/C_{org} ratio	-
O/C_{org} ratio	-
moisture	% (w/w)
dry matter	% (w/w)
bulk density < 3mm	kg/m^3
bulk density (at delivery)	kg/m^3
water holding capacity (WHC)	%
pH content	-
salt content	g/kg & g/l
electrical conductivity	mS/cm
Nitrogen (N), Phosphorus (P), Potassium (K), Magnesium (Mg), Calcium (Ca), Iron (Fe)	g/kg
heavy metals: Lead (Pb), Cadmium (Cd), Copper (Cu), Nickel (Ni), Mercury (Hg), Zinc (Zn), Chromium (Cr), Bor (B), Manganese (Mn), Arsenic (As), Silver (Ag)	mg/kg
∑16 EPA PAH	mg/kg
∑8 EFSA PAH	mg/kg

Benzo(e)pyren, Benzo(j)fluoranthen	mg/kg

4.2 EBC feed package

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

Parameter	Unit
total carbon (C_{tot})	% (w/w)
organic carbon (C_{org})	% (w/w)
Hydrogen (H), Nitrogen (N), Oxygen (O), Sulphur (S)	% (w/w)
ash content (at 550°C)	% (w/w)
H/C_{org} ratio	-
O/C_{org} ratio	-
moisture	% (w/w)
dry matter	% (w/w)
bulk density < 3mm	kg/m^3
bulk density (at delivery)	kg/m^3
water holding capacity (WHC)	%
pH content	-
salt content	g/kg & g/l
electrical conductivity	mS/cm
Nitrogen (N), Phosphorus (P), Potassium (K), Magnesium (Mg), Calcium (Ca), Iron (Fe)	g/kg
heavy metals: Lead (Pb), Cadmium (Cd), Copper (Cu), Nickel (Ni), Mercury (Hg), Zinc (Zn), Chromium (Cr), Bor (B), Manganese (Mn), Arsenic (As), Silver (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

4.3 REACH package

Parameters to meet the requirements for the REACH registration under the substance identification profile (SIP) EC No: 240-383-3. REACH is mandatory for Biochar produced within or imported to Europe (please see the ECHA website for further information). Please see the referenced SIP for further analytical information.

This package works in addition to the EBC basic package. It is *optional* to offer and is not part of the laboratory endorsement.

Parameter	Unit
Volatile organic compounds (VOC)	% (w/w)
ash at 815°C	% (w/w)
XRF (Elemental analysis of metals by X-ray fluorescence)	mg/kg
XRD (structural analysis of charcoal)	-
Benzene (BTX)	mg/kg
chrom (VI)	mg/kg
Cobalt (Co)	mg/kg
Benzo[def]chrysene	mg/kg

4.4 WBC basic package

Analytical requirements are mentioned in Annex 1 the WBC Guidelines.

Parameter	Unit
total carbon (C_{tot})	% (w/w)
organic carbon (C_{org})	% (w/w)
Hydrogen (H), Nitrogen (N), Oxygen (O), Sulphur (S)	% (w/w)
ash content (at 550°C)	% (w/w)
H/C_{org} ratio	-
O/C_{org} ratio	-
moisture	% (w/w)
dry matter	% (w/w)
bulk density < 3mm	kg/m^3
bulk density (at delivery)	kg/m^3
water holding capacity (WHC)	%
pH content	-
salt content	g/kg & g/l
electrical conductivity	mS/cm
Nitrogen (N), Phosphorus (P), Potassium (K), Magnesium (Mg), Calcium (Ca), Iron (Fe)	g/kg
heavy metals: Lead (Pb), Cadmium (Cd), Copper (Cu), Nickel (Ni), Mercury (Hg), Zinc (Zn), Chromium (Cr), Bor (B), Manganese (Mn), Arsenic (As), Silver (Ag), **Selen (Se)**	mg/kg
∑16 EPA PAH	mg/kg
∑8 EFSA PAH	mg/kg

4.5 Global Biochar C-Sink package

Additional parameters to meet the requirements for the Global Biochar C-Sink standard.

Parameter	Unit
net calorific value	MJ/kg

4.6 Additional parameters

Additional parameters that are mentioned in the EBC or WBC standard

Parameter	Unit
Gross calorific value / net calorific value	MJ/kg
ash at 815°C	% (w/w)
Volatile organic compounds (VOC)	% (w/w)
TGA	-
PCB	ng/kg
PCDD/F	pg/g, µg/kg
BET spec. surface area	m^2/g
chrom (VI)	mg/kg

4.7 Artisan System Provider package

Analytical requirements are mentioned in Annex 1 the WBC Guidelines.

Parameter	Unit
total carbon (C_{tot})	% (w/w)
organic carbon (C_{org})	% (w/w)
Hydrogen (H), Nitrogen (N), Oxygen (O), Sulphur (S)	% (w/w)
ash content (at 550°C)	% (w/w)
H/C_{org} ratio	-
O/C_{org} ratio	-
moisture	% (w/w)
dry matter	% (w/w)
bulk density < 3mm	kg/m^3
bulk density (at delivery)	kg/m^3
water holding capacity (WHC)	%
pH content	-
salt content	g/kg & g/l
electrical conductivity	mS/cm
Nitrogen (N), Phosphorus (P), Potassium (K), Magnesium (Mg), Calcium (Ca), Iron (Fe)	g/kg
heavy metals: Lead (Pb), Cadmium (Cd), Copper (Cu), Nickel (Ni), Mercury (Hg), Zinc (Zn), Chromium (Cr), Bor (B), Manganese (Mn), Arsenic (As), Silver (Ag), **Selen (Se)**	mg/kg
∑16 EPA PAH	mg/kg
∑8 EFSA PAH	mg/kg

4.8 Artisan Basic package

This package provides the general minimum analysis recommended for biochar intended for Artisan C-Sink Farmers/Networks or for biochar processors within C-Sink Cooks/Villages.

Analytical requirements are mentioned in Annex 1 of the WBC Guidelines

Parameter	Unit
C_{org}	% (w/w)
H	% (w/w)
H/C_{org}	-
ash at 550°C (inkl. Si)	% (w/w)
pH content	-
Water hoding Capactiy (WHC)	%

4.9 Artisan Pro retention sample package

This package includes the analysis required for each feedstock and Artisan Pro, which entails analyzing a biochar sample from the retention samples collected.

Analytical requirements are mentioned in Annex 1 of the WBC Guidelines

Parameter	Unit
C_{org}	% (w/w)
H	% (w/w)
H/C_{org}	-
ash at 550°C (inkl. Si)	% (w/w)
pH content	-
Water hoding Capactiy (WHC)	%