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Guidelines for Specifications of Biochars DRAFT VERSION

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Leading Carbon Ltd.  
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## 1 **Disclaimer**

2 The International Biochar Initiative (IBI) Guidelines for Specifications of Biochars have been  
3 prepared with the intent of providing the public with guidelines to categorize biochars according  
4 to relevant, reliable and measurable characteristics. In no way shall the IBI or its associates be  
5 responsible for the use or misuse of information and guidance provided in this document. This  
6 document prescribes tests and thresholds only to identify certain qualities and characteristics of  
7 biochars. No portion of this document is intended for use as a sustainability or production  
8 process guideline. Further documentation and guidance is necessary to identify appropriate  
9 sustainability practices and/or safe and effective production processes.

10 The benefits of a given biochar product can vary widely with the combination of crop, soil and  
11 climate factors. This guidance document makes no claims regarding the potential benefits of  
12 any given biochar in any particular application. Caution and careful investigation is warranted  
13 when selecting biochar for an application.

14 The IBI Guidelines for Specifications of Biochars is intended to be a living document. This  
15 document is subject to continuous updates and modifications as the science and body of  
16 knowledge surrounding biochar continues to evolve. Please ensure that you are using the most  
17 up-to-date version.

## 18 **Foreword**

19 The Guidelines for Specifications of Biochars have been developed by the International Biochar  
20 Initiative (IBI) in collaboration with a wide variety of industry and academic experts and  
21 through public input on an international level. The document was created to encourage further  
22 development of the biochar industry by providing standardized information regarding the  
23 characterization of biochar to assist in achieving more consistent levels of product quality. In  
24 addition to providing product definition and quality specification guidelines, this document has  
25 been developed to ensure that consumers have more consistent access to better information  
26 regarding the quality and physicochemical properties of biochar.

27 The Guidelines for Specifications of Biochars are designed to support an IBI certification  
28 program. Such a certification program has yet to be developed, but the implementation of a  
29 certification program will be informed by this document. Separately, the guidelines are also  
30 intended for use by various national and regional product standards bodies, national and  
31 regional biochar groups for their own local adaptation and use, and as a reference in regulatory  
32 situations, as may be appropriate.

33 IBI initiated the guideline creation as a transparent process open to public input. Document  
34 creation was focused among experts in the field, ensuring an efficient path from concept to final  
35 product, and addressing the needs of a broad range of biochar producers and users. As the

1 document was developed, public input from the larger international biochar community was also  
2 sought to provide a wider perspective on the use and functionality of this tool.

3 The design of the Guidelines for Specifications of Biochars follows current best practices and  
4 available science. As biochar science continues to improve, the document will be updated in an  
5 iterative process in order to remain current. Therefore these guidelines and this document will  
6 be periodically revised through further consultation with the international biochar community.

7 The Guidelines for the Specification of Biochars document development process is based on the  
8 following guiding principles:

- 9 • Maintain congruence with best practice guidance for standards development (such as  
10 ISO, ASTM, IEEE);
- 11 • Strictly adhere to process, ensuring efficient and effective collaboration;
- 12 • Engage the knowledgeable and diverse stakeholder group active in the biochar industry;
- 13 • Organize an independent review committee with broad stakeholder representation,  
14 (including project developers, environmental non-governmental organizations (ENGOS),  
15 researchers, and so on); and,
- 16 • Rely on existing infrastructure and capacity within IBI for leadership and administration  
17 of the initiative.

18 The experts charged with the development of the Guidelines for Specifications of Biochars took  
19 part in two phases of working group activities. At the end of each phase, new draft documents  
20 were posted, and comments were solicited. Throughout the process, public comments were  
21 incorporated in subsequent revisions of the draft. These consisted of Phase I, an initial review  
22 of document formatting and characterization criteria, and phase II, an in-depth discussion of  
23 characterization criteria and reporting levels selection. The working groups for each phase were  
24 organized as follows:

25

26 **Phase 1:** Initial review of document formatting and characterization criteria (December 2010 –  
27 March 2011)

28 Working Group #1: North America/South America/Africa

- 29 • Jim Amonette, United States
- 30 • Jason Aramburu, United States
- 31 • Louis de Lange, South Africa
- 32 • Mariam Ekebafé, Nigeria
- 33 • Johannes Lehmann, United States
- 34 • Kim Magrini, United States
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- 4 • Rogerio Traballi, Brazil
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7  
8

9 Working Group #2: Asia/Europe/ Australia/New Zealand

- 10 • Marta Camps, New Zealand
- 11 • Thomas Harttung, Denmark
- 12 • Michael Hayes, Ireland
- 13 • Stephen Joseph, Australia
- 14 • Rupam Katak, India
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- 16 • Franco Miglietta, Italy
- 17 • Amran Salleh, Malaysia
- 18 • Yoshiyuki Shinogi, Japan
- 19 • Balwant Singh, Australia
- 20 • Saran Sohi, United Kingdom
- 21 • Lukas Van Zwieten, Australia

22  
23

24 **Phase 2:** Live, in-depth review of characterization criteria and reporting levels selection (July  
25 2011)

- 26 • Marta Camps, New Zealand
- 27 • Stephen Joseph, Australia
- 28 • Johannes Lehmann, United States
- 29 • Cordner Peacocke, United Kingdom
- 30 • Michael Sesko, United States
- 31 • Saran Sohi, United Kingdom
- 32 • Edward Someus, Sweden

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34

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# 1 Scope

2

3 Issued by the International Biochar Initiative (IBI) and based on international consultation, this  
4 document is intended to establish testing, measurement, reporting methods, and labeling  
5 guidelines for the physical and chemical properties of biochar. Biochar is a solid material  
6 obtained from the carbonization of biomass. Biochar can be used as a product or an ingredient  
7 within a blended product, with a range of applications as an agent for soil improvement,  
8 improved resource use efficiency, remediation and/or protection against particular  
9 environmental pollution, and as an avenue for greenhouse gas abatement.

10 These guidelines provide a standardized definition of biochar and biochar characteristics related  
11 to the use of biochar as a soil amendment. They will serve as the basis for IBI certification  
12 programs, and are intended for use and adaptation to local conditions and regulations by any  
13 nation or region. These guidelines support not only baseline safety considerations but also the  
14 evolving understanding of the positive functions of biochar in soil. This document does not  
15 prescribe appropriate uses for biochar products, nor provide guidelines on what biochar can or  
16 should be used for.

17 These guidelines for the specifications of biochar relate to the physical properties of biochar  
18 only, and do not prescribe production methods or feedstock types, nor do they provide limits or  
19 terms for defining the sustainability and/or greenhouse gas abatement potential of a biochar  
20 product, for a certification scheme or otherwise. Although the biochar production and use  
21 parameters, listed above, are critical attributes of biochar production and application, they will  
22 be addressed in further IBI documents, yet to be developed.

23 Different feedstocks, and hence differentiated testing requirements of biochar, are defined in  
24 this guidance document as means for the identification and classification of a range of biochars.  
25 This testing scheme is based upon increasing levels of physical and chemical property reporting  
26 and not necessarily on increasing levels of biochar performance.

27 The intended audiences for these guidelines for biochar specification include producers, users,  
28 regulators, researchers and marketers of biochar, as well as the many national and regional  
29 biochar affiliates of the IBI. However, the biochar producer is the entity most likely to apply the  
30 guidelines, as a label (of differentiation) to the output of their production process.

## 31 2 Effective Date

32 The effective date of the Guidelines for Specifications of Biochars is **[January 1, 2012]**. The  
33 public posting and comment period is scheduled for autumn 2011.

34

### 3 Terms and Definitions

**Ash:** The solid mineral fraction of biomass or organic material that is not combustible. Ash may remain as a fixed solid after combustion of an organic substance, or it may be entrained as solid particulate matter in the exhaust gases from combustion.

**Biochar:** A solid material obtained from the carbonization of biomass.

**Biochar Characteristics:** For the purposes of these guidelines, biochar characteristics are those biochar physical properties that affect the following uses for biochar: 1) biochar that is added to soils with the intention to improve soil functions; and 2) biochar that is produced in order to reduce emissions from biomass (that would otherwise naturally degrade to greenhouse gases) by converting a portion of that biomass into a stable carbon fraction that has carbon sequestration value.

**Biomass:** The biodegradable fraction of products, waste and residues of biological origin from agriculture (including vegetal and animal substances), forestry, and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste (including municipal solid waste). (European Commission Agriculture and Rural Development 2010)

**Carbonization:** The process of converting feedstock into biochar through reductive thermal processing. The process involves a combination of time, heat and pressure exposure factors that can vary between processors, equipment and feedstocks.

**Contaminant:** An undesirable material in a biochar or biochar feedstock that compromises the quality or usefulness of the biochar. Contaminants include fossil fuels and fossil-fuel-derived chemical compounds, glass, and metal objects.

**Diluent/Dilutant:** Inorganic material that is deliberately or inadvertently comingled with biomass feedstock prior to processing. These materials will not carbonize in an equivalent fashion to the biomass. These materials include common constituents of natural soils, such as clays and gravel that may be gathered with biomass or intermixed through prior use of the feedstock biomass. Diluents/dilutants may be found in a diverse range of feedstocks, such as agricultural residues and municipal solid wastes.

**Feedstock:** The material undergoing the carbonization process to create biochar. Typically, feedstock material for biochar consists of organic material, but may also contain diluents.

**Hazardous Materials or Wastes:** Potential environmental pollutants that, when concentrated, can be a source of regulatory concern for any use or application that may influence human or environmental health and wellbeing (adapted from US Composting Council and US Department of Agriculture 2001).

1 Manufacturer/Producer: The party or parties who process the feedstock materials into biochar,  
2 acquire appropriate labeling, and test the biochar properties.

3 Municipal Waste/ Municipal Solid Waste (MSW): Domestic or small commercial non-hazardous  
4 wastes. MSW includes food wastes, yard wastes, containers and product packaging, and other  
5 miscellaneous inorganic wastes from residential, commercial, institutional and industrial  
6 sources. MSW may contain biodegradable components, recyclable material, inert waste,  
7 composite wastes, domestic hazardous waste and sludge. Other discarded material, including  
8 solid, semi-solid, liquid, or contained gaseous material resulting from community activities can  
9 also be found in MSW. MSW containing hazardous materials or wastes may not be included as  
10 eligible feedstocks under these guidelines. It is the manufacturer's responsibility to ensure that  
11 biochar feedstock materials are free of hazardous materials.

12 Organic Carbon: Biologically degradable carbon-containing compounds found in the organic  
13 fraction of biochar feedstocks. Biochar feedstock can contain such compounds as sugars,  
14 starches, proteins, fats, cellulose and lignocellulose, which are degradable by reductive thermal  
15 processing. Other organic carbon forms can include petroleum and petroleum byproducts such  
16 as plastics and contaminated oils, which are, for the purposes of this document, included within  
17 the definition of contaminants, but may also be thermally degraded. The organic carbon  
18 fraction does not include inorganic carbonate concretions such as calcium and magnesium  
19 carbonates. (adapted from US Composting Council and US Department of Agriculture 2001)

20 Organic Material: Biological material derived from, or produced by living or recently living  
21 organisms. This material can be "unprocessed" or "processed". Unprocessed material is living  
22 material, or recently living material, (biomass) that may have been mechanically resized (such  
23 as wood chips), but has not gone through an anthropogenic chemical modification. Processed  
24 material is recently living material that has been chemically modified by anthropogenic or  
25 biological processes (e.g., paper sludge, manure). This document recognizes that other  
26 definitions of "organic" exist such as those of organic chemistry; however, for the purposes of  
27 these guidelines the IBI has opted to define "organic" within these narrower bounds.

28 Processed Feedstock: Biomass that has gone through chemical processing (for example,  
29 chemical treatment such as occurs with wood preservatives and paper pulp sludges) or  
30 biological processing (for example, digestion, such as manures and sludge from waste effluent  
31 treatment) beyond simple mechanical processing to modify physical properties.

32 Residence Time: The time a feedstock is held within a consistent temperature range in a given  
33 carbonization process.

34 Soil Functions: Soil functions are defined by the proposal for a European Soil Framework  
35 Directive COM(2006)232, as follows: "(i) biomass production, including in agriculture and  
36 forestry; (ii) storing, filtering and transforming nutrients, substances and water; (iii) hosting the  
37 biodiversity pool, such as habitats, species and genes; (iv) acting as a platform for human  
38 activities; (v) source of raw materials; (vi) acting as carbon pool; and (vii) storing geological

1 and archeological heritage.” The guidelines and this document will focus on functions of biochar  
2 in soils.

3 Unprocessed Feedstock: Biomass that has not gone through chemical processing (that is,  
4 chemical treatment, such as wood preservatives and sludges) or biological processing (that is,  
5 digestion, such as manures and sludges) processing, but may have gone through mechanical  
6 processing to change its physical properties, including particle size.

7  
8

## 9 **4 Biomass Feedstock Material and Biochar Production**

### 10 **4.1 General Feedstock Material Requirements**

11 The materials used as feedstocks for biochar production have direct impacts on the nature and  
12 quality of the resulting biochar. Although the focus of this document is on the resulting biochar,  
13 some restrictions have been applied to feedstock contents and quality. To qualify as biochar  
14 under these guidelines, the feedstock may be any combination of biomass and diluents, and  
15 may not contain more than 2% by dry weight of contaminants, (following Brinton 2000).  
16 Suitable feedstocks include but are not limited to agriculture, food, and forestry residues, which  
17 may contain a minimal quantity of contaminants as part of the feedstock.

18 Note: Issues of feedstock sustainability are to be addressed in other IBI or related documents  
19 not included herein.

### 20 **4.2 General Biochar Process and Material Recommendations**

21 This guidance does not prescribe production and handling expectations for biochar, but instead  
22 provides recommendations for safe production processes. It is the responsibility of the biochar  
23 manufacturer to create biochar in a safe manner. The IBI recommends that best industry  
24 practices be followed throughout the manufacturing process.

25 Local requirements and regulations for the operation of biochar production facilities should be  
26 followed. Where applicable, biochar production must comply with local and international  
27 regulatory requirements and treaties that govern thermal processes, the production of volatile  
28 and particulate emissions, and the transport of goods. Relevant to local and international  
29 regulatory compliance, biochar producers should follow the two recommendations listed below:

- 30 • A biochar producer should provide a relevant material safety data sheet (MSDS) for the  
31 final output of its particular biochar production process. Brief outlines of MSDS  
32 document creation are available from numerous online sources, including [MSDS Search](#),  
33 the [Canadian Center for Occupational Health and Safety](#), and the [US Department of  
34 Labor Occupational Health and Safety Administration](#).

- 1 • Biochar should be tested to address the potential for self-heating and flammability  
2 during storage and transportation. Documentation of the results of this testing should  
3 be appended to the MSDS.

4 While the IBI may not require these practices as part of its definition and certification of biochar  
5 since they do not relate directly to product quality, they are important considerations in good  
6 business practice and responsible industrial production. The majority of nations provide  
7 detailed guidelines, expectations and regulations governing the manufacturing sector and will  
8 have relevant information available to industrial operators.

9  
10

## 11 **5 Biochar Product Testing Categories**

12 As is described in this section, biochar products shall be categorized based on the extent of  
13 testing and content analysis (relative to defined thresholds) completed for the given biochar  
14 material. The categorization structure is designed to:

- 15 • Provide a uniform presentation format by which a biochar user would be able to fairly  
16 compare and assess the reported properties of different biochars to determine if a  
17 particular biochar is suitable for a specific application.
- 18 • Incrementally increase the requirements of physical and chemical data reporting, so that  
19 a higher level of characterization and testing provides a more comprehensive  
20 understanding of the composition and properties of the material, as well as a better  
21 understanding of “fit for purpose”.

22 Each testing level category was developed according to an assessment of the relevant  
23 parameters for biochar qualities, characteristics, and safety, balanced against cost and  
24 accessibility. This document, however, does not provide guidance on the interpretation of these  
25 parameters relative to the beneficial uses and applications of biochar. Rather, the intent of this  
26 categorization structure is to provide increasing detail on the relevant parameters of the biochar  
27 in order to support decision-making by users, according to their own requirements.

28 This guidance document defines three levels for testing of biochar, which are as follows:

29 Level 1 - Entry Level: Biochar meets entry level requirements if it has been tested for  
30 the most basic parameters required to assess utility. Level 1 applies only to biochar  
31 from unprocessed feedstock.<sup>1</sup>

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<sup>1</sup> The exclusion of processed feedstocks from qualifying as Level 1 biochar reflects the need for further analysis to provide suitable assurance of the composition and properties of biochar made from processed feedstocks.

1        Level 2 - Moderate Level: Biochar that meets moderate level requirements has been  
2 tested for basic analysis and enhancement properties and meets some toxicity  
3 thresholds, in addition to the requirements of Level 1, regardless of whether it is of  
4 unprocessed or processed feedstock origin.

5        Level 3 - Advanced Level: Biochar that has been tested for advanced analysis and  
6 enhancement properties and meets some additional toxicity thresholds, in addition to  
7 meeting the requirements of Level 2.

8 Further details on each of the testing categories are provided in the following subsections. An  
9 illustration of the interrelationship between the testing level categories is provided in Figure 1,  
10 below.



11  
12  
13 *Figure 1: Flow Chart of Biochar Testing and Declaration Levels*  
14

1

2 **5.1 Level 1, Entry Level Testing and Declaration - Utility**

3 Biochar that is characterised exclusively under Level 1 category tests must originate from  
 4 unprocessed feedstocks. Biochar from processed feedstocks must be characterized by Level 2  
 5 or higher category tests.

6 Producers of biochar that has been tested to Level 1 must declare all basic biochar  
 7 characteristics outlined below, meet carbon content ratio minimums, and pass vegetative and  
 8 invertebrate vigour tests to meet the requirements of a Level 1 testing category. Basic biochar  
 9 characteristics include the physical properties of particle size and moisture content, as well as  
 10 chemical properties of element proportions (H, C and N), ash proportion and pH/liming ability.  
 11 Biochars tested to Level 1 shall conform to all requirements presented in Table 1 below:

12 **Table 1: Level 1 Characteristics and Criteria**

Requirement	Criteria	Unit	Test Method
<b>Basic Biochar Characterization</b>			
Moisture Content	Declaration	% of total mass	ASTM D1762-84 (specify measurement date with respect to time from production)
Total Ash	50% (Maximum)	% of total mass	Apply loss on ignition (ASTM D1762-84) to ascertain total non-carbonate ash, then add back inorganic carbon as carbonate.
Organic Carbon	Declaration	% of total mass	C, H, N analysis by dry combustion (Dumas method), before (total C) and after (organic C) HCl addition; inorganic C is the difference between total and organic C.
Inorganic Carbon	Declaration	% of total mass	
H:C <sub>org</sub>	0.7 (Maximum)	Molar ratio	
Total N	Declaration	% of total mass	Dry combustion (Dumas method) and gas chromatography, following same procedure as for C, H, N analysis above, without HCl addition.
pH	Declaration		Activated carbon pH, as outlined in Ahmedna et al. (2000), and Ahmedna et al (1997)
Liming (if pH is above 7)	Declaration	% CaCO <sub>3</sub>	Rayment & Higginson (1992)
Particle size distribution	Declaration	% or total mass in each class	Progressive dry sieving with 200µm, 2,000µm and 20,000µm sieves, as outlined in ASTM D5158-98 - Method for activated carbon
<b>Vegetative and Invertebrate Vigour</b>			
Earthworm Avoidance Test	Pass/Fail		OECD methodology (1984) as described by Van Zwieten et al. (2009)
Germination Inhibition Assay	Pass/Fail		OECD methodology (2004) 3 test species, as described by Van Zwieten et al. (2009)

13

1 **5.2 Level 2, Moderate Testing and Declaration - Basic Analysis and**  
 2 **Enhancement Properties**

3 Biochars tested to Level 2 must meet basic soil toxicity assessment guidelines and thresholds as  
 4 outlined in Table 2 below, report basic soil enhancement properties, and meet all Level 1  
 5 requirements to meet the requirements of a Level 2 testing category, regardless of whether the  
 6 biochar is derived from a processed or unprocessed feedstock. Basic soil enhancement  
 7 properties include N, P and K nutrient content, and electrical conductivity, while basic soil  
 8 toxicity assessment guidelines follow commonly-identified soil toxicity and soil amendment  
 9 chemical content reporting requirements (soil amendments include fertilizers and composts).  
 10 All values must be reported in order to meet test Level 2 categorization. Where values exceed  
 11 threshold levels, as outlined in Table 2, biochars will not achieve a Level 2 ranking.

12 Biochars tested to Level 2 shall conform to all requirements presented in Table 2 below:

13 **Table 2: Level 2 Characteristics and Criteria**

Requirement	Criteria	Unit	Criteria/Test Method
<b>Basic Soil Toxicity</b>			
	<b>Maximum Allowed Threshold</b>		
Arsenic	13	mg/kg	Bureau de normalisation du Québec (2005)
Cadmium	1.4	mg/kg	Amlinger, Faroino and Pollack, (2004)
Chromium	93	mg/kg	Amlinger, Faroino and Pollack, (2004)
Cobalt	34	mg/kg	Bureau de normalisation du Québec (2005)
Copper	143	mg/kg	Amlinger, Faroino and Pollack, (2004)
Lead	121	mg/kg	Amlinger, Faroino and Pollack, (2004)
Molybdenum	5	mg/kg	Bureau de normalisation du Québec (2005)
Mercury	1.0	mg/kg	Amlinger, Faroino and Pollack, (2004)
Nickel	47	mg/kg	Amlinger, Faroino and Pollack, (2004)
Selenium	2	mg/kg	Bureau de normalisation du Québec (2005)
Zinc	416	mg/kg	Amlinger, Faroino and Pollack, (2004)
Boron	Declaration	mg/kg	US Composting Council and US Department of Agriculture (2001)
Chlorine	Declaration	mg/kg	US Composting Council and US Department of Agriculture (2001)
Sodium	Declaration	mg/kg	US Composting Council and US Department of Agriculture (2001)
<b>Basic Soil Enhancement Properties</b>			
Total P & K <sup>2</sup>	Declaration	% content	Modified dry ashing followed by ICP (Enders and Lehmann 2011)
Mineral N (ammonium and nitrate)	Declaration	mg/kg	2M KCl extraction, followed by spectrophotometry (Rayment and Higginson 1992)
Available P	Declaration	mg/kg	2% formic acid followed by spectrophotometry

<sup>2</sup> Total K is sufficiently equivalent to available K for the purpose of this categorization

Requirement	Criteria	Unit	Criteria/Test Method
			(modified from Rajan et al 1992, Nutrient Cycl in Agroecosystems 32:291-302 and AOAC 2005, as used by Wang et al. 2011 Submitted to Plant and Soil)
Electrical Conductivity	Declaration	S/m	Method 3.A1 Rayment and Higginson 1992; EC of 1:5 soil/water content

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1 **5.3 Level 3, Advanced Testing and Declaration – Advanced Analysis and**  
 2 **Enhancement Properties**

3 Biochars tested to Level 3 must meet a series of advanced toxicity assessment requirements  
 4 and report on a set of advanced soil enhancement properties, in addition to meeting all test  
 5 Level 1 and test Level 2 requirements, regardless of whether the biochar is derived from a  
 6 processed or unprocessed feedstock. Advanced soil toxicity reporting reflects the  
 7 concentrations of volatile aromatic compounds, while advanced soil enhancement properties  
 8 identify the porosity and surface area of biochars.

9 Biochars tested to Level 3 shall conform to all requirements presented in Table 3 below:

10 **Table 3: Level 3 Characteristics and Criteria**

Requirement	Criteria	Unit	Test Method
<b>Advanced Soil Toxicity Reporting</b>			
	<b>Maximum Allowed Threshold</b>		
Polychlorinated Biphenyls	0.2	mg/kg TM or TEQ	Threshold criteria following Amlinger, Faroino and Pollack, (2004). Method following US Environmental Protection Agency (1996)
Polycyclic Aromatic Hydrocarbons (PAH)	6	mg EPA PAH/kg TM	
Furan	0.5	ng/kg I TEQ OMS	US Environmental Protection Agency (2007)
Dioxin	0.5	ng/kg I TEQ OMS	
<b>Advanced Soil Enhancement Properties</b>			
Porosity	Declaration	%	ASTM 1510-11a Iodine Adsorption Method
Surface Area	Declaration	m <sup>2</sup> /g	

11

1 **6 Product Labeling and Instructions**

2 Product labeling and information sharing will become an important part of any subsequently  
3 developed biochar certification program. In order to qualify for certification, biochar producers  
4 and manufacturers must share information about the feedstock and final biochar product.  
5 Communication of biochar qualities, test levels, and feedstock origins must be conducted in a  
6 uniform way to create an easily understood certification program that end-consumers will be  
7 able to support.

8 **6.1 Labeling General Requirements**

9 To meet the requirements of this guidance document, a label shall be attached, provided in a  
10 web-link, or otherwise included with all transactional documents, packaging, advertisement or  
11 other commercial documentation associated with the biochar. This label shall be legible and  
12 placed in a fashion that is visible and clear on the biochar packaging or documentation.

13 **6.2 Product Information Requirements**

14 Included with the label, the manufacturer of the biochar shall make available to the purchaser,  
15 information pertaining to:

- 16 • Feedstock material(s) including content (by weight) of diluents within the biochar  
17 fraction.
- 18 • Country of origin for biochar feedstock and production.
- 19 • All relevant information required by test level categories.

20 **6.3 Special instruction**

21 The manufacturer shall make available to the user instructions for suitable use, storage and  
22 transportation of the biochar in compliance with Hazardous Materials Identification System  
23 (HMIS) requirements, or other occupational health and safety requirements, as required by the  
24 prevailing jurisdiction. Specifically, this information should include guidance on the safe care,  
25 storage and handling of the biochar.

26

## 1 **7 Conformity and Record Keeping**

2 Adequate documentation and reporting are required by producers seeking to gain the IBI's  
3 confidence, or that of any national or regional certification program. The reporting of biochar  
4 feedstock contents and end-product quality are both necessary to provide assurance in end-  
5 product uniformity. Record keeping will be mandatory, in order to establish proof of adequate  
6 sampling, analysis, meeting of thresholds, and for proof of product test level category  
7 qualification over time.

### 8 **7.1 Adequate Sample Testing**

9 Biochar properties and characteristics according to the specification guidelines shall be assessed  
10 and reported as follows (whichever is most frequent):

- 11 - After every 600 metric tonnes (dry weight) of consistent feedstock through-put; or,
- 12 - Every 6 months; or,
- 13 - After a material change in feedstock;<sup>3</sup> or,
- 14 - After a material change in production parameters.<sup>4</sup>

15 Assessment, testing and categorization of biochar should occur before final storage or blending  
16 of product. Sampling of biochar shall be conducted by trained and accredited laboratory  
17 professionals following the appropriate procedures identified for each test within a category  
18 level. Biochar analysis shall follow strict quality control requirements according to standardized  
19 laboratory procedures. Documentation of biochar production and certification reporting and  
20 analyses should be kept for seven years.

### 21 **7.2 Chain of Custody**

22 Chain of custody and product traceability will require an assurance that adequate care and  
23 transparency is being exercised to enable trace-back of final end-products from end-users  
24 across the biochar market to manufacturers and feedstock suppliers. All levels in the biochar  
25 production and supply chain will be required to participate in record keeping, in order to  
26 maintain quality assurance.

27

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<sup>3</sup> Material changes in feedstock reflect gross shifts in feedstock type from one source of biomass to a distinctly different source of biomass (e.g. corn stover switched to wood chips).

<sup>4</sup> Material changes in production processes reflect increases or decreases in process temperature (i.e. +/- 50°C), or mean residence time (i.e. +/- 10 minutes in a continuous process).

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1 **Appendix 1 – Labeling Example**

2

3 The following is an example of adequate product labeling with the necessary product  
4 information as described in this guidance document:

<b>Farmer Joe’s Good-Grow Biochar-Compost Blend</b>	
MATERIAL TYPE	Biochar Tested to Level 1
FEEDSTOCK TYPE	WOODY RESIDUES, SAW DUST, BARK
BIOCHAR PROPERTIES:	
Moisture	20%
Total Ash	10%
Organic Carbon	32%
Inorganic Carbon	18%
H:C <sub>Org</sub>	0.8
pH	6.5
Total N	14.4%
Particle Size Distribution	20% <200µm; 50% 200-2,000 µm; 15% 2,000-20,000 µm; 15% >20,000 µm <sup>5</sup>
Germination Assay	Pass
Earthworm Assay	Pass
PACKAGE INGREDIENTS, BY WEIGHT	50% - BIOCHAR 50% - COMPOSTED SOIL MIXTURE
COUNTRY OF ORIGIN	USA
Please see attached MSDS documentation for appropriate shipping, handling and storage procedures.	

5

6 These guidelines apply only to biochar, and thus require only the biochar portion of a blended  
7 product to be reported in the product information.

8

9 IBI will provide an updated label including certification date, registration number and IBI logo at  
10 the point of achieving certification and upon agreement on the terms of use.

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<sup>5</sup> The goal with particle size distribution is to reach the mid-range of 200-20,000 micrometers (µm). The <200µm and >20,000µm categories are minimum and maximum standards.