



Standard Guide for Determination of Biobased Content, Resources Consumption, and Environmental Profile of Materials and Products¹

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INTRODUCTION

There is an increasing desire in United States and other parts of the world to use materials and products derived from biobased or renewable resources as a means of reducing dependency on fossil based resources and decreasing their environmental profile. Central to the determination of biobased content, resource consumption and environmental profile of materials and products is the origin and fate of the carbon contained in or released during their production, use, and disposal.

Both biobased and fossil materials have carbon as a common foundation. The amount of renewably fixed carbon utilized is a measure of the biobased resource content of a product. Carbon also represents a large part of a product's environmental profile. It is thus reasonable to use carbon and carbon equivalent to combine and track raw materials and energy consumption in the creation of a product.

It is very useful to know the biobased content of a material or product. However, knowledge of all the resources consumed and byproduct materials and energy released allows determination of its environmental impact and thus materially raise the understanding of the consequences of the creation of the product.

1. Scope

1.1 This guide covers a process to determine (1) biobased content of materials and products, (2) total resource consumption, both biobased and nonrenewable, in the form of raw materials and energy, and (3) an environmental profile, which would also include emissions and waste generated.

1.2 Reference to the use of factors to convert materials and energy to carbon equivalents are provided (1-6)². In addition, the use of ISO standards to determine the material and energy inventories and an environmental profile of the products and materials is discussed. It is outside the scope of this guide to provide a detailed description of the use and application of life cycle assessment tools and conversion factors for the determination of a biobased material's environmental profile. Future ASTM International standards are being prepared to cover these subjects.

1.3 In the application of this guide, the protection of business confidential information is an important consider-

ation. In general, the level of detail required to evaluate material and energy inputs and outputs can be reported without revealing proprietary unit process information. Unit processes can be treated as black boxes with inputs and outputs. If business confidentiality is still a concern, unit processes can be further combined or the final LCA (Life Cycle Assessment) results can be reviewed and certified by an external, independent expert with which the vendor will have the appropriate secrecy agreement.

2. Referenced Documents

2.1 ISO Standards:³

- ISO 14040 Environmental Management-Life Cycle Assessment-Principles and framework
- ISO 14041 Environmental Management-Life Cycle Assessment-Goal and scope definition and inventory analysis
- ISO 14042 Environmental Management-Life Cycle Assessment-Life cycle impact assessment
- ISO 14043 Environmental Management-Life Cycle Assessment-Life cycle interpretation

¹ This guide is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.96 on Environmentally Degradable Plastics.

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² The boldface numbers in parentheses refer to the list of references appended to this guide.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

