



Standard Guide for Environmental Life Cycle Assessment (LCA) of Building Materials/Products¹

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INTRODUCTION

This is a general guide for the application of environmental Life Cycle Assessment (LCA) as a tool for evaluating the environmental aspects of materials/products, processes, and services produced and used in buildings and the built environment. This guide does not include, necessarily, all of the environmental features and impacts of the complete building life cycle, but focuses on those issues directly related to building materials/products and those elements of the building's environmental performance affected by these materials/products. **Fig. 1** illustrates the total life cycle of a building. **Fig. 2** is an example of the relationship between the life cycle processes of building materials/products and the total life cycle of a building and illustrates how these product/material life cycle processes merge with the total building life cycle. **Fig. 3** illustrates an example of the life cycle of a building construction material within the context of the total building life cycle.

1. Scope

1.1 This guide covers a common framework and set of principles for potential users, such as product manufacturers, environmental analysts, consultants, architects, and the building industry in general. It describes a framework for life cycle inventory analysis, and describes various options and aspects of Impact Assessment and Interpretation.

1.2 The complexity and level of detail of an LCA will vary greatly depending on the material/product or system studied, the purpose and use of the study, the intended users of the study, and the resources committed to complete the study. The level of detail can range from generic to material/product specific.

1.3 This guide does not describe in detail the actual techniques for performing a LCA.

1.4 LCA is an emerging methodology, which is still evolving. This guide will present its concepts and major features. It should enable the user to better understand LCA and its application to building materials/products, and help to identify sources of additional information and guidance. LCA is only one of many tools designed to aid in environmental evaluation and decision making.

1.5 The component phases of LCA, including goal definition and scoping, inventory, impact assessment, interpretation,

and the various methodologies used in these phases are in various stages of development. Consequently, the results of an LCA must be understood in the context of their completeness and accuracy and must be applied appropriately. LCA does not necessarily proceed as a linear process through these phases but is conducted in an iterative fashion.

2. Referenced Documents

2.1 ASTM Standards:

E 631 Terminology of Building Construction

E 1765 Practice for Applying the Analytical Hierarchy Process (AHP) to Multiattribute Decision Analysis of Investments Related to Buildings and Building Systems²

E 2114 Terminology for Sustainability Relative to the Performance of Buildings

2.2 Other Standards:

ISO 14040 Environmental Management—Life Cycle Assessment—Principles and Framework³

3. Terminology

3.1 Definitions:

3.1.1 For terms related to building construction, refer to Terminology **E 631**. Some of these terms are reprinted here for ease of use.

¹ This specification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.71 on Sustainability.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from International Organization for Standardization (ISO), 1 rue de Varembe, Case postale 56, CH-1211, Geneva 20, Switzerland.