



Standard Guide for Characterizing Environmental Aspects of Manufacturing Processes¹

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1. Scope

1.1 This guide provides manufacturers an approach to characterize any category of manufacturing process and to systematically capture and describe relevant environmental information.

1.2 This guide defines a Process Characterization Methodology that uses graphical and formal representations to support the construction of unit manufacturing process (UMP) information models for characterizing the environmental aspects of manufacturing processes.

1.3 This guide defines the graphical UMP information model as being comprised of four elements (input, output, product and process information, and resources) that supports manufacturers in systematically identifying, collecting, structuring, and visualizing manufacturing information.

1.4 This guide defines the formal representation of the UMP information model through the use of a modeling method and language that can effectively convey the meaning and intent of processes they characterize.

1.5 This guide provides the necessary structure and formality for identifying and capturing key information needs to assess manufacturing performance, yet provides no details about an actual assessment of the process performance.

1.6 This guide provides an approach to link individual UMP information models together to create a network or system of UMP models that extends the characterization of environmental aspects beyond an individual process to a production system or the product itself.

1.7 This guide may be used to complement other standards that address sustainability and the product life cycle. This guide most closely relates to the inventory component as discussed in the ISO 14040 series (ISO 14044) standards, and resource management as discussed in the ISO 55000 series (ISO 55001) standards.

1.8 *This guide does not purport to address all of the security issues and the risks associated with manufacturing information. It is the responsibility of the user of this standard to follow practices and establish appropriate information technology related security measures.*

1.9 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

E2114 Terminology for Sustainability Relative to the Performance of Buildings

E2986 Guide for Evaluation of Environmental Aspects of Sustainability of Manufacturing Processes

2.2 ISO Standards:³

ISO 22400-1:2014 Automation systems and integration—Key Performance Indicators (KPIs) for manufacturing operations management; Part 1: Overview, concepts, and terminology

ISO 14040 Environmental management—Life cycle assessment—Principles and framework

ISO 14044 Environmental management—Life cycle assessment—Requirements and guidelines

ISO 55000:2014 Asset management—Overview, principles and terminology

ISO 55001:2014 Asset management—Management systems—Requirements

2.3 UL Standard:⁴

ULE 880 Sustainability for Manufacturing Organizations

¹ This guide is under the jurisdiction of ASTM Committee E60 on Sustainability and is the direct responsibility of Subcommittee E60.13 on Sustainable Manufacturing.

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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), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

⁴ Available from Underwriters Laboratories (UL), 2600 N.W. Lake Rd., Camas, WA 98607-8542, <http://www.ul.com>.