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Standard Practice for Data Collection for Sustainability Assessment of Building Products[1]

This standard is issued under the fixed designation E 2129; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice offers a set of instructions for collecting data to be used in assessing the sustainability of elements or products for use in both commercial and residential buildings.

1.1.1 There are many features of a building that contribute to sustainability; one of them is the selection of products for use in a building. Other key features influencing sustainability include, but are not limited to: overall efficiency of the design of the building, the impact the building has on the habits of the occupants, and the impact the building has on the microclimate and macroclimate. This standard addresses sustainability issues related to building elements. This standard does not address sustainability issues related to overall building design, site selection, building operations, or other features influencing sustainability.

1.1.2 While it is recommended that users rely on professional judgment informed by both environmental expertise and specific knowledge of the intended use of the product, this standard provides no instruction as to interpretation of the data obtained. Interpretation of the data obtained is the responsibility of the user of this standard.

1.1.3 This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title means only that the document has been approved through the ASTM consensus process.

1.2 This standard is organized according to UNIFORMAT II principles in accordance with Classification E 1557 to ensure consistency in the evaluation of building products.

1.3 This standard includes general, comprehensive data requirements. Depending upon the product, certain data requirements may not apply given the unique characteristics of the element and the potential environmental impacts related to the intended use of the element. Depending upon the product or element, certain data requirements may need to be added as appropriate to the unique characteristics of the product and the potential environmental impacts related to the intended use of the element.

1.4 *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:*

C 150 Specification for Portland Cement
C 208 Specification for Cellulosic Fiber Insulating Board
C 595 Specification for Blended Hydraulic Cements
C 618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
C 989 Specification for Ground Granulated Blast Furnace Slag for Use in Concrete and Mortars
C 1157 Performance Specification for Blended Hydraulic Cement
C 1240 Specification for Silica Fume for Use in Hydraulic Cement Concrete and Mortar
D 5359 Specification Glass Cullet Recovered from Waste for Use in Manufacture of Glass Fiber
E 631 Terminology of Building Constructions[2]
E 1480 Terminology of Facility Management (Building-Related)[2]
E 1557 Classification for Building Elements and Related Sitework—UNIFORMAT II[2]
E 2114 Terminology for Sustainability Relative to the Performance of Buildings

2.2 *Other Referenced Standards:*

AASHTO Standards[3]
American Concrete Institute Standards[4]
ASHRAE Standards[5]

[1] This practice 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] *Annual Book of ASTM Standards*, Vol 04.11.
[3] AASHTO information can be found by searching "www.aashto.org"
[4] ACI standards can be accessed through "www.aci-int.org"
[5] ASHRAE standards can be found by searching "www.ashrae.gov"

ASME Standards[6]
DOE's Federal Energy Management Program Recommendations[7]
EPA Toxics Release Inventory[8]
EPA's Comprehensive Procurement Guidelines[9]
EPA's Energy Star Program[10]
EPA's list of priority Persistent, Bioaccumulative Toxics (PBTs)[11]
EPA's regulations for levels of volatile organic compounds (VOCs) in products[12]
Forest Stewardship Council's Sustainable Forestry Certification Program[13]
HUD Standards[14]
OSHA Regulations[15]
The Carpet and Rug Institute's Labeling Program[16]
The NFRC's standards[17]
The National Toxicology Program's List of Carcinogens[18]
The American Forest & Paper Association's Sustainable Forestry Initiative[19]
The South Coast Air Quality Management District Regulations[20]

3. Terminology

3.1 *Definitions*:

3.1.1 For terms related to the field of building, refer to Terminology E 631.

3.1.2 For terms relating to the operation and management of buildings, refer to Terminology E 1480.

3.1.3 For terms related to sustainability relative to buildings, refer to Terminology E 2114.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *corporate environmental policy*—as used in this standard, refers to the published and verifiable position a company maintains with respect to the manufacture of a building product. Corporate environmental policy may include both environmental and social aspects. Corporate environmental policy may include goals, programs, and specific requirements related to the materials, manufacturing process, operational performance, and IEQ.

3.2.2 *indoor environmental quality (IEQ)*—as used in this standard, refers to the condition or state of the indoor built environment in which the building product is installed. Aspects of IEQ include: light quality, acoustic quality, and air quality.

3.2.3 *manufacturing process*—as used in this standard, refers to the process of creating a building product and includes manufacturing, fabrication and distribution procedures.

3.2.4 *materials (product feedstock)*—as used in this standard, refers to the material resources that are required for the manufacture and/or fabrication of a building product. Material resources include raw materials and recycled content materials.

3.2.5 *operational performance (product installed*—as used in this standard, refers to the functioning of a product during its service life. Specific measures of operational performance will vary depending upon the product. Aspects of operational performance include: durability, maintainability, energy efficiency, and water efficiency.

4. Summary of Practice

4.1 This standard is organized according to UNIFORMAT II Level 1 (Major Group Elements) Classifications for building elements and related sitework. Each UNIFORMAT II Level 1 Classification is subdivided into five criteria categories. Within each criteria category are included general questions and specific questions.

4.1.1 General questions are considered applicable to all building elements and products.

4.1.2 Specific questions are considered applicable to particular product types as indicated.

4.2 Depending on the particular product and building application, some of the questions may not be applicable. The user of this standard should indicate "not applicable" (N/A) in the response as appropriate.

4.3 Depending on the particular product and building application, additional questions may be necessary. The user of this standard may choose to add additional questions as appropriate.

5. Significance and Use

5.1 This standard provides a practice for data collection for the purpose of assessing the sustainability of building products. Such data can inform decisions relative to construction, renovation, repair, and maintenance of buildings with the goal of promoting sustainability and sustainable development.

5.1.1 The users of this standard include building industry professionals who possess a broad, general understanding of sustainability issues relative to the performance of buildings. Such users may include planners, developers, architects, engineers, interior designers, contractors, owners, financial organizations related to the buildings industry, building materials and product manufacturers, government agencies including building officials, and other building professionals.

5.1.2 Users should note that, subsequent to the preliminary assessment facilitated by the comparative information collected in accordance with this standard, additional detailed and more technical information may be required in order to adequately assess specific needs for specific applications.

5.2 There are many environmental features and issues, each with local, regional and global implications, involved in sustainability. It is becoming increasingly necessary to be able to quantify complex sustainability data relative to building industry information tools. This standard provides a format for

[6] ASME standards can be found by searching "www.asme.org"
[7] U.S. DOE information can be found by searching "www.doe.gov"
[8] U.S EPA information can be found by searching "www.epa.gov"
[9] U.S EPA information can be found by searching "www.epa.gov"
[10] U.S EPA information can be found by searching "www.epa.gov"
[11] U.S EPA information can be found by searching "www.epa.gov"
[12] U.S EPA information can be found by searching "www.epa.gov"
[13] FSC information can be accessed by searching "http://fscus.org"
[14] HUD standards can be found by searching "www.hud.org"
[15] OSHA information can be found by searching "www.osha.gov"
[16] CRI information can be found by searching "www.carpet-rug.org"
[17] NFRC information can be found on "www.nfrc.org"
[18] NTP lists can be found on "http;//ntp-server.niels.nih.gov"
[19] AF&PA information can be accessed through "www.afandpa.org"
[20] SQAMD regulations can be found by searching "www.aqmd.org"

relating the commonly accepted sustainability principles to building industry data collection methods.

5.3 The format for data collection is intended to facilitate a cost-effective and efficient assessment of sustainability issues relative to building materials.

5.3.1 The format corresponds to UNIFORMAT II Level 1 (Major Group Elements) Classifications for building elements and related sitework. A building product may be classified under one or more UNIFORMAT II Level 1 Classifications.

5.3.2 Each UNIFORMAT II Level 1 Classification is subdivided according to the five criteria categories to address sustainability issues in a consistent manner.

5.4 The scientific understanding of the functioning and interrelation of ecosystems continues to evolve; nevertheless, there are many accepted principles relative to the design, construction, and operation of buildings for improved sustainability. Commonly accepted environmental principles are addressed in the in the five criteria categories, with an emphasis on the following characteristics: the selection and acquisition of materials (Criteria Category 1), the manufacturing process (Criteria Category 2), the operational performance of the installed product (Criteria Category 3), the impact of the product on IEQ (Criteria Category 4), and the corporate environmental policy of the company manufacturing and/or fabricating the product (Criteria Category 5).

5.5 To the greatest extent feasible, questions within the criteria categories are designed to prompt simple yes-or-no responses.

5.5.1 For questions prompting a yes-or-no response, a “yes” response is typically indicative of the more sustainable response. However, this standard provides no instruction as to the degree of impact on sustainability of a “yes” response relative to a “no” response for a particular question; and, this standard provides no instruction as to the degree of impact on sustainability of one question relative to another question.

5.5.2 The user is cautioned to review each question and the comments associated with each question. Unique characteristics of a product and unique building applications of a product may affect interpretation of the data.

5.5.3 Comments may be provided where there is information which will elucidate the topic and improve understanding relative to the complexities of the particular question.

5.5.4 “N/A” may be indicated where questions request information that is not applicable and/or not available.

6. Procedure

6.1 Table 1 is a data collection format intended to be completed on a product-by-product basis for the express purpose of facilitating comparisons between similar building elements or products.

7. Keywords

7.1 building product; energy efficiency; environmental; green building; IEQ; indoor environmental quality; sustainable; sustainable development; sustainability

TABLE 1 General Questions

	Question	Yes or No	N/A	Comments
Criterion No. 1–Materials (Product Feedstock)				
1.1	Have efforts (such as mining management, site restoration, use of 100 % recycled content, etc.) been made to minimize and/or avoid negative environmental impacts (such as impact to rare or endangered resources or species, releases of toxic chemicals or hazardous air pollutants, etc.) in obtaining raw materials for this product? If yes, describe these efforts.			
1.2	Does the product meet the requirements of EPA regulations for content of volatile organic compounds (VOCs)? (the EPA National VOC Rule can be found in the Federal Register of September 11, 1998 – Volume 63, Number 176, pages 48819–48847)			
1.3	Does the product (coatings, adhesives, etc.) meet the requirements of South Coast Air Quality Management District Regulations for content of VOCs?			
1.4	Does the product meet federal regulations concerning substances listed as being carcinogenic by the National Toxicology Program?			
Criterion No. 2–Manufacturing				
2.1	Has the manufacturer taken steps to minimize the use of nonrenewable energy from the point at which raw materials are gathered to the point at which the final product is transported to the building site? If yes, describe these measures.			
2.2	Is any of the waste produced in making this product reclaimed on-site? If yes, what percentage of the waste is reclaimed? Of the waste that is not reclaimed on-site, how is that waste handled?			
2.3	Does the process for manufacturing this product avoid the release of substances listed on the U.S. EPA's Toxics Release Inventory at or above the levels that require reporting to the EPA? If no, indicate how much of each substance is released per unit of product.			
2.4	Have any recent improvements been made to limit negative environmental impacts relating to the manufacturing process? If yes, describe the benchmark against which the improvements are measured and the degree of improvement.			
2.5	If water is used during the production process, have water conservation and/or recycling measures been initiated? If yes, describe the measures and what percentage of the total water usage they address.			
2.6	Has the manufacturer undertaken any of the following actions? If yes, describe the benchmark against which the improvements are measured and the degree of improvement.			
2.6a	Redesigned a production process to decrease greenhouse gas emissions?			
2.6b	Redesigned a production process to decrease liquid effluents?			
2.6c	Redesigned a production process to utilize less toxic materials?			
2.6d	Substituted safer solvents in a production process?			
2.6e	Instituted more stringent dust controls?			
2.6f	Installed smoke-stack particulate collectors or gas scrubbers?			
2.6g	Installed or improved in-plant solid and toxic waste reduction programs?			
2.7	Does the manufacturing facility comply with OSHA requirements?			
Criterion No. 3–Operational Performance of Installed Product				
3.1	If applicable, does the product qualify for an EPA EnergyStar rating or meet the energy efficiency recommendations of the DOE's Federal Energy Management Program?			
3.2	Describe routine maintenance procedures for the product.			
3.3	How long will the product last in the building if maintained properly with routine maintenance procedures?			
3.4	Does the manufacturer provide detailed instructions with the product upon delivery to the job site for the proper use and maintenance required in order to ensure that this product will last this long?			
Criterion No. 4–Indoor Environmental Quality[A]				
4.1	Is there any other information about how this product contributes to indoor environmental quality (positively or negatively, e.g. acoustical properties, lighting, potential risks to workers during application, etc.) that has not already been reported, but that sender of this questionnaire should know? If yes, describe. (If this product is not intended to be used in the indoor environment or to interface with the occupants, indicate N/A.)			
Criterion No. 5–Corporate Environmental Policy				
5.1	Does the manufacturer have a written environmental policy? If yes, indicate how the sender of this questionnaire could obtain a copy of this policy upon request.			
5.2	Does the manufacturer have a reclamation program or any other program in place to facilitate the recycling or reuse of its product by accepting return of the product at the end of its useful life? If no, comment on the environmental impact of the product as a waste material. If yes, comment on how much of the product is actually reused or recycled at the end of the product's useful life.			
5.3	Does the manufacturer have a program in place to reduce the amount of the product's packaging? If yes, describe.			
5.4	Does the manufacturer have a program in place to facilitate the return, reuse, recycling, or composting of the product's packaging? If yes, describe.			
5.5	Can the environmental claims on this questionnaire be substantiated with invoices, data sheets, or other documentation? If yes, indicate how the sender of this questionnaire could obtain copies of this documentation upon request.			
5.6	Does the manufacturer provide information on the service life of the product or encourage the use of professional guidelines to determine the service life of the product?			
5.7	Does the manufacturer provide information regarding natural disaster mitigation, such as performance of the product during a natural disaster or appropriate response after a natural disaster.			
5.8	Is there other information, for which you could provide objective evidence, about the environmental quality of the building product or element you offer that you would like taken into consideration? If yes, describe the information and indicate how copies of this evidence could be obtained upon request.			

[A] Note that some of the questions under Criterion No. 1 (Materials [Product Feedstock]) refer to attributes of products, for example, toxicity, that pose concerns for indoor environmental quality as well. In the interest of avoiding repetition, those questions are not repeated here. Respondents are reminded to answer all questions in the general section of this questionnaire.