Designation: E 2129 – 01~~3~~3

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~~ building 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.~~ products. 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~~ the Construction Specifications Institute's (CSI) MasterFormat™ sections to ~~ensure~~ promote consistency in the evaluation of building products.

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

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.*

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[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. Referenced Documents

2.1 *ASTM Standards:* [2]

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

D 6400 Specification for Compostable Plastics

E 631 Terminology of Building Constructions

E 1480 Terminology of Facility Management (Building-Related)

E 1557 Classification for Building Elements and Related Sitework—UNIFORMAT II[2]

E 2114 Terminology 2114 Terminology for Sustainability Relative to the Performance of Buildings

2.2 *Other Referenced Standards:*

AASHTO Documents:

ANSI Standards[3]

American Concrete Institute Standards[4]

ASHRAE Standards[4]

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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;* Vol 04.11. volume information, refer to the standard's Document Summary page on the ASTM website.

[3] AASHTO information

[3] ANSI standards can be found by searching "www.aanshtoi.org"

[4] ACI

[4] ASHRAE standards can be accessed through "www.aci-int.org" found by searching "www.ashrae.com"

ASME Standards[5]
CSI's MasterFormat™ Organization[6]
DOE's Federal Energy Management Program Product Efficiency Recommendations[7]
EPA's Toxics Release Inventory[8]
EPA's Comprehensive Procurement Guidelines[9]
EPA's EnergyStar® Program[10]
EPA's ~~list of priority Persistent, Bioaccumulative Toxics (PBTs)~~ National Volatile Organic Compound (VOC) Emission Standards[11]
~~EPA's regulations for levels of volatile organic compounds (VOCs) in products~~
HUD Manufactured Home Construction and Safety Standards[12]
~~Forest Stewardship Council's Sustainable Forestry Certification Program~~
OSHA Regulations[13]
~~HUD Standards~~
The National Fenestration Rating Council's (NFRC) standards[14]
~~OSHA Regulations~~
The National Toxicology Program's Report on Carcinogens (RoC)[15]
~~The Carpet and Rug Institute's Labeling Program~~[16]

~~[5] ASHRAE~~
[5] ASME standards can be found by searching ~~"www.ashrae.gov"~~ "www.asme.org"
~~[6] ASME standards~~
[6] CSI's MasterFormat™ information can be found by searching "www.~~a~~cs~~m~~i~~n~~et.org"
~~[7] U.S. DOE information~~
[7] DOE's Federal Energy Management Program Product Efficiency Recommendations can be found ~~by searching "www.doe.gov"~~ at "www.eren.doe.gov/femp/procurement/begin.html"
~~[8] U.S EPA information~~
[8] EPA's Toxics Release Inventory can be found ~~by searching "www.epa.gov"~~ at "www.epa.gov/tri"
~~[9] U.S EPA information~~
[9] EPA's Comprehensive Procurement Guidelines can be found ~~by searching "www.epa.gov"~~ at "www.epa.gov/cpg"
~~[10] U.S EPA information~~
[10] EPA's EnergyStar® Program can be found ~~by searching "www.epa.gov"~~ at "www.energystar.gov"
~~[11] U.S EPA information~~
[11] EPA's National VOC Emission Standards for Architectural Coatings can be found ~~by s~~ at "www.epa~~re~~.gov/ttn/atw/183e/aim/aimpg.html" and the Nation~~g~~al VOC Emission Standards for Consumer Products can be found at "www.epa.gov/ttn/atw/183e/cp/cppg.html"
~~[12] U.S EPA information~~
[12] HUD standards can be found by searching ~~"www.epa.gov"~~ "www.hud.org"
~~[13] FSC~~
[13] OSHA information can be ~~accessed~~ found by searching ~~"http://fscus.org"~~ "www.osha.gov"
~~[14] HUD standards~~
[14] National Fenestration Rating Council (NFRC) information can be found ~~by searching "www.hud.org"~~ at "www.nfrc.org"
~~[15] OSHA information~~
[15] The National Toxicology Program's Report on Carcinogens (RoC) can be found ~~by searching "www.osha.gov"~~ at "http://ntp-server.niehs.nih.gov/"
~~[16] CRI information~~
[16] SCAQMD regulations can be found ~~by searching "www.carpet-rug.org"~~ at "www.aqmd.gov/rules"

~~The NFRC's standards[16]~~
~~The National Toxicology Program's List of Carcinogens[16]~~
~~The American Forest & Paper Association's Sustainable Forestry Initiative[16]~~
The South Coast Air Quality Management District Regulations[16]

3. Terminology

3.1 *Definitions*:

3.1.1 For terms related to the field of building, refer to ASTM E 631, Standard Terminology ~~E 631.~~ of Building Constructions.

3.1.2 For terms relating to the operation and management of buildings, refer to ASTM E 1480, Standard Terminology ~~E 1480.~~ of Facility Management (Building-Related).

3.1.3 For terms related to sustainability relative to buildings, refer to ASTM E 2114, Standard Terminology ~~E 2114.~~ for Sustainability Relative to the Performance of Buildings. Some of these terms are reprinted here for ease of use.

3.1.3.1 *biobased products, n*—products fabricated from alternative agricultural materials and/or forestry materials.

3.1.3.2 *life-cycle cost (LCC) method, n*— a technique of economic evaluation that sums over a given study period the costs of initial investment (less resale value), replacements, operations (including energy use), and maintenance and repair of an investment decision (expressed in present or annual value terms).

3.1.3.3 *post-consumer, adj*—refers to materials that are reclaimed from products that have already served their intended end-use as a consumer item. Waste from industrial processes are not considered post-consumer. Post consumer materials are a subset of recovered materials.

3.1.3.4 *pre-consumer, adj*—refers to materials that are reclaimed from manufacturing and other industrial processes, and products which have not served their intended end-use as a consumer item such as overissue publications and obsolete inventories. Pre-consumer materials include: culls, trimmed materials, print overruns, overissue publications, and obsolete inventories.

3.1.3.5 *recovered materials, n*—waste material and by-products which have been recovered or diverted from the waste stream, but such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process.

3.1.3.6 *recycled content products, n*—refers to products that contain pre-consumer or post-consumer material as all or part of their feedstock.

3.1.3.7 *renewable resource, n*—a resource that is grown, naturally replenished, or cleansed, at a rate which exceeds depletion of the usable supply of that resource. *Discussion* —A renewable resource can be exhausted if improperly managed. However, a renewable resource can last indefinitely with proper stewardship. Examples include: trees in forests, grasses in grasslands, and fertile soil.

3.1.3.8 *sustainability, n*—the maintenance of ecosystem components and functions for future generations.

3.1.3.9 *sustainable development, n*—development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 ~~*corporate environmental policy*—as used in this standard, refers~~building product, *n*—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~~ elements and ~~social aspects. Corporate environmental policy may include goals, programs, and specific requirements related to the materials, manufacturing process, operational performance, and IEQ.~~ assemblies.

3.2.2 ~~*indoor*~~*corporate environmental ~~quality (IEQ)~~*—as policy, *n*— as used in this standard, refers to the ~~condition or state of~~ published and verifiable position a company maintains with respect to the ~~indoor built environment in which the building product is installed. Aspects~~ manufacture of ~~IEQ include: light quality, acoustic quality,~~ 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, operat~~y~~ional performance, and IEQ.

3.2.3 ~~*manufacturing process*—as used in this standard, refers~~energy efficient, *adj*—refers to ~~the process of creating~~ a building product ~~and includes manufacturing, fabrication and distribution procedures.~~ that requires less energy to manufacture and/or uses less energy when operating in comparison with a benchmark for energy use.

3.2.3.1 *Discussion*—For example, the product may meet a recognized benchmark, such as EPA's Energy Star® Program standards.

3.2.4 ~~*materials (product feedstock)*—as used in this standard,~~indoor environmental quality (IEQ), *n*— refers to the ~~material resources that are required for the manufacture and/or fabrication~~ condition or state of ~~a~~ the indoor built environment in which the building ~~product. Material resources include raw materials~~ product is installed. Aspects of IEQ include: light quality, acoustic quality, and ~~recycled content materials.~~ air quality.

3.2.5 *manufacturing process, n*—refers to the process of creati~~o~~ng a building product and includes manufacturing, fo~~a~~br~~m~~ication and distribution procedures.

3.2.6 *materials (product ~~installed~~* feedstock), *n*— ~~as used in this standard,~~ refers to the material resources that are required for the manufacture and/or fabrication of a building product.

3.2.6.1 *Discussion*—Material resources include raw materials and recycled content materials.

3.2.7 *operational performance (product installed), n*—refers to the functioning of a building 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.~~ CSI's MasterFormat™ Organization (Divisions 1-16).

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

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

4.2 Depending on the particular building 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 The user of this standard may not know the answer to a certain question or the answer may not be available. In such cases, the user of this standard should indicate "unknown" (U/K) in the response.

4.4 To address sustainability issues in a consistent manner, there are five criteria categories referenced in this standard as follows: Materials (Product Feedstock); Manufacturing Process; Operational Performance of Installed Product; Indoor Environmental Quality; and, Corporate Environmental Policy.

4.4.1 In Table 1, the general questions are subdivided into these five criteria categories.

4.4.2 In Table 2, the specific questions indicate the criteria category(ies) affected with an "X" in the column entitled "Criteria Categories." The user may indicate additional criteria categories, as appropriate.

4.5 Depending on the particular building 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 relating the commonly accepted sustainability principles to building industry data collection methods. Users may wish to consider other building product attributes for which sustainability principles are deemed to be important and/or measurement methodologies may exist. For example, energy used and greenhouse gases emitted over a product's lifecycle, which can have a significant effect on the overall sustainability of a building product, may be deemed important.

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 building product (Criteria Category 3), the impact of the building product on IEQ (Criteria Category 4), and the corporate environmental policy of the company manufacturing and/or fabricating the building 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

TABLE 1 General Questions

	Question	Yes or No	N/A	U/K	Comments
	DIVISION 1—GENERAL REQUIREMENTS				
	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.~~				
1.1	Have efforts (such as mining management, site restoration, 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 requirementsofEPA regulations forcontent of vola tile organic compounds (VOCs)? (the EPA Nat ional VOC Rulec an be foundin the Federal Register of September 11, 1998 – Volume 63, Number 176, pages 48819–48847)~~				
1.2	Is the product a recycled content product? If YES, indicate what percentage of the product is recycled and differentiate between pre-consumer and post-consumer recycled content.				
~~1.3~~	~~Does the product (coatings, adhesives,etc.) meet therequi remen ts of South Coast Air Quality Management District Regulations for content of VOCs?~~				
1.3	If applicable, does the recycled content product contain the percentage of recovered materials recommended by the U.S. EPA's Comprehensive Procurement Guidelines?				
~~1.4~~	~~Does the product meet fede ral regulationsconcerning substanceslistedas be ingcarcinogenic by the Nat ional Toxicology Program?~~				
1.4	Is the product 100% recyclable? If NO, please indicate what percentage of the product is recyclable.				
1.5	Is the product a biobased product (i.e. agricultural or forestry material)? If YES, please indicate the source and biobased content percentage. If percentage refers to a component rather than the entire product, please specify.				
1.6	Is the product made from a renewable resource? If YES, indicate the renewable cycle time and what percentage of the product that resource represents.				
1.7	Does the product, in the specified condition of use, meet EPA's National Volatile Organic Compound (VOC) Emission Standards?				
1.8	Does the product in the specified condition of use, meet the requirements of South Coast Air Quality Management District Regulations for content of VOCs?				
	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.~~				
2.1	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?~~				
2.2	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? Ifno, indicate how much of each substance is released per unit of product.~~				
2.3	Does the process for manufacturing this product avoid the use of listed substances above the levels that would require reporting under the U.S. EPA's Toxics Release Inventory? If NO, indicate how much of each substance is released per unit of product.				
~~2.4~~	~~Have any recen t im provements been madeto limitnega tive environment alimpac ts rel ating t othe manufacturing process? If yes,descr ibe the benchmark against which the impr ovementsare measured and the degree of improvement.~~				
2.4a	Does the process for manufacturing the product avoid the addition of substances listed in the National Toxicology Program's Report on Carcinogens?				
~~2.4b~~					
2.4b	If substances listed in the National Toxicology Program's Report on Carcinogens are added directly in the manufacturing process or are reported by suppliers on Material Safety Data Sheets (MSDS), do the concentrations fall below levels required to be reported under federal regulations on the products' MSDS? If NO, indicate the substance, classification and concentration per unit of product.				
~~2.5~~	~~If wate r is used duringtheproduc tio n process, have wat er conservat ionand/o r recycling measures beeninitiated? If yes, describe the measures and wha t percent age of the total water usage they a ddress.~~				
2.5	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.				

	Question	Yes or No	N/A	U/K	Comments
~~2.6~~	~~Has the manufacturer undertaken anyof the followingact ions? If yes, describe the bench mark against whichthe im provementsare measuredand thedegree of improvement.~~				
2.6	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.				
~~2.7~~					
2.7	Has the manufacturer undertaken any of the following actions? If yes, indicate when the action(s) was (were) taken and 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?~~				
2.7a	Redesigned a production process to decrease greenhouse gas emissions?				
~~2.6b~~	~~Redesigned a production process to decrease liquid effluents?~~				
2.7b	Redesigned a production process to decrease liquid effluents?				
~~2.6c~~	~~Redesigned a production process to utilize less toxic materials?~~				
2.7c	Redesigned a production process to utilize less toxic materials?				
~~2.6d~~	~~Substituted safer solvents in a production process?~~				
2.7d	Substituted safer solvents in a production process?				
~~2.6e~~	~~Instituted more stringent dust controls?~~				
2.7e	Instituted more stringent dust controls?				
~~2.6f~~	~~Installed smoke-stack particulate collectors or gas scrubbers?~~				
2.7f	Installed smoke-stack particulate collectors or gas scrubbers?				
~~2.6g~~	~~Installed or improved in-plant solid and toxic waste reduction programs?~~				
2.7g	Installed or improved in-plant solid and toxic waste reduction programs?				
~~2.7~~	~~Does the manufacturing facility comply with OSHA requirements?~~				
2.8	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?~~				
3.1	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~~	~~Describeroutin e maintenance proc eduresfor theproduct.~~				
3.2	Describe the product's energy efficiency impacts.				
~~3.3~~	~~How long will the product lastin thebuilding if maintained p roperly with routine maintenance procedures?~~				
3.3	Describe routine maintenance procedures for the product.				
~~3.4~~	~~Does the manufacturer provide detai led instructions wi th the product upon de l ivery to the jo b siteforthe properuse and maintenancerequired inorder to ensure that this product will last this long?~~				
3.4	How long will the product last in the building if maintained properly with routine maintenance procedures?				
~~3.5~~					
3.5	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.)~~				
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.~~				
5.1	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.~~				
5.2	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.~~				

	Question	Yes or No	N/A	U/K	Comments
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.~~				
5.4	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 environ mentalclaims onthis questionnaire be substant iated wi th invoices, data sheets, or o ther documentati on? If y es, indicate how thesenderof this questionnaire could obtain copiesofthi s documentati on u ponrequest.~~				
5.5	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?				
~~5.6~~	~~Does the manufacturer provide information ontheservice life of the product or encouragethe use ofprofessional guidelines to determi nethe servicelife ofthe product?~~				
5.6	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?				
~~5.7~~	~~Does the manufacturer provide information reg arding natural disaster mi tigation, such asperformance ofthe product during anatural disasteror appropriate responseafteranat u ral disaster.~~				
5.7	Is documentation available to support the product's environmental claims? If YES, please indicate how copies may be obtained upon request.				
~~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.~~				
5.8	Is there other information, for which you could provide objective evidence, about the environmental quality of the building product 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.

a building product and unique ~~building~~ applications of a building 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.

5.5.5 "U/K" may be indicated where questions request information that is unknown or unavailable.

6. Procedure

6.1 Table 1—General Questions and Table 2—Questions Related To Specific Building Products are data collection ~~format~~ questionnaires 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 (IEQ); sustainability; sustainable; sustainable ~~development; sustainability~~ development

TABLE 2 Questions Related to Specific Building Products

	Question	Yes or No	N/A	U/K	Criteria Category(ies)	Comments
DIVISION 2—SITE CONSTRUCTION						
General						
2-A	Does the manufacturer facilitate ultimate deconstruction of buildings and/or building products (in which components are taken apart for reuse) by, for example, designing products for disassembly? If YES, describe the process.				Materials Manufacturing Op. Performance IEQ X Corp. Env. Policy	
2-B	Does the product facilitate water treatment on site? If YES, describe the process and indicate the level of treatment.				Materials Manufacturing X Op. Performance IEQ X Corp. Env. Policy	
Paving						
2-C	Does the manufacturer offer surfaces with high albedo reflectance? What is the albedo reflectance?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
2-D	Does the manufacturer offer pervious paving materials for non-landscaped areas (roadways, surface parking, plazas, pathways)?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
DIVISION 3—CONCRETE						
3-A	Does the product meet the following standards, which refer to recovered materials?				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
3-A.1	ASTM C 618 “Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete?”				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
3-A.2	ASTM C 989 “Specification for Ground Granulated Blast Furnace Slag for use in Concrete and Mortars?”				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
3-A.3	ASTM C 1240 “Specification for Silica Fume for Use in Hydraulic Cement, Concrete, and Mortar?”				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
DIVISION 4—MASONRY						
4-A	Does the product meet the following standards, which refer to recovered materials?				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
4-A.1	ASTM C 989 “Specification for Ground Granulated Blast Furnace Slag for use in Concrete and Mortars?”				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
4-A.2	ASTM C 1240 “Specification for Silica Fume for Use in Hydraulic Cement, Concrete, and Mortar?”				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
DIVISION 5—METALS						
5-A	Does the product have a factory finish or can it be installed unfinished? If NO, describe recommended field finishing properties.				Materials X Manufacturing Op. Performance IEQ Corp. Env. Policy	
5-B	If a finish does exist, can the finish be easily removed to facilitate future recycling of the metal?				Materials X Manufacturing Op. Performance IEQ Corp. Env. Policy	
DIVISION 6—WOOD AND PLASTICS						
Wood						

	Question	Yes or No	N/A	U/K	Criteria Category(ies)	Comments
6-A	Is the wood that is used in the product harvested from forests that have been managed for sustainability according to the guidelines of a recognized certification program? If YES, indicate the name of the certification program.				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
6-B	Is the product made from a species of wood that is naturally resistant to damage associated with the conditions to which it is exposed? If YES, indicate which definition of "naturally resistant" is used to make this determination and indicate the name of the species.				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
6-C	If artificial preservatives are used, are the preservatives manufactured without the use of chromated copper arsenate and creosote? If NO, please indicate which preservatives are used.				Materials X Manufacturing Op. Performance X IEQ Corp. Env. Policy	
6-D	Is the agricultural resource from which this product is made certified organically grown according to the standards of a recognized certification program? If YES, indicate the name of the certification program.				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
6-E	Is the medium density fiberboard (MDF), or products made containing MDF, third party certified to comply with the formaldehyde emissions requirements in ANSI product standard A208.2?				Materials X Manufacturing Op. Performance X IEQ Corp. Env. Policy	
6-F	Does the binder for plywood and/or particleboard meet the Manufactured Home Construction and Safety Standards promulgated by HUD (24 CFR Pt. 3280) for formaldehyde emissions?				Materials X Manufacturing Op. Performance X IEQ Corp. Env. Policy	
Plastics and Plastic Composites						
6-G	Are plastics marked to identify materials for recycling?				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
6-H	Does the building product (or components of the product) meet the requirements of ASTM D 6400 "Standard Specification for Compostable Plastics?"				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
DIVISION 7—THERMAL AND MOISTURE PROTECTION						
Roofing						
7-A	Is the roofing material a light color/high albedo material? If YES, what is the albedo reflectance?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
Sealants and Caulking						
7-B	Do caulking and sealant products come with detailed instructions for proper application in order to minimize health concerns? If YES, indicate how the sender of this questionnaire could obtain a copy of the instructions.				Materials Manufacturing Op. Performance X IEQ Corp. Env. Policy	
7-C	Is the sealant or caulking compound a low-odor, all-weather, waterproof, and vapor-proof coating?				Materials Manufacturing X Op. Performance X IEQ Corp. Env. Policy	
Insulation						
7-D	Does the fiberglass insulation product meet the requirements established in ASTM standard specification D 5359 "Specification for Glass Cullet Recovered from Waste for Use in Manufacture of Glass Fiber?"				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
7-E	In which R-Values is the insulation product available?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
DIVISION 8—DOORS AND WINDOWS						
8-A	Is the energy efficiency of the windows, doors, or skylights determined in accordance with NFRC 100 (U Factor) and NFRC 200 (SHGC) by an accredited independent laboratory and labeled and certified by the manufacturer?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	

	Question	Yes or No	N/A	U/K	Criteria Category(ies)	Comments
8-B	What is the Visible Light Transmission Coefficient of the windows, doors, and skylights as determined according to NFRC 300?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
DIVISION 9—FINISHES						
Flooring						
9-A	Does the carpet product meet the requirements of a third party environmental certification program? If YES, indicate the name of the certification program.				Materials Manufacturing Op. Performance X IEQ Corp. Env. Policy	
9-B	Does the manufacturer recommend the carpet product be aired out prior to installation? If YES, describe the process for airing out.				Materials Manufacturing Op. Performance X IEQ Corp. Env. Policy	
Paints and Coatings						
9-C	Does the finishing product contain plant-sourced oils and solids utilizing only natural and/or aliphatic solvents?				X Materials Manufacturing Op. Performance X IEQ Corp. Env. Policy	
9-D	Is the finish water-borne? If not, indicate the solvent used.				Materials Manufacturing Op. Performance X IEQ Corp. Env. Policy	
DIVISION 10—SPECIALTIES						
10-A	Is the product modular or otherwise adaptable? If yes, describe the product.				X Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
DIVISION 11—EQUIPMENT						
There are no questions for Division 11.						
DIVISION 12—FURNISHINGS						
12-A	Are there components of the furnishings that are reused or refurbished? If YES, indicate how much of the furnishings, per unit, is reused or refurbished.				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
12-B	Does the finishing product for furnishings contain plant-sourced oils and solids utilizing only natural and/or aliphatic solvents?				X Materials Manufacturing Op. Performance X IEQ Corp. Env. Policy	
12-C	Is the finish water-borne? If not, indicate the solvent used.				Materials Manufacturing Op. Performance X IEQ Corp. Env. Policy	
12-D	Is the adhesive or fastener products for furnishings manufactured without the addition of urea-formaldehyde?				Materials Manufacturing Op. Performance X IEQ Corp. Env. Policy	
DIVISION 13—SPECIAL CONSTRUCTION						
There are no questions for Division 13.						
DIVISION 14—CONVEYING SYSTEMS						
14-A	Does the elevator operate by using hydraulics? If YES, describe the method used to prevent and mitigate leakage of hydraulic fluid.				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
DIVISION 15—MECHANICAL						
Oils and Lubricants						
15-A	Are the lubricants for the motors, cables, and other moving parts from re-refined sources?				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
HVAC						

	Question	Yes or No	N/A	U/K	Criteria Category(ies)	Comments
15-B	Does the manufacturer use software or professional guidelines to calculate proper size and life-cycle cost? If YES, comment on how.				Materials Manufacturing X Op. Performance IEQ X Corp. Env. Policy	
15-C	Does the HVAC system use non-ozone-depleting refrigerants? Which refrigerant is used?				X Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-D	Can technologies that extract more heat from the heat source be utilized?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-E	Is the ignition electric (as opposed to a pilot light)?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-F	Are Digital Direct Controls provided?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-G	Does the company provide products to facilitate monitoring temperatures by a central computer?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-H	Do the programmable thermostats have a night mode?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-I	Does the HVAC System meet the energy efficiency performance criteria outlined in 10 CFR 435?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-J	Does the HVAC System meet or exceed the applicable efficiency levels outlined in ASHRAE 90.1?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-K	Does the HVAC system provide ventilation in accordance with ASHRAE standard 62, Ventilation of Acceptable Indoor Air Quality?				Materials Manufacturing X Op. Performance X IEQ Corp. Env. Policy	
15-L	How much CFM of outdoor air per person does the HVAC system provide?				Materials Manufacturing X Op. Performance X IEQ Corp. Env. Policy	
15-M	Does the air monitoring system have the capability to monitor for carbon monoxide, carbon dioxide, total volatile organic compounds and particulates (including PM-10)?				Materials Manufacturing X Op. Performance X IEQ Corp. Env. Policy	
15-N	Do the filters meet the Dust Spot Efficiency Test of ASHRAE Standard 52-76?				Materials Manufacturing X Op. Performance X IEQ Corp. Env. Policy	
15-O	Is the HVAC sealant manufactured without the addition of formaldehyde, aqueous ammonia, respirable crystalline silica, or ethylene glycol?				X Materials Manufacturing Op. Performance X IEQ Corp. Env. Policy	
15-P	Are the filters easy to access, clean, and replace?				Materials Manufacturing X Op. Performance X IEQ Corp. Env. Policy	

Plumbing

	Question	Yes or No	N/A	U/K	Criteria Category(ies)	Comments
15-Q	Are fixtures equipped with automatic sensor operations?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-R	Are fixtures equipped with low flow devices? What is the flow-rate of the faucets? What is the flush rate of the toilets/urinals?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-S	Do the showerheads, faucets, toilets and other water sources comply with ASME A112.18.1M-1989 flow requirements?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-T	Does the manufacturer offer a product(s) to facilitate the use of gray water for acceptable applications (such as irrigation or sprinklers)? If YES, indicate how the sender of this questionnaire could obtain product information.				X Materials Manufacturing Op. Performance IEQ Corp. Env. Policy	
15-U	Does the product use solar power, and/or other renewable form(s) of energy, to heat hot water? If YES, describe the energy source(s).				X Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-V	Is the hot water available “on demand” (as opposed to stored)? If YES, please indicate the type of system utilized.				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-W	What is the recovery efficiency of the hot water heater?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
15-X	What is the stand-by loss of the water heater?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
DIVISION 16—ELECTRICAL						
16-A	How many watts does the product use?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
16-B	What is the average lamp efficiency (lumens/watt)?				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	
16-C	Does the manufacturer offer occupancy/motion sensors? If YES, indicate the type of sensors utilized.				Materials Manufacturing X Op. Performance IEQ Corp. Env. Policy	