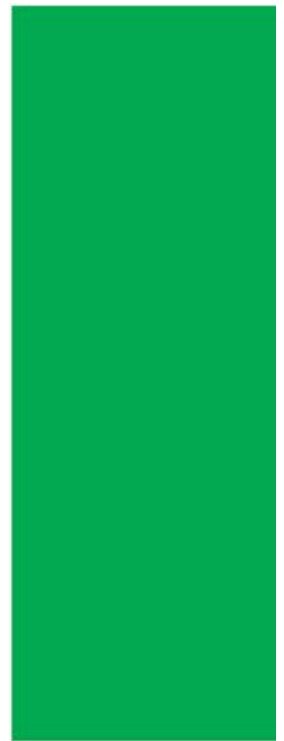


Product Category Rule for Environmental Product Declarations

BIFMA PCR for Storage: UNCPC 3812



Program Operator

NSF International

National Center for Sustainability Standards

Valid through **May, 31, 2017**

ncss@nsf.org



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PRODUCT CATEGORY RULES REVIEW PANEL

TBD

PCR review panel comments may be obtained by contacting NSF International's National Center for Sustainability Standards at ncss@nsf.org.



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BIFMA PRODUCT CATEGORY RULES

These product category rules shall be used in preparing an Environmental Product Declaration (EPD) for *storage products*.

ABOUT BUSINESS AND INSTITUTIONAL FURNITURE MANUFACTURERS ASSOCIATION (BIFMA)

BIFMA is the not-for-profit trade association for business and institutional furniture manufacturers. Since 1973, BIFMA has been the voice of the commercial furniture industry. Our industry's service to our customers – providing healthy, comfortable and productive workspaces – rests on an infrastructure of engineering and material standards. These standards, founded on centuries of craft and enhanced by ever-advancing science, embody the best of our knowledge regarding safety, ergonomics, and sustainability.

BIFMA's role is to sponsor the development and refining of current and future standards, educate on their importance and application, and translate their necessary complexity into more easily understood and implemented formats. We also monitor the state of the industry, serve as a forum for member cooperation and collaboration, interact with international counterparts, and advocate for regulatory conditions that foster value and innovation. Visit <http://bifma.org> or contact email@bifma.org.

ABOUT NSF'S NATIONAL CENTER FOR SUSTAINABILITY STANDARDS (NCSS)

Through the National Center for Sustainability Standards, NSF develops life-cycle based, multi-attribute sustainability standards, protocols, and PCRs for various industries including building products and materials, furniture, carpet and flooring, fabrics, wallcoverings, roofing membranes, green chemicals, and water and wastewater.

The National Center for Sustainability Standards will continue to add to its growing portfolio while providing education, outreach, and innovation support to private industry, trade associations, government and academia to foster a consensus-based approach toward conformity assessment in the sustainability field. Visit <http://www.nsfustainability.org> or contact ncss@nsf.org.



1 GENERAL INFORMATION

This Product Category Rule (PCR) applies to products that provide the function of storage of office based materials and supplies: e.g., books, files, media, digital media, office supplies, or other items potentially associated with storage within an office environment. Other functions that the product may provide are not considered herein. Utilizing the UN Central Product Classification system for this PCR, the Class is 3812 for Other furniture, of a kind used in offices. This PCR includes the scope for subclasses of 38121 – Other metal furniture, of a kind used in offices, and 38122 – Other wooden furniture, of a kind used in offices; as each appropriately applies to the function of storage. Examples of common names or terms used to convey the function of storage within an office setting include, but are not limited to the following: bookcases, lateral files, file cabinets, bin, wardrobes, credenzas, pedestals, overheads, hutches, high-backs, lecterns, cabinets, etc.

This PCR includes the manufacture of storage products constructed from singular or multiple materials including but not limited to wood, metal, plastic, particle board, medium density fiberboard (MDF), bio-based materials, or mixtures of other materials. This PCR is valid through XXX, XX 2018.

This document specifies the requirements for the Life Cycle Assessment (LCA) study and the format and content of the EPD itself. Recognizing the global aspects of the furniture industry this PCR was designed to be globally applicable and therefore geographical coverage is global.

This Product Category Rule referenced the existing PCR System Cabinet was published in 2011 by JIA WONG ENTERPRISE., LTD. An International PCR for Office furniture was referenced and found to have no overlap. Appropriate impact methodologies will be addressed based on manufacturing region and will be addressed herein.

The PCR document has been prepared by NSF International (the program operator) and the Business and Institutional Furniture Manufacturers Association Product Category Rules Task group in accordance with ISO 14025⁵. An open enrollment period was sent out to obtain stakeholders interested in being part of the PCR creation. A multi-stakeholder group composed of furniture industry personnel, material manufacturers, sustainability consultants, and other experts worked to create the PCR.

This PCR is not intended to support comparative assertions.



1.1 Goal and scope requirements for the LCA study

The goal of this PCR is to specify the guidelines for developing a Type III Environmental Product Declaration in conformance with ISO 14025 based on an ISO 14040⁵ and ISO 14044⁵ compliant LCA.

The goal of the LCA that conforms to this PCR shall be at a minimum to identify the environmental impacts of each life cycle phase of the product and shall be presented in a way to be relevant to the public.

This PCR is not written to support comparative assertions. Even for similar products, differences in functional unit, use and end-of-life stage assumptions, and data quality may produce incomparable results⁹. It is not recommended to compare LCA studies or EPDs from another organization as there may be differences in methodology, assumptions and data quality such as variability in data sets and results variability in assessment software tools used. The purpose of this PCR is to provide transparent guidance for an organization to conduct an LCA and develop an EPD in an effort to measure progress towards environmental improvements of the organization's products being studied.

The scope of the LCA shall include a description of the following according to this PCR:

1. Functional Unit
2. System Boundary
3. Description of data
4. Criteria for inclusion of inputs and outputs (cut off rules)
5. Data quality requirements and
6. Units



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PRODUCT DESCRIPTION

The product description shall include the name of the product, product manufacturer and/or model number, a general description of the product and a picture of the product. The product, or range of products, shall be identified by the classification of the product and number of functional units that the product represents. The minimum product or range of products shall be sufficient to meet the service life identified in *Functional Unit*, Section 3.

Based on multiple LCAs from furniture industry manufacturers, similar products (i.e., products with different textiles, core construction material (metal, wood, composite), surface treatments, number of drawers/shelves, etc.) can be included in the same declaration provided that the range of variation within each impact category does not exceed $\pm 10\%$ of impact categories listed in *Parameters to be Declared in the EPD*, Section 8. To reduce the number of unique product life cycle assessments and EPDs for similar storage units, a base configuration can be used internally to support and compare product options against the declared base configuration.



3 FUNCTIONAL UNIT

The functional unit shall be one unit of storage, maintained for a 10 year period. The functional unit shall be presented as how it applies to one of the sub-categories described in Section 3.1.

The ANSI/BIFMA X5.9 method is an industry recognized and approved test methodology to show a storage unit remains usable for a period of 10 years. Products that have been documented to meet ANSI/BIFMA X5.9 can be deemed to meet the 10 year service life. The 10 year service life was based upon an extensive study conducted on behalf of BIFMA in which various product types were evaluated for typical service life in their original application prior to replacement due various reasons, including updates to facility and need for general replacement. Subsequent uses included reburbishment, resale, donation along with disposal; however, are not part of the specified life cycle considerations within this product category rule.

For storage units with a service life of more than 10 years, the entire impact shall be allocated to the 10 year period (i.e., the reference flow shall be one storage unit and not a portion of a storage and results shall not be normalized from a fraction of a storage unit to meet the functional unit).

For storage units with a service life of less than 10 years, a fractional approach shall be used (i.e., it may take more than one storage unit to meet the functional unit requirements). Aggregated results shall be reported for products that require more than one storage unit to meet the service life.

If the product does not meet ANSI/BIFMA X5.9 and the warranty period is five years or more, the maximum service life shall be five years. For product warranties less than five years, the service life shall equal the warranty period.

3.1 Sub category functional unit descriptions

The EPD shall provide information for the entire physical product. The number of storage units required shall be clearly stated on the front page of the EPD declaration and unit values shall not be less than one. The product or range of products shall denote which subcategory of storage function that the unit represents.



3.1.1 Static Storage (e.g., bookcases, hutches, towers, etc.): a storage device that is stationary and consists of no moving parts. The storage device may contain parts that may be repositioned, (e.g., shelf or divider panel). Construction can consist of metal, wood, laminate, resin and glass components including stationary and adjustable components. The storage device shall allow for convenient storage of articles, including but not limited to the following: books, binders, personal and non-personal items found and/or used in the workspace. Storage space is maximized by utilizing vertical space. A functional unit for this category shall contain 0.15 m³ of storage capacity.

3.1.2 Storage Device with Retractable Storage Areas (e.g., file cabinets, pedestals, lateral files, cabinets, etc.): a storage device that has a one or more drawers that extend and have the intended purpose to facilitate the storage of legal and letter size files. Construction can consist of metal, wood, laminate, resin and glass components or any combination of materials. Additional functions shall be clearly denoted in the Product Description section of the EPD. Such additional functions of the storage device could include: cushion top for seating, casters for mobility, and/or locking features. A functional unit for this category shall contain 0.15 m³ of storage capacity.

3.1.3 General Storage: a storage device that does not conform to the specific requirements stated in Sections 3.1.1 and 3.1.2. The storage device within this grouping shall be a clearly defined functional unit that conforms to the requirements of this product category rule and comply with the capacity as defined in this sub-section. Construction can consist of metal, wood, laminate, resin and glass components or any combination of materials. The function(s) of General Storage includes some combination of storage characteristics described in Sections 3.1.1 and 3.1.2 that provide storage for a variety of office and personal items within the workstation, such stored items as paper, binders, books, office supplies, coat, and personal items. Examples of General Storage include: bookcases with hinged or sliding doors, towers that have retractable drawers in addition to fixed open storage area, and hutches with doors and other moving components. A functional unit for this category shall contain 0.25 m³ of storage capacity.

3.2 Cut-off rules

Mass and energy flows that consist of less than 1% may be omitted from the inventory analysis. Cumulative omitted mass or energy flows shall not exceed 5%. Mass or energy flows that contribute more than 10% to an impact category shall be included.



((●)) 4 SYSTEM BOUNDARIES

System boundaries are a set of criteria specifying which unit processes are part of a product system. The entire life cycle is to be covered including all industrial processes from raw material acquisition and pre-processing, production, product distribution and storage, use and maintenance, and end of life management.

Primary Data shall be used for processes under the operational control of the reporting organization. Operational control is defined as any facility that the reporting organization has control over or an operation if it has the full authority to introduce and implement its operating policies at the operation. Primary data shall also be used for all other processes when available. When primary data is not available, secondary data may be used for processes that occur in facilities outside of the operational control of the reporting organization.

Specifically excluded from the System Boundary are the production of capital equipment (including facilities) to make the product, infrastructure, and personnel related activities unless specifically shown to be relevant. Also excluded is the recycling of materials as these are accounted for in the next life cycle. Recycling is described in detail in *Allocation Rules*, Section 5.

A system boundary flow chart example is shown below.

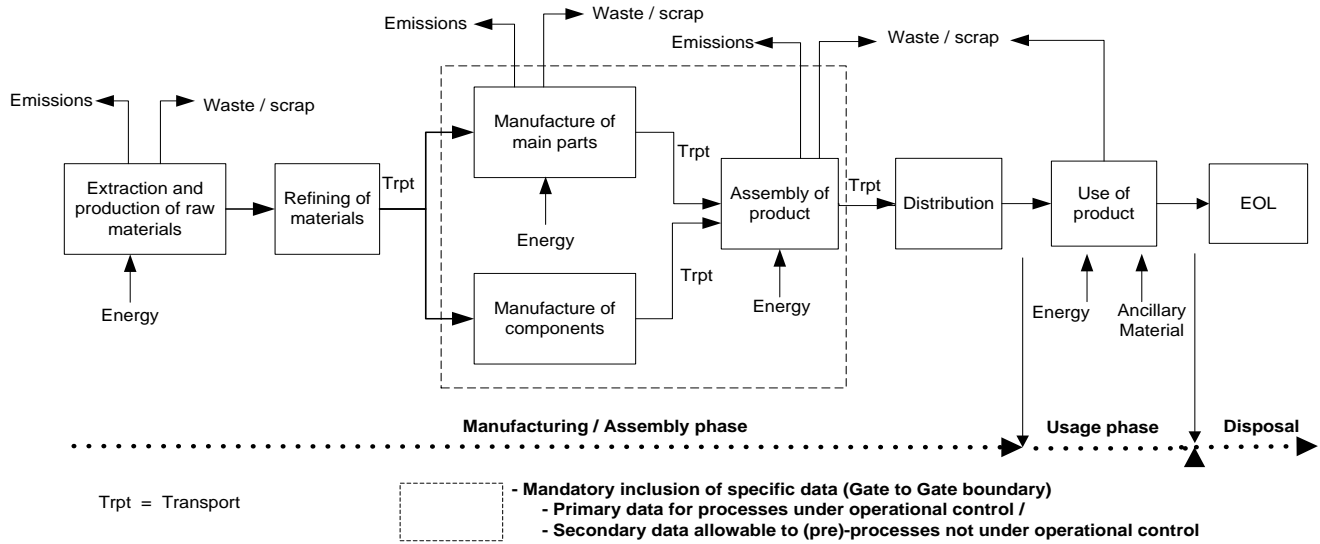


Figure 1: System Boundaries, example flow

4.1 System boundary definitions

4.1.1 Material acquisition and pre-processing stage

The material acquisition and pre-processing and intermediate processing stage starts when the material is extracted from nature, and ends when the material in component form reach the gate of the production facility or service delivery operation. Materials can be considered either “primary” or “secondary”.

- Primary materials are extracted from nature, examples include iron ore, bauxite, wood, etc. that are used to create basic materials used in the production of office furniture (e.g., steel).
- Secondary materials are recovered, reclaimed, or recycled content that are used to create basic materials used in the production of office furniture. Transportation of materials shall be included in the life cycle impact assessment.



- Primary processing is the conversion of materials to a bulk form or a generic shape (materials or components that are not necessarily manufactured exclusively for the office furniture industry).
- Intermediate processing is the conversion of materials to components (e.g., particleboard, plastic pellets, steel coil, etc.).

For the material extraction and primary/intermediate processing stage the boundary ends when the component reaches the gate of the production stage. Transportation of all processing stages shall be included in the life cycle impact assessment.

Waste and scrap created during raw material acquisition and pre-processing shall be accounted for along with emissions associated with transporting the material to recycling or landfill centers. Primary data for this stage shall be used, if available. Otherwise secondary data shall be used. Secondary data shall be used for industry processes and may come from the USLCI for US based processes, the ELCD database for European based processes and the Japanese LCI Database or other relevant national or regional databases. If waste materials are recycled, landfilled, combusted, or composted, the transport distance shall be reported. In the US, the EPA WARM model gives an average transport end of life distance as 32 kilometers (20 miles) and this shall be used for US based processes when primary data or other representative data is not available and when transport distance is not integrated into the dataset.

For material waste not imbedded in software packages, or where primary data does not exist, a 10% scrap rate shall be used for the model and material recycling percentages and rates for the US shall be based on the USEPA Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures (current version)^{Error! Bookmark not defined.} outside the US, a regional, or nationally appropriate waste model shall be used.

All transportation, including interfacility transport, prior to the material being shipped to the production stage shall be included.

Further, transport from the raw material stage to the production stage shall be included. If using an LCA tool where this transport data is not included or primary data does not exist, transport distances listed in Table 1 shall be used for North American based processes for the distance and method of transporting materials from the



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material acquisition and pre-processing stage to the production stage. Transport of the extracted raw materials within the acquisition and pre-processing stage is not covered in Table 1. For processes outside of North America, an appropriate regional or national transportation distance and mode(s) shall be used where primary data does not exist. A weighted average transportation distance may also be calculated from primary data.



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Table 1 materials transport distances, material acquisition, and pre-processing stage to production stage:

Raw Material/ Classification grouping		Distance (miles)		
		Rail	Truck*	Water
Veneer	26 Wood Products	162 miles	332 miles	5982 Miles Picking 5 Ports for an average of all water transport (Asia, Australia, Africa, Europe & South America)
Particle Board	26 Wood Products	162 miles	332 miles	0 miles (NA due to this mode of transport not being significant for this commodity, to our knowledge)
MDF	26 Wood Products	162 miles	332 miles	0 miles (NA due to this mode of transport not being significant for this commodity, to our knowledge)
Paper Backer	27 Pulp, newsprint, paper, and paperboard	0 miles (NA due to this mode of transport not being significant for this commodity, to our knowledge) [837 miles in 2007 U.S. DOT Shipment Characteristics by SCTG Code "Table 7"]	742 miles	0 miles (NA due to this mode of transport not being significant for this commodity, to our knowledge)
Solid Wood	26 Wood Products	162 miles	332 miles	5982 Miles Picking 5 Ports for an average of all water transport (Asia, Australia, Africa, Europe & South America)
Plywood	26 Wood Products	162 miles	332 miles	5982 Miles Picking 5 Ports for an average of all water transport (Asia, Australia, Africa, Europe & South America)
Plastic (inc. polymer-based materials; exc. textiles)	24 Plastics & Rubber	0 miles (NA due to this mode of transport not being significant for this commodity, to our knowledge)	757 miles in 2007 U.S. DOT Shipment Characteristics by SCTG Code Table 13	960 miles in 2007 U.S. DOT Shipment Characteristics by SCTG Code Table 7



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Raw Material/ Classification grouping		Distance (miles)		
		Rail	Truck*	Water
Steel	32 Base metal in prim. or semifin. forms & in finished basic shapes	562 miles in 2007 U.S. DOT Shipment Characteristics by SCTG Code Table 7	932 miles	833 miles in 2007 U.S. DOT Shipment Characteristics by SCTG Code Table 7
Extruded Aluminum	32 Base metal in prim. or semifin. forms & in finished basic shapes	562 miles in 2007 U.S. DOT Shipment Characteristics by SCTG Code Table 7	932 miles	833 miles in 2007 U.S. DOT Shipment Characteristics by SCTG Code Table 7
Cast Aluminum	32 Base metal in prim. or semifin. forms & in finished basic shapes	562 miles in 2007 U.S. DOT Shipment Characteristics by SCTG Code Table 7	932 miles	833 miles in 2007 U.S. DOT Shipment Characteristics by SCTG Code Table 7
Glass	31 Nonmetallic mineral products	0 miles (NA due to this mode of transport not being significant for this commodity, to our knowledge)	126 miles	0 miles (NA due to this mode of transport not being significant for this commodity, to our knowledge)
Fabric Leather	30 Textiles, leather, and articles of textiles or leather	0 miles (NA due to this mode of transport not being significant for this commodity, to our knowledge)	294 miles	5982 Miles Picking 5 Ports for an average of all water transport (Asia, Australia, Africa, Europe & South America)



NOTE: The average transport distances could also be used for complete components or units.

NOTE: Oceanic distances were approximated. For materials where a particular mode of transport was not typical or common, it was assumed to be zero.

Table 7 and Table 13 referenced from:

http://www.bts.gov/publications/commodity_flow_survey/final_tables_december_2009/pdf/entire.pdf

Distances taken from the U.S. Department of Transportation's Research and Innovative Technology Administration (RITA) website's "TranStats".

*Truck distance listed in round trip, as the assumption is made that the delivery truck returns empty after making the delivery.

4.2 Production

The production stage starts with the product components entering the production site and ends with the final product leaving the production gate. This stage is intended to be "gate-to-gate".

Gate-to-gate describes the product boundary encompassing the fabrication and assembly of business and institutional furniture. For purposes of the PCR, the entry gate is the receiving dock of the first facility where basic materials used in the manufacture of the furniture (e.g. steel, particleboard, fabric, laminate, etc.) begins the conversion to furniture components. The end gate is the shipping dock where the ready-to-install furniture is transported for distribution to the end user. The gate-to-gate will include transportation of intermediate materials and components between facilities where more than one physical location is included in the manufacturing process.¹

Site and gate are used here figuratively, as a product may go through many processes and corresponding intermediate facilities before exiting the production stage as a final product. During production, the product undergoes the transformation from intermediate materials, to product component, to semi-finished product, to the final product; additionally, any co-products or wastes formed during production shall be considered in this stage. Production includes processes such as:

- Production of the components or semi-finished product(s);
- Transport of components or semi-finished products between processes and/or facilities;
- Production of the final product by assembling of the components or semi-finished products;



- Use of catalysts or other ancillary materials during production;
- Any additional preparing of the finished product including forming, surface treatment, machining and other processes, as appropriate;
- Packaging materials of the final product shall be included;
- Equipment support chemicals; and
- Personnel support equipment.

Waste and scrap in production shall be included in the LCA model. Commercially available LCA software programs typically embed these flows in the modeling datasets. Primary data shall be used if it is available. If waste materials are recycled, landfilled, combusted, or composted, the transport distances shall follow the current version of the USEPA WARM Model, currently 20 miles (32 Kilometers) (USEPA Waste Reduction Model (WARM)⁸) within North America or other appropriate regionally or nationally applicable model outside North America unless primary data has been obtained in which case primary data shall be used.

For waste and scrap in production not imbedded in software packages modeling datasets, or when no primary data exists, a 30% scrap rate shall be used for the model. The transport distances shall be again follow the USEPA WARM⁸, currently 20 miles (within North America, USEPA Waste Reduction Model (WARM)) or other appropriate regionally or nationally applicable model. The amount of waste material sent to landfill versus recycling shall be based on the EPA Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for Durable Goods (current version)⁶ within North America or other appropriate regionally or nationally applicable model for production outside of North America.

Transportation of parts, semi-finished and finished products to the place of final assembly and/or distribution shall be included. Intercompany movement of parts, semi-finished and finished products shall be accounted for where facilities fall under operational control of the reporting company. For facilities not under operational control of the reporting company, intercompany movement of goods should be included.

4.3 Distribution, storage, and use

The product distribution and storage stage starts with the product leaving the gate of the production facility and ends when the consumer takes possession of the product. Several legs of distribution and storage may occur for



one product, including storage at a distribution center and a retail location if applicable. Product distribution and storage includes processes such as facility operations and transportation between facilities.

The use stage begins when the consumer takes possession of the product and ends with the used product entering the end of life. For some products the use stage does not require energy or generate emissions (e.g., greenhouse gasses); for these products transportation from the storage facility to the use-location to the end-of-life location may be the major processes. Transportation mode and distances shall be based on primary data.

Typical processes for distribution and use include:

- Transportation to the use location and during use;
- Storage at the use location;
- Normal use;
- Repair and maintenance occurring during the usage time; and
- Preparation of a product.

For a service (furniture as a service (leased furniture) should be treated as a product), the production and use stage may be combined into the service delivery stage. This stage encompasses all operations required to complete a service. Considering the example of a home appliance repair person, these processes include driving to the home, assessing the appliance, ordering or picking up parts, and returning to complete the final repair. All material flows (i.e., parts needed for the repair), energy flows (fuel to deliver the service person and/or parts), and end-of-life considerations of materials and wastes make up the processes along the service life cycle.

4.4 End-of-life stage

The end-of-life stage boundary begins when the used product is ready for disposal, recycling, reuse, etc. and ends when the product is buried, returned to nature (combustion, deterioration), or transformed to be recycled or reused. Processes that occur as a result of the disposal are also included within the end of life stage. End-of-life processes may include:

- Collection of end-of-life products and packages;
- Dismantling of components from end-of-life products;



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- Shredding and sorting;
- Incineration and sorting of bottom ash; and
- Landfilling, landfill maintenance, decomposition emissions.

In the absence of primary data on actual end of life treatment for the product, the most current version of the USEPA Municipal Solid Waste (MSW⁶) data or USEPA WARM model^{Error! Bookmark not defined.} or surrogate (shall be identified) within North America or other appropriate regionally or nationally applicable model shall be used outside North American to determine the percent of each material in the product(s) that can be recycled versus landfilled. The amount of each material in the product that can be assumed to be recycled is determined by multiplying the EPA MSW^{Error! Bookmark not defined.} within North America or other appropriate regionally or nationally applicable model recycling rate (in %) by the amount of each material type that is able to be disassembled and is homogenous. The remaining materials that are not recycled should be modeled for end of life using 80% landfill and 20% incineration.



5 ALLOCATION RULES

Allocation procedures shall be uniformly applied to similar inputs and outputs of the system under consideration. If allocation cannot be avoided, users shall follow procedures outlined in ISO 14044-2006 for allocation procedures.

Where possible, allocation should be avoided by dividing unit processes into two or more sub-processes (as specified in ISO 14044, pp 20-22), or through expansion of system boundaries to include the additional functions of coproducts. If allocation cannot be avoided, the following hierarchy of allocation methods is preferred:

- Mass, or other biophysical relationship,
- Economic value.

Deviation from these allocation rules shall be documented and justified.

For allocation due to recycling, companies shall use the Recycled Content Method. Allocation procedures for reuse and recycling discussed in ISO 14044-2006 (see Section 4.3.4.3 on pages 14-16) shall be applied for recycling situations.

Figure 2 illustrates a simplified process map for a product that uses the recycled content method^[1]. The recycled content method is also referred to as the cut-off method, and the 100-0 method.

^[1] The collection process is listed as an attributable end-of-life process; however, the location of this process depends on how the recycled material is collected, as discussed above and in *System Boundaries*, Section 4.



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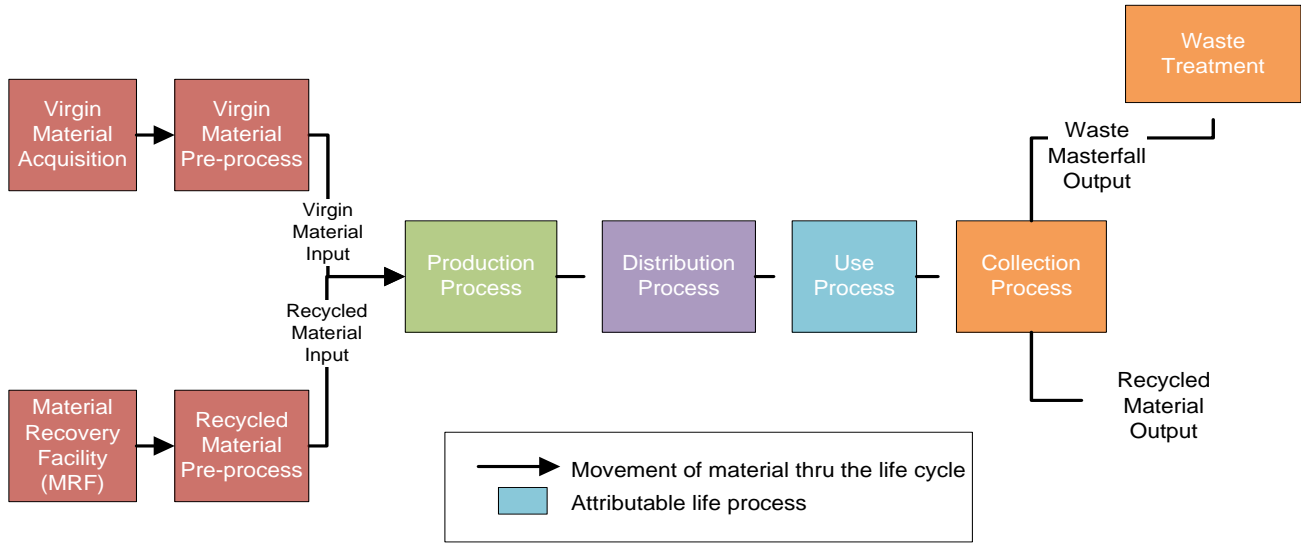


Figure 2: Example Process Map Illustrating the Recycled Material Input Method



6

UNITS AND QUANTITIES

International System of Units (SI units) shall be used for both the LCA and the EPD. Quantities shall be represented with a maximum of 3 significant figures.



7 CALCULATION RULES AND DATA QUALITY REQUIREMENTS

7.1 Types and sources of data

Primary data shall be used for facilities and processes under operational control of the reporting company. Representative data may be used for facility operations that contribute less than (10% of the total product output), so long as at least 50% of facility operations data is from a primary source. For facilities and processes outside the operational control of the reporting company, secondary data can be used. For products that are manufactured wholly or largely outside of the reporting company control (e.g. contracted products or significant assemblies), primary data is highly encouraged; however, secondary data may be used. The reporting company shall use energy production data aligned with the region of manufacture and shall document the unit processes and describe how the secondary data is appropriately selected. Justification for the inability to obtain primary data shall be provided in this case.

Primary data (site specific or representative averages) should be used for unit processes that contribute to the majority of the mass and energy flows, or which have the most relevant environmental emissions (ISO:14044).

7.2 A data quality assessment shall be made for the system under study.

All data shall be accurate, complete, and representative of the manufacturing process, current technology and current measurement capability. The data shall be consistent with the following requirements:

1. The information obtained from the manufacturing process(es) shall be annual average values with the year values were averaged and documented and shall not be more than 5 years of age. The usage of secondary data shall be less than 10 years old unless such data is unavailable. If data older than 10 years is used from a secondary source, reason(s) shall be documented as to why newer data is not available.
2. Data should represent the technology(ies) and process(es) in current use.
3. Data quality assessment shall conform to ISO 14044, Section 4.2.3.6.
4. Data quality assessment shall address the following:



- a) time-related coverage: age of data and the minimum length of time over which data should be collected;
 - b) geographical coverage: geographical area from which data for unit processes should be collected to satisfy the goal of the study;
 - c) technology coverage: specific technology or technology mix;
 - d) precision: measure of the variability of the data values for each data expressed (e.g., variance);
 - e) completeness: percentage of flow that is measured or estimated;
 - f) representativeness: qualitative assessment of the degree to which the data set reflects the true population of interest (i.e., geographical coverage, time period and technology coverage);
 - g) consistency: qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis;
 - h) reproducibility: qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study;
 - i) sources of the data; and
 - j) uncertainty of the information (e.g., data, models and assumptions).
5. Data quality assessments examples include (but not limited to):
- a) USLCI
 - b) ILCD
6. Table 8.2: Criteria to Evaluate the Data Quality Indicators, WRI product standard
7. Representative data should always be used in the upstream phases (extraction, processing and production). Information from databases may be regarded as representative data, if they fulfill the following requirements:
- a) Representative of the geographical area, i.e., data from the same country, or from areas with the same energy supply mix;
 - b) Technological equivalence;
 - c) Boundaries towards nature; and
 - d) Boundaries towards technical systems shall be of best equivalence.

If representative data are not available, use of a specific proxy is allowed. The user shall document and justify the decision to use the specified proxy.



7.3 Data source

The source of the input data shall be transparent.

7.4 Electricity modeling

Where primary data is available for the electrical power grid for a given unit process, it must be used to model the electricity source. If data is not available at that level, the next highest aggregation of electrical grid data must be used, with a preference of local, regional, national, and then multi-national. The French LCA database will soon have estimates of the national grid for most countries globally. The ILCD database has estimates for the EU countries. In the US, the source of national grid data is the U.S. LCI Database.

Carbon offsets or Renewable Energy Credits or Certificates shall not be used in the inventory. These refer to credits purchased for processes not under the control of the purchaser. For example, a coal fired power plant might buy carbon credits that support the planting of forests, or might buy Renewable Energy Credits that support the installation of renewable energy at distributed locations. On-site renewable energy from solar cells or other renewable energy source can only be included in the inventory if they are not grid-linked. This avoids the problem of double-counting of renewable energy.

7.5 LCIA methodology

The following environmental impact categories shall be disclosed in the EPD per functional unit. The impact categories shall also be divided up per functional unit into quantity of each impact category for materials acquisition and refining, production (manufacturing and assembly), distribution and use, and end of life.

1. Global warming potential (GWP 100 years) [kg CO₂-eq.] - IPCC (most recent version); Biomass CO₂ emissions shall be reported separately.
2. Acidification potential (AP) [mol H⁺ eq. / kg of emission] - TRACI 2.0⁷; outside North America, regionally applicable methodologies.



3. Photochemical ozone creation potential (POCP, or “Smog”) [kg O₃ eq. / kg of emission] - TRACI 2.0; or outside North America, regionally applicable methodologies.
4. Eutrophication potential (EP) [kg N eq. / kg of emission] - TRACI 2.0; or outside North America, regionally applicable methodologies.

7.6 Sensitivity analysis

A sensitivity analysis shall be performed for all major assumptions in the LCA model and a clear description of the influence associated with environmental impact for each of the assumptions chosen.



8

PARAMETERS TO BE DECLARED IN THE EPD

References shall be the most recent version required at the time of the LCA. LCI data and Impact Assessment shall be declared in the EPD as detailed below.

8.1 Materials composition

Product specifications, consisting of material composition of the reference product, in kg per functional unit and in percentage of total weight.

8.2 Life cycle inventory data

Inventory assessment categories (e.g., energy and water) shall be reported by life cycle stage and in total for the following:

1. Emissions to air {kg}
 - a. SO_x, NO_x, CO₂, methane, N₂O, CO
2. Water Usage and emission to water {kg}
 - a. Phosphates, nitrates, dioxin, heavy metals (arsenic, lead, mercury, cadmium, and chromium)
 - b. Consumption (total water input)
3. Energy type and usages {MJ}
 - a. Primary energy demand, fossil fuel based energy, nuclear
 - b. Renewable (solar, wind, hydro, biomass w/ replenishment cycle of 10 yrs or less)
4. Waste Management {kg}
 - a. Incineration with energy recovery
 - b. Incineration without energy recovery
 - c. Disposal
 - d. Hazardous waste
 - e. Recycling



8.3 Impact assessment categories

Impact assessment categories shall be reported by life cycle stage and in total. Impact categories shall use the characterization models specified in *LCIA Methodology*, Section 7.5.

1. Global warming potential
2. Acidification potential
3. Photochemical ozone creation potential
4. Eutrophication potential



9 OTHER ENVIRONMENTAL INFORMATION

EPDs developed using this PCR should include, where relevant, additional information related to environmental issues, other than the environmental information derived from LCA, LCI or information modules. This information shall be separated from the information described in ISO 14025, 7.2.2. Identification of the significant environmental aspects should conform to ISO 14025, 7.2.3 and 7.2.4.

Chemicals listed on the MSDS/SDS should be disclosed for all materials that make up 1% or more of the product weight by weight. MSDS/SDS reportable chemicals are defined in this PCR as a chemical listed on a Material Safety Data Sheet or Safety Data Sheet. 95% of product weight should be accounted for. For base metals, materials can be based on generic composition defined by appropriate standards organizations. No further review of wood and other natural fibers is required; however, products using these materials should report added MSDS/SDS reportable chemicals. It is highly suggested that companies choosing to report these chemicals add information as to potential exposure to these disclosed chemicals (i.e., some MSDS listed chemicals may have no route of exposure during normal use).



10 INDEPENDENT VERIFICATION

All verification of EPD, LCA, LCI and additional environmental information shall conform to ISO 14025, Section 8.1.3. The Type III EPD verification shall conform to ISO 14025, Section 8.1.4.

Verifiers shall conform to ISO 14025, Section 8.2. LCA expertise and conform to program operator instructions.



11 REFERENCES

American Forest and Paper Association. Life Cycle Inventory Analysis: Enhanced Methods and Applications for the Products of the Forest Industry. The International Working Group, 2006.

ANSI/BIFMA e3 Furniture Sustainability Standard¹

Atherton, John. Declaration by the Metals Industry on Recycling Principles, International Journal of Life Cycle Assessment, 12 (1), 59-60, 2007.

FTC Part 260, Green guides²

(ILCD, 2010) Joint Research Commission, 2010, ILCD Handbook: General Guide for Life Cycle Assessment³

Intergovernmental Panel on Climate Change (IPCC)⁴

ISO 14025:2006 *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*⁵

ISO 14040:2006 *Environmental management - Life cycle assessment – Principles and framework*⁵

ISO 14044:2006 *Environmental management - Life cycle assessment – Requirements and guidelines*⁵

Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2008⁶

¹ e3-2012 BIFMA Furniture Sustainability Standard, definitions <www.BIFMA.org>

² Federal Trade Commission <<http://www.ftc.gov>>

³ <<http://ict.jrc.ec.europa.eu>>

⁴ World Meteorological Organization (secretariat to IPCC), 7bis Avenue de la Paix, C.P. 2300, CH- 1211 Geneva 2, Switzerland <<http://www.ipcc.ch>>

⁵ International Organization for Standardization (ISO), Case postale 56, CH-1211 Geneve 20, Switzerland <www.iso.org>

⁶ <<http://www.epa.gov/epawaste/nonhaz/municipal/msw99.htm>>



Product Category Rule for Environmental Product Declarations

BIFMA PCR for Storage: UNCPC 3812

USEPA, Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI)⁷

USEPA Waste Reduction Model (WARM)⁸

World Business Council for Sustainable Development's Global Water Tool⁹

World Resources Institute (WRI) Draft Product Life Cycle Accounting and Reporting Standard⁹

⁷ USEPA, Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI)
<<http://www.epa.gov/nrmrl/std/sab/traci/>>

⁸ USEPA Waste Reduction Model <http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html>

⁹ WRI Product Life Cycle Accounting and Reporting Standard (second draft - English) October 2011 *Copyright © World*



12 EPD FORMAT

The format of the environmental product declaration should be structured as follows:

- A. Front page:
 - 1. To avoid misinterpretation of results, a company shall include a disclaimer to the audience (reader) identifying the difficulties in comparing results and referring the reader to additional information if needed.
 - 2. Picture of product
 - 3. Manufacturer's name and contact information
 - 4. Information on the EPD program operator
 - 5. Date of certification and period of validity
 - 6. Functional unit
 - i. 10 year service life
- B. Key environmental parameters:
 - i. Global warming potential
 - ii. Primary energy demand
 - iii. Percentage of recycled content
- C. Product specifications, as described in *Product Description*, Section 2
- D. Material resources, sorted by:
 - 1. Virgin renewable resources
 - 2. Recycled resources
 - 3. Virgin non-renewable resources
- E. Energy consumption:
 - 1. Fossil fuels
 - 2. Nuclear fuels
 - 3. Renewable fuels
 - 4. Miscellaneous fuels (surplus heat, incineration of waste)
- F. Impact assessment categories, as specified in *Impact Assessment Categories*, Section 8.3
- G. Emissions and wastes, as specified in *Parameters to be Declared in the EPD*, Section 8
- H. Additional environmental information per *Other Environmental Information*, Section 9



I. References, as specified in *References*, Section 11

12.1 Validity of the EPD

The validity of the EPD shall be reported in the EPD. If changes in any of the environmental impacts are larger than $\pm 5\%$, the EPD shall be adjusted. Regardless, the EPD shall be reviewed every five years.

12.2 References

The EPD shall, if relevant, refer to:

- The underlying LCA report;
- The relevant PCR document;
- Other documents that verify and complement the EPD;
- Instruction for recycling; and
- Program Operator instructions.