

Product Category Rule (PCR) Guidance

Wooden Pallets

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Product Category Rule (PCR) Guidance for Wooden Pallets, EPD Requirements, UL 10003**First Edition, Dated June 19, 2019*****Summary of Topics******Product Category Rule (PCR) Guidance for Wooden Pallets, EPD Requirements, UL 10003 has been issued.***

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Versions overview

Version	Description	History
1	Version 1 by UL Environment with input from external committee	xxxxx 2019

Editor's Notes:

These Product Category Rules apply to North America and serve both B2B and B2C applications. Updates to this PCR are anticipated as advances in scientific research and EPD application advance.

The PCR development committee was comprised of members from the following organizations:

- National Wooden Pallet & Container Association
- US Forest Service

The PCR external review was conducted by:

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1 General Information

The intended application of this Product Category Rules (PCR) document is to 1) provide guidance for developing Environmental Product Declarations (EPDs) for wooden pallets and to 2) specify the underlying requirements of a Life Cycle Assessment (LCA) conformant to ISO standards that address appropriate environmental aspects of the pallet life cycle. The user of this PCR will be manufacturers of wooden pallets and other interested parties and will enable the creation of EPDs that support comparable, informed, and objective evaluation of wooden pallets.

This document was developed under the UL Environment EPD Program, operating in conformance with the following standards:

- ISO 14025, Environmental labeling and declarations – Type III environmental declarations – Principles and procedures
- ISO 14040, LCA – Principles and procedures
- ISO 14044, LCA – Requirements and guidelines

The rules and requirements of the UL EPD Program are defined in the UL General Program Instructions, available at: <http://industries.ul.com/environment/transparency/product-category-rules-pcrs>.

This PCR applies to products used in North America and is valid for wooden pallets as further described in Section 2.1.

Impacts reported in EPDs created using this PCR are only related to wooden pallets and shall not be used to compare to pallet performance in other reported contexts beyond this PCR scope.

1.1 Committee Members

- | | |
|--|--|
| • Sevda Alanya-Rosenbaum, USDA Forest Products Laboratory | • Laszlo Horvath, Virginia Tech |
| • Richard Bergman, USDA Forest Products Laboratory | • Hinton Howell, Cottondale Wood Products |
| • Andres Carrano Georgia Southern University | • Jordan Piland, Atlas Pallets |
| • LeRoi Cochran CHEP | • Ralph Rupert, Millwood, Inc. |
| • Brad Gething, National Wooden Pallet & Container Association | • Brian Thorn, Rochester Institute of Technology |

1.2 Governance

There are a number of representatives and trade association of wooden pallet manufacturers participating in the creation of this Product Category Rule (“PCR”). These parties represent all or a majority of the companies in their particular sector of the wooden pallet industry. Moreover, the parties participating in the PCR creation represent the vast majority of wooden pallets produced in North America. The very purpose and function of a trade association is to inform its members of important industry developments and to represent their interests in projects such as the update of a PCR affecting their products. This is important because it effectively demonstrates that a large percentage of the wooden pallet industry is represented in the effort to develop the first PCR for wooden pallets.

The role of participants is to establish requirements and procedures to be applied in the development of EPDs for wooden pallets.

1.3 Acknowledgements

The committee would like to acknowledge the National Wooden Pallet and Container Association (NWPCA) for the use of research and data to inform the development of this PCR.

1.4 Identification of Pallet Product

This PCR covers commercially available wooden pallets. This PCR includes various sub-categories according to the following pallet types, which are further described in Section 2.3.2.1

- Stringer
- Block

This PCR does not apply to remanufactured pallets.

1.4.1 UNSPSC Code

The following code covers the range of this rule: 24112701 (Wood Pallet)

1.5 Geographic Coverage

This PCR was developed in English. Regions of applicability include:

- North America

1.6 Period of Validity and Update Process

This document is effective for five (5) years from the latest date of publication. If relevant changes in LCA methodology or other relevant considerations for the product category occur, the document will be revised.

1.7 Public Comment

In accordance with the UL Environment General Program Instructions, this PCR is made freely available for public comment for at least one calendar month and open to all public comments. Identifiable sources are addressed and responses are available upon request.

The public consultation was held from June 8, 2018 – July 8, 2018 and comments were received from thinkstep consulting.

1.8 PCR Review Panel

The PCR external review was conducted by:

- James Mellentine (Chair)
- David Kretschmann
- Kuma Sumathipala

1.9 Other Pallet Rules

Other PCRs considered in the development of this PCR include:

- First transformation wood products for packaging and other non-construction uses (PCR under development), International EPD Program. However, this PCR only covers the first transformation of wood related to sawing, drying, and planing.

1.10 LCA Study References

In developing this PCR, the committee reviewed several LCA studies of pallets, including:

- A Cradle-to-Grave Life-Cycle Assessment of Wooden Pallet Production in the United States. National Wooden Pallet and Container Association, January 2018.
- Bengtsson J, Logie J (2015) Life cycle assessment of one-way and pooled pallet alternatives. Procedia CIRP (2015):414-419

- Tornese F, Carrano, AL, Thorn, BK, Pazour JA, Roy D (2016) Carbon footprint analysis of pallet remanufacturing. J of Clean Prod 126(2016):630-642.
- Carrano AL, Thorn, BK, Woltag H (2014) Characterizing the carbon footprint of wood pallet logistics. Forest Prod J 64(7/8):232-241
- Franklin Associates (2007) Life cycle inventory of wood pallet systems: Final summary report. 45 pp.
- García-Durañona L, Farreny R, Navarro P, Boschmonart-Rives J (2016) Life cycle assessment of a coniferous wood supply chain for pallet production in Catalonia, Spain. J of Clean Prod 137(2016):178-188.
- Park P, Horvath L, Bush RJ (2017) Life cycle inventory analysis of the wood pallet repair process in the United States. Journal of Industrial Ecology. doi:10.1111/jiec.12652
- Bilbao, A.M., Carrano, A.L., Hewitt, M. and Thorn, B.K. (2011) On the environmental impacts of pallet management operations. Management Research Review, Vol. 34, No. 11, pp. 1222-1236.
- Carrano AL, Pazour JA, Roy D, Thorn BK (2015) Selection of pallet management strategies based on carbon emissions impact. Int J Production Economics 164(2015):258-270.
- Buehlmann, Urs, Matthew Bumgardner, and Tom Fluharty. "Ban on landfilling of wooden pallets in North Carolina: an assessment of recycling and industry capacity." Journal of Cleaner Production 17.2 (2009): 271-275.

1.11 Industry average EPD Governance

1.11.1 Industry average EPD Scope

The products represented within an industry average EPD created using this PCR are limited to the scope of products defined in Section 2.3.2 that define the product in commerce.

1.11.2 Involvement of Interested Parties

A call for involvement of interested parties in the creation of an industry average EPD shall be published in at least one industry trade publication. At a minimum, at least three (3) different manufacturing locations from no less than two (2) companies should be involved and represented in an industry average EPD. The method for determining representativeness shall be justified and described per the requirements listed in Section 2.3.2.4.

1.11.3 Industry Average EPD Participation

A manufacturer qualifies for participation in an industry average EPD created using this PCR if they provide primary manufacturer data used in calculating the initial EPD average, or can demonstrate willingness to provide primary manufacturer data during the LCA data collection process.

1.11.4 Retroactive participation:

A manufacturer may apply for retroactive participation by providing relevant qualitative and quantitative product information to the Program Operator, as detailed below. The Program Operator will assess representativeness and will inform and provide the original industry average EPD committee with this application. The participation decision ultimately resides with the Program Operator.

The quantitative metrics provided to achieve retroactive participation shall include product data that is representative of the data used in the industry average EPD; at a minimum, the facility energy consumption by fuel source, the product bill of materials with corresponding masses, normalized by the reference unit. Manufacturers demonstrating unit facility energy consumption between the minimum and the maximum of the industry average will be allowed to participate. To facilitate this, the background LCA report shall provide minimum and maximum values for unit facility energy consumption.

When determining a manufacturer's participation eligibility, the EPD Program Operator shall follow the recommendations of the manufacturer and/or its consultants unless the Program Operator has data or information to the contrary, in which case the Program Operator and manufacturer shall confer in an effort to reach consensus.

All manufacturers who submit an application for retroactive participation shall participate in the update process when the existing industry average EPD expires.

Manufacturers seeking to publicly benchmark product-specific type III EPDs against the industry average EPD shall have participated in the industry average EPD process or retroactively via the options outlined above.

1.11.5 Governance

An industry organization, such as a trade association, shall inform possible industry participants through association meetings, newsletters, e-mail messages, and similar types of outreach, including public notices in the trade press publications. Confidential business information shall be collected by a third party. Data from the third party shall be provided to the facilitator as aggregated data with no trace to the original source of data.



The development of an industry average EPD and or update of an EPD should involve a series of meetings and exchanges in which all participants are invited and kept apprised of the developments. Notices of these meetings should be given to all possible participants regardless of their commitment to active involvement. Minutes of meetings, along with meeting notices, should be preserved as documentation of the process and due diligence observed in the creation or renewal of the EPD.

1.11.6 Data Responsibility/Ownership

Trade associations that lead the development of industry average EPDs may need to collect confidential business information from individual members. This data can include proprietary chemical formulations and processes or other confidential information. In this case, a designated third-party entity such as an LCA practitioner shall be identified as the “industry agent”. The industry agent shall be responsible for activities including collection, secure storage and analysis of such data needed for the EPD development, and will preserve the privacy of individual company information while executing these duties.

The group of manufacturers responsible for developing an industry average EPD shall be responsible for, including but not limited to, insuring industry average EPD updates are made based on the most recent LCA modeling software version and impact assessment version available.

1.11.7 Industry average EPD Updates

industry average EPDs created using this PCR shall expire five (5) years after publication. An update to the existing EPD, or new EPD, may need to be developed prior to the five years if: 1) significant changes have occurred in the manufacturing process; 2) new industry participants; 3) significant changes or alterations in raw materials; 4) major regulatory changes that mandate or trigger changes to operational procedures; or 5) major technological changes would also justify creation of an updated EPD.

Additional companies may be added to an existing industry-wide EPD at the scheduled review by submitting data and having the industry average impacts recalculated.

2 Goal and Scope

The intended application of this PCR document is to give guidance for developing EPDs for wooden pallets and to outline the requirements of a LCA report used to inform the EPD. The users of this PCR will be manufacturers of wooden pallets and other interested parties, such as pallet logistics companies, research and educational institutes, and pallet purchasers. This PCR is valid for wooden pallets as further described in Section 2.1.

This PCR addresses the cradle to end of life environmental impacts of wooden pallets and conforms with ISO 14025, Environmental labeling and declarations – Type III environmental declarations – Principles and procedures. The reporting of additional information as shown under Section 6.2 is permitted. The environmental impacts are calculated using attributional LCA methodology. The life cycle stages excluded from the scope are the following:

- ▶ Product Use (corresponding to use phase/module B1, as described in Section 3.2);
- ▶ Capital equipment manufacture;
- ▶ Personnel impacts;
- ▶ Infrastructure and manufacturing, maintenance, and disposal of production equipment;

Impacts reported in EPDs created using this PCR are only related to wooden pallets and shall not be used to compare to pallet performance in other reported contexts or pallet categories not covered in the PCR scope.

There are more than 450 million new pallets produced in the United States each year. Close to 1.9 billion are in use on a daily basis. The 48x40" grocery (GMA) pallet is the most common pallet size in the US, and represents about 30% of the pallets produced each year. The top ten most common US pallet sizes represent about 60% of the annual pallet production. The remaining 40% of the market includes hundreds of sizes that are specially tailored to specific customer needs. Pallet sizes vary significantly between different regions of the world. Internationally, there are six pallet footprints (sizes) recognized by ISO. There are trends, however, towards increasing domestic and global pallet size standardization.

There are five basic interactive parameters that determine pallet suitability for a given application: strength, stiffness, durability, functionality, and purchase price. These parameters are extremely interdependent, and optimizing just one (i.e. minimizing price) will necessarily impact the others. While the balance among these five parameters will vary, depending on the

specific product and distribution environments, they all apply regardless of the pallet design or material used.¹

Given wooden pallets comprise 90% of the pallets in circulation, plastic, composite, and metal pallets are initially excluded from the scope of this PCR (Bhattacharjya & Walters, 2012).

An EPD prepared under this PCR will present data that have been aggregated over the information modules.

Table 1. Wooden pallet product EPD type

EPD type	Functional Unit	Life Cycle Stages/Information modules	Reference Service Life (RSL)	Primary audience
Cradle to gate with end of life	Functional unit	Modules A1-A3, B2, C1-C3, as described in Section 3.2	RSL required	Business to business (B to B) and/or Business to consumer (B to C)

The comparability of EPD of wooden pallet products will be in accordance with the requirements for comparability as described in ISO 14025, Section 5.6,

“Type III environmental declarations are intended to allow a purchaser or user to compare the environmental performance of products on a life cycle basis. Therefore, comparability of Type III environmental declarations is critical. The information provided for this comparison shall be transparent in order to allow the purchaser or user to understand the limitations of comparability inherent in the Type III environmental declarations.

Type III environmental declarations not based on an LCA covering all life cycle stages, or based on different PCR, are examples of declarations that have limited comparability. Type III environmental declarations based on the same PCR but based on different impact and inventory results are examples of declarations that have limited comparability.”

¹ When semi-finished products are purchased from an external supplier, detailed data on the composition (i.e. raw materials that compose semi-finished product) have to be collected by the EPD owner and listed as « raw materials ».

If multiple plants are producing the same product, the average performance of the manufacturing plant locations shall be taken into account.

2.1 System Function

The function of a wooden pallet is to provide a method to transport goods through buildings, to stack and fit in racks, to be accessible to forklifts and pallet jacks and to function in automated warehouses.

This PCR uses functional units, discussed in Section 3.1 and defined them for the pallet product category.

2.2 Definitions and Acronyms

For the purposes of this document, the following definitions and acronyms apply:

Background Process

A process other than a foreground process; a process not under direct operational control of a manufacturer with contributing data which may not be directly measured by the manufacturer.

DU Declared Unit

Quantity of a pallet for use as a reference unit description in an EPD not covering the full life cycle.

Elementary flow

Material or energy entering the system being studied that has been drawn from the environment without previous human transformation, or material or energy leaving the system being studied that is released into the environment without subsequent human transformation [ISO 14044].

Feedstock Energy

Heat of combustion of a raw material input that is not used as an energy source to a product system, expressed in terms of higher heating value or lower heating value [ISO 14044].

Foreground Process

A process under operational control of the EPD owner. Foreground processes includes data collected by the owner of the EPD, e.g., raw materials amount and processing, energy consumed and waste generated during the manufacturing stage, direct emissions of the facility under operational control of the EPD owner.

FU Functional Unit

Quantified performance of a wooden pallet for use as a reference unit description in an EPD based on LCA [ISO 14025].

Information Module

Compilation of data to be used as a basis for a Type III Environmental Declaration, covering a unit process or a combination of unit processes that are part of the life cycle of a product [ISO 14025].

Intermediate flow

Product, material or energy flow occurring between unit processes of the product system being studied [ISO 14044].

ISO

International Organization for Standardization

LCA Life Cycle Assessment

Calculation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle [ISO 14040].

LCI Life Cycle Inventory

Phase of life cycle assessment involving the compilation and quantification of inputs and outputs for a product throughout its life cycle [ISO 14040].

LCIA Life Cycle Impact Assessment

Phase of life cycle assessment aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts for a product system throughout the life cycle of the product [ISO 14040].

LHV Lower Heating Value

The amount of heat released by combusting a specified quantity of material (initially at 25°C or another reference state) and returning the temperature of the combustion products to 150°C. The lower heating value (LHV) (net calorific value (NCV) or lower calorific value (LCV)) is determined by subtracting the heat of vaporization of the water vapor from the higher heating value. This treats any H₂O formed as a vapor. The energy required to vaporize the water therefore is not released as heat.