



Product Category Rule (PCR) Guidance for Kitchen and Bath Vessel Fixtures

INTRODUCTION

This Product Category Rules (PCR) Guidance Document for Kitchen and Bath Vessel Fixtures was created by Plumbing Manufacturers International (PMI) manufacturing members with the goal that it would result in the consistency of rules and calculations used by program operators in their development of PCRs for such plumbing products.

SUGGESTED SEARCH TERMS: The following terms are recommended for Search Engine Optimization (SEO). It is recommended to use these terms in conjunction with product terms (bathtub, sink, shower receptor, toilet bowl, bidet, fixture, vessel, etc.) to maximize success.

Environmental Product Declaration (EPD)
Product Category Rule (PCR)
Life Cycle Assessment (LCA)
ISO 14020
ISO 14025
EN15804
Life Cycle
Type III Environmental Declaration

IMPORTANT NOTES

This document is not a standard, code or regulation and it creates no legal obligation. This document is advisory in nature, informational in content, and intended to assist program operators in the development of product category rules.

This document is based on ISO 14025:2006¹, Section 6.7: Procedure for the Development of PCR and Section 7.2: Declaration Content, as well as the ACLCA “*Guidance for Product Category Rule Development*”².”

¹ ISO 14025:2006: Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures. (2006). International Organization for Standardization, Technical Committee ISO/TC 207: Environmental Management-Subcommittee SC 3: Environmental labelling.

² Ingwersen, W., Subramanian, V., (Eds.). (2013). Guidance for Product Category Rule Development (1). 4/4The Product Category Rule Guidance Development Initiative.

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Document Version Control

Version No.	Revision Date	Section(s) Revised	Description of Revision(s)	Revised By
1.0	3/23/2016		Initial Release	
1.1	3/5/2018	<p style="text-align: center;">Introduction; B. Preparation for PCR Development - Section 2.a.i. and Section 5.a.i.; C. Developing the Contents of a PCR Document – Table 3: System Boundary Specifications, Section 1.c.i., Section 1.c.ii., Section 1.c.iii., Section 1.d., Section 1.e., Section 1.g., Section 1.i., Section 1.j., Section 1.k., Table 4: Product Cleaning Assumptions; D. General Declaration Content – Section 1.k.</p>	To harmonize with PMI’s PCR Guidance for Kitchen and Bath Fixture Fittings	Sustainability TG

A. Terms and Definitions

Pages 10-11 of the ACLCA *“Guidance for Product Category Rule Development”³* is recommended to familiarize the reader with terms commonly used throughout this document. Specific terms and definitions relative to the topic may be found in ISO 14020 or ISO 14025. Additional terms and definitions specific to the general category of “Kitchen and Bath Vessel Fixtures” are as follows:

1. Production aids: for owned operations, necessary production materials consumed in the manufacturing process but not directly included in the final product. For example, polishing media, hydraulic oil, and mold release agents are considered production aids, but molds that are reusable for many cycles (100 or more) are not.

B. Preparation for PCR Development

Chapter 2 of the ACLCA *“Guidance for Product Category Rule Development”⁴* is recommended in whole to guide the preparation stage before development of a PCR. This section includes the following tasks (*add detail beyond definitions covered in Section A as necessary for intent clarity*):

1. Determine if a PCR is the appropriate application for the desired outcome.
2. Key steps before creation:
 - a. Identify one or more Type III Program Operators with proof of eligibility to ISO 14025 as a partner to ensure conformance with applicable standards and generally accepted practice.
 - i. Selection of a Program Operator should not preclude the involvement of other Program Operators that desire to work in a collaborative manner to form a consensus standard.
 - ii. Further, program operators are encouraged to develop the PCR in collaboration with other program operators with activity in the same market (e.g. North America).
 - b. Determine the product category.
 - c. Perform a thorough search of existing PCRs in this category.
 - i. This search should include both in-market and out-of-market PCRs.
 - ii. The involved Program Operator(s) should coordinate this.
 - d. Involve parties with previous work in this category.
3. Identify the stakeholders.
 - a. Program Operator manages the development.
 - b. Any stakeholder can be the driver.
 - i. Stakeholders include plumbing fixture manufacturers, other program operators, PMI members and allied members, and other plumbing fixture trade associations, product end users and specifiers, consumer organizations, governmental and other public bodies, and non-governmental organizations.
 - c. Process must be transparent. A “transparent” PCR development process is one that:
 - i. Maintains Program Operator rules in a publicly available location, free of charge.

³ Ingwersen, W., Subramanian, V., (Eds.). (2013). *Guidance for Product Category Rule Development* (1.0 ed.). The Product Category Rule Guidance Development Initiative.

⁴ Ibid.

- ii. Maintains up to date records of the entire development process activity, in a publicly available location, free of charge.
 - iii. Specifically identifies stakeholders from the categories in Section (3)(b) above, deemed essential to a quality, open PCR development process.
 - iv. Actively notifies these stakeholders of initiation of the PCR development process, updates to the development process, and corresponding records. An “active notification” is one that is directed at an individual organization.
 - v. Allows sufficient time (a minimum of 30 days following notification) for stakeholders to respond to deliverables in the development process.
 - vi. Responds to all stakeholder comments throughout the process, maintaining these responses as part of recordkeeping. Responses should be made in a reasonable timeframe; in no case greater than 90 days.
4. Announce intent to develop a PCR.
 - a. See the stakeholder and transparency expectations in Sections (3)(b) and (3)(c) above, with focus on stakeholder identification and active notification.
5. Form a PCR development committee.
 - a. The involved program operator(s) are responsible for assembling the PCR development committee, including:
 - i. Ensuring a mix of perspectives and competencies among the members of a PCR committee is achieved.
 - ii. Potential conflicts of interest are identified and resolved.
 - b. This committee at a minimum must include an LCA expert, product expert, program operator representative, a representative of each organization funding PCR development, and downstream customer/specifier. A single individual may satisfy multiple roles.
6. Create definition and classification of product category with a clear scope.
 - a. Use international terms/definitions of product functions.
 - b. Use known/existing classification methodologies where possible (e.g. the CSI format to clearly identify included products).
7. Determine steps needed to create alignment.
 - a. How to collect data and create impact factors; rules and procedures alignment.
 - b. Analysis methods.
 - c. Create a unified PCR.
 - d. Adaptation, revision, or updating of existing methods from other PCRs when possible.
8. Identify and review existing LCAs that may be used to support PCR development.
 - a. These pre-existing LCAs are independent of the LCA performed by the product manufacturer to support an EPD for a specific product.

C. Developing the Contents of a PCR Document (ISO 14025:2006(E), Section 6.7.1⁵)

Detail following the outline of ISO 14025:2006(E), Section 6.7.1⁶ of core PCR requirements is found below.

In addition, Chapter 3 of the ACLCA “*Guidance for Product Category Rule Development*”⁷ provides best practice elements beyond ISO 14025. It is recommended in whole and should be used as a checklist.

1. The PCR document shall include the following:
 - a. Product category definition and description (e.g. function, technical performance, use):

The PCR should apply to the broad category of plumbing ware fixtures that serve as a vessel or pass-through device and do not directly control the flowrate of water. The following table is inclusive of, but not limited to, the product sub-categories to which this PCR will apply.

Table 1: Product Category Definition

Product Sub-Category	Limitations/Exclusions
Bathtubs	Independent of bath enclosure, plumbing supply fittings and plumbing waste fittings. Excludes products with electrical components (e.g. whirlpools).
Shower receptors	Independent of shower enclosure and plumbing waste fittings.
Sinks	Independent of plumbing supply and waste fittings.
Toilet bowls	Independent of tank, fill valve and flush valve.
Bidets	Independent of plumbing supply and waste fittings.
Urinals	Independent of tank, fill valve and flush valve.
Bath and shower enclosures	Independent of bathtub, shower receptor, plumbing supply fittings, showerheads and waste fittings.

⁵ ISO 14025:2006: Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures. (2006). International Organization for Standardization, Technical Committee ISO/TC 207: Environmental Management-Subcommittee SC 3: Environmental labelling.

⁶ Ibid.

⁷ Ingwersen, W., Subramanian, V., (Eds.). (2013). *Guidance for Product Category Rule Development* (1.0 ed.). The Product Category Rule Guidance Development Initiative.

- b. Goal and scope definition for the LCA of the product, including:
 - i. Functional unit:

Table 2: Functional Unit by Product Sub-Category

Product Sub-Category	Functional Unit and Differentiation
Bathtubs	Bathing vessel, further specified by footprint area and volume.
Shower receptors	Fixture that collects showering water and routes to a drain, specified by footprint area.
Sinks	Vessel used for washing, bathing, and/or food preparation; specified by footprint area, volume, number of basins, and application (e.g. kitchen, bathroom, utility, bar/secondary).
Toilet bowls	Vessel used for urination or defecation.
Bidets	Bathroom fixture used for washing the genital and perineal areas.
Urinals	Wall or floor-mounted fixture used for urination.
Bath and shower enclosures	Wall-mounted, impermeable surface that defines and contains the bathing or showering area, specified by surface area.

ii. System boundary:

Table 3: System Boundary Specifications

Boundary Item	Detail
All product life cycle stages as defined by EN15804. ⁸	Express product impacts specific to each life cycle stage.
Include product and associated packaging at point of sale.	Product comparisons are valid only if all activities and materials required for end consumer use are included.
Include required accessories and installation materials.	
Specify the expected product lifetime and justify.	Recommended justification: NAHB ⁹ and NACHI ¹⁰ documents. Generally, state expected lifetime by material type chosen for the application.
Include maintenance items required to retain original product function throughout the specified useful life.	Product comparisons are valid only if all activities and materials required for end consumer use are included.
Include cleaning chemicals and frequency as specified in Table 4, unless the product has a special feature that justifies a deviation.	

iii. Description of data:

Specify the product sub-category and functional unit, including differentiation (e.g. surface area, volume).

iv. Criteria for the inclusion of inputs and outputs:

The product contents included in the LCA (including associated packaging and required accessories/installation materials) must account for at least 99% of the materials by mass. In addition, at least 90% by mass of production aids (necessary production materials not directly included in the final product) for operations owned by the manufacturer must be included within input/output data.

v. Data quality requirements:

⁸ EN150804:2012+A1:2013: Sustainability of Construction Works - Environmental Product Declarations - Core Rules for the Product Category of Construction Products. (2012). European Committee for Standardization.

⁹ Jackson, J., (Ed). (2007). Study of Life Expectancy of Home Components. National Association of Home Builders/Bank of America Home Equity.

¹⁰ International Association of Certified Home Inspectors. (n.d.). InterNACHI's Standard Estimated Life Expectancy Chart for Homes. Retrieved October 1, 2015, from <http://www.nachi.org/life-expectancy.htm>.

All processes owned by the manufacturer must be represented with data that is sourced from the manufacturer. Impacts from activities upstream (supply chain) and downstream (use/disposal) of the manufacturer must be sourced from publicly available attributional datasets assembled according to ISO/TS 14048¹¹. It is preferable that a single dataset be agreed upon by stakeholders to eliminate variability in model results not related to actual impact differences between products.

vi. Units:

All results must be expressed in SI units.

c. Inventory analysis, including

i. Data collection:

It is best practice to collect primary data in detail sufficient to allocate resource use and emissions to individual products. When products manufactured within an operation are uniform, a low level of detail (e.g. utility bills, waste manifests, and emission inventories) may be acceptable to assign impacts to products based on a simple product attribute such as mass or volume. However, when manufactured products have a high degree of variability in resource intensity, more detailed information must be gathered. For example, individual process equipment might be studied to more clearly understand the relationship between resource use and value added.

ii. Calculation procedures:

Calculation procedures are the bridge between data collection and flow allocation. Best practice involves relating resource use and emissions to a product attribute that is commonly measured and tracked, creating an intensity factor that may be applied within a model. For example, energy use may be expressed per machine cycle. The number of machine cycles necessary to create a specific product will dictate energy allocation for this process step.

iii. Allocation of material and energy flows and releases:

Mass allocation is required as a default, except when a manufacturer provides justification for why mass allocation isn't representative or practical and can demonstrate a more representative allocation method. One example might be a plating process where impacts per part are more dependent on surface area than mass. This deviation from the mass allocation rule must be explained and justified.

The "avoided burden" method of accounting for environmental impact at product end of life is not allowed, as it is not accurate from an impact accounting perspective.

¹¹ ISO 14048:2002(E): Environmental Management – Life Cycle Assessment – Data Document Format. (2002). International Organization for Standardization.

Avoided burden is a life cycle assessment (LCA) approach to allocating environmental burden in the presence of recycling or reuse, referring to the impact of virgin material production that is avoided using potentially recyclable material. When determining the overall environmental impact of a product, the product is given credit for its potential to become a recycled material and displace the need for virgin material.

Benefits of using recycled content are to be taken by the manufacturer at the beginning life cycle stages to recognize the impact reduction vs. use of virgin materials. The future benefit of manufacturing a recyclable product is not to be expressed by claiming credit for raw materials not extracted in the future.

d. Impact category selection and calculation rules:

Specify and justify the current global standard for impact category selection and choose both an internationally recognized and market-appropriate calculation method (e.g. TRACI2 from EPA in the US market).

e. Predetermined parameters for reporting LCA data (inventory data categories and impact category indicators):

Model parameters used to report product LCA data should support accurate assignment of flows (e.g. material, energy) to discrete product types. For example, if a product requires more machining than the average, machine time may be a relevant parameter.

In very few instances will strict mass allocation (assigning impacts to products based on mass alone) provide an accurate and actionable model output.

In addition to the LCA data reporting guidance in Section (C)(1)(d) above, resource use (primary energy, both renewable and non-renewable), hazardous and non-hazardous waste disposal, and mass of reusable and recyclable materials throughout the life cycle should be reported.

f. Requirements for provision of additional environmental information, including any methodological requirements (specifications for hazard and risk assessment):

None specified.

g. Materials and substances to be declared (information about product content, including specification of materials and substances that can adversely affect human health and/or the environment, in all stages of the life cycle):

Material designations may be generic to protect trade secrets. For example, CAS numbers of materials that make up 99% of the product by mass. The same level of detail should be applied to other flows (e.g. maintenance materials, cleaning products) except for production aids, which have a 90% mass threshold.

- h. Instructions for producing the data required to develop the declaration (e.g. LCA, LCI, information modules and additional environmental information).

No additional instructions.

- i. Instructions on the content and format of the Type III environmental declaration:

This guidance does not specify a template for the Type III environmental declaration. PMI does not believe this should be a function of the PCR. The format should be a choice of the manufacturer and Program Operator.

The PCR itself should be publicly accessible in the English language. Chapter 5 of the ACLCA *“Guidance for Product Category Rule Development”¹²* is recommended in whole to guide the publishing stage of a PCR.

- j. Information on which stages are not considered, if the declaration is not based on an LCA covering all life cycle stages.

Inclusion of all life cycle stages as defined by EN15804 is strongly recommended to maintain consistency among EPDs for products delivering the same service. Exclusion of one or more life cycle stages must be justified. It is critical that LCA results be reported separately by life cycle stage to enable product comparisons by matching scope.

- k. Period of validity:

It is recommended that the PCR continue without review and/or revision in accordance with the program operator’s general program instructions, but not to exceed a period of 5 years.

- 2. Chapter 7, Section 3 of the ACLCA *“Guidance for Product Category Rule Development”¹³* includes a recommended list of fixed and flexible PCR content. A fixed structure is recommended whenever possible to promote comparison, but flexible components must be allowed to represent true differences due to product technology and other factors.

Assumptions related to general product use and maintenance are recommended to be fixed elements, unless otherwise justified. Product cleaning may be an especially impactful activity that in most cases will not be a differentiator between products in the same category, sub-category, and especially in the same material set.

The following table recommends cleaning assumptions by product sub-category, material, and residential or commercial application:

¹² Ingwersen, W., Subramanian, V., (Eds.). (2013). *Guidance for Product Category Rule Development* (1.0 ed.). The Product Category Rule Guidance Development Initiative.

¹³ Ibid.

Table 4: Product Cleaning Assumptions*

Product Sub-Category	Cleaning Product**
Bathtub – standard size	10 ml of 1% sodium lauryl sulfate solution
Bathtub – large size	10 ml of 1% sodium lauryl sulfate solution
Shower receptors	10 ml of 1% sodium lauryl sulfate solution
Bath and shower enclosures	10 ml of 1% sodium lauryl sulfate solution
Kitchen sinks	10 ml of 1% sodium lauryl sulfate solution
Lavatory (bathroom) sinks	10 ml of 1% sodium lauryl sulfate solution
Toilet bowls (independent of tank or flush valve)	10 ml of 1% sodium lauryl sulfate solution
Urinals (independent of flush valve)	10 ml of 1% sodium lauryl sulfate solution

*Cleaning Frequency: Residential installations are assumed to be cleaned weekly and Commercial installations are cleaned daily.

**Include cleaning chemicals and frequency as specified in Table 4, unless the product has a special feature that justifies a deviation.

Other items common to all products within this category that should be fixed:

Table 5: Other Product Modeling Assumptions

Item	Assumption
Product transport from point of purchase to building site.	500 km Diesel-powered truck/trailer
Installation & de-construction procedures.	Manual (no operational energy use)
Product transport from building site to waste processing.	100 km Diesel-powered truck/trailer
Percentage of recycling to landfilling.	Based on EPA values for material

D. General Declaration Content (ISO 14025:2006 (E), Section 7.2.1¹⁴)

Detail following the outline of ISO 14025:2006(E), Section 7.2.1¹⁵ of core Type III environmental declaration requirements is found below.

1. The Type III environmental declaration shall include the following:
 - a. Identification and description of the organization making the declaration.
 - b. Description of product:

¹⁴ ISO 14025:2006: Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures. (2006). International Organization for Standardization, Technical Committee ISO/TC 207: Environmental Management-Subcommittee SC 3: Environmental labelling.

¹⁵ Ibid.

Specify the product sub-category of the declared product as detailed in Table 1. In addition, specify the functional unit and its detailed information as listed in Table 2. For example, a shower enclosure would include the surface area of wall coverage provided.

- c. Product identification (model number).
- d. Name of the program and program operator's address.
- e. PCR identification.
- f. Date of publication and period of validity.
- g. Data from LCA, LCI, or information modules.

A system description is recommended that demonstrates the life cycle stages considered, the source(s) of data utilized within each life cycle stage (e.g. LCA, LCI, information modules), and the cut-off criteria within each stage. Information may be presented via the use of tables, diagrams, flow charts, or other.

- h. Additional environmental information.
- i. Content declaration covering materials and substances to be declared (e.g. information about product content, including specification of materials and substances that can adversely affect human health and the environment, in all stages of the life cycle). With appropriate justification, this requirement does not apply to proprietary information relating to materials and substances covered by intellectual property rights.

Material designations may be generic to protect trade secrets. For example, CAS numbers of materials that make up 99% of the product by mass. The same level of detail should be applied to other flows (e.g. maintenance materials, cleaning products).

- j. Information on what stages are not considered, if the declaration is not based on an LCA covering all life cycle stages.

Inclusion of all life cycle stages as defined by EN15804 is strongly recommended. If exclusion of a life cycle stage is properly justified, it is critical that LCA results be reported separately by life cycle stage to enable product comparisons by matching scope.

- k. Statement that environmental declarations from different programs may not be comparable. Page 55 of the ACLCA "*Guidance for Product Category Rule Development*¹⁶" provides a checklist of all elements considered necessary for product comparability. It is recommended that this checklist be included in the declaration, along with a statement that all line items must be checked for a product comparison to be possible.

¹⁶ Ingwersen, W., Subramanian, V., (Eds.). (2013). *Guidance for Product Category Rule Development* (1.0 ed.). The Product Category Rule Guidance Development Initiative.

- I. Information on where explanatory material may be obtained.

E. Type III Environmental Declarations Based on Information Modules (ISO 14025:2006(E), Section 7.2.5¹⁷)

Type III environmental declarations for one or more life cycle stages may be prepared using information modules. (Definition: 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 a part of the life cycle of a product.)

Information modules may be combined to obtain an LCA covering all life cycle stages on which to base a Type III environmental declaration for a product under the following conditions:

1. The information modules for all stages of the life cycle and for all parts of the product are combined.

Only manufacturer-specific data, and not general information module data, may be used to represent manufacturer-owned operations.

2. All requirements of ISO 14040¹⁸ are fulfilled.

In addition to fulfilling the LCA requirements of the ISO 14040¹⁹, Section (C)(1)(c) of this guidance document should be followed for quality, representative LCI data for manufacturer-owned operations.

3. The PCR of the product category are satisfied.

Component and material suppliers should provide information, when available, about use and the end-of-life stages.

If the information modules combined in a Type III environmental declaration do not cover the life cycle of the product, then the omissions shall be stated. It is highly recommended that the entire life cycle of the product be included in the declaration.

If relevant aspects and impacts of the life cycle are not included in the information modules, the Type III environmental declaration shall be supported with relevant additional environmental information and the omissions shall be justified.

¹⁷ ISO 14025:2006: Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures. (2006). International Organization for Standardization, Technical Committee ISO/TC 207: Environmental Management-Subcommittee SC 3: Environmental labelling.

¹⁸ ISO 14040:2006: Environmental Management – Life Cycle Assessment – Principles and Framework. (2006). International Organization for Standardization, Technical Committee ISO/TC 207, Environmental management, Subcommittee SC 5, Life cycle assessment.

¹⁹ Ibid.

F. PCR Review

Chapter 4 of the ACLCA *“Guidance for Product Category Rule Development”²⁰* is recommended in whole to guide the PCR review process. Adherence to this PMI guidance document should be a part of this review, as it represents the recommendations of industry.

²⁰ Ingwersen, W., Subramanian, V., (Eds.). (2013). *Guidance for Product Category Rule Development* (1.0 ed.). The Product Category Rule Guidance Development Initiative.