Product Category Rule (PCR) Guidance for Kitchen and Bath Fixture Fittings

INTRODUCTION

This Product Category Rules (PCR) Guidance Document for Kitchen and Bath Fixture Fittings 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 (faucet, fixture fitting, flushometer valve, pot filler, pre-rinse spray valve, shower/tub valve, showerhead, supply fitting, toilet tank, water dispenser, 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 14025:2006[1], 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	2/26/2018		Initial Release	

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 Fixture Fittings" 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 fitting manufacturers, other program operators, PMI members and allied members, and other plumbing fixture fitting 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 6.7.1[5])

Detail following the outline of ISO 14025:2006(E), Section 6.7.1[6] 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 fixture fittings that 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.

[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.

Table 1: Product Category Scope

Product Sub-Category
Bidet faucet
Commercial pre-rinse spray valve
Flushometer valve – toilet (single flush)
Flushometer valve – toilet (dual flush)
Flushometer valve – urinal
Hot and/or cold-water dispenser (private use)
Hot and/or cold-water dispenser (public use)
Kitchen faucet (commercial/restaurant use)
Kitchen faucet (private use)
Laboratory faucet
Laundry sink faucet (private use)
Medical sink faucet
Pot filler (private use)
Public lavatory faucet (manual)
Public lavatory faucet (metering)
Public lavatory faucet (self-closing)
Residential lavatory faucet (manual)
Residential lavatory faucet (metering)
Residential lavatory faucet (self-closing)
Service sink faucet (public use)
Shower/tub valve
Showerhead (institutional use)
Showerhead (private use)
Toilet tank (single flush)
Toilet tank (dual flush)

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
Bidet faucet	A fitting designed for use on a bidet fixture.
Commercial pre-rinse spray valve	Handheld device that has a release to close valve and is suitable for removing food residue from food service items before cleaning them in commercial dishwashing and ware washing equipment.
Flushometer valve – toilet (single flush)	A flushing device attached to a pressurized water supply pipe that, when actuated, opens the pipe for direct flow into the toilet at a rate and in a quantity that enables proper operation of the toilet. The valve then gradually closes to provide trap reseal in the toilet and avoid water hammer.
Flushometer valve – toilet (dual flush)	A flushing device incorporating a feature that allows the user to flush the water closet with either a reduced or a full volume of water, and is attached to a pressurized water supply pipe that, when actuated, opens the pipe for direct flow into the toilet at a rate and in a quantity that enables proper operation of the toilet. The valve then gradually closes to provide trap reseal in the toilet and avoid water hammer.
Flushometer valve – urinal	A flushing device attached to a pressurized water supply pipe that, when actuated, opens the pipe for direct flow into the urinal at a rate and in a quantity that enables proper operation of the urinal. The valve then gradually closes to provide trap reseal in the urinal and avoid water hammer.
Hot and/or cold-water dispenser (private use)	A fitting, intended to be installed for private-use, that is manually controlled by the user for dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fitting is connected to the potable water distribution system of the premises.
Hot and/or cold-water dispenser (public use)	A fitting, intended to be installed for public-use, that is manually controlled by the user for dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fitting is connected to the potable water distribution system of the premises.
Kitchen faucet (commercial/restaurant use)	A fitting designed for discharge into a commercial or restaurant kitchen sink.
Kitchen faucet (private use)	A fitting designed for discharge into a kitchen or bar sink and intended to be installed for private-use.
Laboratory faucet	A fitting designed for discharge into a laboratory sink.
Laundry sink faucet (private use)	A fitting designed for discharge into a laundry sink and intended to be installed for private-use.
Medical sink faucet	A fitting designed for discharge into a medical sink.
Pot filler (private use)	A fitting designed for discharge into a pot or other cooking vessel and intended to be installed for private-use.
Public lavatory faucet (manual)	A fitting designed for discharge into a lavatory, that requires the user to control the flow water, and intended to be installed in non-residential bathrooms that are exposed to walk-in traffic.

Table 2: Functional Unit by Product Sub-Category (continued)

Product Sub-Category	Functional Unit and Differentiation
Public lavatory faucet (metering)	A fitting designed for discharge of a specific volume of water into a lavatory that is turned on mechanically or electronically, and intended to be installed in non-residential bathrooms that are exposed to walk-in traffic. The volume or cycle duration can be fixed or adjustable.
Public lavatory faucet (self-closing)	A fitting designed for discharge into a lavatory that closes itself after the actuation or control mechanism is deactivated and intended to be installed in non-residential bathrooms that are exposed to walk-in traffic.
Residential lavatory faucet (manual)	A fitting designed for discharge into a lavatory, that requires the user to control the flow water, and intended to be installed in bathrooms that are not exposed to walk-in traffic.
Residential lavatory faucet (metering)	A fitting designed for discharge of a specific volume of water into a lavatory that is turned on mechanically or electronically, and intended to be installed in bathrooms that are not exposed to walk-in traffic. The volume or cycle duration can be fixed or adjustable.
Residential lavatory faucet (self-closing)	A fitting designed for discharge into a lavatory that closes itself after the actuation or control mechanism is deactivated and intended to be installed in bathrooms that are not exposed to walk-in traffic.
Service sink faucet (public use)	A fitting designed for discharge into a service sink and intended for non-residential use.
Shower/tub valve	A fitting with a movable part that regulates the flow of water through one or more passages and intended for use in a tub, shower or tub/shower installation.
Showerhead (institutional use)	A device for spraying water onto a bather, typically from an overhead position, and intended to be installed for institutional-use including such facilities, but not limited to, correctional, healthcare and fitness.
Showerhead (private use)	A device for spraying water onto a bather, typically from an overhead position, and intended to be installed for private-use.
Toilet tank (single flush)	A vessel containing a device located above or integral with a toilet that delivers a fixed volume of water for flushing the fixture.
Toilet tank (dual flush)	A vessel containing a device located above or integral with a toilet that delivers a volume of water for flushing the fixture, and incorporates a feature that allows the user to flush with either a reduced or a full volume of water.

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.	
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.	
Include an analysis of product use-phase as specified in Table 5.	

iii. Description of data:

Specify the product sub-category and functional unit, including differentiation. The product sub-category options are found in Table 2, as is a description of the functional unit at its most basic level. Further differentiation may be necessary to allow for valid product comparisons. Examples include flow rate, special characteristics such as enhanced durability dictated by end-use requirements and conformance to a specific code, regulation or standard (e.g. ADA, EPA WaterSense).

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.

[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.

v. Data quality requirements:

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 14048[9]. 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.

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

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.

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*[10]" 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*[11]" 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

[10] Ingwersen, W., Subramanian, V., (Eds.). (2013). Guidance for Product Category Rule Development (1.0 ed.). The Product Category Rule Guidance Development Initiative.
[11] Ibid.

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:

Table 4: Product Cleaning Assumptions*

Product Sub-Category	Cleaning Product**
Bidet faucet	10 ml of 1% sodium lauryl sulfate solution
Commercial pre-rinse spray valve	10 ml of 1% sodium lauryl sulfate solution
Flushometer valve – toilet (single flush)	10 ml of 1% sodium lauryl sulfate solution
Flushometer valve – toilet (dual flush)	10 ml of 1% sodium lauryl sulfate solution
Flushometer valve – urinal	10 ml of 1% sodium lauryl sulfate solution
Hot and/or cold-water dispenser (private use)	10 ml of 1% sodium lauryl sulfate solution
Hot and/or cold-water dispenser (public use)	10 ml of 1% sodium lauryl sulfate solution
Kitchen faucet (commercial/restaurant use)	10 ml of 1% sodium lauryl sulfate solution
Kitchen faucet (private use)	10 ml of 1% sodium lauryl sulfate solution
Laboratory faucet	10 ml of 1% sodium lauryl sulfate solution
Laundry sink faucet (private use)	10 ml of 1% sodium lauryl sulfate solution
Medical sink faucet	10 ml of 1% sodium lauryl sulfate solution
Pot filler (private use)	10 ml of 1% sodium lauryl sulfate solution
Public lavatory faucet (manual)	10 ml of 1% sodium lauryl sulfate solution
Public lavatory faucet (metering)	10 ml of 1% sodium lauryl sulfate solution
Public lavatory faucet (self-closing)	10 ml of 1% sodium lauryl sulfate solution
Residential lavatory faucet (manual)	10 ml of 1% sodium lauryl sulfate solution
Residential lavatory faucet (metering)	10 ml of 1% sodium lauryl sulfate solution
Residential lavatory faucet (self-closing)	10 ml of 1% sodium lauryl sulfate solution
Service sink faucet (public use)	10 ml of 1% sodium lauryl sulfate solution
Shower/tub valve	10 ml of 1% sodium lauryl sulfate solution
Showerhead (institutional use)	10 ml of 1% sodium lauryl sulfate solution
Showerhead (private use)	10 ml of 1% sodium lauryl sulfate solution
Toilet tank (single flush)***	10 ml of 1% sodium lauryl sulfate solution
Toilet tank (dual flush)***	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.

***Cleaning assumptions apply to the exterior of the tank.

The following table provides an analysis of product use-phase for each product sub-category addressed by this guidance document:

Table 5: Product Use-Phase

Product	Use Data	Assumptions/Notes
Bidet faucet	1. Manufacturing Impact	
	2. Per Use Impact • Flow Rate (GPM): product defined • Duration (minutes/use): 0.58 mins • Hot water use/day: product defined • Cold water use/day: product defined	• Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement).
	3. Average Lifetime Impact • Number of users/product: 2 • Uses/day: 2 • Use days/year: 365 • Useful Life: 20 years	• Users/product: 2.67 people/home with the assumption that not all would use the bidet (**Source:** U.S. Census). • USGBC LEED estimates residential toilet flushes = 5.05 flushes/person/day. The assumption is a bidet is used less than half of those times. • Residential use is 365 days a year and 20 years.
Commercial pre-rinse spray valve	1. Manufacturing Impact	
	2. Per Use Impact • Flow Rate (GPM): product defined • Hot water use/day: 100%	• **Source:** DOE - 10 CFR 429 and 431. • Water heating consumes 0.24 kWh of electricity per gallon or 0.0009106 Mcf of natural gas per gallon of water heated (**Source:** EPA WaterSense® Specification for Commercial Pre-Rinse Spray Valves Supporting Statement). • 59% of establishments use natural gas to heat their water, 34% use electricity to heat their water (**Source:** EPA WaterSense® Specification for Commercial Pre-Rinse Spray Valves Supporting Statement).
	3. Average Lifetime Impact • Minutes used/day: 64 • Use days/year: 344 • Useful Life: 5 years	• **Source:** EPA WaterSense® Specification for Commercial Pre-Rinse Spray Valves Supporting Statement.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Flushometer valve - Urinal	1. Manufacturing Impact 2. Per Use Impact • Flush Volume (GPF): product defined • Cold water use/day: 100% 3. Average Lifetime Impact • Number of users/product: 30 • Uses/day: 2 • Use days/year: 260 • Useful Life: 10 years	• **Sources:** EPA WaterSense® Specification for Flushing Urinals; DOE - 10 CFR 430.32(r); CEC Title 20 – Section 1605.3 (Table I-2). • Estimated that the average urinal is flushed 18 times/ day (**Sources:** EPA WaterSense® Specification for Flushing Urinals Supporting Statement; U.S. Department of Labor Statistics; and Amy Vickers, Handbook of Water Use and Conservation, Water Plow Press, 2001). • Assumption is based on urinals/person for a business occupancy, it is 100/per person, so 50 males and conservatively 30 (**Source:** 2015 Uniform Plumbing Code). • The frequency of urinal flushing by males in office lavatories is estimated to be about two times per workday (**Source:** Amy Vickers, Handbook of Water Use and Conservation, Water Plow Press, 2001). • USGBC LEED assumes 2 uses per day per person (if a toilet is present). • Savings assume that urinals are typically used 260 days per year (**Sources:** EPA WaterSense® Specification for Flushing Urinals Supporting Statement; U.S. Department of Labor Statistics; and Amy Vickers, Handbook of Water Use and Conservation, Water Plow Press, 2001). • Commercial use is 260 days a year and 10 years.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Flushometer valve – Toilet (Single Flush)	1. Manufacturing Impact 2. Per Use Impact • Flush Volume (GPF): product defined • Cold water use/day: 100% 3. Average Lifetime Impact • Number of users/product: 30 • Uses/day: 2 • Use days/year: 260 • Useful Life: 10 years	• Commercial Use Only. • **Sources:** DOE - 10 CFR 430.32(q) and EPA WaterSense® Specification for Flushometer-Valve Water Closets. • Number of users/product: o Male: ▪ Business (B) – 1 per 50 ▪ Assembly (A-1) – 1 per 100 ▪ Education (E) – 1 per 50 o Female: ▪ Business (B) – 1 per 15 ▪ Assembly (A-1) – 1 per 25 ▪ Education (E) – 1 per 30 o Take a conservative average of 30 users/product. o Average out 3 uses/female and 2 uses/male = 2 uses/day (**Source:** 2015 Uniform Plumbing Code). • **Source:** Handbook of Water Use and Conservation, Amy Vickers, Handbook of Water Use and Conservation, Water Plow Press, 2001, p26. • Commercial use is 260 days a year and 10 years.
Flushometer valve – Toilet (Dual Flush)	1. Manufacturing Impact 2. Per Use Impact • Flush Volume (GPF): product defined using a basic calculation for 'equivalent flush' ratio 2:1 • Cold water use/day: 100% 3. Average Lifetime Impact • Number of users/product: 30 • Uses/day: 3 • Use days/year: 260 • Useful Life: 10 years	• Commercial Use Only. • **Sources:** DOE - 10 CFR 430.32(q) and EPA WaterSense® Specification for Flushometer-Valve Water Closets. • Users/product: **See:** "Flushometer valve – Toilet (Single Flush)." • The male/female ratio is accounted for in the 2:1 ratio. • Commercial use is 260 days a year and 10 years.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Hot and/or cold-water dispenser (i.e. beverage faucet, filtration faucet) – Private Use	1. Manufacturing Impact 2. Per Use Impact • Volume: 8 oz • Hot water use/day: 70% • Cold water use/day: 30% 3. Average Lifetime Impact • Uses/day: 5 • Use days/year: 365 • Useful Life: 20 years	• Use-phase assumption(s): (1) 8-ounce cup. • Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • Use-phase assumption(s): 1 hot, 3 colds = 2 times average. • Uses/day: 2.67 people * 2 = 5.34 = 5. • Residential use is 365 days a year and 20 years.
Hot and/or cold-water dispenser (i.e. beverage faucet, filtration faucet) – Public Use	1. Manufacturing Impact 2. Per Use Impact • Volume: 8 oz • Hot water use/day: 70% • Cold water use/day: 30% 3. Average Lifetime Impact • Uses/day: 60 • Use days/year: 260 • Useful Life: 10	• Use-phase assumption(s): (1) 8-ounce cup. • Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • Uses/day: 30 people * 2 = 60 • Commercial use is 260 days a year and 10 years.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Kitchen faucet – Commercial/ Restaurant Use	1. Manufacturing Impact 2. Per Use Impact • Flow Rate (GPM): product defined • Hot water use/day: 100% 3. Average Lifetime Impact • Minutes used/day: 240 • Use days/year: 344 • Useful Life: 5 years	• Commercial/restaurant kitchen faucets are not regulated by DOE. • Water heating consumes 0.24 kWh of electricity per gallon or 0.0009106 Mcf of natural gas per gallon of water heated (**Source:** EPA WaterSense® Specification for Commercial Pre-Rinse Spray Valves Supporting Statement). • 59% of establishments use natural gas to heat their water, 34% use electricity to heat their water (**Source:** EPA WaterSense® Specification for Commercial Pre-Rinse Spray Valves Supporting Statement). • Uses/day: 4 hours. • Use days for a restaurant is more than a generic commercial application (**Source:** EPA WaterSense® Specification for Commercial Pre-Rinse Spray Valves Supporting Statement).

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Kitchen faucet - Private Use	1. Manufacturing Impact	
	2. Per Use Impact • Flow Rate (GPM): product defined • Duration (minutes/use): 0.62 mins • Hot water use/day: 70% • Cold water use/day: 30%	• **Sources:** CEC Title 20 – Section 1605.3 (Table H-3); DOE - 10 CFR 430.32(o). • Most events average 12 seconds per event/0.45 gallons per event. • There are 41.6 kitchen faucet events per day at 37 seconds/event = 0.62 minutes (**Source**: CASE Initiative for PY 2013: Title 20 Standards Development – Analysis of Standards Proposal for Residential Faucets and Faucet Accessories). • Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement).
	3. Average Lifetime Impact • Uses/day: 42 • Use days/year: 365 • Useful Life: 20 years	• There are 41.6 kitchen faucet events per day at 37 seconds/event = 0.62 minutes (**Source**: CASE Initiative for PY 2013: Title 20 Standards Development – Analysis of Standards Proposal for Residential Faucets and Faucet Accessories). • Residential use is 365 days a year and 20 years.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Laboratory faucet	1. Manufacturing Impact	
	2. Per Use Impact • Flow Rate (GPM): product defined • Duration (minutes/use): 0.62 mins • Hot water use/day: 70% • Cold water use/day: 30%	• Laboratory faucets are not regulated by DOE. • Use-phase assumption(s): **See:** "Kitchen faucet - Private Use."
	3. Average Lifetime Impact • Uses/day: 42 • Use days/year: 260 • Useful Life: 10	• Use-phase assumption(s): **See:** "Kitchen faucet - Private Use." • Commercial use is 260 days a year and 10 years.
Laundry sink faucet – Private use	1. Manufacturing Impact	
	2. Per Use Impact • Flow Rate (GPM): product defined • Duration (minutes/use): 2.5 mins • Hot water use/day: 70% • Cold water use/day: 30%	• Laundry sink faucets are not regulated by DOE. • Consumption is based on filling a basin and small amounts of rinsing. • Assume typical filling of basin is 4 gallons with 1 gallon to rinse = 5 gallons total. Average utility faucet is 2.2gpm = duration would be 2.5 mins. • Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement).
	3. Average Lifetime Impact • Uses/day: 1 • Use days/year: 365 • Useful Life: 20 years	• Uses/day: Average household washes 300 loads/year, which is 1.2 loads/day. Round down to 1 to be conservative on the usage (**Source:** Energy Star – Clothes Washers). • Residential use is 365 days a year and 20 years.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Medical sink faucet	1. Manufacturing Impact 2. Per Use Impact • Flow Rate (GPM): product defined • Duration (minutes/use): 0.62 mins • Hot water use/day: 70% • Cold water use/day: 30% 3. Average Lifetime Impact • Uses/day: 42 • Use days/year: 260 • Useful Life: 10	 • Medical sink faucets are not regulated by DOE. • Use-phase assumption(s): **See:** "Kitchen faucet - Private Use." • Use-phase assumption(s): **See:** "Kitchen faucet - Private Use." • Commercial use is 260 days a year and 10 years.
Pot filler – Private Use	1. Manufacturing Impact 2. Per Use Impact • Volume: 0.5 gallons • Hot water use/day: 0% • Cold water use/day: 100% 3. Average Lifetime Impact • Uses/day: 0.5 • Use days/year: 365 • Useful Life: 20	 • Use-phase assumption(s): 4-quart pot each time, filled halfway. • Uses/day: 4-quart pot filled every other day. • Residential use is 365 days a year and 20 years.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Public lavatory faucet – Manual	1. Manufacturing Impact 2. Per Use Impact • Flow Rate (GPM): product defined • Duration (minutes/use): 10 secs • Hot water use/day: 70% • Cold water use/day: 30% 3. Average Lifetime Impact • Uses/day: 3 * 30 = 90 • Use days/year: 260 • Useful Life: 10 years	• Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • Use-phase assumption(s): **See:** "Flushometer valve – Toilet (Single Flush)." • Commercial use is 260 days a year and 10 years.
Public lavatory faucet – Metering	1. Manufacturing Impact 2. Per Use Impact • Flow Rate (GPM): product defined • Duration (minutes/use): 0.25mins • Hot water use/day: 70% • Cold water use/day: 30% 3. Average Lifetime Impact • Uses/day: 3 * 30 = 90 • Use days/year: 260 • Useful Life: 10 years	• **Sources:** DOE - 10 CFR 430.32(o) and CEC Title 20 – Section 1605.1 (Table H-1). • Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • Use-phase assumption(s): **See:** "Flushometer valve – Toilet (Single Flush)." • Commercial use is 260 days a year and 10 years.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Residential lavatory faucet	1. Manufacturing Impact	
	2. Per Use Impact • Flow rate: product defined • Time used: 10 seconds • Hot water use/day: 70% • Cold water use/day: 30%	• **Sources:** DOE - 10 CFR 430.32(o); EPA WaterSense® High-Efficiency Lavatory Faucet Specification; and CEC Title 20 – Section 1605.3 (Table H-3). • Most events are around 6 – 10 seconds per event / 0.25 – 0.5 gallons per event for 8 seconds average. • Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement).
	3. Average Lifetime Impact • Uses/day: 18 • Use days/year: 365 • Useful Life: 20 years	• Uses/day: 7 times a day (5 hand washes due to toilet use per USGBC LEED plus 2 extra for brushing teeth). In summary, 7 x 2.56 people = 17.92 = 18. • Residential use is 365 days a year and 20 years.
Residential lavatory faucet accessory (i.e. flow restrictors, aerators, laminar devices)	• **See:** "Residential lavatory faucet"	• **See:** "Residential lavatory faucet"

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Service sink faucet (i.e. mop sink faucet) - Public	1. Manufacturing Impact 2. Per Use Impact • Volume: 5 gallons • Hot water use/day: 70% • Cold water use/day: 30% 3. Average Lifetime Impact • Uses/day: 1 • Use days/year: 260 • Useful Life: 20 years	• Use-phase assumption(s): 5-gallon bucket. • Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • Use-phase assumption(s): 5-gallon bucket. • Commercial use is 260 days a year and 10 years.
Shower/tub valve	• **See:** "Showerhead – Institutional Use" and "Showerhead – Private Use."	• **See:** "Showerhead – Institutional Use" and "Showerhead – Private Use."

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Showerhead – Institutional Use	1. Manufacturing Impact	
	2. Per Use Impact • Flow rate: product defined • Time used: 8 minutes • Hot water use/day: 70% • Cold water use/day: 30%	• **Sources:** DOE - 10 CFR 430.32(p). • Using USGBC LEED assumption of 8 minutes. • Use-phase assumption(s) for hot water: 100°F - 55% summer/59% winter / 105°F - 62% summer/65% winter. • Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement).
	3. Average Lifetime Impact • Uses/day: 2 • Use days/year: 365 • Useful Life: 10 years	• Uses/day: Depends on type of institution. For example, a dorm could be used by 50+ people, a retirement facility could be used by 1 person. Therefore, assume an average household of 2.67 people/home. 1 use per person * 2.67 people. Round down to 2 (**Source:** U.S. Census). • Assume 365 days a year, but showerheads are replaced more often so use 10 years.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Showerhead – Private Use	1. Manufacturing Impact	
	2. Per Use Impact • Flow rate: product defined • Time used: 8 minutes • Hot water use/day: 70% • Cold water use/day: 30%	• **Sources:** DOE - 10 CFR 430.32(p); EPA WaterSense® Specification for Showerheads; and CEC Title 20 – Section 1605.3 (Table H-5). • Using USGBC LEED assumption of 8 minutes. • Use-phase assumption(s) for hot water: 100°F - 55% summer/59% winter / 105°F - 62% summer/65% winter. • Water heating consumes 0.1765 kWh of electricity per gallon or 0.8784 Mcf of natural gas per 1,000 gallons (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement). • 40% of occupied US residences heat their water using electricity, 56% use natural gas (**Source:** EPA WaterSense® High-Efficiency Lavatory Faucet Specification Supporting Statement).
	3. Average Lifetime Impact • Uses/day: 2 • Use days/year: 365 • Useful Life: 10	• Uses/day: An average household of 2.67 people/home. 1 use per person * 2.67 people. Round down to 2 (**Source:** U.S. Census). • Assume 365 days a year, but showerheads are replaced more often so use 10 years.

Table 5: Product Use-Phase (continued)

Product	Use Data	Assumptions/Notes
Toilet tank – Single flush	1. Manufacturing Impact 2. Per Use Impact • Flush Volume (GPF): product defined • Cold water use/day: 100% 3. Average Lifetime Impact • Uses/day: 13 • Use days/year: 365 • Useful Life: 20 years	• **Sources:** DOE - 10 CFR 430.32(q); EPA WaterSense® Specification for Tank-Type Toilets; Peter W. Mayer and William B, DeOreo, Residential End Uses of Water, Aquacraft, Inc., Water Engineering and Management, American Water Works Association, 1998. p. 94; and Alliance for Water Efficiency, Commercial Restroom Water Audits. • Uses/day: An average household of 2.67 people/home. 1 use per person * 2.67 people. (**Source:** U.S. Census). Therefore, 5.05 uses/person * 2.67 people = 13.48. Round down to 13. • Residential use is 365 days a year and 20 years.
Toilet tank – Dual flush	1. Manufacturing Impact 2. Per Use Impact • Effective Flush Volume (GPF): product defined, 2:1 ratio • Cold water use/day: 100% 3. Average Lifetime Impact • Uses/day: 13 • Use days/year: 365 • Useful Life: 20 years	• **Sources:** DOE - 10 CFR 430.32(q) and EPA WaterSense® Specification for Tank-Type Toilets • Uses/day: An average household of 2.67 people/home. 1 use per person * 2.67 people. (**Source:** U.S. Census). Therefore, 5.05 uses/person * 2.67 people = 13.48. Round down to 13. • Residential use is 365 days a year and 20 years.

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

Table 6: 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 7.2.1[12])

Detail following the outline of ISO 14025:2006(E), Section 7.2.1[13] 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:

      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.

   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.

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[12] 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.
[13] Ibid.

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*[14]" 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.

l. Information on where explanatory material may be obtained.

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

E. Type III Environmental Declarations Based on Information Modules (ISO 14025:2006(E), Section 7.2.5[15])

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 14040[16] are fulfilled.

   In addition to fulfilling the LCA requirements of the ISO 14040[17], 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.

[15] 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.
[16] 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.
[17] Ibid.

F. PCR Review

Chapter 4 of the ACLCA "*Guidance for Product Category Rule Development*[18]" 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.

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