

# PCR Guidance for Building-Related Products and Services

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From the range of Environmental Product Declarations of  
UL Environment

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## Part B: Processed Glass EPD Requirements

[www.ul.com/businesses/environment](http://www.ul.com/businesses/environment)





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## Editor's Note:

This Product Category Rule (PCR) is based on revisions made to the Institute of Construction and Environment (Institut Bauen und Umwelt e.V., or IBU) standard Part B PCR structure for Glass Wall and Ceiling Coverings, 2014. Revisions/discussion points to make this PCR applicable to North America include: inclusion of references applicable to the NA market.

The revisions are not modifications to the overall methodology or structure of the IBU PCR, but are intended to reflect practices, methods and requirements that are specific to North America.

This PCR is valid for a period of five (5) years, set to expire in November 2020.

## Acknowledgements

This Part B has been prepared with input from the following organizations:

- Cardinal Glass
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## Scope

This document contains the **Requirements on an Environmental Product Declaration (EPD)** from the range of Environmental Product Declarations published by UL Environment (ULE) in coordination with the EN 15804 standard. The scope of this PCR covers processed and coated glass used in building applications, such as doors, walls, partitions, elevators, surfaces, and in building envelope contexts. While not specifically excluded, not all potential glass finishing processes are included in this PCR.

The system boundaries of EPDs created using this PCR are cradle-to-gate. Installation, use phase, and end of life modules (A4, A5, B1-B7, C1-C4, and D) may not be reported in EPDs created using this PCR and are explicitly excluded. This PCR uses a declared unit on the basis of a cradle-to-gate system boundary instead of a functional unit. Processed glass may be installed and utilized in a variety of applications which are beyond the scope of consideration in this PCR.

The document applies to:

Processed/coated glass, including heat-treated, insulating, and laminated glass used in building applications, used in both building envelope and installed interior building applications. These products map to Construction Specifications Institute (CSI) MasterCode 08810.

Processed glass includes float glass that has undergone the following processing techniques (in combination or in isolation):

- 1) Coating<sup>1</sup>
  - a) Coatings deposited using vacuum-based processes (e.g., sputter deposition, evaporation, etc.)
  - b) Other coating deposition processes, including but not limited to wet-chemical solution chemistry processes, electro-less deposition, and electrodeposition
  - c) Pyrolytic
  - d) Chemical Vapor Deposition (CVD)
  - e) Ceramic enamel, roll coated
  - f) Ceramic enamel, screen printed
  - g) Elastomeric opacifier coating, rolled or sprayed
  - h) Mirrors
  - i) Sol-gel coating processes
  - j) Other (e.g. silicone spandrel coatings)
- 2) Laminating (Used to create products with UNSPSC Code 30171705 - Laminated Glass; includes at least one glass lite)
  - a) Fire rated
  - b) Glass clad polycarbonate
  - c) Interlayers (PVB, EVA, Ionomer, Resin, Intumescent gel, Composites, etc.)
  - d) Colored interlayers
  - e) Designed or printed interlayers
- 3) Heat treated (Used to create products with UNSPSC Code 30171706 – Tempered Glass)
  - a) Heatstrengthened
  - b) Tempered
  - c) Firerated
- 4) Insulating glass unit (IGU) – may incorporate coated, laminated, heat treated glass with air space(s), gas filled space(s) or evacuated space(s).  
(Products with UNSPSC Code 30171710 - Insulating Glass)

<sup>1</sup> Includes dynamic glazing product made with one or more of the processes listed in 1-5.



- 5) Mechanically or chemically processed or fabricated glass (e.g. edging, bending, etching, drilling, notching, cutting, polishing, etc.)
- 6) Combined products of processing elements listed in 1-5

Other PCRs considered in the development of this PCR include:

- GANA PCR for Flat Glass UN CPC 3711, 2014, NSF
- Windows PCR, 2015, IERE
- Part B Glass Wall and Ceiling Coverings, 2014, IBU

Efforts have been made to reconcile this PCR with existing PCRs covering flat glass, so that processing steps are considered an extension of previous efforts.

The EPD requirements include:

- Requirements of the EN 15804 standard as a European core EPD for the purpose of consistency between declarations in Europe and the United States.
- Requirements of the ULE General Program Instructions v 2.0, April 2015 (available upon request)
- The calculation rules for the Life Cycle Assessment and Requirements on the Background Report are specified in a separate document as Part A of the Product Category Rules, available at <http://industries.ul.com/environment/transparency/product-category-rules-pcrs>

## PCR Guidance: Application of PCR to Product System

- Processed glass requires an input of flat or float glass, which is calculated and reported separately as a declared unit using a separate PCR, the GANA PCR for Flat Glass UN CPC 3711, 2014, NSF.
- To report and combine previous results from a specific LCA and EPD for flat glass with this PCR, flat glass results shall be normalized and reported on the basis of the declared unit utilized in this PCR.

To convert a metric ton of a given thickness of soda-lime float glass to m<sup>2</sup>, use the following equation<sup>2</sup>:

$$A = 400/t$$

Where

A = Surface area (m<sup>2</sup>)

t = Glass thickness (mm)

- Float glass declared unit results shall be reported both separately for module A1 and on an aggregated basis with other processed glass material inputs.
- If included, the flat glass EPD declaration holder, number, declared product, and referenced PCR shall also be referenced on the General Information declaration page
- The processed glass system results shall aggregate the component results for one declared system unit. An EPD on the basis of a declared unit is mandatory (cradle-to-gate).

Rules for the background report, including but not limited to: data quality requirements, cut-off criteria, inventory analysis (data collection, calculation, and allocation), and rules for creating the EPD shall be consistent with the referenced PCRs.

<sup>2</sup> This equation assumes a glass density of 2500 kg/m<sup>3</sup> for glass, as referenced in the GANA Guide to Architectural Glass.



## EPD content, format, and use requirements

**The chapters of the EPDs** shall be described in a compact form, as well as factually and technically correct. Judgmental, comparative, or promotional texts are not permitted unless specifically requested in the PCR or if necessary in the context of the EPD. Each document is carefully checked before publication.

**Content of EPD.** An EPD created using this PCR shall contain the required content specified in UL Environment's "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report" in addition to the required content identified in this Part B document, which serves as a reporting template.

**Extent of an EPD.** An EPD may contain multiple data sets representative of a collection of products, as long as each product is uniquely identified either explicitly in the EPD, by product category or by reference to a document that lists all models included. For example, the base model of a carpet available in a variety of colors may be listed by: each individual model number, a model classification that includes all colors, a range of model numbers, or a reference to a catalog of model numbers that include all color variations.

**Verification.** An EPD created using this PCR shall be independently verified through a Program Operator acting in conformance with ISO 14025. The project report shall also be available for independent verification by a Program Operator as required in "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," Section 3.

**Validity.** An EPD created using this PCR is valid for a five (5) year period from the date of issue.

**Comparability.** EPDs shall not contain statements of the superiority of one product over a competitor's product that performs the same functions, or of one manufacturer against another. EPDs shall not contain directly or indirectly such comparative assertions.

The following ISO statements indicate the EPD comparability limitations and intent to avoid any market distortions or misinterpretation of EPDs based on this PCR. ISO 14025, section 7.2.1 requires this statement be included: "Environmental declarations from different programs may not be comparable".

A statement shall be included that indicates, "comparison of the environmental performance of processed glass using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR".

This statement shall be included: "Full conformance with the PCR for North American Processed Glass allows EPD comparability only when all stages of the processed glass life cycle have been considered, which is not permitted under this PCR. However, variations and deviations are possible". Example of variations: Different Life Cycle Assessment (LCA) software and background Life Cycle Inventory (LCI) datasets may lead to differences in results upstream or downstream of the life cycle stages declared.

The EPD owner shall transparently indicate any comparability limitations.

## Product-group-specific LCA calculation rules from PCR Part A

No product-group-specific LCA calculation rules exist.



## 1. General Information

PROGRAM OPERATOR	UL Provided
DECLARATION HOLDER	UL Provided
DECLARATION NUMBER	UL Provided
DECLARED PRODUCT	
REFERENCE PCR	UL Provided
DATE OF ISSUE	UL Provided
PERIOD OF VALIDITY	UL Provided
CONTENTS OF THE DECLARATION	<p>Product definition and information about building physics</p> <p>Information about basic material and the material's origin</p> <p>Description of the product's manufacture</p> <p>Indication of product processing</p> <p>Information about the in-use conditions</p> <p>Life cycle assessment results</p> <p>Testing results and verifications</p>
The PCR review was conducted by:	UL Provided
	UL Provided
	UL Provided
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories. The UL Environment Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project report, based on CEN Norm EN 15804, serves as the core PCR. <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	UL Provided
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	UL Provided
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	UL Provided



## 2. Product System Documentation

### 2.1. PRODUCT DESCRIPTION

The declared products shall be described. If averages are declared across various products, the average breakdown and variation between products shall be explained. The product shall be described according to the specific process(es) and coating(s) used to manufacture and outlined in the Scope section. If applicable, the type and composition of the interlayer shall be included as part of the description (e.g., PVB, EVA, nylon monomer, acrylic, etc.). For an IGU, all layers shall be described and percent mass composition shall be reported, including but not limited to: glass, spacer, desiccant, primary sealant, secondary sealant, and interlayer materials.

### 2.2. APPLICATION

The designated application for the referenced products shall be specified.

### 2.3. TECHNICAL DATA

If relevant for the declared product, technical construction data may be provided with reference(s) to the test standard(s).

### 2.4. PLACING ON THE MARKET / APPLICATION RULES

The respective standard and/or general technical approval or comparable national regulation shall be indicated. Standards shall be quoted as illustrated in the examples.

Examples: ASTM 1503: Standard Specification for Flat Glass Mirror; ASTM C1376: Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; ISO 11479: Glass in building – Coated glass

### 2.5. PROPERTIES OF DECLARED PRODUCT AS DELIVERED

The dimensions/quantities of products declared shall be indicated for the product as delivered.

### 2.6. BASE MATERIALS/ANCILLARY MATERIALS

The primary product components and/or materials shall be indicated as a percentage mass to enable the user of the EPD to understand the composition of the product as delivered.

Declaration of material product content shall list at least those substances contained in the product which are included in the product SDS.

Statements of material non-inclusion, such as "... is free of ..." may not be used. Ancillary materials and additives remaining on the product shall also be declared. If additives such as fire retardants, softeners or biocides are used, their functional chemical group shall be indicated.

### 2.7. MANUFACTURE

The manufacturing process shall be described and can be illustrated using a simple graphic. If the EPD applies to several locations, the production processes for all locations shall be described. Reference to quality management systems may be included.

### 2.8. ENVIRONMENT AND HEALTH DURING MANUFACTURING

Measures relating to environmental and health protection during the manufacturing process that exceed local and national regulations and guidelines (of the production country) may be described, e.g., including but not limited to a description of Environmental Management Systems or similar, thermal radiation, microwaves from tempering ovens, possible low frequency RF from electricity, programs addressing air emissions, waste water, noise, etc.

### 2.9. PRODUCT PROCESSING/INSTALLATION

A description of the type of processing, machinery, tools, dust extraction equipment, auxiliary materials, etc. to be used during installation shall be included. Information on industrial and environmental protection as well as measures for reducing noise, dust or other airborne exposures may be included in this section.



## 2.10. PACKAGING

Information on product-specific packaging: type, composition and possible reuse of packaging materials (paper, pallets, foils etc.) shall be included in this section.

## 2.11. CONDITION OF USE

Any relevant information may be provided in this section regarding special product features for the period of use.

## 2.12. ENVIRONMENT AND HEALTH DURING USE

Information should be provided in this section on the relationship between the product, the environment and health; any possible content of harmful substances or emissions. Any recommendations concerning cleaning, maintenance, etc. of the declared product may be listed here.

## 2.13. REFERENCE SERVICE LIFE

As this PCR does not cover the product use stage (modules B1-B7), consideration or reporting of the product reference service life is not applicable.

## 2.14. EXTRAORDINARY EFFECTS

### FIRE

If relevant, information should be included on fire performance. For example: International Code Council (ICC), National Fire Protection Association (NFPA).

### WATER

Information on product performance including possible impacts on the environment following unforeseeable influence of water (e.g.; flooding) should be included.

### MECHANICAL DESTRUCTION

If relevant, information on product performance including possible impacts on the environment following unforeseeable mechanical destruction should be included.

## 2.15. RE-USE PHASE

The possibilities of re-use, recycling and energy recovery shall be described.

## 2.16. DISPOSAL

The possible disposal channels shall be indicated in accordance with North American waste classification and disposal routes.

## 2.17. FURTHER INFORMATION

Optional details, indication of reference source for additional information; e.g., homepage, reference source for safety data sheet.

## 3. LCA Calculation Rules

### 3.1. DECLARED UNIT

The declared unit for processed glass is 1 m<sup>2</sup>. The mass of one piece of the declared product is to be indicated. In addition to the declared unit, the mass reference, the conversion factor to 1 kg, and thickness shall be indicated in the appropriate table as declared in Section 3.3. If an interlayer is included, the percent contribution to total mass shall be included.





Name	Value	Unit
Declared unit		Required: 1 m <sup>2</sup>
Mass per piece		kg
Conversion factor to 1 kg		-
Thickness		mm
Interlayer percent mass		%

### 3.2. SYSTEM BOUNDARY

The EPD shall be specified as cradle-to-gate in scope. The modules considered in the Life Cycle Assessment as per “System boundaries” outlined in section 6.5 of the PCR, Part A: “Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report” shall be described in brief. It shall be apparent as to what processes are considered in what modules.

### 3.3. ESTIMATES AND ASSUMPTIONS

Key assumptions and estimates for interpretation of the Life Cycle Assessment shall be referred to here, provided that they are not dealt with in other sections of 3 “LCA: Calculation rules”. Imperial units may optionally be included in addition to the required SI units.

### 3.4. CUT-OFF CRITERIA

Cut-off criteria as specified per the PCR, Part A:

“Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report,” Section 6.6 shall be used and documented in the EPD and Background Project Report.

### 3.5. BACKGROUND DATA

The sources for background data used shall be provided and selection of data shall follow Part A, Section 7.3 and collection of data shall follow Part A, Section 7.1. Primary life cycle data shall have priority.

If the variability in generic material or process data for any significant material or process leads to large variations in the end result, the manufacturer shall seek to collect primary life cycle inventory data from their suppliers, if available.

### 3.6. DATA QUALITY

An evaluation shall be provided regarding data quality, including primary and background data age, geographic representativeness, technological coverage, and completeness and shall follow the requirements outlined in Part A, Section 7.4.

### 3.7. PERIOD UNDER REVIEW

The period under review and ensuing averages shall be documented.

### 3.8. ALLOCATION

Part A, Section 7.5 shall be used as the basis for allocation decisions, and mass should be used as the primary basis for co-product allocation in this Part B. Allocation methods deemed more appropriate than on the basis of mass may be used but only when justified. The following allocations shall be indicated and reference shall be made to the modules in which they are performed:

- Allocation in the use of recycled and/or secondary raw materials
- Allocation of energy, auxiliary, and operating materials used for individual products in a factory



### 3.9. COMPARABILITY

A comparison or evaluation of EPD data is only possible if all data sets to be compared are 1) created according to EN 15804 and 2) are considered in a whole building context or utilize identical defined use stage scenarios. Given this PCR is cradle to gate in scope, comparisons of EPD data from one product to another are not allowed. Refer to section 5.3 of EN 15804 for further information.

## 4. LCA: Scenarios and additional technical information

No additional scenario or module technical information is required for cradle-to-gate EPDs using this PCR.

## 5. LCA: Results

In Table 1 "Description of the system boundary", all declared modules shall be indicated with an "X" (included in LCA); all modules that are not declared shall be indicated with "MND" (module not declared). In the following tables 2, 3, 4 and 5, columns may be deleted for modules that are not declared. Indicator values shall be declared with three significant digits (eventually exponential form (e.g., 1.23E-5 = 0.0000123)). A uniform format shall be used for all values of one indicator. If several modules are not declared and therefore have been deleted from the table, the abbreviations for the indicators can be replaced by the complete names, while the readability and clear arrangement shall be preserved; the legends can then be deleted.

Per Part A, TRACI impacts shall be reported to insure a North American context. Although not required for NA registered EPDs, to achieve conformance with EN 15804 and the mutual recognition program with UL Environment and the German Institute for Construction & Environment's (IBU) Part A PCR, CML impacts may optionally be reported.

**Table 1. Description of the system boundary modules**

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)																		
EPD types	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS	RSL
	RAW MATERIAL SUPPLY	TRANSPORT	MANUFACTURING	TRANSPORT FROM GATE TO SITE	ASSEMBLY/INSTALL	USE	MAINTENANCE	REPAIR	REPLACEMENT	REFURBISHMENT	OPERATIONAL ENERGY USE	OPERATIONAL WATER USE	DECONSTRUCTION	TRANSPORT	WASTE PROCESSING	DISPOSAL	REUSE, RECOVERY, RECYCLING POTENTIAL	
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Cradle to gate – declared unit	Mandatory																	Not required

## LIFE CYCLE ENVIRONMENTAL IMPACT RESULTS: [INDICATE DECLARED UNIT AND PRODUCT]

**Table 2. North American LCA Environmental Impact Results**

TRACI 2.1 Impact Assessment, October 2013 (with exception of ADP elements)			
Parameter	Parameter	Unit	
GWP	Global warming potential	[kg CO <sub>2</sub> -Eq.]	
ODP	Stratospheric ozone layer depletion potential	[kg CFC-11 Eq.]	



AP	Acidification potential	[kg SO <sub>2</sub> -Eq.]	
EP	Eutrophication potentials	[kg N-Eq.]	
POCP	Photochemical ozone creation potential	[kg O <sub>3</sub> -Eq.]	
ADP elements	Abiotic resource depletion potential – minerals	[kg Fe Eq., per ReCiPe 2008]	
ADP fossil fuels	Abiotic resource depletion potential – fossil fuels	Surplus energy per extracted MJ, kg or m3 fossil fuel, as a result of lower quality resources	

**Table 3. EU and ROW Life Cycle Environmental Impact Results**

CML 4.1 Impact Assessment (per EN 15804:2012 + A1:2013)			
Parameter	Parameter	Unit	
GWP	Global warming potential	[kg CO <sub>2</sub> -Eq.]	
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC-11 Eq.]	
AP Air	Acidification potentials for air emissions	[kg SO <sub>2</sub> -Eq.]	
EP	Eutrophication potentials	[kg (PO <sub>4</sub> ) <sup>3-</sup> Eq.]	
POCP	Formation potential of tropospheric ozone	[kg ethene Eq.]	
ADP elements	Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	
ADP fossil fuels	Abiotic depletion potential for fossil resources	[MJ, LHV]	



**Table 4. LCA Results: Resource Use**

LCA RESULTS - RESOURCE USE [INDICATE DECLARED UNIT AND PRODUCT]			
Parameter	Parameter	Unit	
PERE	Renewable primary energy as energy carrier	[MJ, LHV]	
PERM	Renewable primary energy resources as material utilization	[MJ, LHV]	
PERT	Total use of renewable primary energy resources	[MJ, LHV]	
PENRE	Non-renewable primary energy as energy carrier	[MJ, LHV]	
PENRM	Non-renewable primary energy as material utilization	[MJ, LHV]	
PENRT	Total use of non-renewable primary energy resources	[MJ, LHV]	
SM	Use of secondary material	[MJ, LHV]	
RSF	Use of renewable secondary fuels	[MJ, LHV]	
NRSF	Use of non-renewable secondary fuels	[MJ, LHV]	
FW	Use of net fresh water	[m <sup>3</sup> ]	
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water		

**Table 5. LCA Results: Output Flows and Waste Categories**

LCA RESULTS: OUTPUT FLOWS AND WASTE CATEGORIES [INDICATE DECLARED UNIT AND PRODUCT]			
Parameter	Parameter	Unit	
HWD	Hazardous waste disposed	[kg]	
NHWD	Non-hazardous waste disposed	[kg]	
RWD	Radioactive waste disposed	[kg]	
CRU	Components for re-use	[kg]	
MFR	Materials for recycling	[kg]	
MER	Materials for energy recovery	[kg]	
EE	Exported energy	[MJ, LHV]	
	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy		

## 6. LCA: Interpretation

To facilitate comprehension of the Life Cycle Assessment, both the aggregate indicators of the Life Cycle Inventory Analysis (LCIA) and the estimated impact outlined in section 5 “LCA results” shall be interpreted in a dominance analysis.

This interpretation shall also include a description of the time frame and/or variance of the LCIA results if the EPD is valid for several products. An illustration of the results with figures is recommended (e.g., for the dominance analysis, the distribution of impacts across the modules, the CO<sub>2</sub>-balance, etc. as appropriate for a reader's understanding of the environmental profile of the declared product).



## 7. Supporting Documentation

The project report elements required to support the content declared in an EPD created using this document are specified in “Part A: Calculations for the Life Cycle Assessment and Requirements on the Project Report.” These project report elements include general information (Part A: Section 4), study goal (Part A: Section 5), study scope (Part A: Section 6), and the life cycle inventory analysis, impact assessment, and interpretation (Part A: Section 7, 8, and 9). Additionally, the project report shall include additional required supporting documentation specified in this Part B and according to Part A: Section 10.

If relevant to the scope of the declared product, or due to the product material composition, it is recommended to provide sufficient supporting documentation in the EPD and Background Report. When providing documentation, testing protocols and other relevant information shall be indicated. If supporting documentation is not provided, the reasons shall be indicated in the EPD and Background Report.

As a general rule, all statements shall be documented with measured data (presented by the corresponding test certificates). In the case of non-verifiable substances, the limit of detection shall be included in the declaration. Interpreting statements such as “... free of ...” or “... are entirely harmless ...” are not permissible.

## 8. References

The literature referred to in the Environmental Product Declaration shall be quoted in full from the following sources. Standards and standards relating to evidence and/or technical features already fully quoted in the EPD do not need to be listed here. Part B of the PCR document on which they are based shall be referenced.

### UL ENVIRONMENT

UL Environment General Program Instructions April 2015, version 2

PCR Part A: UL Environment and Institute of Construction and Environment e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report. July 2014, version 1.3

### SUSTAINABILITY REPORTING STANDARDS

EN 15804: 2012-04 - Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction product.

ISO 14025: 2006 - Environmental labels and declarations — Type III environmental declarations — Principles and procedures

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

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

ISO 14046:2013 - Environmental management- Water footprint- Principles, requirements and guidelines

ISO 15392:2008 - Sustainability in building construction- General principles

ISO 15686-1:2011 - Buildings and constructed assets- Service life planning- Part 1: General principles

ISO 15686-2:2008 - Buildings and constructed assets- Service life planning Part 2: Service life prediction procedures

ISO 15686-7:2008 - Buildings and constructed assets- Service life planning Part 7: Performance evaluation for feedback of service life data from practice

ISO 15686-8:2008 - Buildings and constructed assets- Service life planning Part 8: Reference service life and service life estimation

ISO 21930: 2007 - Sustainability in building construction -- Environmental declaration of building products



### **TESTING AND CLASSIFICATION REFERENCES**

ASTM 1503: Standard Specification for Flat Glass Mirror

ASTM C1376: Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass

ISO 11479: Glass in building – Coated glass

### **RELEVANT FEDERAL STANDARDS AND SOPs**

Environment Canada, National Pollutant Release Inventory (<http://www.ec.gc.ca/inrp-npri/>)

EPCRA 313 Toxic Release Inventory Reporting (U.S.) (<http://www2.epa.gov/toxics-release-inventory-tri-program>)

US EPA, ORD/NRMRL/Sustainable Technology Division, Systems Analysis Branch, SOP No. S-10637-OP-1-0- Tool for the Reduction and Assessment of Chemical and other Environmental Impacts (TRACI), Software Name and Version Number: TRACI version 2.1, USER'S MANUAL, 24 July, 2012

US: Resource Conservation and Recovery Act (RCRA), Clause C (<http://www.epa.gov/region6/rcra/>)

### **RELEVANT PCRS**

Product Category Rules for Building-Related Products and Services, From the range of Environmental Product Declarations of UL Environment and Institute Construction and Environment e.V. (IBU): Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report, June 2014, v1.3

PCR Guidance-Texts for Building-Related Products and Services, From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU), Part B: Requirements on the EPD for Glass wall and ceiling coverings, October 2012.

GANA PCR for Flat Glass UN CPC 3711, 2014, NSF

Windows PCR, 2015, IERE