

ENVIRONMENTAL PRODUCT DECLARATION

USG DUROCK® BRAND CEMENT BOARD
WITH EDGEGUARD™
DETROIT, MI

USG Durock® Brand Cement Board with EdgeGuard™ is a backerboard for tile and exterior finish systems. Its enhanced proprietary edge performance prevents spinout and crumbling. It is easy to cut and fasten, water durable and mold resistant and warranted for interior and exterior applications.

USG Durock® Brand Cement Board with EdgeGuard™ offers architects, builders and tile contractors a strong, water-durable tile base for tub and shower areas. Also an ideal underlayment for tile on floors and countertops in new construction and remodeling. USG Durock® Brand Cement Board with EdgeGuard™ is preferred by many applicators as a base for directly applied finishes, tile, stone and thin brick used in building exteriors.



TRACI v2.1 ENVIRONMENTAL IMPACTS (CRADLE-TO-GATE)			
Declared Unit – 1,000 square feet			
	1/4" Durock® Brand Cement Board	1/2" Durock® Brand Cement Board	5/8" Durock® Brand Cement Board
Global Warming Potential (kg CO ₂ eq.)	6.82E+02	8.41E+02	1.06E+03
Ozone Depletion Potential (kg CFC-11 eq.)	1.85E-08	2.15E-08	2.50E-08
Acidification Potential (kg SO ₂ eq.)	2.28E+00	2.81E+00	3.36E+00
Eutrophication Potential (kg N eq.)	2.01E-01	2.40E-01	2.98E-01
Photochemical Ozone Creation Potential (kg O ₃ eq.)	3.43E+01	4.22E+01	5.23E+01
Abiotic Resource Depletion Potential Fossil Fuels (MJ, LHV)	6.51E+02	8.36E+02	1.03E+03

For over a century, sustainable practices have naturally been an inherent part of our business at USG. Today, they help shape the innovative products that become the homes where we live, the buildings where we work and the arenas where we play. From the product formulations we choose, to the processes we employ, USG is committed to designing, manufacturing, and distributing products that minimize overall environmental impacts and contribute toward a healthier living space. We believe that transparency of product information is essential for our stakeholders and EPDs are the next step toward an even more transparent USG. For additional information, visit usg.com, cgcinc.com and usgdesignstudio.com

ENVIRONMENTAL PRODUCT DECLARATION

USG DUROCK® BRAND CEMENT BOARD WITH EDGEGUARD™

DETROIT, MI

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and ISO 21930: 2017. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

DECLARATION NUMBER	EPD 133	
PROGRAM OPERATOR	ASTM International – 100 Barr Harbor Drive, West Conshohocken, PA USA www.astm.org	
DECLARATION HOLDER	USG Corporation - 550 W. Adams St., Chicago, IL USA	
DECLARED PRODUCT	USG Durock® Brand Cement Board with EdgeGuard™ (Detroit, MI)	
REFERENCE PCR	Product Category Rule for Environmental Product Declarations: PCR 2012:01 The International EPD System Construction Products and Constructions Services v.3.21 2019-12-20	
DATE OF ISSUE PERIOD OF VALIDITY	4/17/20 5 Years	
CONTENTS OF THE DECLARATION	<p>This EPD is complete and contains the following:</p> <ul style="list-style-type: none"> • Product System Documentation • LCA Calculation Rules • Life Cycle Assessment Results • Further Information • References 	
This declaration was independently verified in accordance with ISO 14025 and ISO 21930:2017 <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	Tim Brooke, ASTM International	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas P. Gloria, Industrial Ecology Consultants	

ENVIRONMENTAL PRODUCT DECLARATION

USG DUROCK® BRAND CEMENT BOARD
WITH EDGEGUARD™
DETROIT, MI

1. Product System Documentation

1.1 Product Description and Product Identification

USG Durock® Brand Cement Board with EdgeGuard™ is a backerboard for tile and exterior finish systems. Its enhanced proprietary edge performance prevents spinout and crumbling. It is easy to cut and fasten, is water durable and mold resistant and is warranted for interior and exterior applications. Its classification number according to the UNCPC classification system (see <http://unstats.un.org>) is 37560.

USG Durock® Brand Cement Board with EdgeGuard™ offers architects, builders and tile contractors a strong, water-durable tile base for tub and shower areas. It is also an ideal underlayment for tile on floors and countertops in new construction and remodeling. The board is readily applied over wood or steel framing spaced 16 in. (406 mm) o.c. with corrosion-resistant wood screws, steel screws or hot-dipped galvanized roofing nails. After joints are treated, wall or floor tile is applied using latex fortified mortar or Type I organic adhesive. USG Durock® Brand Cement Board with EdgeGuard™ is preferred by many applicators as a base for directly applied finishes, tile, stone and thin brick used in building exteriors.

The 1/2 in. (12.7 mm) and 5/8 in. (15.9 mm) panels are Underwriters Laboratories Inc. (UL) Classified for fire resistance and may be used in any UL Design where Type DCB panels are listed.

1.2 Application

USG Durock® Brand Cement Board with EdgeGuard™ are intended for use as a backerboard for tile and exterior finish systems. See usg.com for detailed application instructions.

ENVIRONMENTAL PRODUCT DECLARATION

USG DUROCK® BRAND CEMENT BOARD WITH EDGE GUARD™

DETROIT, MI

1.3 Product Technical Data

Table 1: Technical Specifications

NAME	UNIT OF MEASURE	ASTM TEST METHOD	1/4" DUROCK® CEMENT BOARD	1/2" DUROCK® CEMENT BOARD	5/8" DUROCK® CEMENT BOARD
Flexural Strength	psi (MPa)	C947	>1000 (6.9)	>750 (5.2)	>480 (3.3)
Indentation Strength	psi (MPa)	D2394	>1250 (8.6)	>1250 (8.6)	>1250 (8.6)
Shear Bond Strength	psi (MPa)	ANSI A118.4	>50 (0.34)	>50 (0.34)	>50 (0.34)
Nail-Pull Resistance	lb. (0.375 in. [10 mm] head diameter, wet or dry)	C473	--	> 90	> 90
Weight	psf (kg/m ³)	C473	<1.9 (30)	2.4 (38)	3 (48)
Freeze/thaw Resistance	Procedure B, no. of cycles with no deterioration	C666	100	100	100
Mold Resistance	-	G21	Rating 0 (no growth)	Rating 0 (no growth)	Rating 0 (no growth)
		D3273	10/10	10/10	10/10
Non-combustibility	Pass/Fail	E136	Pass	Pass	Pass
Surface Burning Characteristics	Flame/smoke	E84	0/0	0/0	0/0
Thermal	"R"/k value.	C518	--	0.39/1.27	0.49/1.27
Std. Method for Evaluating Ceramic Floor Tile Installation Systems	Passes cycled 1-6	C627	Light Commercial	Light Commercial	Light Commercial
Minimum Bending Radius	Feet	--	--	6	6

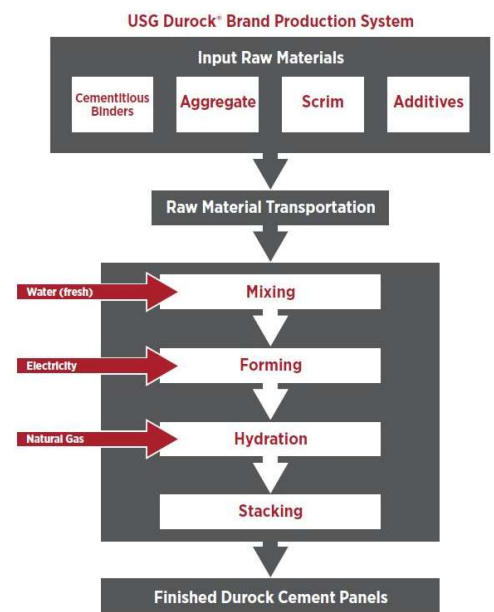
1.4 Product Composition

Table 2: Material Composition

MATERIAL	1/4" DUROCK® BRAND CEMENT BOARD	1/2" DUROCK® BRAND CEMENT BOARD	5/8" DUROCK® BRAND CEMENT BOARD
Cement	51%	45%	46%
Aggregate	44%	51%	50%
Scrim	3%	2%	2%
Additives	2%	2%	2%
Sum	100%	100%	100%

1.5 Product Manufacture

The manufacture of USG Durock® Brand Cement Board with EdgeGuard™ starts with the dry blending of the dry ingredients in a screw conveyor, feeding of this dry ingredient mixture into a mixer where these dry ingredients are mixed with water and wet additives. The resulting slurry is fed onto a former. The wet board is allowed to hydrate. The finished product is stacked, covered with a PE “bag” and banded with plastic straps. Any panels not meeting quality control specifications are converted into reclaim and used as a raw material in the mix.



1.6 Environment and Health During Manufacturing

USG has led the building sector’s effort in developing and supplying sustainable construction materials. Today, sustainability is integrated into the design and manufacture of every wall, ceiling, and flooring product. As both a producer and a buyer of raw materials, we have a responsibility to extensively review and select each material we use. Each decision we make is based on careful consideration of environmental and safety effects over time. Raw materials used in our products are carefully selected and go through a screening procedure. Incoming raw materials are tested for contaminants by an internal lab and third-party labs for consideration of use and worker, environmental, and end-user exposure. This due diligence helps to ensure our products are safe to handle in our manufacturing plants and on job sites while having minimal impact on occupant health and indoor and outdoor environments.

1.7 Packaging

Packaging consists of cardboard edge protectors, pallet bags and wooden pallets. The production of these packaging materials was modeled in this study.

1.8 Reference Service Life

The Reference Service Life is considered not to be relevant for this cradle-to-gate study.



2. LCA Calculation Rules

2.1 Declared Unit

The declared unit for Durock® Brand Cement Board with EdgeGuard™ is defined as 1,000 square feet.

Table 3: Declared Unit

NAME	1/4" DUROCK® BRAND CEMENT BOARD PANELS (METRIC)	1/4" DUROCK® BRAND CEMENT BOARD PANELS (STANDARD)	1/2" DUROCK® BRAND CEMENT BOARD PANELS (METRIC)	1/2" DUROCK® BRAND CEMENT BOARD PANELS (STANDARD)	5/8" DUROCK® BRAND CEMENT BOARD PANELS (METRIC)	5/8" DUROCK® BRAND CEMENT BOARD PANELS (STANDARD)
Functional Unit	92.9 m ²	1,000 ft ²	92.9 m ²	1,000 ft ²	92.9 m ²	1,000 ft ²
Declared Thickness	0.666 cm	0.262 in	1.24 cm	0.488 in	1.55 cm	0.610 in
Density	1,224 kg/m ³	76.4 pcf	889 kg/m ³	55.5 pcf	926 kg/m ³	57.8 pcf
Surface weight per declared unit	8.14 kg/m ²	1,668 lbs./MSF	11.0 kg/m ²	2,259 lbs./MSF	14.3 kg/m ²	2,938 lbs./MSF

2.2 System Boundary

This EPD represents a “cradle-to-gate” LCA analysis for Durock® Brand Cement Board with EdgeGuard™. It covers all the production steps from raw material extraction (i.e., the cradle) to packaged panels on a pallet ready for shipment (gate).

2.3 Estimates and Assumptions

All raw material and energy data are specific to the manufacture of Durock® Brand Cement Board with EdgeGuard™ produced at USG’s Detroit, MI plant. Data collection of energy and raw material inputs were aided by the presence of an extensive computer monitoring system which tracked product formulas and energy usages. The data is limited in that the primary data was collected during the 2018 year and changes in operations may increase/decrease impacts in the future. No changes in raw materials, product formulas or process changes are known at this time that would alter the results of this study. Other data limitations include the use of secondary data sets instead of primary data for upstream and downstream processes, local impacts vs. global impacts, possible impacts vs. actual impacts, inherent uncertainty in the data sets, accuracy and precision of impact assessment methodology, etc.

2.4 Cut-off Criteria

All inputs and outputs to a (unit) process were included in the calculation for which data is available.

In case of insufficient input data or data gaps for a unit process, the cut-off criteria was 1% of renewable and non-renewable primary energy usage and 1% of the total mass of that unit process. The total neglected input flows did not exceed 5% of energy usage and mass.

As such, some minor additives fell well below the cut-off criteria and were therefore not included in this study.

2.5 Background Data

All background was sourced from critically reviewed GaBi databases.

2.6 Data Quality

The LCA model was created using the GaBi ts software. Specific comments related to data quality requirements cited in ISO 14025 Section 4.2.3.6.2 include the following.

Temporal: In the case of Durock® Brand Cement Board with EdgeGuard™ production, the LCI data was collected from the Detroit, MI plant for the 2018 calendar year.

Geographical: Where possible, all processes were chosen as being representative of US manufacturing processes.

Technical: The data selected for this study is specific to the technology used in the preparation of the various raw materials.

Precision: The raw material usage amounts were derived from plant quality data on finished products, coatings usage plant data and product formulas.

Completeness: Virtually all the significant raw material flows (> 99%) used for panel production has been modeled. The exception consists of transportation of the coating raw materials; the effect of which was determined to be less than 1% of the total.

Representative: Where possible all the data sets were selected to be representative of US-based production, are less than 10 years in age and are representative of the technology being employed.

Consistency: All the manufacturing processes were modeled in a consistent manner throughout this study in accordance with the goal and scope definitions.

Reproducibility: The information contained in this study, including raw material, energy and transportation distance inputs, have been fully documented in the LCA report.

Sources of Data: The sources for the processes used in this study have been fully provided in the LCA report and are representative of the material and energy sources used in actual production.

Uncertainty: The relative uncertainty associated with this study has been minimized. No significant assumptions have been made.

2.7 Period under Review

All raw material and energy inputs are for the 2018 calendar year.

2.8 Allocation

Energy inputs were allocated on a mass basis so that 100% of the purchased gas and electricity was allocated to specific types of products based on the mass of those products. Raw material inputs were allocated to specific products based on established product formulas.

2.9 Geographical Scope

This EPD is intended to serve the North American market.

2.10 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. Comparisons are only allowable when EPDs report cradle-to-grave information using a functional unit. Refer to section 5.3 of EN 15804 for further information. Comparison of the environmental performance of panels 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. Full conformance with the PCR for Gypsum Panel Products allows EPD comparability only when all stages of a panel life cycle have been considered. However, variations and deviations are possible.

3. Life Cycle Assessment Results

Table 4: Description of the system boundary modules

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw Material Supply	Transport	Manufacturing	Transport From Gate to Site	Assembly/Install	Use Stage	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
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

ENVIRONMENTAL PRODUCT DECLARATION

USG DUROCK® BRAND CEMENT BOARD
WITH EDGEGUARD™
DETROIT, MI

Table 5: Acronym Key

ABBREVIATION	PARAMETER	UNIT
Life Cycle Impact Assessment Indicators		
GWP	Global Warming Potential	kg CO ₂ eq.
ODP	Ozone Depletion Potential	kg CFC-11 eq.
AP	Acidification Potential	kg SO ₂ eq.
EP	Eutrophication Potential	kg N eq.
POCP	Photochemical ozone creation potential	kg O ₃ eq.
ADP	Abiotic resource depletion potential – fossil fuels	MJ, LHV
Resource Use Parameters		
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, LHV
PERM	Use of renewable primary energy resources used as raw materials	MJ, LHV
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, LHV
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, LHV
PENRM	Use of non-renewable primary energy resources used as raw materials	MJ, LHV
PENRT	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, LHV
SM	Use of secondary materials	kg
RSF	Use of renewable secondary fuels	MJ, LHV
NRSF	Use of non-renewable secondary fuels	MJ, LHV
FW	Net use of fresh water	m ³
Waste Parameters		
HWD	Disposed-of-hazardous waste	kg
NHWD	Disposed-of non-hazardous waste	kg
RWD	Radioactive Waste Disposed	kg
Output Flow Parameters		
CRU	Components for reuse	kg
MFR	Materials for recycling	kg
MER	Materials for energy recovery	kg
EE	Exported energy	MJ

ENVIRONMENTAL PRODUCT DECLARATION

USG DUROCK® BRAND CEMENT BOARD WITH EDGEGUARD™

DETROIT, MI

3.1 Life Cycle Impact Assessment Results

Results are presented for 1000 square feet of Durock® Brand Cement Board with EdgeGuard™.

Table 6: Impact Assessment Results for 1 MSF of 1/4" Durock® Brand Cement Board with EdgeGuard™

TRACI v2.1	UNITS	A1	A2	A3
GWP 100	kg CO ₂ eq.	6.58E+02	1.95E+01	4.65E+00
ODP	kg CFC-11 eq.	1.82E-08	-7.56E-14	3.01E-10
AP	kg SO ₂ eq.	2.17E+00	1.04E-01	9.26E-03
EP	kg N eq.	1.92E-01	7.93E-03	5.35E-04
POCP	kg O ₃ eq.	3.17E+01	2.41E+00	1.96E-01
ADP	MJ, LHV	6.10E+02	2.66E+01	1.47E+01

Table 7: Impact Assessment Results for 1 MSF of 1/2" Durock® Brand Cement Board with EdgeGuard™

TRACI v2.1	UNITS	A1	A2	A3
GWP 100	kg CO ₂ eq.	8.07E+02	2.90E+01	4.99E+00
ODP	kg CFC-11 eq.	2.12E-08	-1.27E-13	3.60E-10
AP	kg SO ₂ eq.	2.66E+00	1.46E-01	1.04E-02
EP	kg N eq.	2.28E-01	1.15E-02	5.99E-04
POCP	kg O ₃ eq.	3.86E+01	3.36E+00	2.19E-01
ADP	MJ, LHV	7.76E+02	4.45E+01	1.63E+01

Table 8: Impact Assessment Results for 1 MSF of 5/8" Durock® Brand Cement Board with EdgeGuard™

TRACI v2.1	UNITS	A1	A2	A3
GWP 100	kg CO ₂ eq.	1.02E+03	3.52E+01	5.94E+00
ODP	kg CFC-11 eq.	2.45E-08	-1.60E-13	4.51E-10
AP	kg SO ₂ eq.	3.17E+00	1.73E-01	1.26E-02
EP	kg N eq.	2.84E-01	1.37E-02	7.24E-04
POCP	kg O ₃ eq.	4.81E+01	3.97E+00	2.64E-01
ADP	MJ, LHV	9.54E+02	5.63E+01	1.98E+01

ENVIRONMENTAL PRODUCT DECLARATION

USG DUROCK® BRAND CEMENT BOARD
WITH EDGEGUARD™
DETROIT, MI

3.2 Life Cycle Inventory Results

Table 9: Resource Use for 1 MSF of Durock® Brand Cement Board with EdgeGuard™

PARAMETER	UNITS	1/4" DUROCK® BRAND CEMENT BOARD PANELS	1/2" DUROCK® BRAND CEMENT BOARD PANELS	5/8" DUROCK® BRAND CEMENT BOARD PANELS
PERE	MJ, LHV	9.93E+02	1.21E+03	1.47E+03
PERM	MJ, LHV	0.00E+00	0.00E+00	0.00E+00
PERT	MJ, LHV	9.93E+02	1.21E+03	1.47E+03
PENRE	MJ, LHV	7.06E+03	8.83E+03	1.09E+04
PENRM	MJ, LHV	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ, LHV	7.06E+03	8.83E+03	1.09E+04
SM	MJ, LHV	1.55E+02	1.87E+02	2.46E+02
RSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00
FW	m ³	4.06E+00	4.67E+00	5.57E-00

Table 10: Output Flows and Waste Categories for 1 MSF of Durock® Brand Cement Board with EdgeGuard™

PARAMETER	UNITS	1/4" DUROCK® BRAND CEMENT BOARD PANELS	1/2" DUROCK® BRAND CEMENT BOARD PANELS	5/8" DUROCK® BRAND CEMENT BOARD PANELS
HWD	kg	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	9.56E+02	1.20E+03	1.46E+03
RWD	kg	1.58E-01	1.91E-01	2.34E-01
CRU	kg	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00
EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00

3.3 LCA Interpretation

The LCA results for the production of 1 MSF of Durock® Brand Cement Board with EdgeGuard™ were dominated by energy usage; primarily gas and electricity usage during the drying process.

4. Further Information

USG certifies that the USG Durock® Brand Cement Board Panel with EdgeGuard™ covered by this EPD are Low-Emitting in flooring applications, defined as below the emissions of the concentrations for each individual volatile organic compound as specified in the Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources using Environmental Chambers Version 1.1 [CDPH/EHLB/Standard Method V1.1 (February 2010); chamber testing portion of CA Section 01350] and ASTM Guide D5116-06. Additional information can be obtained at USG.com, USGDesignStudio.com.

There are no Substances of Very High Concern (SVHC) which exceed 0.1 weight percent in the product.

5. References

LCA Report

A Cradle-to-Gate (A1-A3), Cradle-to-Jobsite (A1-A4) and Cradle-to-Grave (A1-C4) Life Cycle Assessment of USG Durock® Brand Cement Board Panels with EdgeGuard™, December 2, 2019. USG.

PCR

The International EPD® System's PCR 2012:01 Construction Products and Construction Services, Version 2.31, 2019-12-20

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: 2017 - Sustainability in building construction -- Environmental declaration of building products