Environmental Product Declaration

USG FIBEROCK® AQUASMART™ TILE BACKERBOARD AND UNDERLAYMENT

Gypsum, OH

Features and Benefits

- Integrated waterproof[1] performance
- Mold and mildew resistant
- Lighter and easy to cut, carry, and install
- Uniform composition provides strength
- Use in wet and dry areas throughout the home
- Ideal under tile, stone, vinyl, hardwood flooring, laminate flooring, carpeting, and countertops
- Superior tile bond
- Suitable for walls, floors, and countertops
- Provides a smooth, flat, paintable surface for wall applications

[1] Waterproof in accordance with ANSI A118.10 (Section 4.5)

Environmental Impacts (A1-A3) Cradle-to-Gate
Declared Unit – 92.9 Square Meters (1,000 Square Feet)

	0.42"
Global Warming Potential-Total (kg CO2 eq.)[1]	1.65E+02
Ozone Depletion Potential (kg CFC 11 eq.)[2]	5.90E-09
Acidification Potential (kg SO2 eq.)[2]	1.08E+00
Eutrophication Potential -marine (kg N eq.)[2]	2.37E-01
Eutrophication Potential – freshwater (kg P eq.)[2]	1.41E-04
Photochemical Ozone Creation Potential (kg O3 eq.)[2]	8.56E+00
Abiotic Depletion Potential fossil fuels (MJ, LHV)[3]	4.54E+03

[1] IPCC 2021 (AR6)
[2] TRACI 2.2
[3] CML August 2016

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Gypsum, OH

This declaration is an Environmental Product Declaration (EPD) in accordance with ISO 14025:2006 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.

USG Corporation has sole ownership, liability, and responsibility for this EPD. The owner of the declaration shall be liable for the underlying information and evidence; ASTM, or its affiliates, shall not be liable with respect to manufacturer information, life cycle assessment data, and evidence.

DECLARATION NUMBER	EPD 973
EPD TYPE	Product specific, facility specific EPD
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
EPD TYPE	Type III Declaration per ISO 14025:2006
DECLARED PRODUCT	USG Fiberock® AquaSmart™ Tile Backerboard and Underlayment
DATE OF ISSUE PERIOD OF VALIDITY	05/08/25 5 Years
MARKETS OF APPLICABILITY	North America
CORE STANDARD	ISO 21930:2017
CORE PCR	Smart EPD Part A Product Category Rules for Building and Construction Products and Services (Standard 1000), Version 1.2, published March 14, 2025 www.smartepd.com
SUB-CATEGORY PCR	Smart EPD Part B Product Category Rules for Gypsum Panels (Standard 1000-004), Version 2.0, published February 24, 2025 www.smartepd.com
SUB-CATEGORY PCR REVIEW	Independent Panel Review, contact info@smartepd.com
ACLCA PCR OPEN STANDARD CONFORMANCE	Transparency
ACLCA PCR OPEN STANDARD VERSION	Version 1.0 | May 25, 2022
This declaration was independently verified in accordance with ISO 14025 and ISO 21930:2017 □ INTERNAL ☒ 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

1.Product System Documentation

1.1 Product Description and Product Identification

USG Fiberock® AquaSmart™ Tile Backerboard and Underlayment panels feature a homogenous waterproof composition using proprietary waterproof technology. The panels provide added durability and superior performance (vs. traditional tile backerboards) and are manufactured to meet ANSI A118.10 (Section 4.5) for waterproofness. With enhanced performance, USG Fiberock® AquaSmart panels combine the benefits of waterproof technology in a lighter weight solution (our 1/2" panel transitioned to 0.42" in 2023) that makes installation easier- and backed by USG warrantied performance. USG Fiberock® AquaSmart panels are also an ideal substrate for painted wall surfaces, when transitioning from tile to paint.

USG Fiberock® AquaSmart panels provide a smooth, flat surface that resists swelling and warping often seen with wood-based underlayments, and they contain none of the resins, adhesives, or solvents that can stain floor covering materials. It also offers greater resistance to indentation than other underlayment products and can be used throughout a home-in both wet and dry areas-regardless of the flooring material chosen.

USG Fiberock® AquaSmart Tile Backerboard and Underlayment is nominally 0.42" (10.7 mm) thick. The panel size is 3 ft. × 5 ft. (915 mm × 1,525 mm) or 4 ft. × 8 ft. (1,220 mm × 2,440 mm).

USG Fiberock® AquaSmart Tile Backerboard and Underlayment are fiber-reinforced gypsum panels and meet ASTM standard C1278 *Specification for Fiber Reinforced Gypsum Panel*. The panels meet residential and light-commercial performance rating based on Robinson Floor Test (ASTM C627), conducted by The Tile Council of North America (TCNA).

USG Fiberock® AquaSmart Tile Backerboard and Underlayment is manufactured at the USG Gypsum, OH plant.

1.2 Designated Application

For flooring applications over a wood-based substrate, laminate USG Fiberock® AquaSmart panels to subfloor using Type 1 organic adhesive or latex-modified thin-set mortar or dry-set mortar. Fasten to subfloor with 1-1/4 in. USG Durock™ Brand Tile Backer Screws for wood framing (or equivalent) or 1-1/2 in. hot-dipped galvanized roofing nails spaced 8 in. o.c. in both directions with perimeter fasteners at least 3/8 in. and less than 5/8 in. from ends and edges. Drive nails and screws so that bottoms of heads are flush with panel surface to ensure firm panel contact with subfloor. Do not overdrive fasteners.

For wall applications, fasten panels to framing with specified fasteners. Drive fasteners into field of panels first, working toward ends and edges. Hold panels in firm contact with framing while driving fasteners. Space fasteners a maximum 8 in. o.c. for walls, 6 in. o.c. for ceilings, with perimeter fasteners at least 3/8 in. and less than 5/8 in. from ends and edges. Drive nails and screws so that bottoms of heads are flush with panel surface to ensure firm panel contact with framing. Do not overdrive fasteners past panel surface. For steel stud applications (20 ga. or equivalent), use 1-1/4 in. or 1-5/8 in. USG Durock™ Tile Backer Screws for steel framing (or equivalent). For wood stud applications, use 1-1/4 in., 1-5/8 in., or 2-1/4 in. USG Durock™ Tile Backer Screws for wood framing (or equivalent) or 1-1/2 in. hot-dipped galvanized roofing nails.

For countertop applications, install minimum 3/4 in. exterior grade plywood or OSB base across cabinet supports. Fit ends and edges of USG Fiberock® underlayment closely abutted, but not forced together. Stagger panel joints from plywood base joints. Space fasteners 8 in. o.c. around the perimeter and in the field of the board.

Treat panel joints according to the recommended options that can be found at www.usg.com. Treat all horizontal surfaces where water can pool, for example shower benches and niches, with a liquid or sheet applied waterproofing memberane.

1.3 Product Technical Data

Table 1: Performance Data

Properties	Unit of Measure	ASTM Test Method	0.42"
Weight	psf (kg/m^2)	C473	2.2 (10.7)
Flexural strength	lbf	C473	>85
Compressive strength	psi	N/A	>500
Shear bond strength	psi	N/A	>50
Water Absorption	% by wt. 2hrs	C473	<5
Surface Water Absorption	grams	C473	1.6
Nail-pull Resistance	lbf	C473	>100
Mold resistance		D3273	10 (no growth)
Surface-burning characteristics	Flame/smoke	E84	5/0
Thermal	"R"(°F-ft²-h/Btu)	C518	0.294
Standard method for evaluating ceramic floor tile installation systems	Passes cycles 1-6	C627	Light commercial

1.4 Placing on the Market/Application Rules

Wood framing shall approximate the moisture content it will reach in service by allowing the enclosed building to stand as long as possible prior to the application of the Fiberock® AquaSmart panels. It is the responsibility of the installer to verify and follow the installation requirements of all the components in an assembly.

1.5 Delivery Status

USG Fiberock® AquaSmart Tile Backerboard and Underlayment panels typically come in the following sizes and packaging. The panels are protected by cardboard edge protectors, put on wooden pallets, and shipped in packaging units shown below.

Table 2: Product Data: Sizes and Packaging

Size (thickness × width × length)	Units (pcs)
0.42 in. x 3 ft. x 5 ft. (10.7 mm x 915 mm x 1,525 mm)	60
0.42 in. x 4 ft. x 8 ft. (10.7 mm x 1,220 mm x 2,440 mm)	35

1.6 Product Composition

Table 3: Product Formula

Material	Value
Calcium sulfate dihydrate	>90%
Cellulose fiber	<10%
Additives	<2%
Total	**100%**

1.7 Product Manufacturing

The manufacturing of Fiberock® AquaSmart™ Tile Backerboard and Underlayment starts with the pulping of waste paper to turn it into cellulose fibers. The cellulose fibers are blended with other ingredients in a large mixing tank. The mixed slurry travels onto a mesh screen, allowing water to drain. The drained water is treated at the plant and recirculated back into the process. The de-watered slurry is transferred to a forming machine, where the material is pressed to achieve the required caliper. Coating is applied to the surface of the panels to promote bond to tiles and other covering materials. The formed sheets are conveyed to a dryer where excess water is removed. The board is cut to its final size, with cardboard edge protectors applied, and put on wood pallets. Trimmed material and off-spec product are reclaimed and fed back into the process. In the manufacturing of this product, there is no hazardous waste generated at the USG facility.

1.8 Environment and Health During Manufacturing

USG and CGC lead the building sector in developing and supplying sustainable construction materials. Today, sustainability is integrated into the design and manufacturing of wall, ceiling, and flooring products. In the manufacturing of our products, we review and select each material with consideration of environmental protection, health, and safety. Raw materials used in our products are carefully selected and go through a qualification procedure. Raw materials are tested for contaminants by an internal lab and third-party labs.

1.9 Packaging

USG Fiberock® AquaSmart Tile Backerboard and Underlayment are packaged with cardboard edge protectors and put on wooden pallets. The production and transportation of these packaging materials were modeled in this LCA study.

Table 4: Packaging Materials Weight

Product	Packaging Materials Weight (kg/m^2)
0.42"	0.16

1.10 Conditions of Use

For wall applications, the maximum stud spacing is 16 in. (406 mm) o.c. Framing shall be designed (based on stud properties alone) not to exceed L/360 deflection for tile, L/240 for surfaces that will be painted. Maximum fastener spacing is 8 in. (203 mm) o.c. for wood & steel framing, and 6 in. (152 mm) o.c. for ceiling applications.

For floor tile applications, the maximum joist spacing is 24 in. (610 mm) o.c. The subfloor system should be designed with a maximum deflection limit of L/360 for the span. Some finish materials may require a more rigid subassembly (such as large format tile and natural stone products). In these cases, follow the manufacturer's minimum requirements. The subfloor should be APA Span-Rated Plywood or OSB with an Exposure 1 classification or better with tongue and groove or back blocked at the unsupported edges.

1.11 Environment and Health During Use Stage

This product is not expected to produce any unusual hazards during normal use.

1.12 Reference Service Life

The reference service life (RSL) is considered not to be relevant for this cradle-to-gate study.

1.13 Re-Use Phase

USG Fiberock® AquaSmart Tile Backerboard and Underlayment cannot be re-used at the end of life.

1.14 End-of-Life Disposal

USG Fiberock® AquaSmart Tile Backerboard and Underlayment are put in landfill at the end of life.

2. LCA Calculation Methodology

2.1 Declared Unit

The declared unit is defined as 92. 9 square meters (1,000 square feet) of the panels.

Table 5: Declared Unit

Name	0.42"
Declared Unit	92.9 m^2 (1,000 ft^2)
Declared Thickness	0.42 in (10.7 mm)
Surface weight per declared unit	2.2 lb/ft^2 (10.7 kg/m^2)

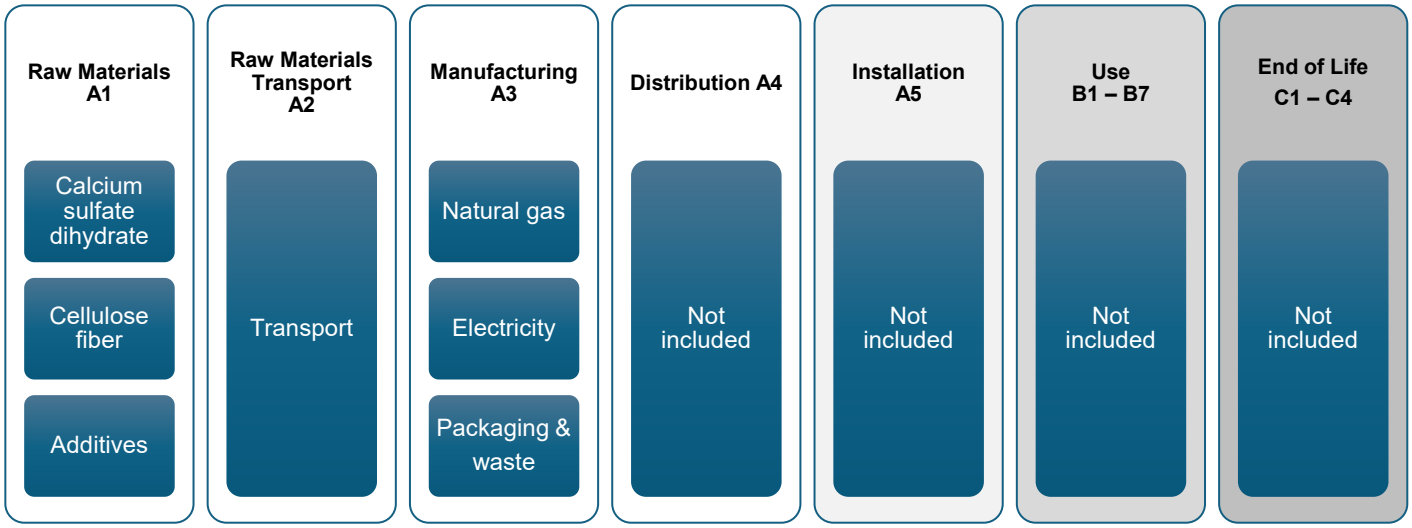
Table 6: Gypsum Panel Specifications

Label	Specification	
CSI/Masterformat	09 28 19	Fibered Gypsum Backing Boards
UNCPC	314	Boards and Panels
UNSPSC	30161509	Gypsum Board
Product class and standard	ASTM C1278	Fiber-Reinforced Gypsum Panels
Product subcategory		Water-Resistant Gypsum Backing Board Gypsum Backing Board
Core type		Regular
Facer type		Unfaced
Recycled content	Recycled paper (pre-consumer)	<10%
	Recycled gypsum core (pre-consumer)	>90%
Additional information		Mold-resistant Moisture-resistant

3. System Boundary

This EPD represents a "cradle-to-gate" LCA analysis for USG Fiberock® AquaSmart™ Tile Backerboard and Underlayment. It covers all the production steps from raw material extraction (i.e., the cradle) to packaged panels ready for shipment (the gate). The infrastructure/capital goods are excluded for upstream, core, and downstream processes in the LCA report and in the EPD. Heating and cooling of the manufacturing facility is included in the analysis.

Figure 1: Specific Processes Covered by this EPD by Life Cycle Stage



A manufacturer shall not make claims based on an industry-average EDP which leads to the market to believe the industry-average is representative of manufacturer-specific or product-specific results.

3.1 Estimates and Assumptions

Primary energy and raw material input data were collected from the Gypsum, OH plant for the 2024 calendar year. Data collection of energy and raw material inputs was aided by the presence of an extensive computer monitoring system which tracked product formulas by product type. Additional data limitations include the use of proxy processes rather than actual supplier generated primary data. This would include such processes as gypsum (calcium sulfate dihydrate), which is representative of gypsum but may not necessarily be representative of USG's particular supplier. In addition, the data is limited in that the primary data was collected during the 2024 year and changes in operations may increase/decrease impacts in the future. 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.

3.2 Cut-off Criteria

The requirements for the exclusion of inputs and outputs (cut-off rules) shall follow the guidance in ISO 21930 Section 7.1.8.

3.3 Background Data

All background data was sourced from critically reviewed LCA for Experts databases from Sphera.

3.4 Data Requirements and Data Sources

The LCA model was created using LCA for Experts software (version 10.9.1.10) from Sphera. Specific comments related to data quality requirements cited in ISO 14025 Section 4.2.3.6.2 include the following.

Temporal: The LCI data was collected from the manufacturing plant for the 2024 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 and product formulas.

Completeness: Virtually all the significant raw material flows (> 99%) in USG Fiberock® AquaSmart™ Tile Backerboard and Underlayment production have been modeled.

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.

All foreground data (thermal energy, electricity, raw materials, inbound transport distances) are based on primary data collected at the Gypsum, OH plant for the 2024 calendar year.

Table 7: Data Disclosure Table

Material/ Process Category	Module	Material/ Process Name	Inventory Dataset Name	Dataset Geographic Region	Year Dataset Represents
Raw material/Product	A1	Gypsum	Gypsum (FGD) from hard coal power plant	US	2020-2026
	A1	Waste paper	Recycled, burden free	N/A	N/A
Transportation	A2	Truck	Truck - Heavy Heavy-duty Diesel Truck / 50,000 lb payload -8a	US	2023-2027
	A2	Rail	Rail transport cargo - Diesel, average train, gross tonne weight 1,000t / 726t payload capacity	GLO	2023-2027
Energy	A3	Electricity	Electricity grid mix 1kV-60kV - RFCW	US	2021-2026
	A3	Natural gas	Thermal energy from natural gas	US	2020-2026

3.5 Allocation

Energy inputs were allocated based on the mass of the products. Raw material inputs were allocated to specific products based on established product formulas.

4. Life Cycle Assessment Results

Production Stage			Construction Stage		Use Stage							End-of-Life Stage			
Raw Material Supply	Transport to factory	Manufacturing	Transport to site	Construction/Installation Process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-construction/Demolition	Transport	Waste Processing	Disposal
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Figure 2: System Boundary

4.1 LCA Results

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of the thresholds, safety margins or risks.

Table 8: North American LCA Environmental Impacts – 92.9 Square Meters (1,000 Square Feet) (A1-A3)

Impact Category	Units	0.42"
Global Warming Potential – Total (GWP-total)[1]	kg CO2 eq.	1.65E+02
Global Warming Potential – Fossil (GWP-fossil)[1]	kg CO2 eq.	3.39E+02
Global Warming Potential – Biogenic (GWP-biogenic)[1]	kg CO2 eq.	-1.74E+02
Global Warming Potential – Land Use and Land Use Change (GWP- luluc)[1]	kg CO2 eq.	1.14E-01
Ozone Depletion Potential (ODP)[2]	kg CFC 11eq.	5.90E-09
Acidification Potential (AP)[2]	kg SO2 eq.	1.08E+00
Eutrophication Potential - marine (EP - marine)[2]	kg N eq.	2.37E-01
Eutrophication Potential - freshwater (EP - freshwater)[2]	kg P eq.	1.41E-04
Photochemical Ozone Creation Potential (POCP)[2]	kg O3 eq.	8.56E+00
Abiotic Depletion Potential fossil fuels (ADP-fossil)[3]	MJ, LHV	4.54E+03

[1] IPCC 2021 (AR6)
[2] TRACI 2.2
[3] CML August 2016

Table 9: Resource and Waste Flows for 92.9 Square Meters (1,000 Square Feet), EN 15804+A2

Use of primary resources	Units	0.42"
Renewable primary resources used as an energy carrier (RPRE)	MJ, NCV	6.03E+02
Renewable primary resources with energy content used as material (RPRM)	MJ, NCV	3.64E-02
Non-renewable primary resources used as an energy carrier (NRPRE)	MJ, NCV	4.91E+03
Non-renewable primary resources with energy content used as material (NRPRM)	MJ, NCV	3.53E+00
Secondary material, fuel, and recovered energy	**Units**	**0.42"**
Secondary material (SM)	kg	1.00E+03
Renewable secondary fuel (RSF)	MJ, NCV	0.00E+00
Non-renewable secondary fuel (NRSF)	MJ, NCV	0.00E+00
Recovered energy (RE)	MJ, NCV	0.00E+00
Consumption of fresh water (FW)	m3	1.59E+00
Emissions inventory parameters for transparency	**Units**	**0.42"**
Biogenic carbon content of product	kg CO2 eq.	-1.51E+02
Calcination uptake from carbonation	kg CO2 eq.	0.00E+00
Biogenic carbon of bio-based packaging	kg CO2 eq.	-2.22E+01
Combustion of waste from renewable sources used in production	kg CO2 eq.	0.00E+00
Combustion of waste from non-renewable sources used in production	kg CO2 eq.	0.00E+00
Indicators describing waste	**Units**	**0.42"**
Hazardous waste disposed (HWD)	kg	2.45E-04
Non-hazardous waste disposed (NHWD)	kg	6.15E+00
High-level radioactive waste (RWD)	kg	1.32E-01
Intermediate and low-level waste	kg	N/A
Assignments of output flows at the end-of-life	**Units**	**0.42"**
Components for re-use (CRU)	kg	0.00E+00
Materials for recycling (MR)	kg	0.00E+00
Materials for energy recovery (MER)	kg	0.00E+00
Recovered energy exported (EE)	MJ, NCV	0.00E+00

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building or construction works has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase only when performance and specifications for product or construction works have been established and serve as a functional unit for comparison.

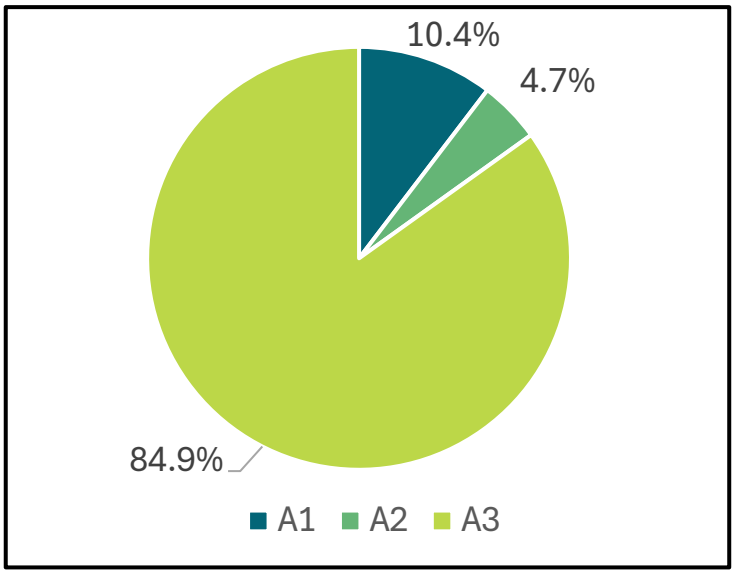
Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building or construction works level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: different LCA software and background LCI datasets may lead to differences in results upstream or downstream of the life cycle stages declared.

Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparisons can be inaccurate and could lead to erroneous selection of materials or products that have higher impact, at least in some impact categories.

4.2 LCA Interpretation

The LCA results for the production of USG Fiberock® AquaSmart™ Tile Backerboard and Underlayment were dominated by energy usage during manufacturing. Figure 3 shows the result for GWP-fossil. Future efforts to reduce the GWP should focused on reducing the weight of the panels.

Figure 3: Process Dominance Analysis for GWP-fossil for the Production of 92.9 Square Meters (1,000 Square Feet) of 0.42" USG Fiberock® AquaSmart™ Tile Backerboard and Underlayment (A1-A3)



5. Additional Environmental Information

Hydrogen sulfide (H_2S) formation in Municipal Solid Waste (MSW) and Construction & Demolition (C&D) landfills requires a sulfate source, carbon source, anaerobic conditions, moisture, pH, and temperature. Gypsum panels are a significant contributor to H_2S formation.

There are no regulated substances of very high concern to be declared.

6. References

LCA Report

A Cradle-to-Gate Life Cycle Assessment of USG Fiberock® AquaSmart™ Tile Backerboard and Underlayment, 05/08/25. USG (Confidential)

Product PCR

ISO 21930:2017 Sustainability in buildings and civil engineering works-Core rules for environmental product declarations of construction products and services

Smart EPD Part A Product Category Rules for Building and Construction Products and Services (Standard 1000), Version 1.2, published March 14, 2025, www.smartepd.com

Smart EPD Part B Product Category Rules for Gypsum Panels (Standard 1000-004), Version 2.0, published February 24, 2025, www.smartepd.com

Sustainability Reporting Standards

EN 15804:2012+A2:2019 - 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/Amended 1:2020 - Environmental management – Life cycle assessment – Principles and framework

ISO 14044:2006/amended 2:2020 - Environmental management – Life cycle assessment – Requirements and guidelines

ISO 14046:2014 - 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 15686-2:2012 - Buildings and constructed assets- Service life planning Part 2: Service life prediction procedures

ISO 15686-7:2017 - 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

ASTM General Program Instructions, v8.0, 4/29/2020, ASTM International