

ENVIRONMENTAL PRODUCT DECLARATION

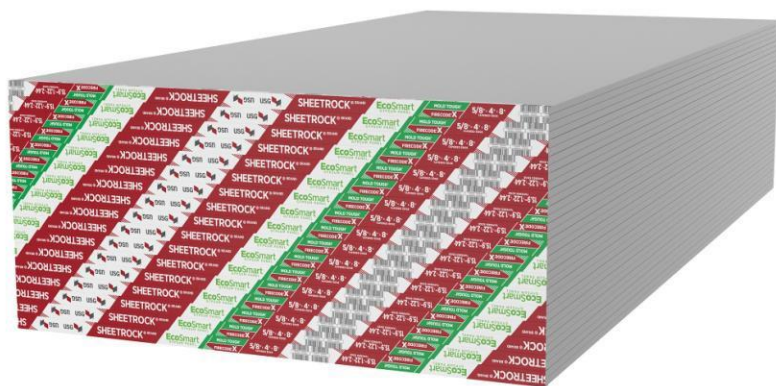
USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X

UNITED STATES GYPSUM COMPANY

BRIDGEPORT, AL; PLASTER CITY, CA; RAINIER, OR; SPERRY, IA; WASHINGTONVILLE, PA



USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X represent a revolution in wallboard manufacturing, significantly reducing the need for natural resources and impact on the environment. These 5/8 in. moisture- and mold-resistant Type X panels have been formulated to achieve all of the strength and performance characteristics of standard 5/8 in. USG Sheetrock® Brand Mold Tough® Firecode® X Panels, but at a lower environmental impact and reduced weight.



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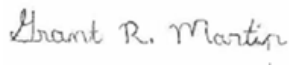


USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X
5/8" Wallboard Panel

According to ISO 14025 and EN 15804

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. 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.



PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	USG
DECLARATION NUMBER	4787352797.106.1
DECLARED PRODUCT	USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X
REFERENCE PCR	FPInnovations, "Product Category Rules for North American Gypsum Boards", 2013
DATE OF ISSUE	January 31, 2018
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Life cycle assessment results Testing results and verifications
The PCR review was conducted by:	PCR Review Panel
	Thomas Gloria, Chair
	222.FPInnovations
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	 Grant R. Martin, UL Environment
	 Thomas Gloria, Industrial Ecology Consultants

This EPD conforms with EN 15804

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2.0 Product Information

2.1 Product Description

USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X have a noncombustible, moisture- and mold-resistant gypsum core that is encased in moisture- and mold-resistant, 100% recycled green face and brown back papers. When tested in accordance with ASTM D3273, *Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber*, the panels meet or exceed ASTM C1396 specifications. The long edges of the panels are tapered, allowing joints to be reinforced and concealed with USG Sheetrock® Brand joint treatment systems. The panels are UL Classified for fire resistance and can be used in any UL design in which UltraLight Innovation Type X (ULIX™) panels are listed. On the face along the long edge of each panel, the UL Type Designation is printed for easy identification by building inspectors.

2.2 Designated Application

These gypsum board products are intended primarily for interior applications in both residential and commercial buildings. They are used in both ceiling and wall applications as an interior finish. Upon installation, the joints are typically treated with joint tape and joint compound and the smooth gypsum board wall or ceiling is then finished with the desired aesthetic treatment.

2.3 Product Data

Table #1: Summary of the general data for Gypsum boards

Product Data: Sizes and Types	Thickness Inch (mm)	Specific Density In lb/ft ² (kg/m ²)	Core Type	ASTM Standard
5/8" Firecode Gypsum Board	5/8" (15.9mm)	1.85 lb/ft ² (9.03 kg/m ²)	gypsum	C1396

Intended for:

- Commercial or residential applications where 5/8 inch moisture- and mold-resistant Type X panels are required
- New or repair and remodel construction
- Protection of load-bearing and non-load-bearing wood or steel framed fire-rated walls
- Protected exterior soffit and ceiling applications
- Interior tile substrate in dry locations or areas with limited water exposure
- Wall, column, floor-ceiling and roof-ceiling assemblies (refer to specific UL design for complete details)

Compliance:

- Complies with ASTM C1396 for 5/8 inch Type X, water-resistant gypsum wallboard and exterior gypsum soffit board



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2.4 Technical Data

Table #2: Summary of the technical data for USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X

Technical Data	Value and Units/Test Results /Statement	Referenced documents and links
"R" factor-thermal resistance in US unit (SI unit)	0.45 °F x ft ² x h/Btu [0.08 K x m ² /W]	ASTM C518
Material Safety Data Sheet – Yes/No	Yes	Available at usg.com
Mold Resistance	Meets or exceeds	ASTM C1396
Water absorption	Meets or exceeds	ASTM C473
Total water absorption	<5% by wt.	ASTM C473
Surface burning characteristics		
Flame Spread	15	ASTM E84
Smoke Developed	0	ASTM E84
Foil Application: (if applicable), Desiccant Method Test	Not Applicable	ASTM C1396
Abuse/impact resistance test (if applicable)	Not Applicable	ASTM C1629
Total Recycled Content (%)	Bridgeport, AL: 93.6% Plaster City, CA: 5.3% Rainier, OR: 5.3% Sperry, IA: 6.1% Washingtonville, PA: 93.6%	As defined in ISO 14021
Pre-consumer (%)	Bridgeport, AL: 93.6% Plaster City, CA: 5.3% Rainier, OR: 5.3% Sperry, IA: 6.1% Washingtonville, PA: 93.6%	As defined in ISO 14021
Post-consumer (%)	Bridgeport, AL: 0.0% Plaster City, CA: 0.0% Rainier, OR: 0.0% Sperry, IA: 0.0% Washingtonville, PA: 0.0%	As defined in ISO 14021

2.5 Placing on the Market/Application Rules

Standard application rules for gypsum board are presented in the *USG Gypsum Construction Handbook* available online at usg.com.



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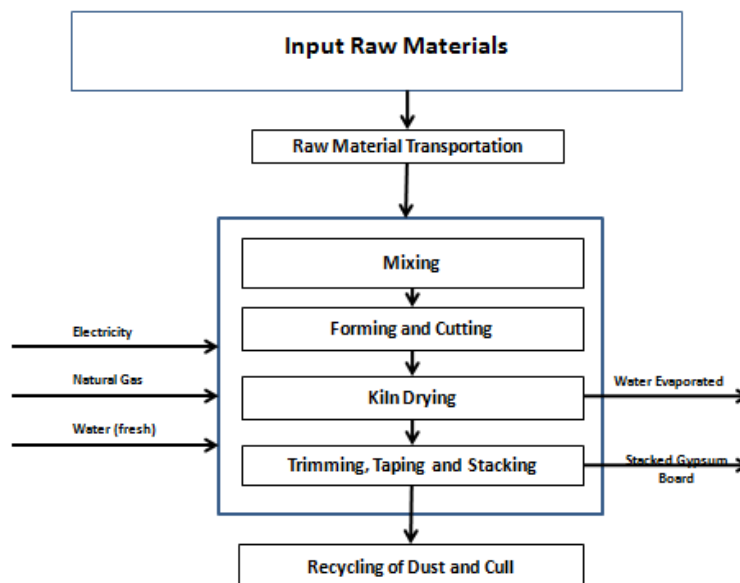
2.6 Product Formulation

Product Specifications	Measurement	Value
	Thickness	5/8 in. (15.9 mm)
	Lengths	8-12 ft. (2438-3658 mm)
	Width	4 ft. (1219 mm)
	Weight (nominal)	1.85 lbs/ ft ² (9.03 kg/m ²)
	Edges	Tapered

Product Formulation	Additive	Amount (kg/1000 sq. ft.)
	Gypsum	763.4
	Vermiculite	24.9
	Paper	45.4
	Additives	28.1

Product formulation values are averages taken from plants that product USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X. Some variance may occur from plant to plant.

2.7 Manufacturing



The manufacture of gypsum board starts with the combining of the dry ingredients in a screw conveyor, feeding of this dry ingredient mixture into a pin mixer where these dry ingredients are mixed with water and wet additives. The resulting slurry is fed between two sheets of paper; facing paper (Manila) on the bottom and backing paper

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(Newslined) on the top. The wet gypsum board is allowed to hydrate after which the hard board is cut and transferred into a kiln for evaporation of excess water. After removal of the evaporative water, the board is cut to its final size, end tapes are applied and the resulting product is ready for shipment. Any gypsum board not meeting quality control specifications is recycled on-site.

2.8 Environment and Health during Manufacturing

All appropriate equipment required by federal, state and local regulations are in place at all USG manufacturing facilities.

2.9 Packaging

End tape is applied to every two pieces to form a unit for shipment. A quantity of units are collected and placed on sleutters (i.e., spacers) for easy pick-up by fork lift trucks.

2.10 Product Installation

Standard rules and practices for installing and finishing gypsum board are presented in the *USG Gypsum Construction Handbook* available online at usg.com.

2.11 Environment and Health during Use Stage

USG gypsum board is not a controlled product under WHMIS (Workplace Hazardous Materials Information System).

2.12 Reference Service Life

The reference service life is not relevant for a cradle-to-gate (A1-A3) analysis as dictated by the gypsum board PCR. However, the reference life for USG Sheetrock® Brand gypsum board is assumed to be equal to the buildings' useful life if properly installed and maintained.

2.13 End-of-Life

All gypsum boards are disposed of in a construction and demolition waste landfill. In certain areas, USG has agreements with third-party gypsum waste recyclers who collect gypsum construction waste at jobsites for recycling and then transport this post-consumer gypsum raw material to specific USG manufacturing plants for use in the manufacturing of new wallboard. There are several alternative options to landfilling such as the use of reground gypsum wallboard for soil amendment applications. Contact your local EPA for reuse rules and regulations.



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2.14 Further Information

Additional information can be found at usg.com

3.0 LCA: Calculation Rules

3.1 Declared or Functional Unit

Gypsum board with a specified thickness of 5/8 in (15.9mm)	Value and Units
Declared Unit	1000 sq. ft.
Conversion to kg	862kg

3.2 System Boundary

The system boundaries are cradle to shipping gate (modules A1-A3) and include the following system processes in the production of 5/8" USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X: raw material extraction, raw material production, raw material transportation from suppliers to the production facility, product manufacturing, and waste management.

3.3 Estimates and Assumptions

All paper raw material and energy data is specific to the manufacture of USG Manila and Newslined papers at the USG paper mills located in North Kansas City, MO. All USG Sheetrock® Brand gypsum board raw material and energy inputs are specific to the USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X product produced at the Bridgeport, AL; Plaster City, CA; Rainier, OR; Sperry, IA and Washingtonville, PA gypsum board plants.

3.4 Cut-off Criteria

The cut-off criteria for input flows to be considered within each system boundary were as follows:

Mass – if a flow is less than 1% of the cumulative mass of the model flows it may be excluded, providing its environmental relevance is minor.

Energy – if a flow is less than 1% of the cumulative energy of the system model it may be excluded, providing its environmental relevance is minor.

The sum of the excluded material flows must not exceed 5% of mass, energy or environmental relevance.

3.5 Data Requirements and Data Sources

Manufacturer specific data was obtained from the United States Gypsum plants in Bridgeport, AL; Plaster City, CA; Rainier, OR; Sperry, IA; Washingtonville, PA; North Kansas City, MO.



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3.6 Allocation

The LCI data was collected for the 2016 production year. Raw material and energy inputs were allocated to the USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X based on the mass of those panels.

3.7 Comparability of EPDs

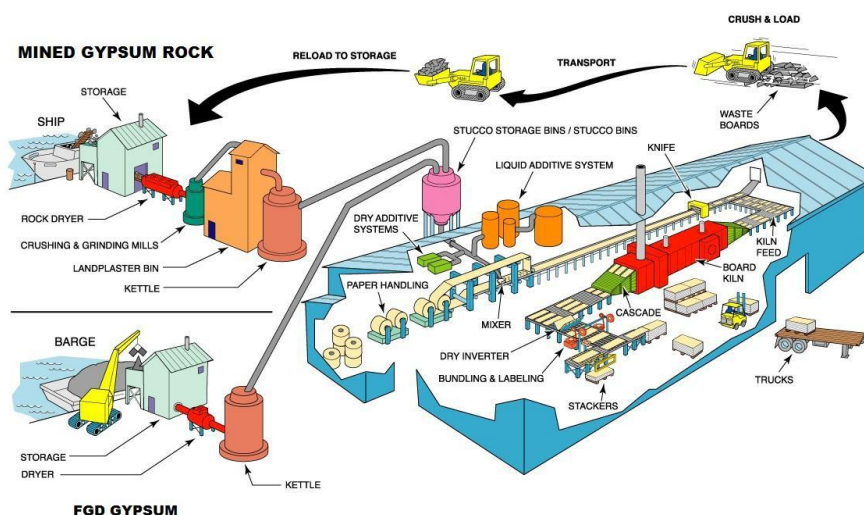
Environmental declarations from different programs may not be comparable. The comparison of the environmental performance of gypsum boards using the EPD information shall be based on the product's use in and its impacts on or within the building, and shall consider the complete life cycle (all information modules).

Full conformance with the PCR for North American Gypsum Boards ensures EPD comparability when all stages of a product's life cycle have been duly considered; however, variations and deviations are possible.

4.0 LCA Scenarios and Additional Technical Information

Life Cycle Flow Diagram

The SHEETROCK® Brand Gypsum Panels Manufacturing Process



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5.0 LCA Results

Part 1- Description of the system boundary (X: included in LCA; MND- module not declared)															
Product stage				Construction process stage				Use stage				End of life stage			
Raw material	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy	Operational water use	Deconstruction 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
Part 2- Results of the LCA- ENVIRONMENTAL IMPACT: 1000 sq. ft of gypsum board, with thickness of 5/8 inches															
Parameter								Units		Modules included in LCA: A1-A3					
										() range					
Global warming potential								kg CO2-Eq.		256 (229 – 282)					
Depletion potential of the stratospheric ozone layer								kg CFC-11 Eq.		1.89E-07 (1.82E-07 – 1.96E-07)					
Acidification potential								kg SO2 Eq.		0.582 (0.401 – 0.855)					
Eutrophication potential								kg N Eq.		0.0370 (0.0259 – 0.0593)					
Photochemical ozone creation potential								kg O3 Eq.		9.88 (5.22 – 20.9)					
Abiotic Depletion potential-fossil fuels								MJ		504 (443 – 541)					
Part 3- Results of the LCA- RESOURCE USE: 1000 sq. ft of gypsum board, with thickness of 5/8 inches															
Parameter								Units		Modules included in LCA: A1-A3					
										() range					
Use of non-renewable primary energy resources (NRPE)- excluding NRPE used as raw materials								MJ, HHV		4776 (4202 – 5156)					
NRPE, fossil								MJ, HHV		4618 (4105 – 5038)					
NRPE, nuclear								MJ, HHV		158 (97.3 – 230)					
Use of NRPE used as raw materials								MJ, HHV		0.00 (0.00 – 0.00)					
Use of non-renewable secondary fuels								MJ, HHV		0.00 (0.00 – 0.00)					
Use of non-renewable material resources								kg		503 (47 – 810)					
Use of renewable primary energy resources (RPE)- excluding RPE used as raw materials								MJ, HHV		427 (298 – 681)					
Use of RPE used as raw materials								MJ, HHV		0.00 (0.00 – 0.00)					
Use of renewable secondary fuels								MJ, HHV		0.00 (0.00 – 0.00)					
Use of renewable material resources								kg		7.03 (7.03 – 7.03)					
Use of secondary material								kg		343 (44.9 – 785)					
Net use of fresh water								m3		1.29 (1.01 – 1.80)					



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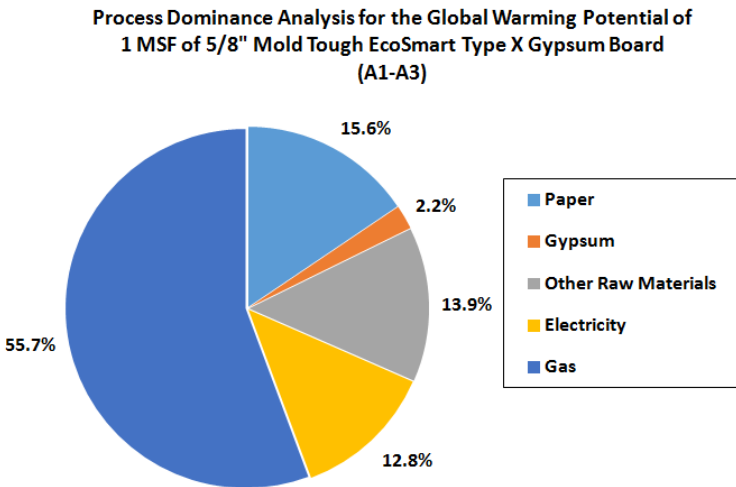
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Part 4- Results of the LCA- OUTPUT FLOWS and WASTE CATEGORIES: 1000 sq. ft of gypsum board, with thickness of 5/8 inches		
Parameter	Units	Modules included in LCA: A1-A3 () range
Hazardous waste disposed	kg	1.80E-03 (1.73E-03 – 1.83E-03)
Non hazardous waste disposed	kg	228 (200 – 253)
Radioactive waste disposal	kg	0.0577 (0.0406 – 0.0925)
Components for re-use	kg	0.00 (0.00 – 0.00)
Materials recycling	kg	0.00 (0.00 – 0.00)
Materials for energy recovery	kg	0.00 (0.00 – 0.00)
Material for disposal to landfill	kg	228 (200 – 253)

6.0 LCA Interpretation

The figure below graphically depicts relative contributions for the cradle-to gate production of 1 MSF of USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X. The significant sources of greenhouse gases at the plant are generated during the combustion of natural gas and indirectly the consumption of electricity at the generating plant.

Declarations based on this PCR are not comparative assertions; that is, no claim of environmental superiority can be inferred or implied.



7.0 Additional environmental information

USG Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X have achieved UL GREENGUARD Gold certification and qualifies as a low-emitting material (meets CDPH 01350).



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8.0 References

1. International Organization for Standardization (ISO), International Standard ISO 14025, Environmental labels and declarations – Type III environmental declaration – Principles and procedures, 2006
2. International Organization for Standardization (ISO), International Standard ISO 14040, Environmental management – Life cycle assessment – Principles and framework, 2006.
3. International Organization for Standardization (ISO), International Standard ISO 14044, Environmental management – Life cycle assessment – Requirements and guidelines, 2006.
4. International Organization for Standardization (ISO), International Standard ISO 21930, Sustainability in building construction -- Environmental declaration of building products, 2007.
5. European Standards, EN 15804, Sustainability of construction works, Environment product declarations, core rules for the product category of construction products, 2012.
6. FPInnovations, "Product Category Rules for North American Gypsum Boards", 2013.
7. Jane C. Bare, Gregory A. Norris, David W. Pennington, and Thomas McKone, 2003.
TRACI-The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts, Journal of Industrial Ecology, Volume 6, Number 3–4, 2003.
8. Dr. Lindita Bushi and Mr. Jamie Meil, "A Cradle-to-Gate Life Cycle Assessment of 1/2" Regular and 5/8" Type X Gypsum Wallboard" Prepared for the Gypsum Association by the Athena Institute, 2011.
9. Dr. Mark Englert, "A Cradle to Gate (A1-A3) and Cradle to Grave (A1-C4) Life Cycle Assessment of USG Sheetrock® Brand Type X Panels, USG Sheetrock® Brand Mold Tough® Type X Panels, and USG Sheetrock® Brand EcoSmart Mold Tough® Type X Panels, 2017 (Confidential)
10. ASTM C11-16, Standard Terminology Relating to Gypsum and Related Building Materials and Systems
11. ASTM C473-15, Standard Test Methods for Physical Testing of Gypsum Panel Products
12. ASTM C1396 - 17, Standard Specification for Gypsum Board
13. ASTM C518-15, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
14. ASTM E84-16, Standard Test Method for Surface Burning Characteristics of Building Materials
15. ASTM C1629-15, Standard Classification for Abuse-Resistant Non-Decorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels

