

ENVIRONMENTAL PRODUCT DECLARATION

SECUROCK® EXOAIR® 430

GYPSUM BOARD PANELS



Securock® ExoAir® 430 is a glass mat-faced, moisture- and mold-resistant gypsum panel, with a non-combustible core integrated with a factory-applied synthetic vapor permeable air/water barrier membrane. The in-plant application provides a uniform membrane with superior bond resulting in predictable air and water barrier performance and adhesion to the base panel. The panel is designed for use under a variety of exterior claddings, including open joint rain screens, where traditionally a separate gypsum sheathing panel and air barrier would have been used.



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 and usgdesignstudio.com



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According to ISO 14025,
ISO21930:2007

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	4787352797.110.1	
DECLARED PRODUCT	USG Securock ExoAir 430	
REFERENCE PCR	ASTM International North American Glass Mat Gypsum Panels v1. Aug 2016	
DATE OF ISSUE	July 1, 2019	
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	
	www.FPinnovations.ca	
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL		
	Grant R. Martin, UL Environment	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:		
	Thomas P. Gloria, Industrial Ecology Consultants	

This EPD conforms with ISO 21930:2007



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1. Product System Documentation

1.1. Product Description

Product Identification

Securock® ExoAir® 430 consists of a non-combustible core primarily of gypsum with non-woven glass-mat facings on the face and back [ASTM C1658] coated with an air/water permeable membrane. This EPD covers the exterior glass-mat gypsum board products produced by USG Corporation at USG’s Jacksonville, FL gypsum board plant. Securock® ExoAir® 430 System is a gypsum sheathing panel with a factory-applied fluid air/water barrier membrane coated to the face of the panel. The panel brings two proven technologies together - Securock® Brand Glass-Mat Sheathing and Tremco Commercial Sealants & Waterproofing’s fluid-applied air/water barrier membrane into one panel—that efficiently delivers the high-performance air/water barrier.

The controlled factory application of the membrane to the face of the panel provides the assurance that only a traditional thick-film membrane can. The system provides air/water barrier continuity with a direct connection of the sealant to the membrane, giving visual verification to ensure that the air/water barrier will perform to expectations.

1.2. Application

The glass-mat gypsum board products covered in this EPD are used in exterior applications in both residential and commercial buildings as noted below. During installation, these glass-mat gypsum board panels are fastened to wood or metal studs using screws. Depending on the application, location, etc., various finishing materials may be applied to the exterior surface.

1.3. Technical Data

The following technical construction data is relevant for the products covered by this EPD.

Table 1: Technical Specifications

NAME	TEST METHOD	SECUROCK® EXOAIR® 430
Membrane Adhesion to Panel, 15 psi min.	ASTM C297	Pass
Flexural Strength		
Bearing edge perpendicular to board length, lbf. min.		147
Bearing edge parallel to board length, lbf. min.	ASTM C473	100
Water Absorption, % max.		10
Nail-Pull Resistance, lbf. min.		90
Weight, psf nominal		2.6
Thermal Resistance, R (°F.ft ² .h/ BTU)	ASTM C518	0.50
Nail Sealability	ASTM D1970. Section 7.9	Pass
Mold Resistance	ASTM D3273	10
Peel Adhesion, lbf./in. pli ≥ 1	ASTM D3330	Pass
Membrane Adhesion to Panel, 16 psi min.	ASTM D4541	Pass
Water Vapor Permeance, perms Membrane, Wet Cup	ASTM E96	6.78



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Composite, Wet Cup		8
Air Permeance, 0.004 cfm/ ft ² @ 1.57 lb/ft ² max.	ASTM E2178	0.0001 cfm/ ft ²
Assembly Air Leakage, 0.04 cfm/ ft ² @ 1.57 lb/ft ² max.	ASTM E2357	0.002 cfm/ ft ²
Assembly Water Penetration, 15 minutes @ 2.86 lb/ft ²	ASTM E331	Pass
Bending Radius*, Dry	-	9'
Coefficient of Thermal Expansion, in./in./ °F	ASTM E831	8.5 x 10 ⁻⁶
Water Resistance, @ 22 in./ 5hrs.	AATCC 127-08	Pass
R-Value R (°F.ft ² .h/ BTU)		0.50
R-Value R (m ² .K/W)		0.088

*Recommended fastener spacing is 6" o.c. when panels are bent.

1.4. Placing on the Market / Application Rules

Standard application rules for gypsum board are presented in the USG Construction Handbook available on-line at USG.com.

1.5. Product Formulation

Table 2: Material Composition

MATERIAL	5/8" SECUROCK® EXOAIR® 430	1/2" SECUROCK® EXOAIR® 430
Core	91.2%	88.0%
Facer Scrim	1.1%	1.5%
Backer Scrim	1.1%	1.5%
ExoAir Coating	6.6%	9.0%
Total	100%	100%

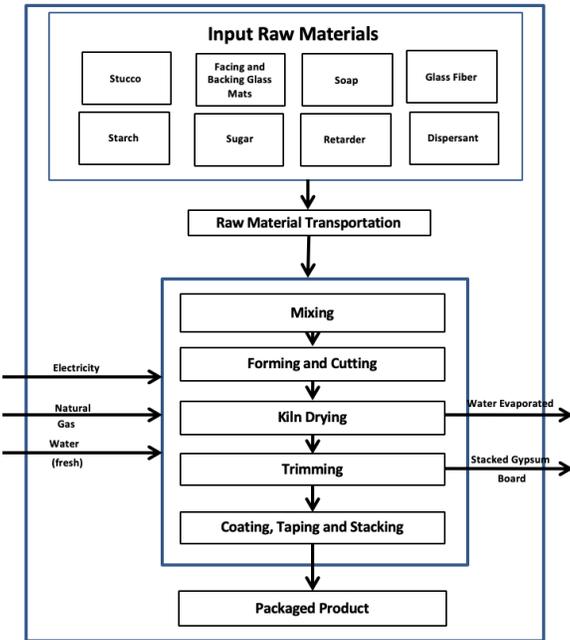




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1.6. Manufacture



The manufacture of glass-mat gypsum board starts with the combining of the dry ingredients and mixing the dry ingredients with water and wet additives. The resulting slurry is fed between two sheets of glass-mat. The wet gypsum board is allowed to hydrate after which the board is cut and transferred into a kiln for evaporation of excess water. After evaporation, the board is cut to its final size, coated, and is then ready for shipment.

1.7. Environment and Health During Manufacturing

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

1.8. Installation

Standard rules and practices for installing and finishing gypsum board are presented in the Securock® ExoAir® 430 Installation Instructions available on-line at securockexoair.com.

1.9. Ancillary Products

This section briefly describes the products that were modeled as part of the installation process for the Securock® ExoAir® 430 product. The usage values for these ancillary products are based on an 8' wide by 125' wall application consisting of 5/8" Securock® ExoAir® 430 to studs using screws as described below. Depending on the application, location, etc., various caulks, coatings membranes and other finishing materials may be applied to the exterior surface. These were not included in this analysis.

Fasteners (screw type and fastener spacing are taken from USG literature for the 5/8" Securock® ExoAir® 430 Glass-Mat Panel)

- Application consisting of 5/8" 4'x8' glass mat gypsum board panels on steel studs
- 12" oc stud spacing (minimum allowable stud spacing)
- 1.625" type S screw
- 4" spacing between screws (minimum recommended screw spacing)
- 3,375 screws total per 1 MSF at 2.237 g/screw = 7.55 kg of screws/MSF

1.10. Packaging

A quantity of units is collected and placed on sleutters (i.e., spacers) for easy pick-up by fork lift trucks.





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1.11. Conditions of Use

Table 3: Allowable Uniform Wind Load (PSF) for 5/8" Thick Panels

FRAME SPACING	12"			16"			24"		
Fastener Spacing	4	6	8	4	6	8	4	6	8
Allowable Pressure	107	67	50	75	50	38	34	27	24

Securock® ExoAir® 430 may be used with both steel and wood framing. The sheathing can be installed perpendicular or parallel to the framing. Fasteners must have a minimum edge distance of 3/8". The values in this table are based on testing per ASTM E330 and represent the capacity of the panel to resist flexural failure or fastener pull-through with a 3.0 factor of safety. Capacities are based on a minimum fastener head diameter of 0.325" (#6 bugle head screw). The withdrawal resistance of fasteners from framing is different on several factors, including but not limited to fastener type, fastener length and framing properties. The specification of fasteners is the responsibility of the designer of record. These capacities assume continuous support of each stud flange over the full length of the panel. Allowable Pressures are based on maximum deflection limitation of L/360. Consult USG representative for higher deflection limitations. Allowable pressure values are for short-term wind loads. Framing design is independent of these values. The design capacities of assemblies constructed with pneumatically driven fasteners are beyond the scope of this document.

1.12. Environment and Health During Use

This product is not expected to produce an unusual hazards during normal use. Exposure to high dust levels may irritate the skin, eyes, nose, throat, or upper respiratory tract. Proper personal protective gear should be worn by installer for protection.

1.13. Reference Service Life

All USG glass-mat gypsum board products carry a lifetime warranty. However, the useful life of exterior Securock® ExoAir® 430 products should be as long as the buildings' useful life if properly installed and maintained. For the purposes of this study the useful life of the Securock® ExoAir® 430 is considered to be the same as the building's useful life.

1.14. Re-Use Phase

Securock® ExoAir® 430 panels cannot generally be re-used at end of life.

1.15. Disposal

For this study, all glass-mat gypsum boards are disposed of in a construction and demolition waste landfill.





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2. LCA Calculation Rules

2.1. Declared Unit

The declared unit for this LCA study is 1,000 square feet of glass-mat gypsum board ready for shipment.

Table 4: Declared Unit

NAME	5/8" SECUROCK® EXOAIR® 430	1/2" SECUROCK® EXOAIR® 430
Declared Unit	92.9 m ²	92.9 m ²
Declared Thickness	1.59 cm	1.27 cm
Conversion Factor (1 kg)	9.67E-04	1.32E-03

For purposes of defining a functional unit, an ESL of a building in North America of 60 years shall be used.

2.2. System Boundary

This EPD represents a “cradle-to-grave” LCA analysis for Securock® ExoAir® 430. It covers all the production steps from raw material extraction (i.e., the cradle) to end of life disposal (grave).

2.3. Estimates and Assumptions

All glass-mat gypsum board raw material and energy inputs are specific to the specific products produced at the selected gypsum board plant.

2.4. 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.

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 8 software. Specific comments related to data quality requirements cited in ISO 14025 Section 4.2.3.6.2 include the following.



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Temporal: Raw material and energy inputs were collected from the USG, Jacksonville, FL plant for the production year 2016 and were allocated by mass to the specific products.

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 for glass-mat gypsum board production were derived from plant MDIS (Manufacturing Data Information Systems) data.

Completeness: Virtually all the significant raw material flows (> 99%) in glass-mat gypsum board 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 2016 calendar year.

2.8. Allocation

In the case of glass-mat gypsum board, raw material and energy inputs was collected for the 2016 production year. Raw material and energy inputs were allocated to the specific type of glass-mat gypsum board based on the mass of that type of glass-mat gypsum board.

2.9. Comparability

EPDs created from different programs or using different PCRs may not be comparable.





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3. LCA: Scenarios and additional technical information

Table 5: Transport to the building site (A4)

NAME	5/8" SECUROCK® EXOAIR® 430	1/2" SECUROCK® EXOAIR® 430	UNIT
Fuel type	Diesel	Diesel	-
Liters of fuel	2.24	1.64	l/100km
Vehicle type	US Truck	US Truck	-
Transport distance	399	399	km
Capacity	0.97	0.97	
Gross density of products transported	702	513	kg/m ³

Table 6. Installation into the building (A5)

NAME	VALUE	UNIT
Ancillary materials	7.55	kg
Net freshwater consumption specified by water source and fate	0	m ³
Other resources	0	kg
Electricity consumption	0	kWh
Other energy carriers	0	MJ
Material loss	10% of surface area	%
Output substances following waste treatment on site	0	%
Dust in the air	~ 0	kg



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Table 7. Use or application of the installed product (B1)

NAME	VALUE	UNIT
RSL	60	years

Table 8. Maintenance (B2)

NAME	VALUE	UNIT
Maintenance process information	As required by the PCR, a standard Life expectancy for ceiling panels based on historic practices of 60 years shall be used. No maintenance is required.	
Maintenance cycle	0	Number/ RSL
Maintenance cycle	0	Number/ ESL
Water consumption	0	m ³
Auxiliary	0	kg
Other resources	0	kg
Electricity consumption	0	kWh
Other energy carriers	0	MJ
Material loss	0	kg

Note: LCA Scenarios for modules B3-B7 are intentionally not displayed as a result of values being zero.



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Table 9. End of life (C1-C4)

NAME		5/8” SECUROCK® EXOAIR® 430	1/2” SECUROCK® EXOAIR® 430	UNIT
Collection process (specified by type)	Collected separately	0	0	kg
	Collected with mixed construction waste	1041	763	kg/MSF
Recovery (specified by type)	Reuse	0	0	kg
	Recycling	0	0	kg
	Landfill	1041	763	kg/MSF
	Incineration	0	0	kg
	Incineration with energy recovery	0	0	kg
	Energy conversion efficiency rate	0	0	-
Disposal	Product or material for final deposition	1041	763	kg/MSF
Removals of biogenic carbon (excluding packaging)		0	0	kg CO ₂





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4. Life Cycle Assessment Results

Table 10: Description of the system boundary modules

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MND

Table 11: 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		
RPRE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value (LHV)
RPRM	Use of renewable primary energy resources used as raw materials	MJ, net calorific value
RPRT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value
NRPRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value
NRPRM	Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value
NRPRT	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value



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SM	Use of secondary materials	kg
RSF	Use of renewable secondary fuels	MJ, net calorific value
NRSF	Use of non-renewable secondary fuels	MJ, net calorific value
RE	Recovered energy	MJ, net calorific value
FW	Net use of fresh water	m3
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

4.1. Life Cycle Impact Assessment Results

Results are presented for 1000 square feet of gypsum panels.

Table 12: North American Impact Assessment Results for 5/8" Securock® ExoAir® 430

TRACI v2.1	UNITS	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
GWP	kg CO ₂ eq.	6.50E+02	7.14E+01	2.74E+01	0.00E+00	1.95E+01									
ODP	kg CFC-11 eq.	1.71E-07	1.31E-12	3.43E-11	0.00E+00	1.96E-10									
AP	kg SO ₂ eq.	1.09E+00	2.80E-01	7.16E-02	0.00E+00	1.21E-01									
EP	kg N eq.	7.09E-02	2.09E-02	4.61E-03	0.00E+00	1.01E-02									
POCP	kg O ₃ eq.	1.67E+01	9.47E+00	1.19E+00	0.00E+00	2.52E+00									
ADP	MJ, LHV	1.52E+03	7.23E+01	1.26E+01	0.00E+00	3.24E+01									



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Table 13: North American Impact Assessment Results for 1/2" Securock® ExoAir® 430

TRACI v2.1	UNITS	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
GWP	kg CO ₂ eq.	5.68E+02	5.23E+01	2.70E+01	0.00E+00	1.42E+01									
ODP	kg CFC-11 eq.	1.67E-07	9.61E-13	2.85E-11	0.00E+00	1.43E-10									
AP	kg SO ₂ eq.	1.06E+00	2.05E-01	6.84E-02	0.00E+00	8.85E-02									
EP	kg N eq.	6.98E-02	1.53E-02	4.34E-03	0.00E+00	7.42E-03									
POCP	kg O ₃ eq.	1.56E+01	6.94E+00	1.12E+00	0.00E+00	1.84E+00									
ADP	MJ, LHV	1.32E+03	5.30E+01	1.18E+01	0.00E+00	2.37E+01									

4.2. Life Cycle Inventory Results

Table 14: Resource Use for 5/8" Securock® ExoAir® 430

PARAMETER	UNITS	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
RPRE	MJ, NCV	5.97E+02	1.34E+01	3.92E+01	0.00E+00	2.64E+01									
RPRM	MJ, NCV	0.00E+00													
NRPRE	MJ, NCV	1.16E+04	1.71E+04	2.85E+02	0.00E+00										
NRPRM	MJ, NCV	0.00E+00													
SM	kg	1.02E+03	0.00E+00	1.13E+02	0.00E+00										
RSF	MJ, NCV	0.00E+00													
NRSF	MJ, NCV	0.00E+00													
RE	MJ, NCV	0.00E+00													
FW	m ³	2.46E+00	6.52E-02	4.22E-02	0.00E+00	5.05E-02									

Table 15: Resource Use for 1/2" Securock® ExoAir® 430

PARAMETER	UNITS	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
RPRE	MJ, NCV	5.42E+02	8.84E+00	9.96E+01	0.00E+00	1.93E+01									
RPRM	MJ, NCV	0.00E+00													
NRPRE	MJ, NCV	9.24E+03	3.58E+02	1.34E+03	0.00E+00	1.93E+02									
NRPRM	MJ, NCV	0.00E+00													
SM	kg	1.02E+03	0.00E+00	1.13E+02	0.00E+00										
RSF	MJ, NCV	0.00E+00													
NRSF	MJ, NCV	0.00E+00													
RE	MJ, NCV	0.00E+00													
FW	m ³	1.99E+00	4.30E-02	2.67E-01	0.00E+00	3.70E-02									



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Table 16: Output Flows and Waste Categories for 5/8" Securock® ExoAir® 430

PARAMETER	UNITS	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
HWD	kg	2.77E-02	4.22E-06	8.36E-07	0.00E+00	5.43E-06									
NHWD	kg	1.72E+01	2.04E-02	1.31E+02	0.00E+00	1.04E+03									
HLRW	kg	N/A													
ILLRW	kg	N/A													
CRU	kg	0.00E+00													
MR	kg	1.06E+02	0.00E+00	1.18E+01	0.00E+00	1.03E+03									
MER	kg	0.00E+00	0.00E+00	4.61E-03	0.00E+00										
EE	MJ, LHV	0.00E+00													

Table 17: Output Flows and Waste Categories for 1/2" Securock® ExoAir® 430

PARAMETER	UNITS	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
HWD	kg	2.28E-02	2.78E-06	2.54E-03	0.00E+00	3.97E-06									
NHWD	kg	1.56E+01	1.34E-02	1.73E+00	0.00E+00	7.58E+02									
HLRW	kg	N/A													
ILLRW	kg	N/A													
CRU	kg	0.00E+00													
MR	kg	7.55E+01	0.00E+00	8.39E+00	0.00E+00	7.56E+02									
MER	kg	0.00E+00													
EE	MJ, LHV	0.00E+00													

5. LCA Interpretation

The LCA results for the production of glass-mat gypsum board were dominated by energy usage; primarily natural gas and electricity usage as well as the application of the air-barrier coating. For example, application of the coating (coating and energy contributions) were responsible for 29.0% of the global warming impact of the 5/8" Securock® ExoAir® 430 panel.

6. References

LCA Report

LCA Report for USG Securock® ExoAir® 430 Glass-Mat Gypsum Board Panels. January 28 2019. USG.

ASTM INTERNATIONAL

ASTM International: Product Category Rules for Preparing an Environmental Product Declaration for North American Glass Mat Gypsum; August 2016, version 1

SUSTAINABILITY REPORTING STANDARDS



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According to ISO 14025,
ISO 21930:2007

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

