Cabot® Gypsum Company

Cabot Gypsum Board — Regular Core / Panneau de Revêtement, Noyau Traité / Centro Regular

NSF Certified Environmental Product Declaration www.nsf.org

Environmental Product Declaration

Regular Gypsum Board 1/2 Inch

Program Operator	NSF Certification LLC 789 N. Dixboro, Ann Arbor, MI 48105 www.nsf.org
Manufacturer Name and Address	Cabot Gypsum ULC 221 Henry Paint Street Point Tupper, Nova Scotia B9A 1Y7
Declaration Number	EPD10808
Declared Product and Declared Unit	92.9 m^2 (1,000 square feet) of Regular Gypsum Board (1/2 inch)
Reference PCR and Version Number	NSF PCR for Gypsum Panel Products (Version 1.1, 2020)
Product's Intended Application and Use	Product is designed for interior walls and ceilings.
Product RSL	75 years
Markets of Applicability	North America
Date of Issue	1/12/2023
Period of Validity	5 years from date of issue
EPD Type	Product Specific
Range of Dataset Variability	N/A
EPD Scope	Cradle-to-Gate
Year of reported manufacturer primary data	2020
LCA Software and Version Number	GaBi 10.6.1.35
LCI Database and Version Number	GaBi Database 2021.2
LCIA Methodology and Version Number	TRACI 2.1 and IPCC AR6
The sub-category PCR review was conducted by:	• Thomas P. Gloria, Industrial Ecology Consultants • Bill Stough, Sustainable Research Group • Jack Geibig, EcoForm
This declaration was independently verified in accordance with ISO 14025: 2006. The NSF PCR for Gypsum Panel Products (Version 1.1, 2020) serves as the core PCR. ☐ Internal ☒External	Tony Favilla afavilla@nsf.org
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Lindsay Bonney, WAP Sustainability Consulting, LLC
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Jack Geibig - EcoForm jgeibig@ecoform.com

Limitations:
Environmental declarations from different programs (ISO 14025) may not be comparable.
Only EPDs prepared from cradle-to-grave life-cycle results and based on the same function, reference service life, based on the same scenarios, and quantified by the same functional unit, and meeting all the conditions in ISO 14025, Section 6.7.2 and ISO 21930 can be used to assist purchasers and users in making informed comparisons between products.
Full conformance with the NSF PCR for Gypsum Panel Products, which is compatible with ISO 21930, allows EPD comparability only 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 results for upstream or downstream of the life cycle stages declared.
Additional information on the life cycle assessment can be found by contacting Cabot Gypsum directly via https://cabotgypsum.com/index.php/en/contact-us.

Description of Company

Cabot Gypsum ("Cabot") is headquartered in Point Tupper, Novia Scotia, Canada. Cabot's current product mix includes regular and fire rated products, mold and moisture resistant products, abuse resistant products, vinyl ceiling tiles, and exterior sheathing products. Cabot's natural gypsum comes from local quarries and gypsum recycling facilities.

Product Description

Cabot Regular Gypsum Board is designed for use with most walls, partitions and ceilings in both new commercial and residential construction and remodeling work. It consists of a noncombustible, dimensionally stable gypsum rock core. The face layer consists of 100% recycled ivory colored paper, which is formed along each edge, wrapped around and sealed to the brown paper on the back side. This board comes from the factory as a ready-to-finish product. Cabot Regular Gypsum Board is manufactured by Cabot at its Nova Scotia facility.

The product in this EPD is considered a gypsum board product. The CSI code for this product is 09 29 00 and it falls under the following sub-category as defined by the PCR: gypsum panel products.

Applicable Product Standards

Applicable product standards for gypsum boards include:

- ASTM C11–18b Standard terminology relating to gypsum and related building materials and systems.
- ASTM C22 / C22M–00(15) Standard Specification for Gypsum.
- ASTM C473–17 Standard Test Methods for Physical Testing of Gypsum Panel Products.
- ASTM C1396 / C1396M–17- Standard Specification for Gypsum Board.
- ASTM C1658 – Standard Specification for Glass Mat Gypsum Panels.
- ASTM D3273–16 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- ASTM E84–19b Standard Test Method for Surface Burning Characteristics of Building Materials.
- ASTM E119–18ce1 Standard Test Methods for Fire Tests of Building Construction and Materials.

Technical Data

Table 1 shows the technical specifications of the product, including any testing data as appropriate.

Table 1: Technical Details

Parameter	Regular Gypsum Board
Performance	Class A Flame Spread Rating
Edge	Tapered, Square
Thickness	1/2 inch
Width	48”
Color	Ivory, Brown
Core	Non-Combustible

Manufacturing

Gypsum arrives at the manufacturing plant and is introduced to the system through a grilled opening, sent on through a hammer mill and then conveyed into a pebble bin. This material is then calcined and ground to proper specifications. The calcined gypsum is then conveyed into the stucco holding bin and transported into the additive mix. Here, water and additives are introduced. After blending, face and back mats are glued. The board is cut to the specified length, bundled with end tape, and sent to the stacker before shipment.

Material Composition

The composition of the product was obtained from Cabot associates and is presented in Table 2. The raw materials for the product were obtained from various suppliers across North America. The product under review is packaged with end tape, tear tape, plastic bags, and air bags.

Table 2: Material Composition

	Regular Gypsum Board
Natural Gypsum, including virgin and reclaimed	50 - 60%
Water	40 - 50%
Face/Backing Material	0 - 5%
Other Materials	0 - 5%

LIFE CYCLE ASSESSMENT BACKGROUND INFORMATION

Declared Unit

The declared unit is 92.9 m^2 (1,000 square feet) of gypsum board. This product is used to construct walls or ceilings in most commercial and residential construction settings. Applications include wood framing and light gauge metal framing

Table 3: Declared Unit

	Regular Gypsum Board
Mass per declared unit [kg]	748

System Boundary

This is a Cradle-to-Gate study. An overview of the system boundary is shown in

Figure *1* and a summary of the life cycle modules included in this EPD is presented in Table 4. Infrastructure flows have been excluded.

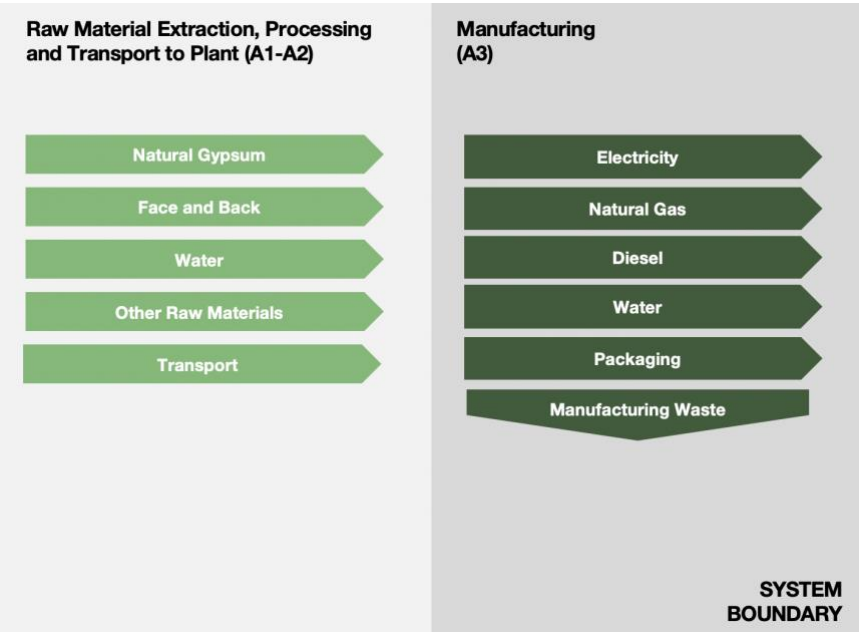


Figure 1: System Boundary

Table 4: Life Cycle Stages Included in the Study

Production			Construction		Use							End of Life				Benefits & Loads Beyond 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 to Site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction	Transport	Waste Processing	Disposal	Reuse, Recovery, Recycling Potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

This study does not include the impacts associated with installation, use, maintenance, repair, operational energy and water use, replacement, refurbishment, and disposal.

Cut-off Criteria

Material inputs greater than 1% (based on total mass of the final product) were included within the scope of the analysis. Material inputs less than 1% were included if sufficient data were available to warrant inclusion and/or the material input was thought to have significant environmental impact. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the declared unit. No known flows were deliberately excluded from this EPD.

Allocation

General principles of allocation were based on ISO 14040/44.

To derive a per-unit value for the manufacturing inputs, such as electricity, thermal energy and water, allocation based on total production by mass was adopted. Inputs per-kilogram of product were then scaled according to the weight of each product per functional unit.

As a default, secondary GaBi datasets use a physical mass basis for allocation.

LIFE CYCLE ASSESSMENT RESULTS

All results are given per declared unit, which is 92.9 m^2 of gypsum board. Environmental impacts were calculated using the GaBi software platform. Impact results have been calculated using the TRACI 2.1 and IPCC AR6 impact assessment methodologies. Results presented in this report are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

Table 5: LCIA Indicators

Abbreviation	Parameter	Unit
TRACI 2.1		
AP	Acidification potential of soil and water	kg SO_2 eq
EP	Eutrophication potential	kg N eq
GWP	Global warming potential (100 years, includes biogenic CO_2)	kg CO_2 eq
ODP	Depletion of stratospheric ozone layer	kg CFC 11 eq
ADPfossil	Depletion of non-renewable fossil fuels	MJ, surplus energy
SFP	Smog formation potential	kg O_3 eq
IPCC AR6		
GWP, excl	GWP100, excl biogenic carbon	kg CO_2 eq
GWP, incl	GWP100, incl biogenic carbon	kg CO_2 eq

Table 6: Biogenic Carbon Indicators

Abbreviation	Parameter	Unit
BCRP	Biogenic Carbon Removal from Product	[kg CO_2]
BCEP	Biogenic Carbon Emission from Product	[kg CO_2]
BCRK	Biogenic Carbon Removal from Packaging	[kg CO_2]
BCEK	Biogenic Carbon Emission from Packaging	[kg CO_2]
BCEW	Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	[kg CO_2]
CCE	Calcination Carbon Emissions	[kg CO_2]
CCR	Carbonation Carbon Removals	[kg CO_2]
CWNR	Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	[kg CO_2]

Table 7: Resource Use, Waste, and Output Flow Indicators

Abbreviation	Parameter	Unit
Resource Use Parameters		
RPR_E	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value (LHV)
RPR_M	Use of renewable primary energy resources used as raw materials	MJ, net calorific value
RPR_T	Total use of renewable primary energy resources	MJ, net calorific value
$NRPR_E$	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value
$NRPR_M$	Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value
$NRPR_T$	Total use of non-renewable primary energy resources	MJ, net calorific value

Abbreviation	Parameter	Unit
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	m^3
Waste Parameters and Output Flows		
HWD	Disposed-of-hazardous waste	kg
NHWD	Disposed-of non-hazardous waste	kg
HLRW	High-level radioactive waste, conditioned, to final repository	kg
ILLRW	Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
CRU	Components for reuse	kg
MR	Materials for recycling	kg
MER	Materials for energy recovery	kg
EEE	Exported electrical energy	MJ
EET	Exported thermal energy	MJ

The user of the EPD should take care when comparing EPDs from different companies. Assumptions, data sources, and assessment tools may all impact the variability of the final results and make comparisons misleading. Without understanding the specific variability, the user is therefore, not encouraged to compare EPDs.

Regular Gypsum Board 1/2 Inch

The LCIA results presented below are for 92.9 m^2 (1,000 square feet) of gypsum board.

Impact Category	Total A1-A3	A1	A2	A3
TRACI LCIA Impacts (North America)				
AP [kg SO_2 eq]	**8.13E-01**	1.25E-01	4.30E-01	2.58E-01
EP [kg N eq]	**9.85E-02**	4.99E-02	1.86E-02	3.00E-02
GWP, incl biogenic carbon [kg CO_2 eq]	**1.67E+02**	-1.52E+01	1.87E+01	1.64E+02
ODP [kg CFC 11 eq]	**6.62E-08**	6.62E-08	3.58E-14	9.62E-14
ADP-fossil fuel [MJ]	**4.45E+02**	9.12E+01	3.53E+01	3.19E+02
SFP [kg O_3 eq]	**1.74E+01**	2.98E+00	9.08E+00	5.31E+00
IPCC AR6				
GWP100, excl biogenic carbon [kg CO2 eq.]	**2.35E+02**	5.01E+01	1.91E+01	1.65E+02
GWP100, incl biogenic carbon [kg CO2 eq.]	**1.70E+02**	-1.48E+01	1.66E+02	1.70E+02
Carbon Emissions and Uptake				
BCRP [kg CO_2]	**2.85E+01**	2.85E+01	-	-
BCEP [kg CO_2]	**-**	-	-	-
BCRK [kg CO_2]	**4.21E-04**	-	-	4.21E-04
BCEK [kg CO_2]	**-**	-	-	-
BCEW [kg CO_2]	**-**	-	-	-
CCE [kg CO_2]	**-**	-	-	-
CCR [kg CO_2]	**-**	-	-	-
CWNR [kg CO_2]	**-**	-	-	-

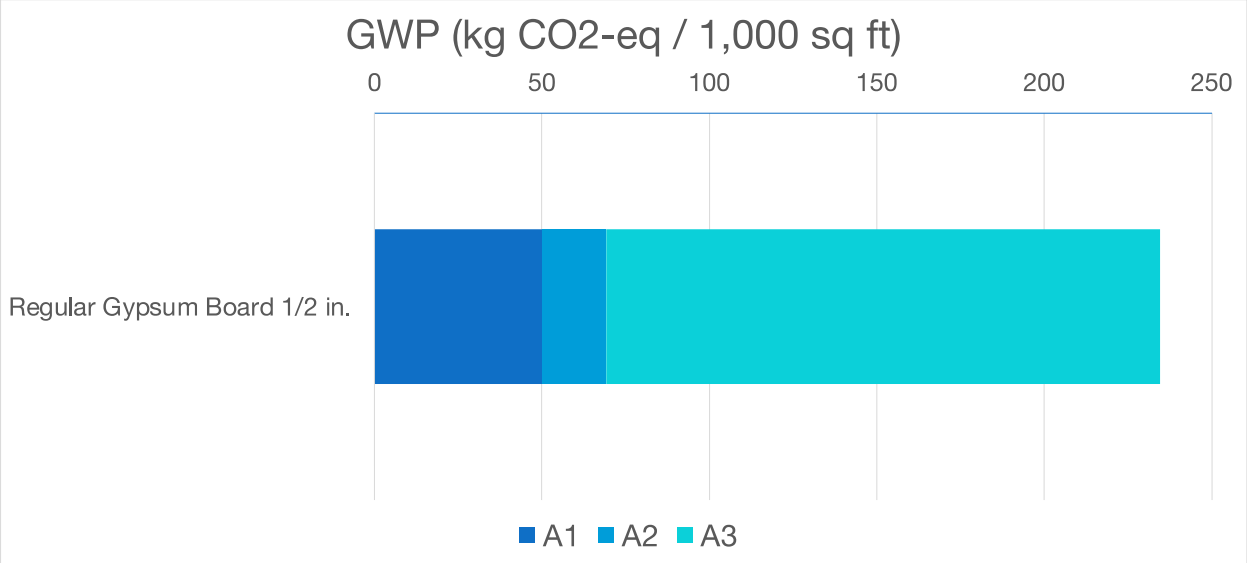
Impact Category	Total A1-A3	A1	A2	A3
Resource Use Indicators				
RPR_E [MJ]	**6.37E+02**	5.23E+02	1.04E+01	1.04E+02
RPR_M [MJ]	**7.46E+02**	7.46E+02	-	1.50E-03
RPR_T [MJ]	**1.38E+03**	1.27E+03	1.04E+01	1.04E+02
$NRPR_E$ [MJ]	**3.42E+03**	7.22E+02	2.67E+02	2.43E+03
$NRPR_M$ [MJ]	**3.29E+01**	3.29E+01	-	1.61E-02
$NRPR_T$ [MJ]	**3.45E+03**	7.55E+02	2.67E+02	2.43E+03
SM [kg]	-	-	-	-
RSF [MJ]	**-**	-	-	-
NRSF [MJ]	**-**	-	-	-
RE [MJ]	**-**	-	-	-
FW [m^3]	**1.00E+00**	8.15E-01	3.73E-02	1.48E-01
Output Flows and Waste Categories				
HWD [kg]	**4.08E-04**	4.08E-04	1.11E-09	1.37E-07
NHWD [kg]	**4.82E+00**	1.89E+00	2.29E-02	2.91E+00
HLRW [kg]	**2.11E-05**	1.92E-05	8.76E-07	9.91E-07
ILLRW [kg]	**2.44E-02**	2.28E-02	7.38E-04	8.75E-04
CRU [kg]	**-**	-	-	-
MR [kg]	**-**	-	-	-

Impact Category	Total A1-A3	A1	A2	A3
MER [kg]	**-**	-	-	-
EEE [MJ]	**2.38E-01**	-	-	2.38E-01
EET [MJ]	**1.12E-01**	-	-	1.12E-01

LIFE CYCLE ASSESSMENT INTERPRETATION

A dominance analysis was performed for all products in the LCA to show which of the life cycle modules contributes to the majority of the impacts. Due to the relevance of this impact category to the product type and the manufacturer's interests, this dominance analysis is provided for IPCC AR6 Global Warming Potential (GWP) 100, excluding biogenic carbon results.

Global warming potential (GWP) is a measure of how much heat a greenhouse gas traps in the atmosphere up to a specified time horizon and measured relative to carbon dioxide.



The dominance analysis shows that the impacts from raw material extraction (A1) and manufacturing (A3) average 21% and 70%, respectively, while impacts from transportation (A2) are significantly lower (9%). At a more granular level, we find natural gypsum and facer/backer are the largest contributors to A1 impacts at 11% and 6% of overall emissions, respectively. The emissions sources contributing the most within the manufacturing stage (A3) are natural gas and electricity usage at the manufacturing facility, accounting for 51% and 18% of overall emissions, respectively.

REFERENCES

1. Life Cycle Assessment, LCA Report for Cabot Gypsum – Gypsum Boards. WAP Sustainability Consulting. October 2022.
2. NSF Product Category Rule (PCR) for Gypsum Panel Products Version 1.1 (April 2020)
3. ISO 14040: 2006 Environmental Management – Life cycle assessment – Principles and framework.
4. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.
5. ISO 14044: 2006/ Amd 1:2017 Environmental Management – Life cycle assessment – Requirements and Guidelines – Amendment 1.
6. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
7. ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.