

PANEL REY®


Paneles de Yeso



Environmental Product Declaration (EPD)

The Environmental Product Declaration of 1,000 square feet (MSF) of gypsum board of varying thicknesses manufactured by Panel Rey S.A at their plants in NUEVO LEON, SAN LUIS POTOSI, and JUAREZ Mexico

This environmental product declaration was conducted in accordance with ISO 14025:2006. It is a declaration with all the relevant information disclosed per the governing product category rule the International EPD® System PCR Construction products and construction services, V2.2 2012:01 and EN1504. The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

Program Operator:	 <p>Labeling Sustainability Inc. Mexico City, Mexico ifo@labelingsustainability.com</p>
Date of publication (issue):	12/19/2018
Date of validity: An EPD should provide current information and may be updated if conditions change. The stated validity is, therefore, subject to the continued registration and publication at www.environdec.com .	12/19/2023
EPD registration:	PRLS121918
Product Category Rules:	International EPD® System PCR Construction products and construction services, V2.2 2012:01
Product group classification:	UN CPC 54
Reference year for data:	2016, 2017, and mid-2018
Geographical scope:	Mexico

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): <i>International EPD® System PCR Construction products and construction services, V2.2 2012:01</i>
PCR review was conducted by: Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se
Independent third-party verification of the declaration and data, according to ISO 14025:2006: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification

Third party verifier:
 Geoff Guest, PhD.
 Ecogamut Consulting Inc.



Approved by: The International EPD[®] System

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes No

Contact Information:

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Environmental Product Declaration

In accordance with ISO 14025 and EN 15804+A1 and/or ISO 21930 for:

Gypsum Board of Varying Thicknesses

from

Panel Rey S.A.

EPD registration number:	PRLS121918
Publication date:	2018-12-19
Validity date:	+5 years from the finalization of verification / date of the verification report
Geographical scope:	Mexico, United States, and Latin America



EPD Owner

Panel Rey S.A.

Contact:

Karla Daniela Macías Luján, kmacias@gpromax.com

Site Locations:

1. **Planta El Carmen (Monterrey)**

El Carmen, Nuevo León, México
Carr. Monterrey-Monclova Km. 11.5
Col. El Carmen
C.P 66560

2. **Planta San Luis (San Luis Potosi)**

Matehuala, San Luis Potosí, México
Av. Comisión Fed. de Electricidad 775
Zona Industrial
C.P. 1200

3. **Planta Juárez (Juarez)**

Ciudad Juárez, Chihuahua, México
Carr. Miguel Ahumada-Juárez Km 338.5
Samalayuca
C.P. 32730

Company Information

Panel Rey, founded in 1986, is a Mexican gypsum board company with a global vision and modern technology that offers the most advanced integrated construction system based on a galvanized steel structure covered with drywall.

Product Information

Product Name:

1,000 square feet (MSF) of gypsum board of varying thicknesses

Product Identification:

This EPD assumes the impacts from the products manufactured by Panel Rey S.A. are in accordance with the following ASTM standards:

Table 1: Panel Rey Panel Type, Manufacturing ASTM, and Manufacturing Facility

Panel Type	ASTM	Manufacturing Facility
Flex Rey 1/4"	C1396 / C473	Monterrey
Regular Rey 1/2"	C1396	Monterrey, San Luis Potosí, Juarez
Regular Rey 3/8"	C1396	Monterrey, San Luis Potosí, Juarez
Regular Rey 5/8"	C1396	Monterrey, San Luis Potosí, Juarez
Water Rey 1/2"	C1396 / C4733	Monterrey, San Luis Potosí, Juarez
Water Rey Type X 5/8"	C1396 / C4733	Monterrey, Juarez
Light Rey 1/2"	C1396	Monterrey, San Luis Potosí, Juarez
Guard Rey 1/2"	C1396 (C-36) / C36 conform to C-473	Monterrey, San Luis Potosí, Juarez
Guard Rey Type X 5/8"	C1396 (C-36) / C36 conform to C-473	Monterrey, Juarez
Soffit Type C 5/8"	C1396 / C-36 conform to C-473	Monterrey, Juarez
Soffit Type X 5/8"	C1396 / C-36 conform to C-474	Monterrey, Juarez
Fire Rey 1/2"	C1396 (section 5)	Monterrey, San Luis Potosí, Juarez
Fire Rey 5/8"	C1396 (section 5)	Monterrey, San Luis Potosí, Juarez
Fire Rey Type C 1/2"	C1396 (section 5)	Monterrey, San Luis Potosí, Juarez
Fire Rey Type C 5/8"	C1396 (section 5)	Monterrey, Juarez
Exterior Rey 1/2"	C1396	Monterrey, San Luis Potosí
Exterior Rey 5/8"	C1396	Monterrey, San Luis Potosí
Ceiling Rey 1/2"	C1396	Monterrey, San Luis Potosí, Juarez
Glass Rey 1/2"	C1396 / C1177	Monterrey
Glass Rey Type X 5/8"	C1396 / C1178	Monterrey
Glass Rey 1/2"	C1396 / C1177	Juarez
Glass Rey Type X 5/8"	C1396 / C1178	Juarez
Glass Rey 1/2"	C1396 / C1177	San Luis Potosí
Glass Rey Type X 5/8"	C1396 / C1178	San Luis Potosí
Glass Rey Interiors 1/2"	C1658 / C1396	Monterrey, Juarez

Additional ASTMS for the various panel types are included in the table below.

Table 2: Additional ASTM's for Panel Rey Products as Defined by their Specific Characteristics

Panel Type	NC	FR	TS	TC	CR	BF	TE	P	RM	SP
Water Rey 1/2"		D3273								
Water Rey Type X 5/8"		D3273				E119				
Guard Rey 1/2"		D3273								
Guard Rey Type X 5/8"		D3273				E119				
Soffit Type C 5/8"						E119				
Soffit Type X 5/8"						E119				
Fire Rey 5/8"						E119				
Fire Rey Type C 1/2"						E119				
Fire Rey Type C 5/8"						E119				
Exterior Rey 5/8"						E119				
Glass Rey 1/2"	E136	D3273	C297	C518	C473	E136	D1037 / E228	E96	E72	E330
Glass Rey Type X 5/8"	E136	D3273	C297	C518	C473	E136 / E119	D1037 / E228	E96	E72	E330
Glass Rey Interiors 1/2"	E136	D3273	C297	C518	C473	E119	D1037 / E228	E96	E72	

Note: NC=Non-Combustible, FR= Fungal Resistance, TS= Tensile Strength, TC= Thermal Conductivity, CR= Compression, BF= Building Fire Resistance, TE= Thermal Expansion, P= Permeability, RM= Resistance to Movement, SP= Structural Performance

UN CPC Code:

CPC 54: Construction Services.

Product Description:

The Gypsum Board is a product that consists of a fireproof core made essentially of gypsum. This is covered on both sides with 100% recycled paper or resistant fiberglass coating. ON Panel Rey Interior gypsum boards the front covering runs the entire length of the beveled edges of the board for greater strength and protection of the core. The ends are square cut and finished smooth. The Drywall is offered in a wide variety of standard lengths and thickness. Panel Rey products do not contain asbestos.

Geographical Scope:

This EPD covers the gypsum panels of varying thicknesses manufactured at Panel Rey manufacturing facilities: Monterrey, San Luis Potosi, and Juarez. The specific addresses are in the section “Site Locations” above.

LCA Information

Functional Unit/Declared Unit:

1,000 square feet (MSF) of gypsum board of varying thicknesses

Time Representativeness:

All primary data reported by Panel Rey S.A. stem from the 2016, 2017, and mid-2018 calendar years from utility bills and primary company records.

Database and LCA Software Used:

To perform the LCA for this EPD OpenLCA software with ecoinvent v3.4 database was used.

System Boundaries:

This is a “cradle-to-gate” life cycle analysis reported in accordance with EPD Product Category Rule (PCR) v2.2 2012:01. The following three life cycle stages are included:

A1: Raw material supply (upstream processes)- Extraction, handling, and processing of the materials (including fuels) used in the production of the steel rebar.

A2: Transportation- Transportation of these materials from the supplier to the “gate” of the concrete producer.

A3: Manufacturing (core processes)- The energy used to store, move, and shape the steel and to operate the facility (steel plant).

Exclusions to the system boundary are mentioned in the PCR and include the functional unit or performance characteristics of the construction product when integrated into the building or the product’s referenced service life (RSF). (1)

The entire system is outlined in Figure 1: Process Map for Panel Rey’s Manufacturing Processes: Monterrey, San Luis Potosi, and Juarez and Table 3: Steps in the Panel Rey Manufacturing Process with Machine and Direct Energy Requirements Noted below.

Figure 1: Process Map for Panel Rey’s Manufacturing Processes: Monterrey, San Luis Potosi, and Juarez

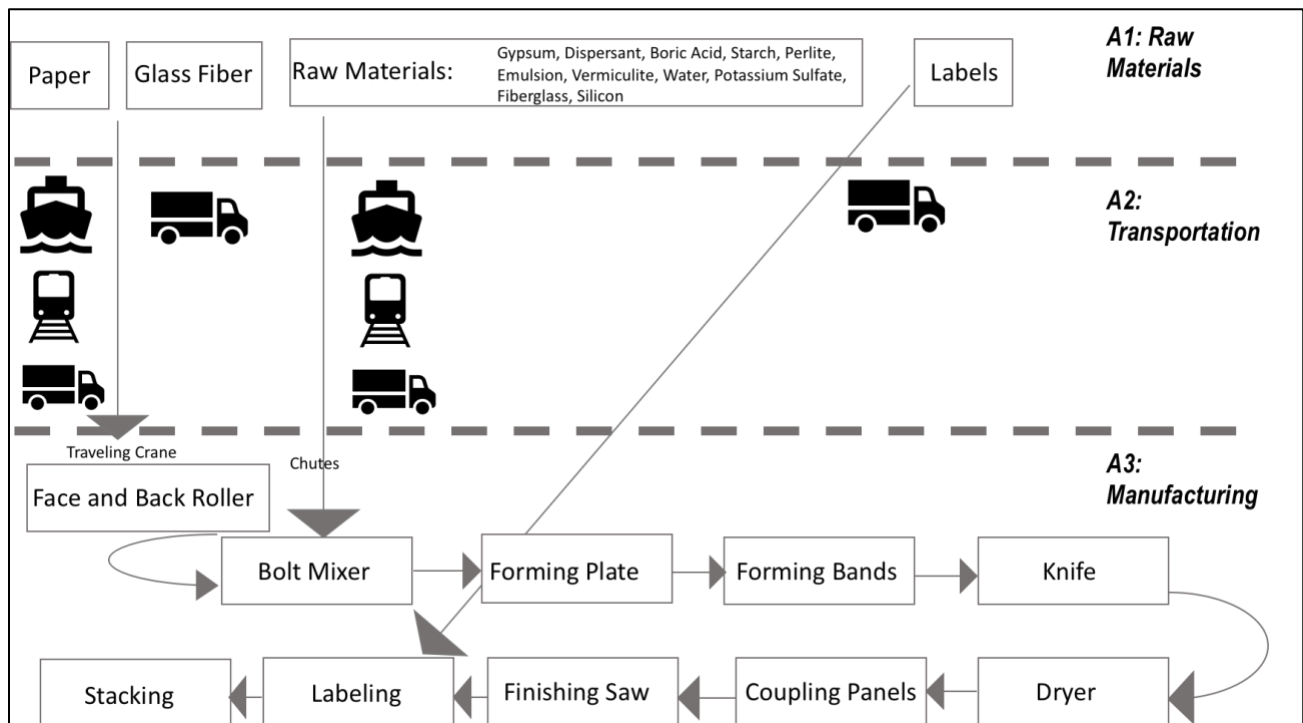


Table 3: Steps in the Panel Rey Manufacturing Process with Machine and Direct Energy Requirements Noted

Steps in the manufacturing process	Machinery	Energy
Pouring and storage of dry and wet additives	Chutes	Electricity
Loading of paper rolls	Traveling crane	Electricity
Mixing of additives	Bolt mixer	Electricity
Formation of panel (faces and core)	Manual formation plate	
Drying	Furnace	Electricity/Natural Gas
Coupling of panels into pairs	Flipper	Electricity
Cutting of panel	Finishing saw	Electricity
Labeling	Labeling machine	Electricity
Stacking	Stacker	Electricity

This EPD does not require and therefore does not include the following stages:

A4-A5: Construction process stage- Transport and construction installation.

B-B7: Use stage- Use, maintenance, repair, replacement, refurbishment, operational energy use, and operational water use.

C1-C4: End of life stage- De-construction demolition, transport, waste processing, and disposal.

D: Resource recovery stage- Reuse-recycling-recovery potential.

A summary of the limitations of this EPD include the following:

- This “cradle-to-gate” EPD is to understand the environmental impacts of the products listed and is not a comparative study.
- No environmental claim can be implied about the environmental superiority of the products modeled in this study. The EPD reporting process does not make statements that the products modeled in an LCA, or the resulting EPD, are environmentally better or worse than other products.
- The LCIA results do not predict actual impacts and are a direct result of the information modeled only.
- This EPD does not report all the environmental impacts due to manufacturing of the product, but instead the environmental impacts for categories with established LCA-based methods to track and report. Unreported environmental impacts include, but are not limited to, factors attributed to human health, land use changes, and habitat destruction.
- In addition, the manufacturer can report on best practices in sustainability, including social indicators outside this EPD, in an attempt to illustrate a more complete picture of their sustainability practices that cannot be captured in this EPD. (1)

More Information:

Allocation

The PCR, version 2012:01 v2.2, outlines scenarios where allocation is necessary. These areas include: a). a multi-output subprocess delivering goods that are treated equally, b). co-production on electricity and heat, and c). co-production of goods and energy.

The manufacturing processes produced two co-products: gypsum dust and recycled paper. The majority of gypsum dust is recycled back into the panel raw materials but at the Monterrey plant a small percentage of that dust is also sent to another product line, setting compounds.

Allocation for recycled material was treated under the Polluters Pay Principal. This type of recycling is called open loop recycling. The burden for the environmental impacts is on the original use and only the transportation from the recycling facility to manufacturers' facilities were recorded as inputs when available in the unit process. The 100% recycled paper, used as face and backing for most gypsum panels, has no incoming burdens for raw materials such as cellulose but does have impacts from the manufacturing process to turn that recycled material into a usable product, i.e. paper. There is also reported impacts from the other chemicals/raw materials included in the paper making process.

Cut-off Criteria

ISO 14044:2006 and Product Category Rule (PCR) V2.2 2012:01, section 7.6. requires the LCA model to contain a minimum of 95% of the total inflows (mass and energy) to the upstream and core modules be included in this study. The cut-off criteria were applied to all other processes unless noted above as follows:

- A 1% cut-off is considered for all renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process where the total of the neglected inputs does not exceed 5%.

Data Variability and Quality

This EPD was created using plant-specific data for upstream materials. Potential variations due to supplier locations, manufacturing processes and efficiencies of fuel use are not accounted for in this EPD. Data differences can occur with changing suppliers, mine locations, manufacturing equipment, and overall efficiency. Data quality is judged based on the five indicators below. These indicators apply to the impact categories reported in this study based on the information obtained and used for the model. The corresponding detailed data clarifications are broken down to the process level. The five indicators included are:

Technical representativeness: The degree to which the data reflects the actual technology(ies) used.

Overall quality: Good to very good

Temporal Representativeness: The degree to which the data reflects the actual time (e.g. year) or age of the activity. **Overall quality: Good with a few fair points of data**

Geographical representativeness: The degree to which the data reflects the actual geographic location of the activity (e.g. country or site). **Overall quality: Good to very good**

Completeness: The degree to which the data are statistically representative of the relevant activity. Completeness includes the percentage of locations for which data is available and used out of the total number that relates to a specific activity. **Overall quality: Good**

Reliability: The degree to which the sources, data collection methods and verification procedures used to obtain the data are dependable. **Overall quality: Very good**

Content Declaration

Data on electricity, water, waste, raw material inputs and corresponding transportation mode/distances used in this study were primary data compiled by Panel Rey on each of the manufacturing facilities: El Carmen (Monterrey), San Louis Potosi, and City of Juarez. To obtain the results based on the functional unit of kg/MSF, the kg per production was then multiplied by each panel’s kg factor. Due to the varying thicknesses not all panels have the same kg/MSF. All products considered for this study have the same manufacturing processes and somewhat similar raw material input. The consumption amounts of energy, water, and waste for each manufacturing facility use Monterrey and San Luis Potosi an average of 2016 and 2017 data, full years, but the Juarez plant did not manufacturer for 2016 so the consumption data is from mid-2017 to mid-2018.

Product:

1,000 square feet (MSF) of gypsum board of varying thicknesses. All panels contain three main raw materials as detailed in the table below. The exact amounts vary due to thicknesses and panel performance criteria. The range of Panel Rey products covered have a gypsum material composition of >85% and are 1/2”, 3/8” or 5/8” thick. The product line contains specialty boards for a variety of construction needs. These include interior and exterior use, water prone areas, fire resistant boards, and for specialized areas like ceilings and soffits.

Raw Material	Approximate % of Panel Composition
Gypsum	91.15
Liner (Face & Back)	6.35
Additives	2.5
Total	100

Packaging:

There are two types of paper labels used on the edges of each pair of wallboards: sticker and tape. The sticker is a white paper tape with three-ink printing and a self-adhesive. The tape is a paperboard tape

thicker than a paper sheet designed to break the gummed tape when using the panel. Both the stickers and the tape fall below the cutoff as outlined in the PCR and was not modeled in the raw materials for any of the panels.

The second half of the packaging is the spacers used to keep the panels from being damaged or crushed while they are stored or transported. Completed panels that do not pass the quality standards or ones that are damaged in production or handling are then cut and used as spacers for the panels that are stacked and ready for shipment. This means that all packaging, aside from the stickers and tape, are 100% recycled material. This material is accounted for in the original manufacturing process and according to the polluter pays principal were modeled in the panel processes with no incoming burdens, including transportation since it is within the same facility.

Recycled Content:

Panel Rey manufacturing contains several areas of on-site recycling. Panels that are low quality, usually before the completed labeling stage, are sent daily to the mountain of gypsum where they are reground back into raw material. A second area of gypsum recycling is in the dust collection. Cutting, mixing, and other manufacturing processes that create dust is captured and recycled back into the raw material process. The total of both recycling processes contributes to the amount of gypsum recycled as part of the manufacturing process.

Panel Rey manufacturing facilities have an on-site operation for recycling for not only their own used water but also for water from local municipal resources. To cut down the amount of fresh potable water they buy and consume for manufacturing, Panel Rey facilities purchase untreated waste water from the local water municipal sources, treat it, and use it for their manufacturing processes. The impact results for recycled content includes the amount of recycled water in the manufacturing processes.

The paper that backs all non-Glass Rey panels is 100% recycled fiber content. This includes primarily the fibers as the paper additives are not recycled. The total amount of recycled paper fibers as part of the total panels average 5.17% of the panel.

Environmental Performance

Potential Environmental Impact:

Parameters describing environmental potential impacts were calculated using CML Baseline method, TRACI 2.1 and OpenLCA EN:15804 Method in accordance with the guidelines of the PCR. The rebar is

modeled, reviewed, and reported on in this LCIA phase. The outcomes of the LCI modeling and subsequent assessments using OpenLCA software and the impact categories modeled with the TRACI method as recommended by the U.S. EPA are listed in the tables below. The PCR states that “the impact categories shall be calculated using characterization factors recommended in regionally accepted impact assessment methods.” The U.S. EPA’s TRACI method was chosen over the European CML Baseline because Panel Rey is based in Mexico but has offices, does business and exports its products to the United States. Shall any customer wish to examine their product impacts it makes more sense that they are in a U.S. method versus a European one. Panel Rey is a company selling its products in the U.S., Canada, and Latin America. (1)

Table 4: Summary results for 1,000 square feet (MSF) of gypsum board of various thicknesses using the TRACI metrics in each impact category

TRACI 2.1: LCI Impact Summary Results for 1,000 Square Feet (MSF) of Gypsum Board of Varying Thicknesses						
Panel + Manufacturing	Factor: kg/MSF	Acidification	Eutrophication	Global warming	Ozone depletion	Smog
		kg SO2 eq	kg N eq	kg CO2 eq	kg CFC-11 eq	kg O3 eq
Flex Rey 1/4" Monterrey	415.49	2.06E-01	7.15E-02	5.14E+01	5.61E-06	3.74E+00
Regular Rey 1/2" Monterrey	694.00	4.34E-01	1.38E-01	9.70E+01	1.13E-05	8.52E+00
Regular Rey 1/2" SLP	694.00	5.25E-01	1.43E-01	1.02E+02	2.48E-05	8.33E+00
Regular Rey 1/2" Juarez	694.00	9.39E-01	2.25E-01	1.97E+02	4.23E-05	1.70E+01
Regular Rey 3/8" Monterrey	542.50	2.52E-01	8.44E-02	6.60E+01	6.97E-06	4.78E+00
Regular Rey 3/8" SLP	542.50	3.83E-01	1.01E-01	7.67E+01	1.90E-05	6.25E+00
Regular Rey 3/8" Juarez	542.50	7.02E-01	1.64E-01	1.50E+02	3.24E-05	1.29E+01
Regular Rey 5/8" Monterrey	1002.44	4.66E-01	1.56E-01	1.22E+02	1.29E-05	8.83E+00
Regular Rey 5/8" SLP	1002.44	7.08E-01	1.86E-01	1.42E+02	3.51E-05	1.15E+01
Regular Rey 5/8" Juarez	1002.44	1.30E+00	3.02E-01	2.77E+02	5.98E-05	2.39E+01
Water Rey 1/2" Monterrey	712.14	4.73E-01	1.50E-01	1.11E+02	1.36E-05	8.75E+00
Water Rey 1/2" SLP	712.14	5.98E-01	1.61E-01	1.16E+02	2.72E-05	9.57E+00
Water Rey 1/2" Juarez	712.14	9.89E-01	2.37E-01	2.06E+02	4.33E-05	1.77E+01

Water Rey type X 5/8" Monterrey	1051.43	6.18E-01	1.46E-01	1.33E+02	1.49E-05	1.10E+01
Water Rey Type X 5/8" Juarez	1051.43	1.38E+00	2.74E-01	2.74E+02	5.89E-05	2.42E+01
Light Rey 1/2" Monterrey	612.35	3.34E-01	1.22E-01	7.98E+01	8.52E-06	5.84E+00
Light Rey 1/2" SLP	612.35	4.72E-01	1.39E-01	9.06E+01	2.18E-05	7.31E+00
Light Rey 1/2" Juarez	612.35	8.30E-01	2.09E-01	1.73E+02	3.68E-05	1.48E+01
Guard Rey 1/2" Monterrey	712.14	4.35E-01	1.40E-01	1.07E+02	1.30E-05	8.25E+00
Guard Rey 1/2" SLP	712.14	5.67E-01	1.52E-01	1.13E+02	2.67E-05	9.25E+00
Guard Rey 1/2" Juarez	712.14	9.59E-01	2.28E-01	2.03E+02	4.28E-05	1.74E+01
Guard Rey Type X 5/8" Monterrey	1051.43	6.97E-01	2.36E-01	1.65E+02	1.94E-05	1.24E+01
Guard Rey Type X 5/8" Juarez	1051.43	1.57E+00	3.92E-01	3.30E+02	6.93E-05	2.83E+01
Soffit Rey Type C 5/8" Monterrey	1084.09	7.46E-01	2.23E-01	1.75E+02	1.99E-05	1.33E+01
Soffit Rey Type C 5/8" Juarez	1084.09	1.63E+00	3.80E-01	3.41E+02	7.03E-05	2.94E+01
Soffit Rey Type X 5/8" Monterrey	1013.78	5.95E-01	1.87E-01	1.42E+02	1.43E-05	1.05E+01
Soffit Rey Type X 5/8" Juarez	1013.78	1.43E+00	3.34E-01	2.98E+02	6.15E-05	2.56E+01
Fire Rey 1/2" Monterrey	694.00	4.82E-01	1.38E-01	1.00E+02	9.83E-06	7.23E+00
Fire Rey 1/2" SLP	694.00	5.68E-01	1.54E-01	1.10E+02	2.52E-05	8.87E+00
Fire Rey 1/2" Juarez	694.00	9.76E-01	2.35E-01	2.04E+02	4.23E-05	1.74E+01
fire Rey 5/8" Monterrey	1013.78	6.04E-01	1.98E-01	1.43E+02	1.47E-05	1.07E+01
fire Rey 5/8" SLP	1013.78	8.29E-01	2.25E-01	1.61E+02	3.68E-05	1.30E+01
fire Rey 5/8" Juarez	1013.78	1.43E+00	3.43E-01	2.98E+02	6.18E-05	2.55E+01
Fire Rey Type C 1/2" Monterrey	943.47	6.36E-01	1.90E-01	1.51E+02	1.72E-05	1.15E+01
Fire Rey Type C 1/2" SLP	943.47	8.69E-01	2.21E-01	1.71E+02	3.85E-05	1.42E+01
Fire Rey Type C 1/2" Juarez	943.47	1.40E+00	3.25E-01	2.94E+02	6.07E-05	2.53E+01
Fire Rey Type C 5/8" Monterrey	1013.78	6.83E-01	2.05E-01	1.62E+02	1.85E-05	1.23E+01
Fire Rey Type C 5/8" Juarez	1013.78	1.51E+00	3.49E-01	3.16E+02	6.53E-05	2.72E+01
Exterior Rey 1/2" Monterrey	712.14	3.81E-01	1.29E-01	9.52E+01	1.00E-05	6.95E+00
Exterior Rey 1/2" SLP	712.14	5.73E-01	1.55E-01	1.14E+02	2.70E-05	9.32E+00

Exterior Rey 5/8" Monterrey	1013.78	6.37E-01	2.13E-01	1.55E+02	1.92E-05	1.20E+01
Exterior Rey 5/8" SLP	1013.78	8.08E-01	2.26E-01	1.60E+02	3.80E-05	1.30E+01
Ceiling Rey 1/2" Monterrey	793.79	4.99E-01	1.44E-01	1.20E+02	1.15E-05	8.87E+00
Ceiling Rey 1/2" SLP	793.79	6.81E-01	1.67E-01	1.34E+02	2.89E-05	1.08E+01
Glass Rey 1/2" Monterrey	861.83	1.41E+00	3.72E-01	3.16E+02	4.57E-02	2.16E+01
Glass Rey 1/2" SLP	861.83	1.49E+00	3.78E-01	3.07E+02	4.57E-02	2.19E+01
Glass Rey 1/2" Juarez	861.83	2.11E+00	5.04E-01	4.47E+02	4.58E-02	3.50E+01
Glass Rey Type X 5/8" Monterrey	1111.30	1.82E+00	4.80E-01	4.08E+02	5.90E-02	2.79E+01
Glass Rey Type X 5/8" Juarez	1111.30	2.72E+00	6.50E-01	5.76E+02	5.90E-02	4.51E+01
Glass Rey Interiors 1/2" Monterrey	861.83	8.92E-01	2.96E-01	2.01E+02	5.22E-02	1.40E+01
Glass Rey Interiors 1/2" Juarez	861.83	1.65E+00	4.33E-01	3.44E+02	5.23E-02	2.80E+01

Table 5: Summary results for 1,000 square feet (MSF) of gypsum board of varying thicknesses using the CML Baseline impact methods

CML-IA Baseline*: LCI Impact Summary Results for 1,000 Square Feet (MSF) of Gypsum Board of Varying Thicknesses								
Panel + Manufacturing	Factor: kg/MSF	ADP	ADE	AC	EU	GW	OD	POC
		MJ	kg Sb eq	kg SO2 eq	kg PO4--- eq	kg CO2 eq	kg CFC-11 eq	kg C2H4 eq
Flex Rey 1/4" Monterrey	415.49	8.07E+02	1.09E-04	2.36E-01	5.70E-02	6.07E+01	5.55E-06	1.05E-02
Regular Rey 1/2" Monterrey	694.00	1.21E+03	2.31E-04	3.95E-01	9.72E-02	9.76E+01	8.70E-06	1.66E-02
Regular Rey 1/2" SLP	694.00	2.74E+03	2.17E-04	5.04E-01	9.89E-02	1.03E+02	1.93E-05	2.79E-02
Regular Rey 1/2" Juarez	694.00	3.99E+03	4.29E-04	8.79E-01	1.69E-01	1.98E+02	3.25E-05	4.28E-02
Regular Rey 3/8" Monterrey	542.50	8.05E+02	9.46E-05	2.31E-01	5.80E-02	6.64E+01	5.35E-06	9.84E-03
Regular Rey 3/8" SLP	542.50	2.10E+03	9.64E-05	3.65E-01	7.13E-02	7.75E+01	1.48E-05	2.04E-02
Regular Rey 3/8" Juarez	542.50	3.06E+03	2.59E-04	6.54E-01	1.25E-01	1.51E+02	2.49E-05	3.18E-02

Regular Rey 5/8" Monterrey	1002.44	1.49E+03	1.75E-04	4.27E-01	1.07E-01	1.23E+02	9.89E-06	1.82E-02
Regular Rey 5/8" SLP	1002.44	3.88E+03	1.78E-04	6.75E-01	1.32E-01	1.43E+02	2.73E-05	3.77E-02
Regular Rey 5/8" Juarez	1002.44	5.65E+03	4.78E-04	1.21E+00	2.31E-01	2.79E+02	4.60E-05	5.88E-02
Water Rey 1/2" Monterrey	712.14	1.80E+03	2.93E-04	4.38E-01	1.03E-01	1.12E+02	1.04E-05	1.97E-02
Water Rey 1/2" SLP	712.14	3.37E+03	2.70E-04	5.73E-01	1.11E-01	1.17E+02	2.12E-05	3.19E-02
Water Rey 1/2" Juarez	712.14	4.01E+03	3.40E-04	8.58E-01	1.64E-01	1.98E+02	3.27E-05	4.18E-02
Water Rey type X 5/8" Monterrey	1051.43	2.12E+03	2.59E-04	5.30E-01	1.10E-01	1.34E+02	1.16E-05	2.30E-02
Water Rey Type X 5/8" Juarez	1051.43	6.16E+03	5.14E-04	1.26E+00	2.19E-01	2.76E+02	4.56E-05	6.19E-02
Light Rey 1/2" Monterrey	612.35	1.00E+03	2.17E-04	3.12E-01	7.87E-02	8.04E+01	6.61E-06	1.40E-02
Light Rey 1/2" SLP	612.35	2.44E+03	2.16E-04	4.55E-01	9.22E-02	9.17E+01	1.70E-05	2.56E-02
Light Rey 1/2" Juarez	612.35	3.52E+03	3.98E-04	7.80E-01	1.53E-01	1.74E+02	2.84E-05	3.85E-02
Guard Rey 1/2" Monterrey	712.14	1.75E+03	2.11E-04	3.99E-01	9.65E-02	1.08E+02	9.95E-06	1.83E-02
Guard Rey 1/2" SLP	712.14	3.32E+03	1.88E-04	5.41E-01	1.06E-01	1.14E+02	2.08E-05	3.07E-02
Guard Rey 1/2" Juarez	712.14	4.49E+03	3.83E-04	8.96E-01	1.71E-01	2.04E+02	3.30E-05	4.47E-02
Guard Rey Type X 5/8" Monterrey	1051.43	2.51E+03	3.22E-04	6.49E-01	1.56E-01	1.66E+02	1.51E-05	2.99E-02
Guard Rey Type X 5/8" Juarez	1051.43	6.91E+03	6.50E-04	1.47E+00	2.87E-01	3.32E+02	5.35E-05	7.29E-02
Soffit Rey Type C 5/8" Monterrey	1084.09	2.12E+03	4.84E-04	6.95E-01	1.55E-01	1.76E+02	1.53E-05	2.89E-02
Soffit Rey Type C 5/8" Juarez	1084.09	6.60E+03	8.10E-04	1.53E+00	2.88E-01	3.43E+02	5.42E-05	7.25E-02
Soffit Rey Type X 5/8" Monterrey	1013.78	1.70E+03	4.63E-04	5.56E-01	1.28E-01	1.43E+02	1.10E-05	2.29E-02
Soffit Rey Type X 5/8" Juarez	1013.78	5.90E+03	7.69E-04	1.34E+00	2.52E-01	3.00E+02	4.74E-05	6.37E-02
Fire Rey 1/2" Monterrey	694.00	1.20E+03	2.76E-04	4.67E-01	9.22E-02	1.01E+02	7.59E-06	1.96E-02

Fire Rey 1/2" SLP	694.00	2.82E+03	2.76E-04	5.47E-01	1.06E-01	1.11E+02	1.96E-05	2.94E-02
Fire Rey 1/2" Juarez	694.00	4.05E+03	4.85E-04	9.17E-01	1.75E-01	2.05E+02	3.26E-05	4.41E-02
fire Rey 5/8" Monterrey	1013.78	1.73E+03	4.03E-04	5.65E-01	1.33E-01	1.43E+02	1.13E-05	2.38E-02
fire Rey 5/8" SLP	1013.78	4.12E+03	4.04E-04	7.98E-01	1.55E-01	1.62E+02	2.87E-05	4.30E-02
fire Rey 5/8" Juarez	1013.78	5.92E+03	7.08E-04	1.34E+00	2.56E-01	3.00E+02	4.76E-05	6.44E-02
Fire Rey Type C 1/2" Monterrey	943.47	1.83E+03	4.01E-04	5.90E-01	1.33E-01	1.52E+02	1.33E-05	2.47E-02
Fire Rey Type C 1/2" SLP	943.47	4.10E+03	4.10E-04	8.29E-01	1.57E-01	1.73E+02	3.00E-05	4.33E-02
Fire Rey Type C 1/2" Juarez	943.47	5.71E+03	6.80E-04	1.31E+00	2.47E-01	2.96E+02	4.68E-05	6.25E-02
Fire Rey Type C 5/8" Monterrey	1013.78	1.97E+03	4.31E-04	6.34E-01	1.43E-01	1.63E+02	1.42E-05	2.65E-02
Fire Rey Type C 5/8" Juarez	1013.78	6.13E+03	7.30E-04	1.41E+00	2.65E-01	3.18E+02	5.03E-05	6.71E-02
Exterior Rey 1/2" Monterrey	712.14	1.64E-02	1.77E-04	3.53E-01	8.63E-02	9.58E+01	7.74E-06	1.64E-02
Exterior Rey 1/2" SLP	712.14	3.34E+03	1.94E-04	5.46E-01	1.08E-01	1.15E+02	2.10E-05	3.10E-02
Exterior Rey 5/8" Monterrey	1013.78	2.42E+03	3.38E-04	5.85E-01	1.44E-01	1.56E+02	1.47E-05	2.69E-02
Exterior Rey 5/8" SLP	1013.78	4.60E+03	2.96E-04	7.72E-01	1.55E-01	1.62E+02	2.96E-05	4.40E-02
Ceiling Rey 1/2" Monterrey	793.79	1.40E+03	3.06E-04	4.67E-01	1.02E-01	1.21E+02	8.89E-06	1.89E-02
Ceiling Rey 1/2" SLP	793.79	3.28E+03	3.07E-04	6.53E-01	1.20E-01	1.36E+02	2.25E-05	3.40E-02
Glass Rey 1/2" Monterrey	861.83	3.39E+03	8.52E-04	1.35E+00	2.61E-01	3.18E+02	4.64E-03	5.93E-02
Glass Rey 1/2" SLP	861.83	5.16E+03	7.64E-04	1.45E+00	2.64E-01	3.10E+02	4.65E-03	7.16E-02
Glass Rey 1/2" Juarez	861.83	7.04E+03	1.09E-03	2.00E+00	3.71E-01	4.50E+02	4.67E-03	9.37E-02
Glass Rey Type X 5/8" Monterrey	1111.30	4.37E+03	1.10E-03	1.74E+00	3.37E-01	4.11E+02	5.98E-03	7.64E-02
Glass Rey Type X 5/8" Juarez	1111.30	9.07E+03	1.41E-03	2.58E+00	4.78E-01	5.80E+02	6.02E-03	1.21E-01
Glass Rey Interiors 1/2" Monterrey	861.83	2.22E+03	3.93E-04	8.49E-01	1.90E-01	2.03E+02	5.29E-03	3.87E-02

Glass Rey Interiors 1/2" Juarez	861.83	5.95E+03	6.84E-04	1.56E+00	3.05E-01	3.47E+02	5.32E-03	7.52E-02
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Note: 1 *ADP= Abiotic depletion potential for fossil resources, ADE= Abiotic depletion potential for non-fossil resources-elements, AC= Acidification, EU= Eutrophication, OD= Ozone depletion, POC= Photochemical ozone creation, GW= Global warming

Use of Resources:

Parameters describing the use of resources were calculated using OpenLCA EN15804 Methods, AWARE, direct LCI reporting, and Cumulative Energy Demand. These methods are in accordance with the PCR and EN:15804. (1)

Table 6: Summary results for 1,000 square feet (MSF) of gypsum board of varying thicknesses using the Cumulative Energy Demand impact methods

Cumulative Energy Demand*: LCI Impact Summary Results for 1,000 Square Feet (MSF) of Gypsum Board of Varying Thicknesses									
Panel + Manufacturing	Factor: kg/MSF	Total NRPE	NRPE	NRPE-SF	NRPE-RM	Total RPE	RPE	RPE-SF	RPE-RM
		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ
Flex Rey 1/4" Monterrey	415	6.95E+02	6.95E+02	0	0	3.42E+02	3.42E+02	0	0
Regular Rey 1/2" Monterrey	694	1.34E+03	1.34E+03	0	0	5.76E+02	5.76E+02	0	0
Regular Rey 1/2" SLP	694	3.04E+03	3.04E+03	0	0	5.74E+02	5.74E+02	0	0
Regular Rey 1/2" Juarez	694	4.38E+03	4.38E+03	0	0	5.88E+02	5.88E+02	0	0
Regular Rey 3/8" Monterrey	542.5	8.90E+02	8.90E+02	0	0	4.53E+02	4.53E+02	0	0
Regular Rey 3/8" SLP	542.5	2.33E+03	2.33E+03	0	0	4.54E+02	4.54E+02	0	0
Regular Rey 3/8" Juarez	542.5	3.35E+03	3.35E+03	0	0	4.64E+02	4.64E+02	0	0

Regular Rey 5/8" Monterrey	1002.44	1.64E+03	1.64E+03	0	0	8.37E+02	8.37E+02	0	0
Regular Rey 5/8" SLP	1002.44	4.30E+03	4.30E+03	0	0	8.39E+02	8.39E+02	0	0
Regular Rey 5/8" Juarez	1002.44	6.20E+03	6.20E+03	0	0	8.57E+02	8.57E+02	0	0
Water Rey 1/2" Monterrey	712.14	1.97E+03	1.97E+03	0	0	5.82E+02	5.82E+02	0	0
Water Rey 1/2" SLP	712.14	3.71E+03	3.71E+03	0	0	5.81E+02	5.81E+02	0	0
Water Rey 1/2" Juarez	712.14	4.97E+03	4.97E+03	0	0	5.93E+02	5.93E+02	0	0
Water Rey type X 5/8" Monterrey	1051.43	2.31E+03	2.31E+03	0	0	5.40E+01	5.40E+01	0	0
Water Rey Type X 5/8" Juarez	1051.43	6.73E+03	6.73E+03	0	0	7.08E+01	7.08E+01	0	0
Light Rey 1/2" Monterrey	612.35	1.11E+03	1.11E+03	0	0	5.21E+02	5.21E+02	0	0
Light Rey 1/2" SLP	612.35	2.71E+03	2.71E+03	0	0	5.21E+02	5.21E+02	0	0
Light Rey 1/2" Juarez	612.35	3.86E+03	3.86E+03	0	0	5.33E+02	5.33E+02	0	0
Guard Rey 1/2" Monterrey	712.14	1.92E+03	1.92E+03	0	0	5.93E+02	5.93E+02	0	0
Guard Rey 1/2" SLP	712.14	3.66E+03	3.66E+03	0	0	5.93E+02	5.93E+02	0	0
Guard Rey 1/2" Juarez	712.14	4.92E+03	4.92E+03	0	0	6.05E+02	6.05E+02	0	0

Guard Rey Type X 5/8" Monterrey	1051.43	2.75E+03	2.75E+03	0	0	8.86E+02	8.86E+02	0	0
Guard Rey Type X 5/8" Juarez	1051.43	7.57E+03	7.57E+03	0	0	9.07E+02	9.07E+02	0	0
Soffit Rey Type C 5/8" Monterrey	1084.09	2.33E+03	2.33E+03	0	0	8.94E+02	8.94E+02	0	0
Soffit Rey Type C 5/8" Juarez	1084.09	7.24E+03	7.24E+03	0	0	9.15E+02	9.15E+02	0	0
Soffit Rey Type X 5/8" Monterrey	1013.78	1.89E+03	1.89E+03	0	0	8.58E+02	8.58E+02	0	0
Soffit Rey Type X 5/8" Juarez	1013.78	6.48E+03	6.48E+03	0	0	8.78E+02	8.78E+02	0	0
Fire Rey 1/2" Monterrey	694	1.33E+03	1.33E+03	0	0	5.83E+02	5.83E+02	0	0
Fire Rey 1/2" SLP	694	4.49E-02	4.49E-02	0	0	5.84E+02	5.84E+02	0	0
Fire Rey 1/2" Juarez	694	4.45E+03	4.45E+03	0	0	5.97E+02	5.97E+02	0	0
fire Rey 5/8" Monterrey	1013.78	1.92E+03	1.92E+03	0	0	8.52E+02	8.52E+02	0	0
fire Rey 5/8" SLP	1013.78	4.57E+03	4.57E+03	0	0	8.53E+02	8.53E+02	0	0
fire Rey 5/8" Juarez	1013.78	6.50E+03	6.50E+03	0	0	8.72E+02	8.72E+02	0	0
Fire Rey Type C 1/2" Monterrey	943.47	2.02E+03	2.02E+03	0	0	7.75E+02	7.75E+02	0	0

Fire Rey Type C 1/2" SLP	943.47	4.54E+03	4.54E+03	0	0	7.76E+02	7.76E+02	0	0
Fire Rey Type C 1/2" Juarez	943.47	6.26E+03	6.26E+03	0	0	7.93E+02	7.93E+02	0	0
Fire Rey Type C 5/8" Monterrey	1013.78	2.17E+03	2.17E+03	0	0	8.33E+02	8.33E+02	0	0
Fire Rey Type C 5/8" Juarez	1013.78	6.72E+03	6.72E+03	0	0	8.52E+02	8.52E+02	0	0
Exterior Rey 1/2" Monterrey	712.14	1.72E+03	1.72E+03	0	0	5.87E+02	5.87E+02	0	0
Exterior Rey 1/2" SLP	712.14	3.68E+03	3.68E+03	0	0	5.89E+02	5.89E+02	0	0
Exterior Rey 5/8" Monterrey	1013.78	2.65E+03	2.65E+03	0	0	8.48E+02	8.48E+02	0	0
Exterior Rey 5/8" SLP	1013.78	5.08E+03	5.08E+03	0	0	8.47E+02	8.47E+02	0	0
Ceiling Rey 1/2" Monterrey	793.79	1.55E+03	1.55E+03	0	0	6.67E+02	6.67E+02	0	0
Ceiling Rey 1/2" SLP	793.79	3.63E+03	3.63E+03	0	0	6.68E+02	6.68E+02	0	0
Glass Rey 1/2" Monterrey	861.83	3.79E+03	3.79E+03	0	0	7.78E+02	7.78E+02	0	0
Glass Rey 1/2" SLP	861.83	5.77E+03	5.77E+03	0	0	7.76E+02	7.76E+02	0	0
Glass Rey 1/2" Juarez	861.83	7.78E+03	7.78E+03	0	0	7.96E+02	7.96E+02	0	0
Glass Rey Type X 5/8" Monterrey	1111.3	4.89E+03	4.89E+03	0	0	1.00E+03	1.00E+03	0	0

Glass Rey Type X 5/8" Juarez	1111.3	1.00E+04	1.00E+04	0	0	1.03E+03	1.03E+03	0	0
Glass Rey Interiors 1/2" Monterrey	861.83	2.51E+03	2.51E+03	0	0	7.66E+02	7.66E+02	0	0
Glass Rey Interiors 1/2" Juarez	861.83	6.59E+03	6.59E+03	0	0	7.85E+02	7.85E+02	0	0

Note: 2 *Total NRPE= Total use of non-renewable primary energy, NRPE= Use of non-renewable primary energy resources, NRPE-SF= Use of non-renewable secondary Fuels, NRPE-RM= Use of non-renewable primary energy resources as raw materials. Total RPE= Total use of renewable primary energy, RPE= Use of renewable primary energy resources, RPE-SF= Use of renewable secondary Fuels, RPE-RM= Use of renewable primary energy resources as raw materials.

Table 7: Summary results for 1,000 square feet (MSF) of gypsum board of varying thicknesses using the impact methods AWARE, EN15804, and direct LCI reporting

EN15804 Impact Method (Open LCA), AWARE, and LCA Calculations: LCI				
Impact Summary Results for 1,000 Square Feet (MSF) of Gypsum Board of Varying Thicknesses				
Panel + Manufacturing	Factor: kg/MSF	Water	AWARE	Secondary Use of
		m3	m3	Materials
				kg
Flex Rey 1/4" Monterrey	415.49	4.55E-03	1.08E+01	4.80E+01
Regular Rey 1/2" Monterrey	694	8.59E-03	2.03E+01	4.80E+01
Regular Rey 1/2" SLP	694	9.49E-03	1.96E+01	6.73E+01
Regular Rey 1/2" Juarez	694	1.03E-02	2.76E+01	6.73E+01
Regular Rey 3/8" Monterrey	542.5	5.75E-03	1.41E+01	6.73E+01
Regular Rey 3/8" SLP	542.5	7.12E-03	1.43E+01	5.26E+01
Regular Rey 3/8" Juarez	542.5	7.67E-03	2.04E+01	5.26E+01
Regular Rey 5/8" Monterrey	1002.44	1.06E-02	2.61E+01	5.26E+01
Regular Rey 5/8" SLP	1002.44	1.32E-02	2.64E+01	9.72E+01
Regular Rey 5/8" Juarez	1002.44	1.42E-02	3.77E+01	9.72E+01
Water Rey 1/2" Monterrey	712.14	9.86E-03	2.59E+01	9.72E+01
Water Rey 1/2" SLP	712.14	1.09E-02	2.54E+01	5.42E+01

Water Rey 1/2" Juarez	712.14	1.10E-02	3.30E+01	5.42E+01
Water Rey type X 5/8" Monterrey	1051.43	1.20E-02	2.70E+01	5.42E+01
Water Rey Type X 5/8" Juarez	1051.43	1.37E-02	3.74E+01	8.00E+01
Light Rey 1/2" Monterrey	612.35	7.04E-03	1.84E+01	8.00E+01
Light Rey 1/2" SLP	612.35	8.48E-03	1.84E+01	4.14E+01
Light Rey 1/2" Juarez	612.35	9.06E-03	2.53E+01	4.14E+01
Guard Rey 1/2" Monterrey	712.14	9.47E-03	2.43E+01	4.14E+01
Guard Rey 1/2" SLP	712.14	1.05E-02	2.38E+01	4.77E+01
Guard Rey 1/2" Juarez	712.14	1.07E-02	3.14E+01	4.77E+01
Guard Rey Type X 5/8" Monterrey	1051.43	1.41E-02	3.78E+01	4.77E+01
Guard Rey Type X 5/8" Juarez	1051.43	1.80E-02	5.01E+01	7.04E+01
Soffit Rey Type C 5/8" Monterrey	1084.09	1.42E-02	3.36E+01	7.04E+01
Soffit Rey Type C 5/8" Juarez	1084.09	1.68E-02	4.61E+01	8.31E+01
Soffit Rey Type X 5/8" Monterrey	1013.78	1.19E-02	3.04E+01	8.31E+01
Soffit Rey Type X 5/8" Juarez	1013.78	1.54E-02	4.21E+01	7.90E+01
Fire Rey 1/2" Monterrey	694	8.26E-03	2.20E+01	7.90E+01
Fire Rey 1/2" SLP	694	9.95E-03	2.20E+01	5.36E+01
Fire Rey 1/2" Juarez	694	1.07E-02	2.99E+01	5.36E+01
fire Rey 5/8" Monterrey	1013.78	1.21E-02	3.21E+01	5.36E+01
fire Rey 5/8" SLP	1013.78	1.45E-02	3.22E+01	7.84E+01
fire Rey 5/8" Juarez	1013.78	1.56E-02	4.37E+01	7.84E+01
Fire Rey Type C 1/2" Monterrey	943.47	1.23E-02	2.78E+01	7.84E+01
Fire Rey Type C 1/2" SLP	943.47	1.48E-02	2.81E+01	7.24E+01
Fire Rey Type C 1/2" Juarez	943.47	8.59E-03	3.85E+01	7.24E+01
Fire Rey Type C 5/8" Monterrey	1013.78	1.32E-02	2.99E+01	7.24E+01
Fire Rey Type C 5/8" Juarez	1013.78	1.65E-02	4.14E+01	7.78E+01
Exterior Rey 1/2" Monterrey	712.14	8.45E-03	2.42E+01	7.78E+01
Exterior Rey 1/2" SLP	712.14	1.06E-02	2.47E+01	5.46E+01
Exterior Rey 5/8" Monterrey	1013.78	1.38E-02	3.54E+01	5.46E+01
Exterior Rey 5/8" SLP	1013.78	1.50E-02	3.44E+01	7.81E+01
Ceiling Rey 1/2" Monterrey	793.79	9.57E-03	2.32E+01	7.81E+01
Ceiling Rey 1/2" SLP	793.79	1.15E-02	2.33E+01	6.93E+01
Glass Rey 1/2" Monterrey	861.83	2.41E-02	6.94E+01	6.93E+01
Glass Rey 1/2" SLP	861.83	2.47E-02	6.51E+01	2.25E+01

Glass Rey 1/2" Juarez	861.83	2.76E-02	7.67E+01	2.25E+01
Glass Rey Type X 5/8" Monterrey	1111.3	3.10E-02	8.95E+01	2.25E+01
Glass Rey Type X 5/8" Juarez	1111.3	3.56E-02	9.88E+01	2.90E+01
Glass Rey Interiors 1/2" Monterrey	861.83	1.79E-02	3.36E+01	2.90E+01
Glass Rey Interiors 1/2" Juarez	861.83	2.18E-02	4.43E+01	2.25E+01

Waste Production:

Parameters describing the use of resources were calculated using EDIP 2003 and direct LCI reporting. (1)

Table 8: Summary results for 1,000 square feet (MSF) of gypsum board of varying thicknesses using the EDIP 2003 impact methods

EDIP 2003: LCI Impact Summary Results for 1,000 Square Feet (MSF) of Gypsum Board of Varying Thicknesses				
		Non-Hazardous Waste	Hazardous Waste	Radioactive Waste
Panel + Manufacturing	Factor: kg/MSF	kg	kg	kg
Flex Rey 1/4" Monterrey	415.49	9.57E+00	8.52E-04	1.75E-03
Regular Rey 1/2" Monterrey	694	1.83E+01	1.58E-03	3.72E-03
Regular Rey 1/2" SLP	694	1.53E+01	2.87E-03	3.08E-03
Regular Rey 1/2" Juarez	694	6.67E+01	3.41E-03	1.02E-02
Regular Rey 3/8" Monterrey	542.5	1.17E+01	1.11E-03	2.13E-03
Regular Rey 3/8" SLP	542.5	1.16E+01	2.20E-03	2.26E-03
Regular Rey 3/8" Juarez	542.5	5.09E+01	2.61E-03	7.73E-03
Regular Rey 5/8" Monterrey	1002.44	2.16E+01	2.05E-03	3.93E-03
Regular Rey 5/8" SLP	1002.44	2.15E+01	4.07E-03	4.17E-03
Regular Rey 5/8" Juarez	1002.44	9.41E+01	4.82E-03	1.43E-02
Water Rey 1/2" Monterrey	712.14	2.62E+01	1.71E-03	4.59E-03
Water Rey 1/2" SLP	712.14	2.01E+01	3.05E-03	3.85E-03
Water Rey 1/2" Juarez	712.14	6.74E+01	3.53E-03	1.04E-02
Water Rey type X 5/8" Monterrey	1051.43	2.42E+01	1.16E-03	4.21E-03
Water Rey Type X 5/8" Juarez	1051.43	8.51E+01	3.85E-03	1.29E-02
Light Rey 1/2" Monterrey	612.35	1.39E+01	1.36E-03	2.61E-03
Light Rey 1/2" SLP	612.35	1.30E+01	2.58E-03	2.63E-03
Light Rey 1/2" Juarez	612.35	5.72E+01	3.04E-03	8.77E-03
Guard Rey 1/2" Monterrey	712.14	2.56E+01	1.66E-03	4.36E-03

Guard Rey 1/2" SLP	712.14	1.95E+01	3.01E-03	3.66E-03
Guard Rey 1/2" Juarez	712.14	6.68E+01	3.49E-03	1.02E-02
Guard Rey Type X 5/8" Monterrey	1051.43	3.54E+01	2.48E-03	6.22E-03
Guard Rey Type X 5/8" Juarez	1051.43	1.14E+02	5.41E-03	1.74E-02
Soffit Rey Type C 5/8" Monterrey	1084.09	3.74E+01	2.55E-03	6.38E-03
Soffit Rey Type C 5/8" Juarez	1084.09	1.15E+02	5.53E-03	1.75E-02
Soffit Rey Type X 5/8" Monterrey	1013.78	2.38E+01	2.31E-03	4.44E-03
Soffit Rey Type X 5/8" Juarez	1013.78	9.68E+01	5.10E-03	1.48E-02
Fire Rey 1/2" Monterrey	694	1.68E+01	1.58E-03	3.03E-03
Fire Rey 1/2" SLP	694	1.61E+01	2.96E-03	3.17E-03
Fire Rey 1/2" Juarez	694	6.65E+01	3.49E-03	1.02E-02
fire Rey 5/8" Monterrey	1013.78	2.41E+01	2.31E-03	4.56E-03
fire Rey 5/8" SLP	1013.78	2.35E+01	4.33E-03	4.64E-03
fire Rey 5/8" Juarez	1013.78	9.71E+01	5.09E-03	1.49E-02
Fire Rey Type C 1/2" Monterrey	943.47	3.27E+01	2.20E-03	5.52E-03
Fire Rey Type C 1/2" SLP	943.47	3.39E+01	4.11E-03	5.92E-03
Fire Rey Type C 1/2" Juarez	943.47	9.92E+01	4.78E-03	1.50E-02
Fire Rey Type C 5/8" Monterrey	1013.78	3.51E+01	2.36E-03	5.93E-03
Fire Rey Type C 5/8" Juarez	1013.78	1.07E+02	5.14E-03	1.61E-02
Exterior Rey 1/2" Monterrey	712.14	1.65E+01	1.55E-03	3.09E-03
Exterior Rey 1/2" SLP	712.14	1.98E+01	3.02E-03	3.74E-03
Exterior Rey 5/8" Monterrey	1013.78	3.79E+01	2.41E-03	6.48E-03
Exterior Rey 5/8" SLP	1013.78	2.70E+01	4.30E-03	5.15E-03
Ceiling Rey 1/2" Monterrey	793.79	1.94E+01	1.81E-03	3.51E-03
Ceiling Rey 1/2" SLP	793.79	1.88E+01	3.39E-03	3.59E-03
Glass Rey 1/2" Monterrey	861.83	4.71E+01	3.33E-03	6.46E-03
Glass Rey 1/2" SLP	861.83	4.14E+01	4.87E-03	5.86E-03
Glass Rey 1/2" Juarez	861.83	1.21E+02	5.75E-03	1.70E-02
Glass Rey Type X 5/8" Monterrey	1111.3	6.07E+01	4.30E-03	8.33E-03
Glass Rey Type X 5/8" Juarez	1111.3	1.56E+02	7.41E-03	2.19E-02
Glass Rey Interiors 1/2" Monterrey	861.83	3.92E+01	2.45E-03	5.07E-03
Glass Rey Interiors 1/2" Juarez	861.83	1.09E+02	4.93E-03	1.50E-02

Table 9: Summary results for 1,000 square feet (MSF) of gypsum board of varying thicknesses using direct LCI reporting

Direct LCI Reporting: LCI Impact Summary Results for 1,000 Square Feet (MSF) of Gypsum Board of Varying Thicknesses						
Panel + Manufacturing	Factor: kg/MSF	Components for Reuse	Materials for Recycling*	Materials for Energy Recovery	Exported Electricity	Exported Heat
		kg	kg	kg	MJ	MJ
Flex Rey 1/4" Monterrey	415	1.25E-01	3.47E+02	0	0	0
Regular Rey 1/2" Monterrey	694	2.08E-01	5.79E+02	0	0	0
Regular Rey 1/2" SLP	694	3.19E-01	3.35E+02	0	0	0
Regular Rey 1/2" Juarez	694	3.47E-01	3.85E+02	0	0	0
Regular Rey 3/8" Monterrey	542.5	1.63E+00	4.53E+02	0	0	0
Regular Rey 3/8" SLP	542.5	2.50E-01	2.62E+02	0	0	0
Regular Rey 3/8" Juarez	542.5	2.71E-01	3.01E+02	0	0	0
Regular Rey 5/8" Monterrey	1002.44	3.01E-01	8.37E+02	0	0	0
Regular Rey 5/8" SLP	1002.44	4.61E-01	4.84E+02	0	0	0
Regular Rey 5/8" Juarez	1002.44	5.01E-01	5.56E+02	0	0	0
Water Rey 1/2" Monterrey	712.14	2.14E-01	5.95E+02	0	0	0
Water Rey 1/2" SLP	712.14	3.28E-01	3.44E+02	0	0	0
Water Rey 1/2" Juarez	712.14	3.56E-01	3.95E+02	0	0	0
Water Rey type X 5/8" Monterrey	1051.43	3.15E-01	8.78E+02	0	0	0
Water Rey Type X 5/8" Juarez	1051.43	5.26E-01	5.83E+02	0	0	0
Light Rey 1/2" Monterrey	612.35	1.84E-01	5.11E+02	0	0	0
Light Rey 1/2" SLP	612.35	2.82E-01	2.96E+02	0	0	0
Light Rey 1/2" Juarez	612.35	3.06E-01	3.39E+02	0	0	0
Guard Rey 1/2" Monterrey	712.14	2.14E-01	5.95E+02	0	0	0
Guard Rey 1/2" SLP	712.14	3.28E-01	3.44E+02	0	0	0
Guard Rey 1/2" Juarez	712.14	3.56E-01	3.95E+02	0	0	0

Guard Rey Type X 5/8" Monterrey	1051.43	3.15E-01	8.78E+02	0	0	0
Guard Rey Type X 5/8" Juarez	1051.43	5.26E-01	5.83E+02	0	0	0
Soffit Rey Type C 5/8" Monterrey	1084.09	3.25E-01	9.05E+02	0	0	0
Soffit Rey Type C 5/8" Juarez	1084.09	5.42E-01	6.01E+02	0	0	0
Soffit Rey Type X 5/8" Monterrey	1013.78	3.04E-01	8.46E+02	0	0	0
Soffit Rey Type X 5/8" Juarez	1013.78	5.07E-01	5.62E+02	0	0	0
Fire Rey 1/2" Monterrey	694	2.08E-01	5.79E+02	0	0	0
Fire Rey 1/2" SLP	694	3.19E-01	3.35E+02	0	0	0
Fire Rey 1/2" Juarez	694	3.47E-01	3.85E+02	0	0	0
fire Rey 5/8" Monterrey	1013.78	5.07E-01	8.46E+02	0	0	0
fire Rey 5/8" SLP	1013.78	4.66E-01	4.90E+02	0	0	0
fire Rey 5/8" Juarez	1013.78	5.07E-01	5.62E+02	0	0	0
Fire Rey Type C 1/2" Monterrey	943.47	2.83E-01	7.88E+02	0	0	0
Fire Rey Type C 1/2" SLP	943.47	4.34E-01	4.56E+02	0	0	0
Fire Rey Type C 1/2" Juarez	943.47	4.72E-01	5.23E+02	0	0	0
Fire Rey Type C 5/8" Monterrey	1013.78	3.04E-01	8.46E+02	0	0	0
Fire Rey Type C 5/8" Juarez	1013.78	5.07E-01	5.62E+02	0	0	0
Exterior Rey 1/2" Monterrey	712.14	2.14E-01	5.95E+02	0	0	0
Exterior Rey 1/2" SLP	712.14	3.28E-01	3.44E+02	0	0	0
Exterior Rey 5/8" Monterrey	1013.78	3.04E-01	8.46E+02	0	0	0
Exterior Rey 5/8" SLP	1013.78	4.66E-01	4.90E+02	0	0	0
Ceiling Rey 1/2" Monterrey	793.79	2.38E-01	6.63E+02	0	0	0

Ceiling Rey 1/2" SLP	793.79	3.65E-01	3.83E+02	0	0	0
Glass Rey 1/2" Monterrey	861.83	2.59E-01	7.20E+02	0	0	0
Glass Rey 1/2" SLP	861.83	3.96E-01	4.16E+02	0	0	0
Glass Rey 1/2" Juarez	861.83	4.31E-01	4.78E+02	0	0	0
Glass Rey Type X 5/8" Monterrey	1111.3	3.33E-01	9.28E+02	0	0	0
Glass Rey Type X 5/8" Juarez	1111.3	5.56E-01	6.16E+02	0	0	0
Glass Rey Interiors 1/2" Monterrey	861.83	2.59E-01	7.20E+02	0	0	0
Glass Rey Interiors 1/2" Juarez	861.83	4.31E-01	4.78E+02	0	0	0

Note: 3 *All recycling calculations include on-site recycling of water used in all Panel Rey processes: manufacturing and all other employee uses

References

1. **EPD International.** *Construction Products and Construction Services, Version 2.2 2012:01.* s.l. : EPD International, 2017.
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