

ENVIRONMENTAL PRODUCT DECLARATION

EXPANDED POLYSTYRENE INSULATION

MOLDED, CLOSED-CELL FOAM PLASTIC INSULATION
LONG-TERM STABLE R-VALUE



Expanded polystyrene (EPS) is an innovative, high-performance building material engineered to deliver long-term, reliable energy efficiency. EPS insulation is an ideal choice for green building design, offering numerous environmental advantages, including reduced energy consumption, recycled content, localized distribution and improved indoor air quality.



This EPD complies with the Building Envelope Thermal Insulation Product Category Rule (PCR), version 1.4 by Underwriters Laboratory (UL).



The EPS Industry Alliance (EPS-IA), which represents manufacturers and distributors of expanded polystyrene (EPS) products throughout North America, facilitates educational outreach on the technical, environmental and performance advancements of EPS.

The EPS industry is committed to sustainability through innovation. We demonstrate this dedication through lean manufacturing processes, a comprehensive recycling system and by harnessing new technologies to conserve raw materials and reduce waste. The EPS industry is continuously seeking to further market applications, reduce impacts and raise performance.

EPS-IA has invested significant time and resources in life-cycle analysis. This Environmental Product Declaration is part of our goal to provide life-cycle information on all EPS insulation applications.

www.epsindustry.org



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EPS INSULATION

ACCORDING TO ISO 14025

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	EPS Industry Alliance	
DECLARATION NUMBER	4787238561.101.1	
DECLARED PRODUCT	EPS Insulation	
REFERENCE PCR	UL PCR: Building Envelope Thermal and Mechanical Insulation v1.4 2016	
DATE OF ISSUE	8/10/2017	
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 Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications	
The PCR review was conducted by:	UL Environment	
	Peer Review Panel	
	epd@ul.com	
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL		
	Wade Stout, UL Environment	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:		
	Thomas Gloria, Industrial Ecology Consultants	

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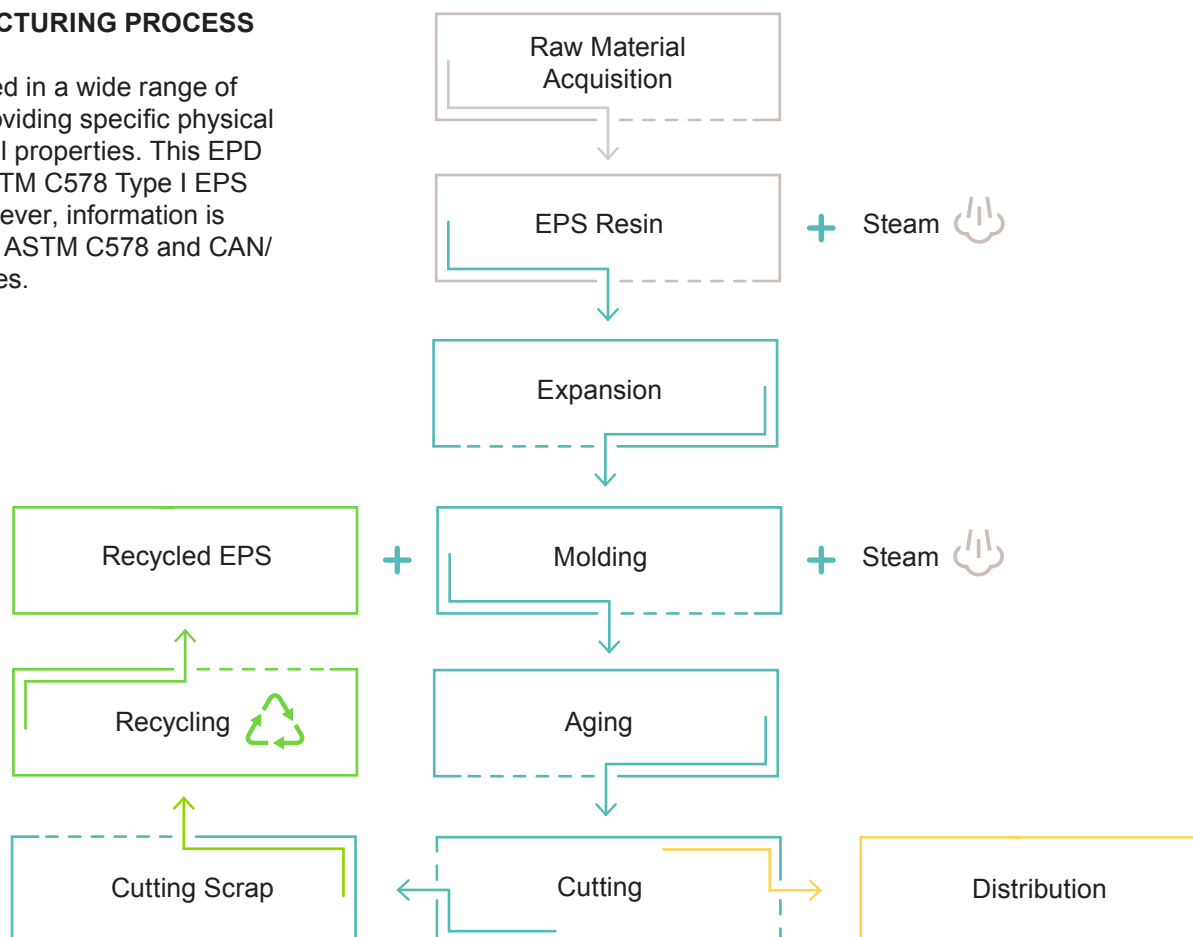
PRODUCT DESCRIPTION

Expanded polystyrene (EPS) insulation is a closed-cell foam plastic that is 98% air. EPS insulation is foam plastic and has never contained chlorofluorocarbon (CFCs), hydrofluorocarbons (HFCs) or hydrochlorofluorocarbon (HCFCs) blowing agents. EPS is easily recyclable and re-incorporated into the manufacturing process.

EPS is created in a two-stage process. First, EPS resin is loaded into an expander and exposed to steam, which causes it to expand. The expanded material is transferred into a block mold where, once again, steam is used to further expand and fuse the material into a solid, homogenous block. Recycled EPS is typically incorporated to produce a recycled content product. Following a short aging process, the EPS block is cut into sheets or various shapes to suit all insulation applications. Cutting scrap is recycled in-house and reused in the production cycle. The basic EPS product is white, although it can be colored.

EPS MANUFACTURING PROCESS

EPS is produced in a wide range of types, each providing specific physical and mechanical properties. This EPD is based on ASTM C578 Type I EPS insulation. However, information is available for all ASTM C578 and CAN/ULC S701 Types.



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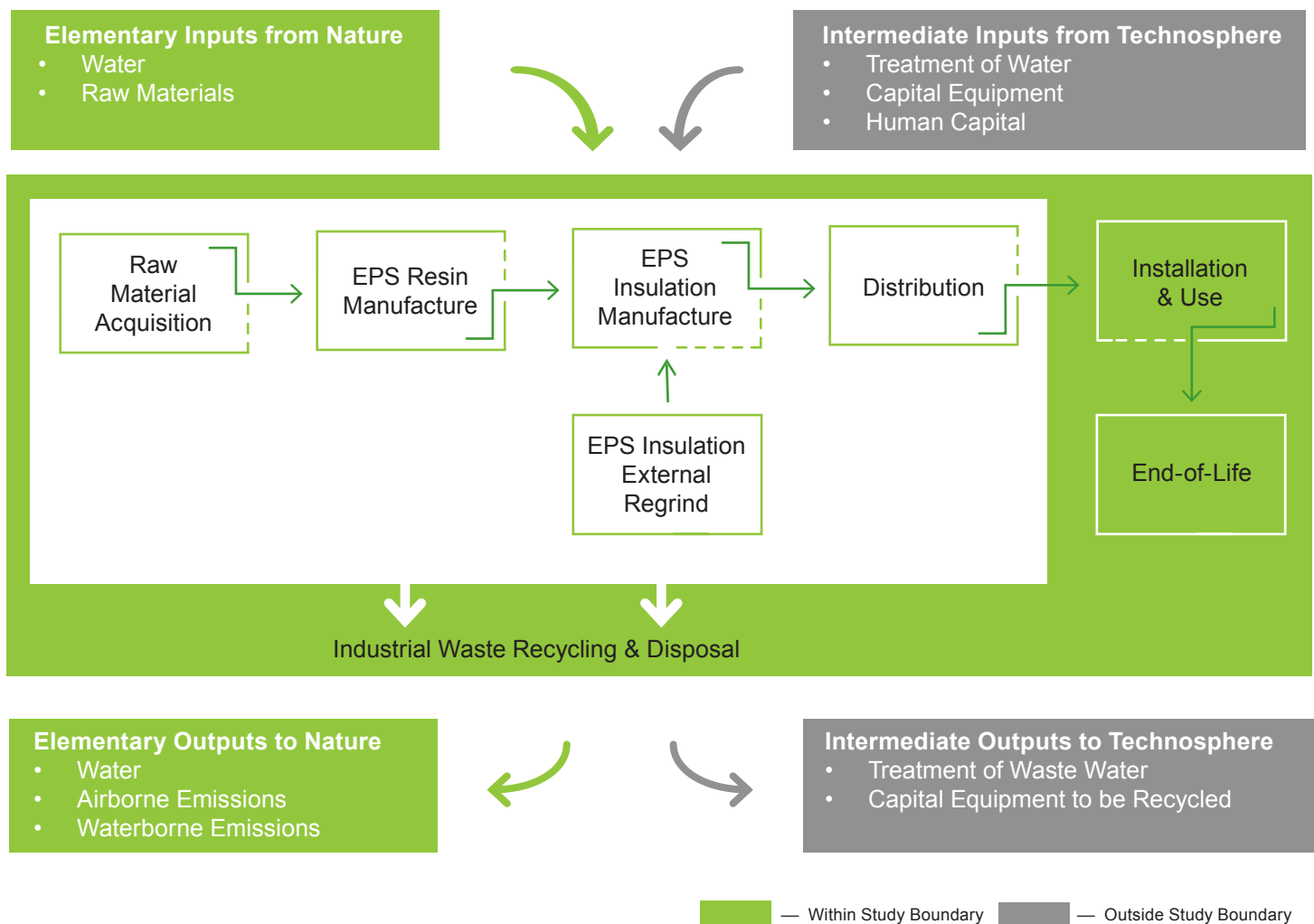


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The principal purpose of the LCA is to provide updated environmental impacts associated with EPS insulation from cradle to grave. The illustration below details EPS insulation production and subsequent life cycle stages.

EPS INSULATION SYSTEM BOUNDARIES



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FUNCTIONAL UNIT

The functional unit used for this study is 1 m² (10.765 ft²) of insulation material with a thickness that gives an average thermal resistance RSI = 1 m²•K/W (R-value 5.68 ft²•hr•°F/BTU) and with a building service life of 60 years. The thickness of the ASTM C578 Type I EPS insulation required for the functional unit is 4.01 centimeters (1.58 in).

Note: The EPD data is derived from the LCA of EPS Insulation and Cradle-to-Gate LCA of EPS Resin reports by ERG/Franklin Associates. Percentages have been rounded and may not total to 100%.

GEOGRAPHIC ANALYSIS

The geographic scope of the analysis is insulation manufactured, used, and disposed of in North America. End-of-life management of insulation was modeled based on all insulation being taken to a construction and demolition (C&D) landfill. This included transport and landfill machinery. The insulation was modeled as inert within the landfill.

INVENTORY & IMPACT ASSESSMENT

The LCA study addresses global, regional, and local environmental impact categories. For most of the impact categories examined, the TRACI 2.1 methodology, developed by the United States Environmental Protection Agency (EPA) specific to U.S./Canadian conditions and updated in 2012, is employed.

For the category of acidification, units of TRACI 2.04 were used in accordance with the Product Category Rule. For the category of Global Warming Potential (GWP), contributing elementary flows are characterized using factors reported by the Intergovernmental Panel on Climate Change (IPCC) in 2013 with a 100 year time horizon.

DATA QUALITY ASSESSMENT

Primary data was collected from three EPS resin manufacturers in North America – one in Canada, one in the U.S., and one in Mexico. Data was provided by one plant for each manufacturer. A straight average of these three resin data sets was used for the average EPS resin data set.

Primary data was collected from a total of 29 insulation manufacturing plants (23 in the U.S. and six in Canada). The following companies provided data for this assessment: ACH Foam Technologies, Inc., Atlas EPS, Insulation Technology, Inc., Insulfoam, NOVA Chemicals Inc., Plasti-Fab Ltd., VersaTech, Inc., Styropek. All insulation data sets were weighted using production amounts provided by each plant.

The data quality goals were to use data that are (1) geographically representative for each insulation system based on the locations where material sourcing and resin manufacturing operations, insulation manufacturing, distribution, and end-of-life management take place, and (2) representative of current industry practices in these regions. EPS-IA provided current, geographically representative data for both the EPS resin and the EPS insulation system. Those data sets used in the models that were not collected for this analysis were drawn largely from reliable published databases (U.S. LCI Database) or from the ERG/Franklin Associates confidential database of primary North American unit process data. The data sets used were the most current and most geographically and technologically relevant data sets available during the data collection phase of the project.



METHODOLOGY

The LCA has been conducted following internationally accepted standards for LCA methodology as outlined in the ISO 14040 and 14044 standards, which provide guidance and requirements for conducting life cycle assessments. However, for some specific aspects of life cycle assessment, the ISO standards have some flexibility and allow for methodological choices to be made. These include the method used to allocate energy requirements and environmental releases among more than one useful product produced by a process, the methodology used to allocate environmental burdens for recycled content, and the methodology used for end of life management. The following sections describe the approach to each issue used in this study.

ENERGY DEMAND

Figure 3 shows total energy demand for the life cycle of the insulation system. The production of raw materials makes the largest contribution (81.8 percent) of the total energy demand for the EPS insulation. Insulation manufacturing also makes a significant contribution at 12 percent of the total. The manufacturing process for EPS insulation includes expansion of the resin, regrinding and converting scrap for reuse in the process, and, at some plants, combustion of captured blowing agent emissions. Transportation steps make up almost five percent of the total energy. A little more than two percent of that energy comes from distributing the insulation to the distribution centers and users. Packaging the resin and insulation requires very little energy. The insulation is installed manually, so no energy is required to complete that process. The use of the insulation also requires no energy. One percent of the total energy is required to dispose of the insulation, which includes transport to the C&D (construction and demolition) landfill, as well as for landfill equipment.

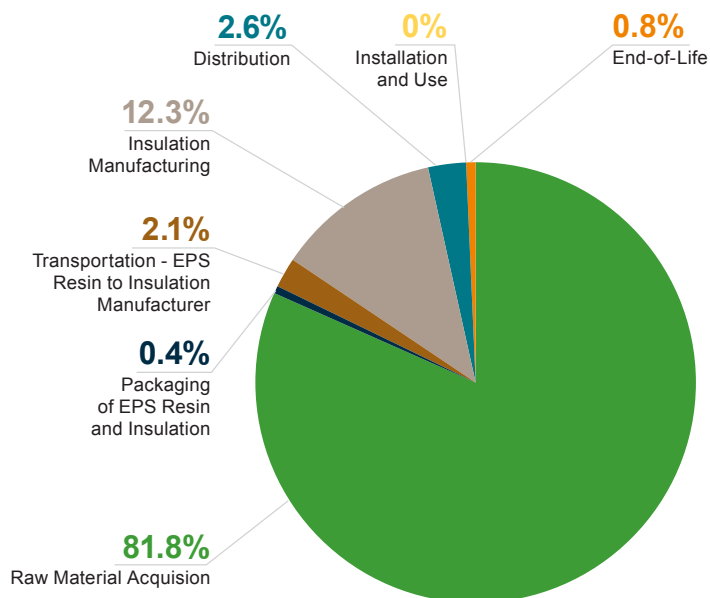


Figure 3: Total energy Demand for EPS Insulation