siplast®

Paratherm®

Environmental Product Declaration

Program Operator	NSF Certification, LLC 789 N. Dixboro Ann Arbor, MI 48105 www.nsf.org
General Program instructions and Version Number	Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Version 3.1
Manufacturer Name and Address	Siplast 1000 Rochelle Blvd. Irving, TX. 75062-3940
Declaration Number	EPD10251
Declared Product and Functional Unit	Paratherm® NH Roof Insulation 1 m^2 of installed insulation material with a thickness that gives an average thermal resistance RSI = 1m^2KW and with a building service life of 75 years
Reference PCR and Version Number	Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Version 3.1 Part B: Building Envelope Thermal Insulation EPD Requirements UL 10010-1
Product's intended Application and Use	Thermal Insulation for Roofing Applications
Product RSL	75 years as per PCR guidelines
Markets of Applicability	North America, Europe
Date of Issue	05/23/2019
Period of Validity	06/21/2023
EPD Type	Product Specific
Range of Dataset Variability	N/A
EPD Scope	Cradle to gate with options (A1-A3, B1-B5, B7, and C1-C4)
Year of reported manufacturer primary data	2016
LCA Software and Version Number	GaBi 8.6.0.20
LCI Database and Version Number	GaBi Database Version 8.7, Service Pack 35
LCIA Methodology and Version Number	TRACI 2.1 CML 2001-Jan 2016
The sub-category PCR review was conducted by:	Thomas Gloria, PhD (chair) Christoph Koffler, PhD Andre Desjarlais
This declaration was independently verified in accordance with ISO 14025: 2006. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v3.1 (February 2018), based on CEN Norm EN 15804 (2012) and ISO 21930:2017, serves as the core PCR, with additional considerations from the USGBC/UL Environment Part A Enhancement (2017) **☐ Internal ☒ External**	Jenny Oorbeck joorbeck@nsf.org
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	WAP Sustainability Consulting
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.

Comparison of the environmental performance of Building Envelope Thermal Insulation using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR.

Full conformance with the PCR for Building Envelope Thermal Insulation 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.

Company Description

The Siplast story of uncompromising quality and commitment to our customers begins over half a century ago with an innovation that would change the commercial roofing and waterproofing industry. In the late 1960s, Siplast Research and Development, working in conjunction with Shell Chemical of Europe, developed SBS (styrene-butadiene-styrene) modified bitumens. We found that by properly modifying asphalt with SBS, we could produce a highly durable elastomeric blend with exceptional elongation/recovery properties over a wide range of temperatures.

There are Siplast roofs applied in the early years of our SBS blend that are still in service today. Since then, Siplast Engineered Roof Systems have been applied over all types of deck constructions, in the extremely varied weather conditions of more than 40 countries. That performance history has helped us earn our reputation as a leader in the development and manufacture of the world's most advanced roofing and waterproofing systems.

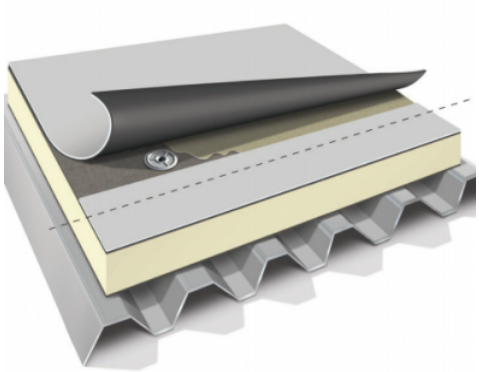
For more information about Siplast, visit http://www.siplast.com/.

Product Description

Insulation is a crucial part of the roofing system, providing thermal performance in today's energy efficient buildings. Paratherm® is a rigid roof insulation board composed of a closed cell polyisocyanurate foam core bonded on each side to fiberglass-reinforced facers. Please contact your Siplast representative for additional information on Paratherm®.

Product Description (cont.)

Paratherm® NH Polyiso Roof Insulation is available in 4ft. x 4 ft. and 4ft. x 8ft. boards with thicknesses ranging from 1 to 4.5 inches. Paratherm® NH Polyiso Roof Insulation is designed for use in any low-slope roofing application, including built-up roofs, modified bitumen, or most single-ply roofing systems. Manufacturing data was collected from the company's Gainesville, TX plant. The product can also be manufactured at facilities in Statesboro, GA and Cedar City, UT.



The dimensions and quantities that are delivered to site of application vary based on customer order.

Paratherm® NH Polyiso Roof Insultation					
Functional Unit	1 m^2 of insulation material with a thickness that gives an average thermal resistance RSI = 1 m^2K/W				
Specification	1.0 in	1.5 in	2.0 in	3.0 in	4.5 in
Mass [kg]	0.787	0.741	0.728	0.703	0.678
Thickness to achieve Functional Unit [in]	0.996	0.99	0.996	0.979	0.953

Property	Value	Test Method
Product Form	Glass fiber-reinforced cellulosic felt facers bonded to a core of non-halogenated isocyanurate foam	-
Compressive Strength	20 PSI	ASTM D1621
Dimensional Stability (Length + Width)	<2%	ASTM D2126
Water Absorption	<1.5%	ASTM C209
Moisture Vapor Transmission	<1.5 Perm	ASTM E96
Service Temperature	-100° to 250°F (-73.3° to 121.1°C)	-
Flame Spread Index	<75	ASTM E84

Material Composition

Material	Mass %
Ethyldimethylmethane (Isopentane)	<1-10
n-Pentane	<1-5.5
Proprietary Flame Retardant	NA
Fibrous Glass	<25
Non-hazardous Ingredients	>40
Total	100

No materials are classified by the Resource Conservation and Recovery Act (RCRA), subtitle 3 for the United States. Additionally, no materials are classified REACH Substances of Very High Concern for Europe.

Manufacturing

This stage includes an aggregation of raw material extraction, supplier processing, delivery, manufacturing and packaging by GAF. Manufacturing data was collected from the company's Gainesville, TX plant. The product can also be manufactured at facilities in Statesboro, GA and Cedar City, UT.

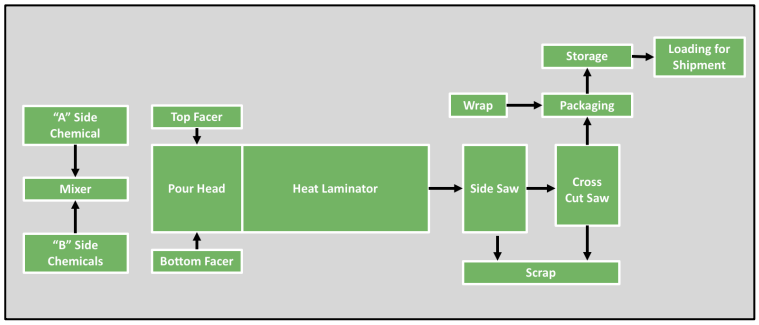


Figure 1: Manufacturing Process Flow

Packaging

After manufacturing, the product is packaged for shipment to the customer. Packaging includes a plastic film referred to as Hooder that wraps around the entire product. The amount of Hooder per functional units is .0033 kgs. The Hooder may be recyclable in some markets, but for the purposes of this EPD it is assumed to be landfilled.

Additional packaging includes the pallets that the final product is shipped on. However, Siplast utilizes waste insulation board as the foundation to their pallets. As such, there are no additional packaging inputs required for the pallets.

Transportation

Transportation was considered for all upstream and downstream processes. All shipping was assumed to occur via truck. Inputs to the three primary transportation phases are disclosed in the table.

Input	Type, Energy Carrier	Miles	km
Raw material supplier to manufacturing facility	Truck, Diesel	785	1,263
Shipping to Customer	Truck, Diesel	500	805
Shipping to Landfill	Truck, Diesel	100	161

Product Installation

Detailed installation instructions are provided online along with the type of fasteners required for each product. Installation equipment is required though not included in the study as these are multi-use tools and the impacts per declared unit is considered negligible. However, fuel used by a fork-lift or crane to unload the roof insulation board to the roofing system cannot be used for multiple installations. Therefore, the impacts due to diesel by a crane or fork-lift have been considered. Apart from diesel, fasteners (screw and plate) are required to affix the insulation board onto the roof deck. Finally, a 5% install waste was also considered. (Note: Compliance with model building codes does not always ensure compliance with state or local building codes, which may be amended versions of these model codes. Always check with local building code officials to confirm compliance).

Use

The product does not require any regular maintenance during its use phase until the entire roofing system is replaced. Therefore, the impacts from the Use phase modules of B1-B3, B5 and B7 are considered to be zero.

Disposal

In this stage, the product is transported to the end-of-life facility and disposed of. Included in this stage are the following:

- Deconstruction – There are no impacts during this stage as the product is either disposed of with the underlying roofing system or manually removed.
- Transportation to recycling or disposal – Estimated fuel requirements made based on weight of product and average distance to landfill.
- Waste processing for reuse, recycling, energy recovery and/or reclamation – all product is assumed to be landfilled.
- Waste disposal – All pre-treatment, required resource inputs and management activities of the disposal site included through the use of secondary GaBi dataset.

Though this product can be recycled, this study assumes it is landfilled as a conservative estimate.

System Boundary

The overall system boundary is identified in the flow chart below. This EPD is considered Cradle-to-Gate, with options.

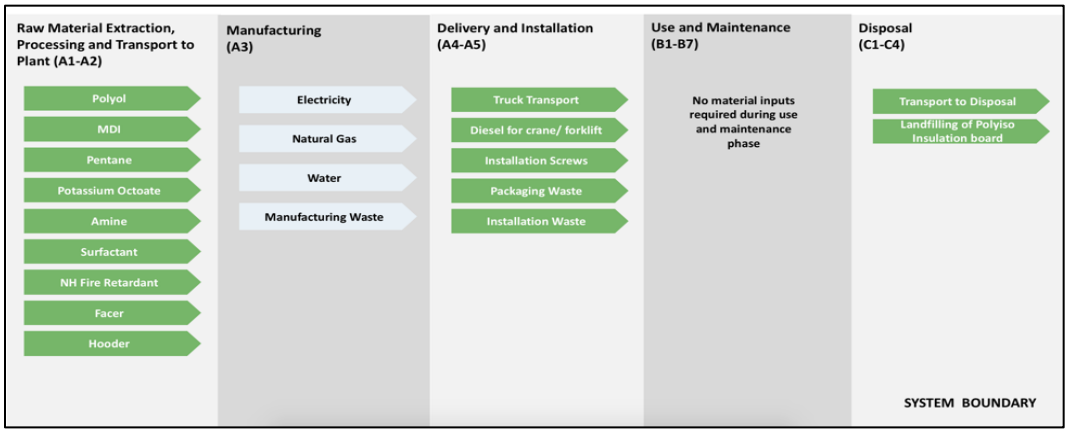


Figure 2: System Boundary

Cut-Off Rules

All inputs for which data was available were included. Material inputs greater than 1% (based on total mass of the final product) were included within the scope of analysis. Material inputs less than 1% were included if sufficient data was available to warrant inclusion. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the functional unit. Some raw materials were excluded. This was due to lack of adequate representative secondary data within GaBi. However, the excluded materials were significantly below the cut off criteria and include minor additives such as proprietary binders.

Data Sources

Primary data was collected onsite. This includes electrical and thermal energy, water consumption, waste generation, bill of materials and suppliers.

Secondary data was source from GaBi Database Version 8.7, Service Pack 35.

Data Quality

Third party verified ISO 14040/44 secondary LCI data sets contribute to more than 67% of the total impacts to any of the required impact categories identified by the applicable PCR. The geographical scope of the manufacturing portion of the life cycle is Gainesville, Texas. All primary data were collected from the manufacturer. The geographic coverage of primary data is considered excellent. The primary data provided by the manufacturer represent all information for calendar year 2016. Using this data meets the PCR requirements. Time coverage of this data is considered very good. Primary data provided by the manufacturer is specific to the technology that Siplast uses in manufacturing their product. It is site-specific and considered of good quality. It is worth noting that the energy and water used in manufacturing the product includes overhead energy such as lighting, heating and sanitary use of water. Sub-metering would improve the technological coverage of data quality. Data necessary to model cradle-to-gate unit processes was sourced from GaBi LCI datasets. Improved life cycle data from suppliers would improve technological coverage.

Allocation

General principles of allocation were based on ISO 14040/44. Where possible, allocation was avoided. When allocation was necessary it was done on a physical mass basis.

Comparability and Benchmarking

The user of the EPD should take care when comparing EPDs from different companies. Assumptions, data sources, and assessment tools may all impact the uncertainty of the final results and make comparisons misleading. Without understanding the specific variability, the user is therefore, not encouraged to compare EPDs. Even for similar products, differences in use and end-of-life stage assumptions, and data quality may produce incomparable results. Comparison of the environmental performance of Polyiso Roof Insulation using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR. Full conformance with the PCR for Polyiso Roof Insulation 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.

Scenarios and Additional Technical Information

Scenario 1: Transport to the Building Site

Parameter	Value	Unit	Source
Fuel type	Diesel	-	GaBi
Liters of fuel	39.0625	l/100km	GaBi
Vehicle type	Truck – Trailer, basic enclosed/ 45,000 lb payload		GaBi
grabCapacity Utilization	0.78	%	GaBi
Gross density of products transported	175.75	kg/m³	Calculation
Weight of products transported	20,411.657	kg	GaBi
Volume of products transported	116.14	m³	Source
Capacity utilization volume factor	1	-	GaBi

Scenario 2: Installation into the Building

Name	Value	Unit
RSL	75	years
Declared product properties (at the gate) and finishes, etc.	See Table 2	
Design application parameters	Installation per recommendation by manufacturer	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Accepted industry standard	-
Service Temperature	260	F

Input per sq. m	Thickness of 0.5-1.2 in	Thickness > 1.3 in	Unit
Diesel (for crane or forklift)	0.00075-0.0018	0.00195	kg
Fasteners	0.0941	0.0784	kg
Install waste	5	5	%

Name	Value	Unit
Reference Service Life	75	years
Replacement Cycle (RSL)	1	Number/RSL
Estimated Service Life of Building	75	Years
Replacement Cycle (ESL)	1	Number/ESL
Energy Input	.00075-.0018	kg/Replacement
Net Freshwater	0	kg/Replacement
Ancillary Materials (Fasteners)	.0941	kg/Replacement
Replacement of worn parts	0	kg/Replacement
Direct emissions to ambient air, soil and water	0	kg/Replacement
*RSL defined by PCR Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Version 3.1		

Scenario 4: End of Life

	Paratherm NH Polyiso 20 PSI 1.0 in	Paratherm NH Polyiso 20 PSI 1.5 in	Paratherm NH Polyiso 20 PSI 2.0 in	Paratherm NH Polyiso 20 PSI 3.0 in	Paratherm NH Polyiso 20 PSI 4.5 in	Unit
Collected as mixed construction waste	0.935	0.572	0.423	0.273	0.176	kg
Landfilling	0.935	0.572	0.423	0.273	0.176	kg

LCA Results

All results are given per functional unit, which is 1 m² of installed insulation material with a thickness that gives an average thermal resistance RSI = 1 m²KW over an estimated building life of 75 years. Environmental Impacts were calculated using the GaBi software platform. Impact results have been calculated using both TRACI 2.1 and CML 2001-Jan 2016 characterization factors.
See Impact Category Key section at the end of this document for definition of acronyms.

1. Paratherm® NH Polyiso 20 PSI 1.0 in.

1.1 EU - CML Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADP-elements [kg Sb eq]	5.50E-06	8.67E-09	2.92E-05	0.00E+00	0.00E+00	0.00E+00	1.39E-04	0.00E+00	MND	0.00E+00	0.00E+00	2.20E-09	0.00E+00	1.78E-08	MND
ADP-fossil fuel [MJ]	3.80E+01	6.72E-01	5.70E+00	0.00E+00	0.00E+00	0.00E+00	1.77E+02	0.00E+00	MND	0.00E+00	0.00E+00	1.70E-01	0.00E+00	6.42E-01	MND
AP [kg SO2 eq]	4.22E-03	1.66E-04	1.51E-03	0.00E+00	0.00E+00	0.00E+00	2.36E-02	0.00E+00	MND	0.00E+00	0.00E+00	3.62E-05	0.00E+00	1.75E-04	MND
EP [kg Phosphate eq]	7.78E-04	4.42E-05	3.96E-05	0.00E+00	0.00E+00	0.00E+00	3.45E-03	0.00E+00	MND	0.00E+00	0.00E+00	9.75E-06	0.00E+00	2.27E-05	MND
GWP [kg CO2 eq]	2.19E+00	4.77E-02	5.89E-01	0.00E+00	0.00E+00	0.00E+00	1.13E+01	0.00E+00	MND	0.00E+00	0.00E+00	1.21E-02	0.00E+00	4.13E-02	MND
ODP [kg CFC 11 eq]	2.17E-06	1.63E-15	2.82E-10	0.00E+00	0.00E+00	0.00E+00	8.68E-06	0.00E+00	MND	0.00E+00	0.00E+00	4.13E-16	0.00E+00	7.57E-15	MND
POCP [kg Ethene eq]	5.96E-04	1.63E-05	1.95E-04	0.00E+00	0.00E+00	0.00E+00	3.23E-03	0.00E+00	MND	0.00E+00	0.00E+00	3.67E-06	0.00E+00	1.48E-05	MND

1.2 North America - TRACI Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
AP [kg SO2 eq]	4.55E-03	2.22E-04	5.72E-04	0.00E+00	0.00E+00	0.00E+00	2.14E-02	0.00E+00	MND	0.00E+00	0.00E+00	4.83E-05	0.00E+00	1.90E-04	MND
EP [kg N eq]	5.41E-04	1.80E-05	-2.75E-04	0.00E+00	0.00E+00	0.00E+00	1.14E-03	0.00E+00	MND	0.00E+00	0.00E+00	4.06E-06	0.00E+00	9.64E-06	MND
GWP [kg CO2 eq]	2.19E+00	4.77E-02	5.88E-01	0.00E+00	0.00E+00	0.00E+00	1.13E+01	0.00E+00	MND	0.00E+00	0.00E+00	1.20E-02	0.00E+00	4.11E-02	MND
ODP [kg CFC 11 eq]	2.17E-06	1.63E-15	2.82E-10	0.00E+00	0.00E+00	0.00E+00	8.68E-06	0.00E+00	MND	0.00E+00	0.00E+00	4.13E-16	0.00E+00	7.57E-15	MND
Resources [MJ]	5.07E+00	9.01E-02	2.34E-01	0.00E+00	0.00E+00	0.00E+00	2.16E+01	0.00E+00	MND	0.00E+00	0.00E+00	2.28E-02	0.00E+00	8.24E-02	MND
POCP [kg O3 eq]	7.47E-02	7.31E-03	2.11E-02	0.00E+00	0.00E+00	0.00E+00	4.12E-01	0.00E+00	MND	0.00E+00	0.00E+00	1.57E-03	0.00E+00	3.77E-03	MND

1.3 Resources and Waste

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD [kg]	1.24E-08	5.24E-09	4.31E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.33E-09	0.00E+00	2.27E-09	MND
NHWD [kg]	3.45E-02	2.53E-05	5.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	6.42E-06	0.00E+00	9.38E-01	MND
HLRW [kg]	8.94E-04	1.48E-06	1.72E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.76E-07	0.00E+00	6.76E-06	MND
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
R [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPR_E [MJ]	1.76E+00	1.67E-02	7.97E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	4.23E-03	0.00E+00	4.65E-02	MND
RPR_M [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPR_T [MJ]	1.76E+00	1.67E-02	7.97E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	4.23E-03	0.00E+00	4.65E-02	MND
$NRPR_E$[MJ]	4.04E+01	6.76E-01	6.13E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.71E-01	0.00E+00	6.59E-01	MND
$NRPR_M$[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
$NRPR_T$[MJ]	4.04E+01	6.76E-01	6.13E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.71E-01	0.00E+00	6.59E-01	MND
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
FW [m3]	9.72E-03	8.10E-05	7.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	2.06E-05	0.00E+00	7.97E-05	MND

2. Paratherm® NH Polyiso 20 PSI 1.5 in.

2.1 EU - CML Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADP-elements [kg Sb eq]	4.84E-06	8.16E-09	2.42E-05	0.00E+00	0.00E+00	0.00E+00	1.16E-04	0.00E+00	MND	0.00E+00	0.00E+00	2.02E-09	0.00E+00	1.63E-08	MND
ADP-fossil fuel [MJ]	3.72E+01	6.32E-01	4.74E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+02	0.00E+00	MND	0.00E+00	0.00E+00	1.56E-01	0.00E+00	5.88E-01	MND
AP [kg SO2 eq]	4.10E-03	1.56E-04	1.25E-03	0.00E+00	0.00E+00	0.00E+00	2.20E-02	0.00E+00	MND	0.00E+00	0.00E+00	3.32E-05	0.00E+00	1.61E-04	MND
EP [kg Phosphate eq]	7.61E-04	4.16E-05	3.36E-05	0.00E+00	0.00E+00	0.00E+00	3.34E-03	0.00E+00	MND	0.00E+00	0.00E+00	8.94E-06	0.00E+00	2.08E-05	MND
GWP [kg CO2 eq]	2.16E+00	4.49E-02	4.88E-01	0.00E+00	0.00E+00	0.00E+00	1.08E+01	0.00E+00	MND	0.00E+00	0.00E+00	1.11E-02	0.00E+00	3.79E-02	MND
ODP [kg CFC 11 eq]	2.13E-06	1.53E-15	2.34E-10	0.00E+00	0.00E+00	0.00E+00	8.52E-06	0.00E+00	MND	0.00E+00	0.00E+00	3.79E-16	0.00E+00	6.94E-15	MND
POCP [kg Ethene eq]	5.85E-04	1.53E-05	1.62E-04	0.00E+00	0.00E+00	0.00E+00	3.05E-03	0.00E+00	MND	0.00E+00	0.00E+00	3.37E-06	0.00E+00	1.35E-05	MND

2.2 North America - TRACI Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
AP [kg SO2 eq]	4.42E-03	2.09E-04	4.77E-04	0.00E+00	0.00E+00	0.00E+00	2.04E-02	0.00E+00	MND	0.00E+00	0.00E+00	4.43E-05	0.00E+00	1.74E-04	MND
EP [kg N eq]	5.30E-04	1.69E-05	-2.27E-04	0.00E+00	0.00E+00	0.00E+00	1.28E-03	0.00E+00	MND	0.00E+00	0.00E+00	3.73E-06	0.00E+00	8.84E-06	MND
GWP [kg CO2 eq]	2.16E+00	4.48E-02	4.87E-01	0.00E+00	0.00E+00	0.00E+00	1.08E+01	0.00E+00	MND	0.00E+00	0.00E+00	1.10E-02	0.00E+00	3.77E-02	MND
ODP [kg CFC 11 eq]	2.14E-06	1.53E-15	2.34E-10	0.00E+00	0.00E+00	0.00E+00	8.56E-06	0.00E+00	MND	0.00E+00	0.00E+00	3.79E-16	0.00E+00	6.94E-15	MND
Resources [MJ]	4.96E+00	8.48E-02	1.97E-01	0.00E+00	0.00E+00	0.00E+00	2.10E+01	0.00E+00	MND	0.00E+00	0.00E+00	2.09E-02	0.00E+00	7.56E-02	MND
POCP [kg O3 eq]	7.29E-02	6.88E-03	1.75E-02	0.00E+00	0.00E+00	0.00E+00	3.89E-01	0.00E+00	MND	0.00E+00	0.00E+00	1.44E-03	0.00E+00	3.46E-03	MND

2.3 Resources and Waste

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD [kg]	1.18E-08	4.93E-09	3.70E-09	0.00E+00	0.00E+00	0.00E+00	8.17E-08	0.00E+00	MND	0.00E+00	0.00E+00	1.22E-09	0.00E+00	2.08E-09	MND
NHWD [kg]	3.35E-02	2.38E-05	5.34E-02	0.00E+00	0.00E+00	0.00E+00	3.48E-01	0.00E+00	MND	0.00E+00	0.00E+00	5.89E-06	0.00E+00	8.60E-01	MND
HLRW [kg]	8.75E-04	1.39E-06	1.42E-04	0.00E+00	0.00E+00	0.00E+00	4.07E-03	0.00E+00	MND	0.00E+00	0.00E+00	3.45E-07	0.00E+00	6.20E-06	MND
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
R [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPRE [MJ]	1.58E+00	1.57E-02	6.61E-01	0.00E+00	0.00E+00	0.00E+00	9.03E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.88E-03	0.00E+00	4.26E-02	MND
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPRT [MJ]	1.58E+00	1.57E-02	6.61E-01	0.00E+00	0.00E+00	0.00E+00	9.03E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.88E-03	0.00E+00	4.26E-02	MND
NRPRE[MJ]	3.96E+01	6.36E-01	5.10E+00	0.00E+00	0.00E+00	0.00E+00	1.81E+02	0.00E+00	MND	0.00E+00	0.00E+00	1.57E-01	0.00E+00	6.04E-01	MND
NRPRM[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRPRT[MJ]	3.96E+01	6.36E-01	5.10E+00	0.00E+00	0.00E+00	0.00E+00	1.81E+02	0.00E+00	MND	0.00E+00	0.00E+00	1.57E-01	0.00E+00	6.04E-01	MND
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
FW [m3]	9.52E-03	7.63E-05	6.57E-04	0.00E+00	0.00E+00	0.00E+00	4.10E-02	0.00E+00	MND	0.00E+00	0.00E+00	1.89E-05	0.00E+00	7.31E-05	MND

3. Paratherm® NH Polyiso 20 PSI 2.0 in.

3.1 EU - CML Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADP-elements [kg Sb eq]	4.54E-06	8.02E-09	2.43E-05	0.00E+00	0.00E+00	0.00E+00	1.15E-04	0.00E+00	MND	0.00E+00	0.00E+00	1.99E-09	0.00E+00	1.61E-08	MND
ADP-fossil fuel [MJ]	3.71E+01	6.22E-01	4.77E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+02	0.00E+00	MND	0.00E+00	0.00E+00	1.54E-01	0.00E+00	5.81E-01	MND
AP [kg SO2 eq]	4.10E-03	1.53E-04	1.26E-03	0.00E+00	0.00E+00	0.00E+00	2.20E-02	0.00E+00	MND	0.00E+00	0.00E+00	3.27E-05	0.00E+00	1.59E-04	MND
EP [kg Phosphate eq]	7.64E-04	4.09E-05	3.37E-05	0.00E+00	0.00E+00	0.00E+00	3.35E-03	0.00E+00	MND	0.00E+00	0.00E+00	8.83E-06	0.00E+00	2.05E-05	MND
GWP [kg CO2 eq]	2.18E+00	4.42E-02	4.91E-01	0.00E+00	0.00E+00	0.00E+00	1.09E+01	0.00E+00	MND	0.00E+00	0.00E+00	1.09E-02	0.00E+00	3.74E-02	MND
ODP [kg CFC 11 eq]	2.12E-06	1.51E-15	2.35E-10	0.00E+00	0.00E+00	0.00E+00	8.50E-06	0.00E+00	MND	0.00E+00	0.00E+00	3.74E-16	0.00E+00	6.85E-15	MND
POCP [kg Ethene eq]	5.91E-04	1.50E-05	1.63E-04	0.00E+00	0.00E+00	0.00E+00	3.08E-03	0.00E+00	MND	0.00E+00	0.00E+00	3.32E-06	0.00E+00	1.34E-05	MND

3.2 North America - TRACI Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
AP [kg SO2 eq]	4.42E-03	2.05E-04	4.79E-04	0.00E+00	0.00E+00	0.00E+00	2.04E-02	0.00E+00	MND	0.00E+00	0.00E+00	4.37E-05	0.00E+00	1.72E-04	MND
EP [kg N eq]	5.36E-04	1.66E-05	-2.29E-04	0.00E+00	0.00E+00	0.00E+00	1.30E-03	0.00E+00	MND	0.00E+00	0.00E+00	3.68E-06	0.00E+00	8.72E-06	MND
GWP [kg CO2 eq]	2.18E+00	4.41E-02	4.90E-01	0.00E+00	0.00E+00	0.00E+00	1.08E+01	0.00E+00	MND	0.00E+00	0.00E+00	1.09E-02	0.00E+00	3.72E-02	MND
ODP [kg CFC 11 eq]	2.13E-06	1.51E-15	2.35E-10	0.00E+00	0.00E+00	0.00E+00	8.50E-06	0.00E+00	MND	0.00E+00	0.00E+00	3.74E-16	0.00E+00	6.85E-15	MND
Resources [MJ]	4.96E+00	8.34E-02	1.98E-01	0.00E+00	0.00E+00	0.00E+00	2.10E+01	0.00E+00	MND	0.00E+00	0.00E+00	2.06E-02	0.00E+00	7.46E-02	MND
POCP [kg O3 eq]	7.30E-02	6.77E-03	1.76E-02	0.00E+00	0.00E+00	0.00E+00	3.90E-01	0.00E+00	MND	0.00E+00	0.00E+00	1.43E-03	0.00E+00	3.41E-03	MND

3.3 Resources and Waste

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD [kg]	1.17E-08	4.85E-09	3.72E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.20E-09	0.00E+00	2.05E-09	MND
NHWD [kg]	3.33E-02	2.34E-05	5.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	5.81E-06	0.00E+00	8.49E-01	MND
HLRW [kg]	8.76E-04	1.37E-06	1.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.40E-07	0.00E+00	6.12E-06	MND
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
R [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPR_E [MJ]	1.51E+00	1.55E-02	6.65E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.83E-03	0.00E+00	4.21E-02	MND
RPR_M [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPR_T [MJ]	1.51E+00	1.55E-02	6.65E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.83E-03	0.00E+00	4.21E-02	MND
$NRPR_E$[MJ]	3.95E+01	6.25E-01	5.13E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.55E-01	0.00E+00	5.96E-01	MND
$NRPR_M$[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
$NRPR_T$[MJ]	3.95E+01	6.25E-01	5.13E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.55E-01	0.00E+00	5.96E-01	MND
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
FW [m^3]	9.51E-03	7.50E-05	6.61E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.86E-05	0.00E+00	7.22E-05	MND

4. Paratherm® NH Polyiso 20 PSI 3.0 in.

4.1 EU - CML Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADP-elements [kg Sb eq]	4.22E-06	7.74E-09	2.39E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.93E-09	0.00E+00	1.56E-08	MND
ADP-fossil fuel [MJ]	3.66E+01	6.00E-01	4.69E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.49E-01	0.00E+00	5.63E-01	MND
AP [kg SO_2 eq]	4.03E-03	1.48E-04	1.24E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.17E-05	0.00E+00	1.54E-04	MND
EP [kg Phosphate eq]	7.55E-04	3.95E-05	3.31E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	8.55E-06	0.00E+00	1.99E-05	MND
GWP [kg CO_2 eq]	2.16E+00	4.26E-02	4.83E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.06E-02	0.00E+00	3.63E-02	MND
ODP [kg CFC 11 eq]	2.12E-06	1.46E-15	2.31E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.62E-16	0.00E+00	6.63E-15	MND
POCP [kg Ethene eq]	5.84E-04	1.45E-05	1.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.22E-06	0.00E+00	1.29E-05	MND

4.2 North America - TRACI Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
AP [kg SO2 eq]	4.35E-03	1.98E-04	4.71E-04	0.00E+00	0.00E+00	0.00E+00	2.01E-02	0.00E+00	MND	0.00E+00	0.00E+00	4.23E-05	0.00E+00	1.67E-04	MND
EP [kg N eq]	5.29E-04	1.61E-05	-2.25E-04	0.00E+00	0.00E+00	0.00E+00	1.28E-03	0.00E+00	MND	0.00E+00	0.00E+00	3.56E-06	0.00E+00	8.45E-06	MND
GWP [kg CO2 eq]	2.16E+00	4.26E-02	4.82E-01	0.00E+00	0.00E+00	0.00E+00	1.07E+01	0.00E+00	MND	0.00E+00	0.00E+00	1.06E-02	0.00E+00	3.60E-02	MND
ODP [kg CFC 11 eq]	2.12E-06	1.46E-15	2.31E-10	0.00E+00	0.00E+00	0.00E+00	8.48E-06	0.00E+00	MND	0.00E+00	0.00E+00	3.62E-16	0.00E+00	6.63E-15	MND
Resources [MJ]	4.89E+00	8.05E-02	1.94E-01	0.00E+00	0.00E+00	0.00E+00	2.06E+01	0.00E+00	MND	0.00E+00	0.00E+00	2.00E-02	0.00E+00	7.22E-02	MND
POCP [kg O3 eq]	7.21E-02	6.53E-03	1.73E-02	0.00E+00	0.00E+00	0.00E+00	3.84E-01	0.00E+00	MND	0.00E+00	0.00E+00	1.38E-03	0.00E+00	3.31E-03	MND

4.3 Resources and Waste

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD [kg]	1.14E-08	4.68E-09	3.65E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.17E-09	0.00E+00	1.99E-09	MND
NHWD [kg]	3.25E-02	2.26E-05	5.13E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	5.63E-06	0.00E+00	8.22E-01	MND
HLRW [kg]	8.68E-04	1.32E-06	1.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.29E-07	0.00E+00	5.93E-06	MND
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
R [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPR_E [MJ]	1.41E+00	1.49E-02	6.53E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.70E-03	0.00E+00	4.08E-02	MND
RPR_M [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPR_T [MJ]	1.41E+00	1.49E-02	6.53E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.70E-03	0.00E+00	4.08E-02	MND
$NRPR_E$[MJ]	3.90E+01	6.04E-01	5.04E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.50E-01	0.00E+00	5.78E-01	MND
$NRPR_M$[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
$NRPR_T$[MJ]	3.90E+01	6.04E-01	5.04E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.50E-01	0.00E+00	5.78E-01	MND
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
FW [m^3]	9.41E-03	7.24E-05	6.49E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.80E-05	0.00E+00	6.99E-05	MND

5. Paratherm® NH Polyiso 20 PSI 4.5 in.

5.1 EU - CML Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADP-elements [kg Sb eq]	3.93E-06	7.46E-09	2.33E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.86E-09	0.00E+00	1.51E-08	MND
ADP-fossil fuel [MJ]	3.57E+01	5.79E-01	4.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.44E-01	0.00E+00	5.43E-01	MND
AP [kg SO_2 eq]	3.93E-03	1.43E-04	1.20E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.06E-05	0.00E+00	1.48E-04	MND
EP [kg Phosphate eq]	7.38E-04	3.81E-05	3.22E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	8.26E-06	0.00E+00	1.92E-05	MND
GWP [kg CO_2 eq]	2.12E+00	4.11E-02	4.70E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.02E-02	0.00E+00	3.50E-02	MND
ODP [kg CFC 11 eq]	2.07E-06	1.40E-15	2.25E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.50E-16	0.00E+00	6.41E-15	MND
POCP [kg Ethene eq]	5.73E-04	1.40E-05	1.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.11E-06	0.00E+00	1.25E-05	MND

5.2 North America - TRACI Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
AP [kg SO_2 eq]	4.25E-03	1.91E-04	4.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	4.09E-05	0.00E+00	1.61E-04	MND
EP [kg N eq]	5.19E-04	1.55E-05	-2.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.44E-06	0.00E+00	8.16E-06	MND
GWP [kg CO_2 eq]	2.12E+00	4.10E-02	4.69E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.02E-02	0.00E+00	3.48E-02	MND
ODP [kg CFC 11 eq]	2.07E-06	1.40E-15	2.25E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.50E-16	0.00E+00	6.41E-15	MND
Resources [MJ]	4.77E+00	7.76E-02	1.89E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.93E-02	0.00E+00	6.98E-02	MND
POCP [kg O_3 eq]	7.04E-02	6.30E-03	1.68E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.33E-03	0.00E+00	3.19E-03	MND

5.3 Resources and Waste

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD [kg]	1.11E-08	4.51E-09	3.55E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.13E-09	0.00E+00	1.92E-09	MND
NHWD [kg]	3.15E-02	2.18E-05	4.97E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	5.44E-06	0.00E+00	7.94E-01	MND
HLRW [kg]	8.48E-04	1.28E-06	1.37E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.18E-07	0.00E+00	5.73E-06	MND
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
R [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EET [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPR_E [MJ]	1.33E+00	1.44E-02	6.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.58E-03	0.00E+00	3.94E-02	MND
RPR_M [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPR_T [MJ]	1.33E+00	1.44E-02	6.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	3.58E-03	0.00E+00	3.94E-02	MND
$NRPR_E$[MJ]	3.80E+01	5.82E-01	4.91E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.45E-01	0.00E+00	5.58E-01	MND
$NRPR_M$[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
$NRPR_T$[MJ]	3.80E+01	5.82E-01	4.91E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.45E-01	0.00E+00	5.58E-01	MND
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
FW [m^3]	9.19E-03	6.98E-05	6.32E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	0.00E+00	0.00E+00	1.74E-05	0.00E+00	6.75E-05	MND

Life Cycle Assessment: Interpretation

Overall for Siplast's roof insulation product, for all different thickness, Global Warming and Abiotic Depletion of fossil fuels and elements are seen to be the largest impact categories. Within the impact categories, the vast majority of impacts are aggregated in the A1-A3 phase of the life cycle of the product.

In the sourcing, extraction and manufacturing stage (A1-A3), Methylene diphenyl diisocyanate (MDI) contributes to around 59% of the overall Global Warming Potential (GWP) impacts. The second highest contributor is polyol (25%) and manufacturing electricity (4.4%) of impacts. Thermal energy contributes to around 3.4% of impacts within A1-A3.

Finally, installation contributes 4-5% of life cycle GWP impacts. Within installation, fasteners contribute almost completely to the overall impacts. This is due to the processing of steel through manufacturing of galvanized screws, stamping and bending of steel plates and the energy and resources consumed in this process.

Impact Category Key

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 (primary energy and primary energy resources used as raw materials)	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 (primary energy and primary energy resources used as raw materials)	MJ, net calorific value
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		
HWD	Disposed-of-hazardous waste	kg
NHWD	Disposed-of non-hazardous waste	kg
HLRW	High-level radioactive waste, conditioned, to final repository	kg
Output Flow Parameters		
CRU	Components for reuse	kg
R	Materials for recycling	kg
MER	Materials for energy recovery	kg
EE	Exported energy	MJ

Abbreviation	Parameter	Unit
Europe - CML 2001 - Jan 2016		
ADP-elements	Abiotic depletion potential for non-fossil resources	kg Sb eq
ADP-fossil	Abiotic depletion potential for fossil resources	MJ, net calorific value
AP	Acidification potential of soil and water	kg SO_2 eq
EP	Eutrophication potential	kg Phosphate eq
GWP	Global warming potential	kg CO_2 eq
OPD	Depletion of stratospheric ozone layer	kg CFC 11 eq
POCP	Photochemical ozone creation potential	kg Ethane eq
North America - TRACI 2.1		
AP	Acidification potential of soil and water	kg N eq
EP	Eutrophication potential	kg SO_2 eq
GWP	Global warming potential	kg CO_2 eq
ODP	Depletion of stratospheric ozone layer	kg CFC 11 eq
Resources	Depletion of non-renewable fossil fuels	MJ, surplus energy
POCP	Photochemical ozone creation potential	kg O_3 eq