AIR-SHIELD™ LMP, LSR, TMP

AIR-SHIELD fluid-applied membranes are water-based air/liquid moisture barriers that cure to form a tough, seamless, elastomeric membrane. AIR-SHIELD fluid-applied membranes exhibit excellent resistance to air leakage. When properly applied as a drainage plane, AIR-SHIELD fluid-applied membranes prohibit liquid water intrusion into the substrate.





Performance dashboard

Features & functionality

AIR-SHIELD LMP

AIR-SHIELD LMP is a water-based air/liquid moisture barrier that cures to form a tough, seamless, elastomeric membrane.

AIR-SHIELD LSR

AIR-SHIELD LSR is an asphalt-free, single-component, synthetic rubber based liquid air/vapor and liquid moisture barrier.

AIR-SHIELD TMP

AIR-SHIELD TMP is a water-based air/liquid moisture barrier that cures to form a tough, seamless, elastomeric membrane.

Visit W.R. MEADOWS for more product information:

AIR-SHIELD LMP
AIR-SHIELD LSR
AIR-SHIELD TMP

MasterFormat® 07 27 26
AIR-SHIELD Guide Specs

For spec help, contact us or call 800-342-5976.

Environment & materials

Improved by:

Made in the United States

USGBC member

CAGBC member

VOC CONTENT:
AIR-SHIELD LMP: 99 g/L
AIR-SHIELD LSR: 115 g/L
AIR-SHIELD TMP: 133 g/L

Certifications, rating systems & disclosures:

Health Product Declaration

Product ingredients do not contain chemicals in the Living Building Challenge Red List

Build America, Buy America Act compliant

See LCA, interpretation & rating systems

SM Transparency Report (EPD)™

EPD	LCA
3rd-party reviewed	✓
	Transparency Report (EPD)
3rd-party verified	✓

Validity: 05/27/25 – 05/27/30
SM-WRM – 05272025 – 006

This Environmental Product Declaration (EPD) was externally verified by Lindita Bushi, PhD, Senior Research Associate at Athena, in accordance with ISO 21930:2017, ASTM International. (2023). Product Category Rules (PCR) for Preparing an Environmental Product Declaration (EPD) for Water-Resistive and Air Barriers as well as ISO 14025:2006.

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Athena Sustainable Materials Institute

SUMMARY

Reference PCR
ASTM PCR for Water-Resistive and Air Barriers

Regions; system boundaries
North America; Cradle-to-gate

Declared unit: 1 m^2

LCIA methodology: TRACI 2.1

LCA software; LCI database
SimaPro Developer 9.6; ecoinvent v3.10, US-EI 2.2

Public LCA:
LCA of W. R. MEADOWS Air and Vapor Barriers

In accordance with ISO 14044 and the reference PCR, this life cycle assessment was conducted by Sustainable Minds and reviewed by Lindita Bushi, PhD, Senior Research Associate, at Athena.

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LCA results & interpretation

AIR-SHIELD™ LMP, LSR, TMP

AIR-SHIELD™ LMP | AIR-SHIELD™ LSR | AIR-SHIELD™ TMP | EPD additional content

Scope and summary

Cradle to gate | Cradle to gate with options | Cradle to grave

Application

AIR-SHIELD LSR liquid synthetic rubber) is an asphalt-free, single-component, synthetic rubber based liquid air/vapor and liquid moisture barrier. AIR-SHIELD LSR cures to form a tough, seamless, elastomeric membrane, which exhibits excellent resistance to and moisture transmission. It meets ASTM E 84, Class A, and exceeds ABAA air permeance requirements.

Declared unit

One square meter weighing 2.085 kg (2.085 kg/m^2), typically applied at 75 mil wet thickness. The theoretical coverage rate (not including waste) at that thickness is approximately 22 ft^2 (gal (0.54 m^2/L) to attain a 2.3 mil dry thickness.

Product density: 9.4 lbs/gal = 1.126 kg/L
Coverage rate (kg/m^2): (1.126 kg/L)/(0.54 m^2/L) = 2.085 kg/m^2
% solids by weight: 65%

Manufacturing data

Reporting period: January 2023 – December 2023
Location: Cartersville, GA; Fort Worth, TX; and Hampshire, IL

Sensitivity analysis

Sensitivity analyses were performed to check the robustness of the results where the highest potential environmental impacts are occurring. Since there were two raw materials which contributed the most to total impacts across air and vapor barrier products evaluated, sensitivity analyses were conducted on their usage to assess the impact of decreasing their presence in those products.

Global warming potential was evaluated for sensitivity since W. R. Meadows is interested in the potential CO_2-equivalent emissions of its products. Decreasing the amount of styrene butadiene copolymer by 10% could reduce the total GWP by 2.9%, and decreasing the amount of LLDPE resin could lower the total GWP by 13.8%. This shows that global warming potential is sensitive to the amount of LLDPE resin present in the products.

Material composition by wt%

MATERIAL	WT%
Polymers	55-65%
Mineral Filler	10-15%
Additives	10-30%
Calcium carbonate	5-10%
Water	5-10%
Oils	10-15%
Pigment	<1%
Silica	<1%
Packaging, stretch film	<1%
Packaging, plastic pail	1-3%
Packaging, steel drum	1-3%
Packaging, pallet	<1%

Average plant impacts by life cycle stage [mPts/decl unit]



LIFE CYCLE STAGE	MPTS/DECL. UNIT
Raw material acquisition	2.98E-01
Transportation	2.09E-02
Manufacturing	3.60E-02
Total impacts = 3.55E-01 mPts	

What's causing the greatest impacts

All life cycle stages

Across all locations, the total potential CO_2-equivalent emissions generated during the cradle-to-gate stage of 1 m^2 of AIR-SHIELD LSR production is 6.4-5 kg CO_2-eq. Raw material supply contributes 5.11 kg CO_2-eq, accounting for 80-85% of the total results. This is primarily due to the polymers used as a raw material input for this product. Ozone depletion, fossil fuel depletion, and respiratory effects were the most impacted categories in this stage. The manufacturing stage was the second highest contributor (~10% to GWP), mostly due to the energy required for production at the facility. Transportation accounts for the least of the impacts among all impact categories.

Raw material acquisition

The raw material acquisition (A1) stage has the most significant contribution to most impact categories, primarily due to the biobased binder. While the wood chips account for a much larger share by weight of the raw materials, the use of post-industrial wood chips reduces its contribution to the potential impacts. The starch component in the binder contributed to over 50% of impacts for seven out of ten impact categories.

Transportation

The transportation (A2) of raw materials is the least impactful contributor to the total results. Materials are sourced from within America and transported via semi-truck to the manufacturing facility.

Manufacturing

Manufacturing (A3) is the second highest contributor to most impact categories. The primary driver of environmental impacts within the manufacturing stage is the electricity required to produce the panels. However, impacts from the manufacturing stage dominate the results for global warming, ozone depletion, and fossil fuel depletion, stemming primarily from the use of electricity and natural gas. Activities in this stage also include final product packaging and manufacturing waste disposal.

Embodied carbon

Embodied carbon can be defined as the cradle-to-gate (A1-A3) global warming potential impacts. The average embodied carbon across three plants per declared unit of AIR-SHIELD™ LSR is 6.21E+00 kg CO_2-eq.

How we're making it greener

- W. R. MEADOWS utilizes OEE (Overall Equipment Effectiveness) to optimize manufacturing processes and reduce energy consumption. OEE identifies inefficiencies and wasted energy. By monitoring equipment performance, it uncovers downtime, slow speeds, and quality defects.
- Energy-saving improvements through OEE: Meadows has achieved streamlined processes, better scheduling, reduced machine wear, and lower energy costs.
- Reduction in scrap and waste: OEE insights help identify performance issues, reducing defects, waste and material waste while enhancing product quality.
- Supports sustainability and environmental goals: By lowering energy use and cutting carbon footprints, OEE fosters more sustainable manufacturing practices.

See how we make it greener

LCA results

LIFE CYCLE STAGE	A1 RAW MATERIAL ACQUISITION	A2 TRANSPORT	A3 MANUFACTURING
Information modules: Included (X) | Excluded (MND)*	**(X) A1 Raw material acquisition**	**(X) A2 Transport**	**(X) A3 Manufacturing**

*Modules A4, A5, B, C, and D are excluded.

SM Single Score

Learn about SM Single Score results

Impacts per declared unit	2.98E-01 mPts	2.09E-02 mPts	3.60E-02 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Extraction and preprocessing of polymers and other raw materials.	Truck transportation to manufacturing facility.	Electricity and natural gas consumption during the manufacturing process.

Life cycle impact results per declared unit of AIR-SHIELD™ LSR (Cartersville, GA)

LIFE CYCLE STAGE	A1 RAW MATERIAL SUPPLY	A2 TRANSPORT	A3 MANUFACTURING
Ecological damage			
Impact category / Unit			
GWP, IPCC $_{TOTAL}$ / kg CO_2-eq	5.26E+00	1.29E-01	6.29E-01
GWP, IPCC $_{BIOGENIC}$ / kg CO_2-eq	-5.72E-04	0.00E+00	5.72E-04
GWP, IPCC $_{FOSSIL}$ / kg CO_2-eq	5.26E+00	1.29E-01	6.28E-01
GWP, TRACI 2.1 $_{TOTAL}$ / kg CO_2-eq	5.11E+00	1.27E-01	7.48E-01
GWP, TRACI 2.1 $_{BIOGENIC}$ / kg CO_2-eq	-1.20E-04	0.00E+00	1.20E-04
GWP, TRACI 2.1 $_{FOSSIL}$ / kg CO_2-eq	5.11E+00	1.27E-01	7.48E-01
Ozone depletion / kg CFC-11 eq	1.90E-07	1.98E-09	3.62E-09
Acidification / kg SO_2 eq	1.49E-02	1.51E-04	1.48E-03
Eutrophication / kg N eq	2.49E-03	1.11E-05	2.74E-04
Human health damage			
Impact category / Unit			
Smog / kg O_3 eq	1.99E-01	2.33E-03	2.24E-02
Respiratory effects / kg $PM_{2.5}$ eq	2.32E-03	3.97E-05	1.77E-04
Additional environmental information			
Impact category / Unit			
Carcinogenics / CTU_h	51.30%	0.6%	48.10%
Non-carcinogenics / CTU_h	73.3%	6.29%	20.42%
Ecotoxicity / CTU_e	82.99%	6.60%	10.41%
Fossil fuel depletion / MJ surplus	1.97E+01	2.43E-01	4.57E-01

Life cycle impact results per declared unit of AIR-SHIELD™ LSR (Forth Worth, TX)

LIFE CYCLE STAGE	A1 RAW MATERIAL SUPPLY	A2 TRANSPORT	A3 MANUFACTURING
Ecological damage			
Impact category / Unit			
GWP, IPCC $_{TOTAL}$ / kg CO_2-eq	5.26E+00	5.19E-01	6.22E-01
GWP, IPCC $_{BIOGENIC}$ / kg CO_2-eq	-5.72E-04	0.00E+00	5.72E-04
GWP, IPCC $_{FOSSIL}$ / kg CO_2-eq	5.26E+00	5.19E-01	6.21E-01
GWP, TRACI 2.1 $_{TOTAL}$ / kg CO_2-eq	5.11E+00	5.84E-01	7.42E-01
GWP, TRACI 2.1 $_{BIOGENIC}$ / kg CO_2-eq	-1.20E-04	0.00E+00	1.20E-04
GWP, TRACI 2.1 $_{FOSSIL}$ / kg CO_2-eq	5.11E+00	5.84E-01	7.41E-01
Ozone depletion / kg CFC-11 eq	1.90E-07	9.06E-09	2.81E-09
Acidification / kg SO_2 eq	1.49E-02	6.94E-04	1.48E-03
Eutrophication / kg N eq	2.49E-03	5.07E-05	2.71E-04
Human health damage			
Impact category / Unit			
Smog / kg O_3 eq	1.99E-01	1.07E-02	2.22E-02
Respiratory effects / kg $PM_{2.5}$ eq	2.32E-03	1.82E-04	1.74E-04
Additional environmental information			
Impact category / Unit			
Carcinogenics / CTU_h	50.25%	2.72%	47.02%
Non-carcinogenics / CTU_h	60%	23.59%	16.41%
Ecotoxicity / CTU_e	67.13%	24.47%	8.40%
Fossil fuel depletion / MJ surplus	1.97E+01	1.12E+00	4.48E-01

Life cycle impact results per declared unit of AIR-SHIELD™ LSR (Hampshire, IL)

LIFE CYCLE STAGE	A1 RAW MATERIAL SUPPLY	A2 TRANSPORT	A3 MANUFACTURING
Ecological damage			
Impact category / Unit			
GWP, IPCC $_{TOTAL}$ / kg CO_2-eq	5.26E+00	3.61E-01	6.22E-01
GWP, IPCC $_{BIOGENIC}$ / kg CO_2-eq	-5.72E-04	0.00E+00	5.72E-04
GWP, IPCC $_{FOSSIL}$ / kg CO_2-eq	5.26E+00	3.61E-01	6.21E-01
GWP, TRACI 2.1 $_{TOTAL}$ / kg CO_2-eq	5.11E+00	3.57E-01	7.42E-01
GWP, TRACI 2.1 $_{BIOGENIC}$ / kg CO_2-eq	-1.20E-04	0.00E+00	1.20E-04
GWP, TRACI 2.1 $_{FOSSIL}$ / kg CO_2-eq	5.11E+00	3.57E-01	7.41E-01
Ozone depletion / kg CFC-11 eq	1.90E-07	5.53E-09	2.81E-09
Acidification / kg SO_2 eq	1.49E-02	4.23E-04	1.48E-03
Eutrophication / kg N eq	2.49E-03	3.10E-05	2.67E-04
Human health damage			
Impact category / Unit			
Smog / kg O_3 eq	1.99E-01	6.51E-03	2.22E-02
Respiratory effects / kg $PM_{2.5}$ eq	2.32E-03	1.11E-04	1.74E-04
Additional environmental information			
Impact category / Unit			
Carcinogenics / CTU_h	50.80%	1.68%	47.52%
Non-carcinogenics / CTU_h	66.11%	15.86%	18.03%
Ecotoxicity / CTU_e	74.21%	16.51%	9.28%
Fossil fuel depletion / MJ surplus	1.97E+01	6.81E-01	4.48E-01

References

LCA Background Report
LCA of W. R. MEADOWS Water Resistive and Air Barriers, 2025. Developed using the IPCC Fifth Assessment Report (AR5) 100-year time, TRACI v2.1, CML, and Cumulative Energy Demand (LHV) impact assessment methodologies, SimaPro Analyst 9.6 software, and ecoinvent v3.10 and US-EI 2.2 databases.

ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures

ISO 21930:2017, Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services

ASTM PCR for Water-Resistive and Air Barriers (UNCPC 54530 and/or CSI MasterFormat DESIGNATIONS 072500, 072600 and 072700), Version 3.0, September 2024. PCR review conducted by Thomas Gloria, PhD (chair, t.gloria@industrial-ecology.com); Graham Finch (RDH, Building Science, Inc.) and Paul H. Shipp (USG Corporation).

Download PDF SM Transparency Report/ EPD

SM Transparency Reports (TR) are ISO 14025 Type III environmental declarations (EPD) that enable practitioners and users to compare the potential environmental performance of products on a life cycle basis. Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building. This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. It should be noted that different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other impact categories may be included in the future. Should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes. Comparison of the environmental performance of structural and architectural wood products using EPD information shall be based on the product's use and impacts at the construction works level, and therefore EPDs may not be used for comparability purposes when considering the construction works energy use phase as instructed under this PCR. Full conformance with the PCR for structural and architectural wood products allows EPD comparability only when all stages of a life cycle have been considered, when they comply with all referenced standards, use the same sub-category Part B PCR, and use equivalent scenarios with respect to construction works. 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.

Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4

Building product disclosure and optimization

Environmental product declarations

- ○ Industry-wide (generic) EPD — ½ product
- ☑ Product-specific Type III EPD — 1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1

Building product disclosure and optimization

Environmental product declarations

- ○ Industry-wide (generic) EPD — 1 product
- ☑ Product-specific Type III EPD — 1.5 products

Collaborative for High Performance Schools National Criteria

MW CS.1 – Environmental Product Declarations

- ☑ Third-party certified type III EPD — 2 points

Green Globes for New Construction and Sustainable Interiors

Materials and resources

- ☑ NC 3.5.2 Path B: Prescriptive Path for Building Core and Shell
- ☑ NC 3.5.2.2 and SI 4.1.2 Path B: Prescriptive Path for Interior Fit-outs

BREEAM New Construction 2018

Mat 02 - Environmental impacts from construction products

Environmental Product Declarations (EPD)

- ○ Industry-average EPD — .5 points
- ○ Multi-product specific EPD — .75 points
- ☑ Product-specific EPD — 1 point

EPD additional content

AIR-SHIELD™ LMP, LSR, TMP

AIR-SHIELD™ LMP | AIR-SHIELD™ LSR | AIR-SHIELD™ TMP | EPD additional content

Data

Background: This product-specific plant-specific declaration was created by collecting production data from 3 facilities in Cartersville, GA; Fort Worth, TX; and Hampshire, IL. All unit processes were modeled using primary data. Secondary data sources include those available in the ecoinvent v3.10 and US-EI 2.2 databases.

Product-specific packaging includes poly bags which are typically disposed of at the site of installation.

Allocation The W. R. MEADOWS facility produces multiple types of products each year. To allocate electricity and natural gas consumption accurately to each product, total annual energy consumption was distributed based on the proportion of each product's annual production (by mass) relative to the total plant production. This approach assigns manufacturing activities proportionally to each product made.

All associated manufacturing resources and waste flows were allocated using the same approach. There are no co-products produced during their manufacturing processes. The model used in the LCA ensures that the sum of the allocated inputs and outputs of a unit process shall be equal to the inputs and outputs of the unit process before allocation. This means that no double counting or omissions of inputs or outputs through allocation is occurring.

Cut-off criteria for the inclusion of mass and energy flows are 1% of renewable primary resource energy usage, 1% nonrenewable primary resource (energy) usage, 1% of the total mass input of that unit process, and 1% of environmental impacts. The total of neglected input flows per module does not exceed 5% of energy usage, mass, and environmental impacts.

The only exceptions to these criteria are substances with hazardous and toxic properties, which must be listed even when the given process unit is under the cut-off criterion of 1% of the total mass. No known flows are deliberately excluded from this declaration, and no substances considered to be hazardous or toxic according to the Resource Conservation and Recovery Act (RCRA), Subtitle C are present in the products. Therefore, these criteria have been met. Biogenic carbon is included in reported results.

Quality

The precision of the data is considered high. W. R. MEADOWS personnel provided a detailed bill of materials, and facility managers provided utility information for the manufacturing facility. The raw material transportation distances were provided directly by the facility.

The data included is considered complete. The LCA model included all known material and energy flows. As pointed out in that section, no known flows above 1% were excluded and the sum of all excluded flows totals less than 5%, whether evaluated by mass, energy, or potential environmental impact.

The consistency of the model is considered high. Furthermore, the modeling assumptions were consistent throughout the model, with a preference for the ecoinvent v3.10 database.

Major system boundary exclusions

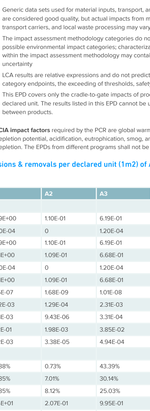
- Manufacture and transport of packaging not associated with final product
- Construction of major capital equipment
- Maintenance and operation of support equipment
- Human labor and employee transport
- Disposal of final product, except for biogenic carbon balance reporting

Scenarios and additional technical information

Biogenic carbon disclosure in installation stage (A5) While the impacts from installation are out of the scope of this cradle-to-gate study, ISO 21930:2017 requires that biogenic carbon emissions associated with packaging disposed of after product installation are separately reported. The biogenic carbon removals from packaging in the manufacturing stage (A3) are later accounted for as biogenic carbon emissions in the installation stage (A5).

Product name	Biogenic carbon emission from packaging (A5)
AIR-SHIELD LMP	4.94E-02 kg CO_2
AIR-SHIELD LSR	3.55E-04 kg CO_2
AIR-SHIELD TMP	3.55E-04 kg CO_2

Flow diagram



Major assumptions and limitations

- Generic data sets used for material inputs, transport, and waste processing are considered good quality, but material inputs from material suppliers, transport carriers, and local waste processing may vary
- The impact assessment methodology categories do not represent all possible environmental impact categories; characterization factors used within the impact assessment methodology may contain varying levels of uncertainty
- LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks
- This EPD covers only the cradle-to-gate impacts of products using a declared unit. The results listed in this EPD cannot be used to compare between products.

LCIA impact factors required by the PCR are global warming, ozone depletion potential, acidification, eutrophication, smog, and fossil fuel depletion. The EPDs from different programs shall not be comparable.

LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ LMP (Cartersville, GA)

Parameter	Unit	A1	A2	A3	Total
LCIA results					
GWP, $IPCC_{TOTAL}$	kg CO_2 eq	3.09E+00	1.10E-01	6.19E-01	**3.82E+00**
GWP, $IPCC_{BIOGENIC}$	kg CO_2 eq	-1.20E-04	0	1.20E-04	**0**
GWP, $IPCC_{FOSSIL}$	kg CO_2 eq	3.09E+00	1.10E-01	6.19E-01	**3.82E+00**
GWP, TRACI 2.1$_{TOTAL}$	kg CO_2 eq	3.01E+00	1.09E-01	6.68E-01	**3.79E+00**
GWP, TRACI 2.1$_{BIOGENIC}$	kg CO_2 eq	-1.20E-04	0	1.20E-04	**0**
GWP, TRACI 2.1$_{FOSSIL}$	kg CO_2 eq	3.01E+00	1.09E-01	6.68E-01	**3.79E+00**
Ozone depletion	kg CFC-11 eq	1.05E-07	1.68E-09	1.01E-08	**1.17E-07**
Acidification	kg SO_2 eq	9.82E-03	1.29E-04	2.31E-03	**1.23E-02**
Eutrophication	kg N eq	2.21E-03	9.43E-06	3.31E-04	**2.55E-03**
Smog	kg O_3 eq	1.32E-01	1.98E-03	3.85E-02	**1.73E-01**
Respiratory effects	kg PM2.5 eq	1.62E-03	3.38E-05	4.94E-04	**2.15E-03**
Additional environmental information					
Carcinogenics	CTUh	55.88%	0.73%	43.39%	**100%**
Non-carcinogenics	CTUh	62.85%	7.01%	30.14%	**100%**
Ecotoxicity	CTUe	66.85%	8.12%	25.03%	**100%**
Fossil fuel depletion	MJ surplus	1.04E+01	2.07E-01	9.95E-01	**1.16E+01**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	1.42E+00	2.39E-03	1.71E+01	**1.85E+01**
Renewable primary resources with energy content used as material	MJ, NCV	4.08E-02	0	0	**4.08E-02**
Total use of renewable primary resources with energy content	MJ, NCV	1.46E+00	2.39E-03	1.71E+01	**1.85E+01**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	6.96E+01	1.56E+00	1.06E+01	**8.17E+01**
Non-renewable primary resources with energy content used as material	MJ, NCV	1.73E+01	0	0	**1.73E+01**
Total use of non-renewable primary resources with energy content	MJ, NCV	8.69E+01	1.56E+00	1.06E+01	**9.90E+01**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**
Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m3	4.43E+00	7.65E-03	7.42E-01	**5.18E+00**
Abiotic depletion (fossil fuels)	MJ, LHV	7.94E+01	1.47E+00	9.31E+00	**9.01E+01**
Output flows and waste category indicators					
Hazardous waste disposed	kg	5.54E-02	3.31E-04	1.10E-02	**6.68E-02**
Non-hazardous waste disposed	kg	1.35E-03	1.34E-06	1.08E-03	**2.43E-03**
High-level radioactive waste, conditioned, to final repository	kg	6.78E-06	1.75E-08	9.53E-07	**7.76E-06**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	1.55E-05	3.43E-08	5.11E-06	**2.07E-05**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	-1.20E-04	0	-4.94E-02	**-4.95E-02**
Biogenic carbon emission from packaging	kg CO_2	0	0	1.20E-04	**1.20E-04**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**

LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ LMP (Fort Worth, TX)

Parameter	Unit	A1	A2	A3	Total
LCIA results					
GWP, $IPCC_{TOTAL}$	kg CO_2 eq	3.09E+00	1.92E-01	6.06E-01	**3.89E+00**
GWP, $IPCC_{BIOGENIC}$	kg CO_2 eq	-1.20E-04	0	1.20E-04	**0**
GWP, $IPCC_{FOSSIL}$	kg CO_2 eq	3.09E+00	1.92E-01	6.06E-01	**3.89E+00**
GWP, TRACI 2.1$_{TOTAL}$	kg CO_2 eq	3.01E+00	1.90E-01	6.56E-01	**3.86E+00**
GWP, TRACI 2.1$_{BIOGENIC}$	kg CO_2 eq	-1.20E-04	0	1.20E-04	**0**
GWP, TRACI 2.1$_{FOSSIL}$	kg CO_2 eq	3.01E+00	1.90E-01	6.56E-01	**3.86E+00**
Ozone depletion	kg CFC-11 eq	1.05E-07	2.94E-09	9.26E-09	**1.17E-07**
Acidification	kg SO_2 eq	9.82E-03	2.25E-04	2.28E-03	**1.23E-02**
Eutrophication	kg N eq	2.21E-03	1.65E-05	3.27E-04	**2.55E-03**
Smog	kg O_3 eq	1.32E-01	3.47E-03	3.81E-02	**1.74E-01**
Respiratory effects	kg PM2.5 eq	1.62E-03	5.91E-05	4.91E-04	**2.17E-03**
Additional environmental information					
Carcinogenics	CTUh	55.70%	1.27%	43.02%	**100%**
Non-carcinogenics	CTUh	59.97%	11.70%	28.33%	**100%**
Ecotoxicity	CTUe	63.05%	13.38%	23.57%	**100%**
Fossil fuel depletion	MJ surplus	1.04E+01	3.62E-01	9.78E-01	**1.18E+01**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	1.38E+00	4.18E-03	1.71E+01	**1.85E+01**
Renewable primary resources with energy content used as material	MJ, NCV	4.08E-02	0	0	**4.08E-02**
Total use of renewable primary resources with energy content	MJ, NCV	1.42E+00	4.18E-03	1.71E+01	**1.85E+01**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	6.96E+01	2.73E+00	1.02E+01	**8.25E+01**
Non-renewable primary resources with energy content used as material	MJ, NCV	1.73E+01	0	0	**1.73E+01**
Total use of non-renewable primary resources with energy content	MJ, NCV	8.69E+01	2.73E+00	1.02E+01	**9.98E+01**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**
Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m3	4.43E+00	1.34E-02	6.20E-01	**5.06E+00**
Abiotic depletion (fossil fuels)	MJ, LHV	7.94E+01	2.56E+00	9.16E+00	**9.11E+01**
Output flows and waste category indicators					
Hazardous waste disposed	kg	5.54E-02	5.79E-04	1.10E-02	**6.70E-02**
Non-hazardous waste disposed	kg	1.35E-03	2.34E-06	1.07E-03	**2.42E-03**
High-level radioactive waste, conditioned, to final repository	kg	6.80E-06	3.06E-08	9.54E-07	**7.78E-06**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	1.61E-05	5.99E-08	3.43E-06	**1.96E-05**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	-1.20E-04	0	-4.94E-02	**-4.95E-02**
Biogenic carbon emission from packaging	kg CO_2	0	0	1.20E-04	**1.20E-04**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**

LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ LMP (Hampshire, IL)

Parameter	Unit	A1	A2	A3	Total
LCIA results					
GWP, $IPCC_{TOTAL}$	kg CO_2 eq	3.09E+00	2.41E-01	6.47E-01	**3.98E+00**
GWP, $IPCC_{BIOGENIC}$	kg CO_2 eq	-1.20E-04	0	1.20E-04	**0**
GWP, $IPCC_{FOSSIL}$	kg CO_2 eq	3.09E+00	2.41E-01	6.46E-01	**3.98E+00**
GWP, TRACI 2.1$_{TOTAL}$	kg CO_2 eq	3.01E+00	2.38E-01	6.96E-01	**3.95E+00**
GWP, TRACI 2.1$_{BIOGENIC}$	kg CO_2 eq	-1.20E-04	0	1.20E-04	**0**
GWP, TRACI 2.1$_{FOSSIL}$	kg CO_2 eq	3.01E+00	2.38E-01	6.95E-01	**3.95E+00**
Ozone depletion	kg CFC-11 eq	1.05E-07	3.70E-09	1.27E-08	**1.21E-07**
Acidification	kg SO_2 eq	9.82E-03	2.83E-04	2.55E-03	**1.27E-02**
Eutrophication	kg N eq	2.21E-03	2.07E-05	3.48E-04	**2.58E-03**
Smog	kg O_3 eq	1.32E-01	4.35E-03	4.02E-02	**1.77E-01**
Respiratory effects	kg PM2.5 eq	1.62E-03	7.42E-05	5.07E-04	**2.20E-03**
Additional environmental information					
Carcinogenics	CTUh	54.68%	1.57%	43.75%	**100%**
Non-carcinogenics	CTUh	57.65%	14.13%	28.22%	**100%**
Ecotoxicity	CTUe	60.88%	16.23%	22.89%	**100%**
Fossil fuel depletion	MJ surplus	1.04E+01	4.55E-01	9.88E-01	**1.19E+01**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	1.38E+00	5.25E-03	1.71E+01	**1.84E+01**
Renewable primary resources with energy content used as material	MJ, NCV	4.08E-02	0	0	**4.08E-02**
Total use of renewable primary resources with energy content	MJ, NCV	1.42E+00	5.25E-03	1.71E+01	**1.85E+01**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	6.96E+01	3.43E+00	1.11E+01	**8.41E+01**
Non-renewable primary resources with energy content used as material	MJ, NCV	1.73E+01	0	0	**1.73E+01**
Total use of non-renewable primary resources with energy content	MJ, NCV	8.69E+01	3.43E+00	1.11E+01	**1.01E+02**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**

Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m3	4.43E+00	1.68E-02	6.75E-01	**5.12E+00**
Abiotic depletion (fossil fuels)	MJ, LHV	7.94E+01	3.22E+00	9.55E+00	**9.21E+01**
Output flows and waste category indicators					
Hazardous waste disposed	kg	5.54E-02	7.27E-04	1.10E-02	**6.73E-02**
Non-hazardous waste disposed	kg	1.13E-01	0	8.05E-01	**9.19E-01**
High-level radioactive waste, conditioned, to final repository	kg	6.80E-06	3.84E-08	9.54E-07	**7.79E-06**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	1.61E-05	7.52E-08	8.11E-06	**2.42E-05**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	-1.20E-04	0	-4.94E-02	**-4.95E-02**
Biogenic carbon emission from packaging	kg CO_2	0	0	1.20E-04	**1.20E-04**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**

LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ LSR (Cartersville, GA)

Parameter	Unit	A1	A2	A3	Total
LCIA results					
GWP, $IPCC_{TOTAL}$	kg CO_2 eq	5.26E+00	1.29E-01	6.29E-01	**6.02E+00**
GWP, $IPCC_{BIOGENIC}$	kg CO_2 eq	-5.72E-04	0	5.72E-04	**0**
GWP, $IPCC_{FOSSIL}$	kg CO_2 eq	5.26E+00	1.29E-01	6.28E-01	**6.02E+00**
GWP, TRACI 2.1$_{TOTAL}$	kg CO_2 eq	5.11E+00	1.27E-01	7.48E-01	**5.99E+00**
GWP, TRACI 2.1$_{BIOGENIC}$	kg CO_2 eq	-1.20E-04	0	1.20E-04	**0**
GWP, TRACI 2.1$_{FOSSIL}$	kg CO_2 eq	5.11E+00	1.27E-01	7.48E-01	**5.99E+00**
Ozone depletion	kg CFC-11 eq	1.90E-07	1.98E-09	3.62E-09	**1.95E-07**
Acidification	kg SO_2 eq	1.49E-02	1.51E-04	1.48E-03	**1.66E-02**
Eutrophication	kg N eq	2.49E-03	1.11E-05	2.74E-04	**2.78E-03**
Smog	kg O_3 eq	1.99E-01	2.33E-03	2.24E-02	**2.24E-01**
Respiratory effects	kg PM2.5 eq	2.32E-03	3.97E-05	1.77E-04	**2.54E-03**
Additional environmental information					
Carcinogenics	CTUh	51.30%	0.61%	48.10%	**100%**
Non-carcinogenics	CTUh	73.30%	6.29%	20.42%	**100%**
Ecotoxicity	CTUe	82.99%	6.60%	10.41%	**100%**
Fossil fuel depletion	MJ surplus	1.97E+01	2.43E-01	4.57E-01	**2.04E+01**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	1.63E+00	2.81E-03	4.80E-01	**2.12E+00**
Renewable primary resources with energy content used as material	MJ, NCV	4.08E-02	0	0	**4.08E-02**
Total use of renewable primary resources with energy content	MJ, NCV	1.68E+00	2.81E-03	4.80E-01	**2.17E+00**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.42E+02	1.83E+00	8.14E+00	**1.52E+02**
Non-renewable primary resources with energy content used as material	MJ, NCV	1.73E+01	0	0	**1.73E+01**
Total use of non-renewable primary resources with energy content	MJ, NCV	1.59E+02	1.83E+00	8.14E+00	**1.69E+02**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**
Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m3	6.12E+00	8.98E-03	4.47E-01	**6.57E+00**
Abiotic depletion (fossil fuels)	MJ, LHV	1.46E+02	1.72E+00	6.90E+00	**1.55E+02**
Output flows and waste category indicators					
Hazardous waste disposed	kg	6.96E-02	1.09E-03	1.58E-03	**7.23E-02**
Non-hazardous waste disposed	kg	2.21E+00	4.40E-03	6.40E-01	**2.86E+00**
High-level radioactive waste, conditioned, to final repository	kg	9.06E-06	2.05E-08	7.58E-07	**9.84E-06**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	2.07E-05	3.99E-08	6.45E-06	**2.72E-05**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	-5.72E-04	0	-3.55E-04	**-9.27E-04**
Biogenic carbon emission from packaging	kg CO_2	0	0	5.72E-04	**5.72E-04**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**

LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ LSR (Fort Worth, TX)

Parameter	Unit	A1	A2	A3	Total
LCIA results					
GWP, $IPCC_{TOTAL}$	kg CO_2 eq	5.26E+00	5.19E-01	6.22E-01	**6.48E+00**
GWP, $IPCC_{BIOGENIC}$	kg CO_2 eq	-5.72E-04	0	5.72E-04	**0**
GWP, $IPCC_{FOSSIL}$	kg CO_2 eq	5.26E+00	5.19E-01	6.21E-01	**6.48E+00**
GWP, TRACI 2.1$_{TOTAL}$	kg CO_2 eq	5.11E+00	5.84E-01	7.42E-01	**6.44E+00**
GWP, TRACI 2.1$_{BIOGENIC}$	kg CO_2 eq	-1.20E-04	0	1.20E-04	**0**
GWP, TRACI 2.1$_{FOSSIL}$	kg CO_2 eq	5.11E+00	5.84E-01	7.41E-01	**6.44E+00**
Ozone depletion	kg CFC-11 eq	1.90E-07	9.06E-09	2.81E-09	**2.01E-07**
Acidification	kg SO_2 eq	1.49E-02	6.94E-04	1.48E-03	**1.71E-02**
Eutrophication	kg N eq	2.49E-03	5.07E-05	2.71E-04	**2.81E-03**
Smog	kg O_3 eq	1.99E-01	1.07E-02	2.22E-02	**2.32E-01**
Respiratory effects	kg PM2.5 eq	2.32E-03	1.82E-04	1.74E-04	**2.68E-03**
Additional environmental information					
Carcinogenics	CTUh	50.25%	2.72%	47.02%	**100%**
Non-carcinogenics	CTUh	60.00%	23.59%	16.41%	**100%**
Ecotoxicity	CTUe	67.13%	24.47%	8.40%	**100%**
Fossil fuel depletion	MJ surplus	1.97E+01	1.12E+00	4.48E-01	**2.13E+01**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	1.64E+00	1.29E-02	5.22E-01	**2.18E+00**
Renewable primary resources with energy content used as material	MJ, NCV	4.08E-02	0	0	**4.08E-02**
Total use of renewable primary resources with energy content	MJ, NCV	1.68E+00	1.29E-02	5.22E-01	**2.22E+00**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.42E+02	8.40E+00	7.85E+00	**1.58E+02**
Non-renewable primary resources with energy content used as material	MJ, NCV	1.73E+01	0	0	**1.73E+01**
Total use of non-renewable primary resources with energy content	MJ, NCV	1.59E+02	8.40E+00	7.85E+00	**1.76E+02**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**
Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m3	6.12E+00	4.12E-02	2.90E-01	**6.45E+00**
Abiotic depletion (fossil fuels)	MJ, LHV	1.46E+02	7.89E+00	6.82E+00	**1.61E+02**
Output flows and waste category indicators					
Hazardous waste disposed	kg	6.96E-02	1.78E-03	1.58E-03	**7.30E-02**
Non-hazardous waste disposed	kg	2.21E-03	7.22E-06	6.74E-04	**2.89E-03**
High-level radioactive waste, conditioned, to final repository	kg	9.06E-06	9.42E-08	7.58E-07	**9.91E-06**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	2.07E-05	1.83E-07	4.52E-06	**2.54E-05**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	-5.72E-04	0	-3.55E-04	**-9.27E-04**
Biogenic carbon emission from packaging	kg CO_2	0	0	5.72E-04	**5.72E-04**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**

LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ LSR (Hampshire, IL)

Parameter	Unit	A1	A2	A3	Total
LCIA results					
GWP, $IPCC_{TOTAL}$	kg CO_2 eq	5.26E+00	3.61E-01	6.22E-01	**6.25E+00**
GWP, $IPCC_{BIOGENIC}$	kg CO_2 eq	-5.72E-04	0	5.72E-04	**0**
GWP, $IPCC_{FOSSIL}$	kg CO_2 eq	5.26E+00	3.61E-01	6.21E-01	**6.25E+00**
GWP, TRACI 2.1$_{TOTAL}$	kg CO_2 eq	5.11E+00	3.57E-01	7.42E-01	**6.21E+00**
GWP, TRACI 2.1$_{BIOGENIC}$	kg CO_2 eq	-1.20E-04	0	1.20E-04	**0**
GWP, TRACI 2.1$_{FOSSIL}$	kg CO_2 eq	5.11E+00	3.57E-01	7.41E-01	**6.21E+00**
Ozone depletion	kg CFC-11 eq	1.90E-07	5.53E-09	2.81E-09	**1.98E-07**
Acidification	kg SO_2 eq	1.49E-02	4.23E-04	1.48E-03	**1.68E-02**
Eutrophication	kg N eq	2.49E-03	3.10E-05	2.67E-04	**2.79E-03**
Smog	kg O_3 eq	1.99E-01	6.51E-03	2.22E-02	**2.28E-01**
Respiratory effects	kg PM2.5 eq	2.32E-03	1.11E-04	1.74E-04	**2.61E-03**
Additional environmental information					
Carcinogenics	CTUh	50.80%	1.68%	47.52%	**100%**
Non-carcinogenics	CTUh	66.11%	15.86%	18.03%	**100%**
Ecotoxicity	CTUe	74.21%	16.51%	9.28%	**100%**
Fossil fuel depletion	MJ surplus	1.97E+01	6.81E-01	4.48E-01	**2.09E+01**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	1.64E+00	7.85E-03	5.22E-01	**2.17E+00**
Renewable primary resources with energy content used as material	MJ, NCV	4.08E-02	0	0	**4.08E-02**
Total use of renewable primary resources with energy content	MJ, NCV	1.68E+00	7.85E-03	5.22E-01	**2.21E+00**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.42E+02	5.13E+00	7.85E+00	**1.55E+02**
Non-renewable primary resources with energy content used as material	MJ, NCV	1.73E+01	0	0	**1.73E+01**
Total use of non-renewable primary resources with energy content	MJ, NCV	1.59E+02	5.13E+00	7.85E+00	**1.72E+02**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**
Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m3	6.12E+00	2.51E-02	2.90E-01	**6.43E+00**
Abiotic depletion (fossil fuels)	MJ, LHV	1.46E+02	4.81E+00	6.82E+00	**1.58E+02**
Output flows and waste category indicators					
Hazardous waste disposed	kg	6.19E-01	1.61E-00	2.57E-01	**6.38E+01**
Non-hazardous waste disposed	kg	4.27E-15	0	1.28E+00	**1.28E+00**
High-level radioactive waste, conditioned, to final repository	kg	9.06E-06	5.75E-08	7.58E-07	**9.88E-06**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	2.07E-05	1.12E-07	4.52E-06	**2.53E-05**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	-5.72E-04	0	-3.55E-04	**-9.27E-04**
Biogenic carbon emission from packaging	kg CO_2	0	0	5.72E-04	**5.72E-04**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**

LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ TMP (Cartersville, GA)

Parameter	Unit	A1	A2	A3	Total
LCIA results					
GWP, $IPCC_{TOTAL}$	kg CO_2 eq	8.79E-01	2.98E-02	1.34E-01	**1.04E+00**
GWP, $IPCC_{BIOGENIC}$	kg CO_2 eq	0	0	0	**0**
GWP, $IPCC_{FOSSIL}$	kg CO_2 eq	8.79E-01	2.98E-02	1.34E-01	**1.04E+00**
GWP, TRACI 2.1$_{TOTAL}$	kg CO_2 eq	8.56E-01	2.94E-02	1.52E-01	**1.04E+00**
GWP, TRACI 2.1$_{BIOGENIC}$	kg CO_2 eq	0	0	0	**0**

GWP, TRACI 2.1 $_{FOSSIL}$	kg CO_2 eq	8.56E-01	2.94E-02	1.52E-01	**1.04E+00**
Ozone depletion	kg CFC-11 eq	2.99E-08	4.56E-10	8.22E-10	**3.11E-08**
Acidification	kg SO_2 eq	2.79E-03	3.49E-05	3.20E-04	**3.15E-03**
Eutrophication	kg N eq	6.28E-04	2.56E-06	4.75E-05	**6.78E-04**
Smog	kg O_3 eq	3.76E-02	5.38E-04	4.84E-03	**4.29E-02**
Respiratory effects	kg PM2.5 eq	4.62E-04	9.16E-06	3.83E-05	**5.09E-04**
Additional environmental information					
Carcinogenics	CTUh	52.98%	0.66%	46.36%	**100%**
Non-carcinogenics	CTUh	70.71%	7.53%	21.76%	**100%**
Ecotoxicity	CTUe	78.36%	9.06%	12.59%	**100%**
Fossil fuel depletion	MJ surplus	2.97E+00	5.62E-02	1.01E-01	**3.12E+00**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	3.48E-01	6.48E-04	1.97E-01	**5.46E-01**
Renewable primary resources with energy content used as material	MJ, NCV	0	0	0	**0**
Total use of renewable primary resources with energy content	MJ, NCV	3.48E-01	6.48E-04	1.97E-01	**5.46E-01**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.89E+01	4.23E-01	1.76E+00	**2.11E+01**
Non-renewable primary resources with energy content used as material	MJ, NCV	4.92E+00	0	0	**4.92E+00**
Total use of non-renewable primary resources with energy content	MJ, NCV	2.38E+01	4.23E-01	1.76E+00	**2.60E+01**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**
Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m3	1.89E+00	3.08E-03	1.04E-01	**2.00E+00**
Abiotic depletion (fossil fuels)	MJ, LHV	2.18E+01	3.98E-01	1.49E+00	**2.36E+01**
Output flows and waste category indicators					
Hazardous waste disposed	kg	8.34E+00	1.33E-01	6.63E-02	**8.54E+00**
Non-hazardous waste disposed	kg	2.27E-13	0	3.10E+02	**3.10E+02**
High-level radioactive waste, conditioned, to final repository	kg	1.90E-06	4.74E-09	1.57E-07	**2.06E-06**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	4.31E-06	9.21E-09	1.61E-06	**5.94E-06**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	0	0	-3.55E-04	**-3.55E-04**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	**0**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**

LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ TMP (Fort Worth, TX)

Parameter	Unit	A1	A2	A3	Total
LCIA results					
GWP, IPCC $_{TOTAL}$	kg CO_2 eq	8.79E-01	5.41E-02	1.33E-01	**1.07E+00**
GWP, IPCC $_{BIOGENIC}$	kg CO_2 eq	0	0	0	**0**
GWP, IPCC $_{FOSSIL}$	kg CO_2 eq	8.79E-01	5.41E-02	1.33E-01	**1.07E+00**
GWP, TRACI 2.1 $_{TOTAL}$	kg CO_2 eq	8.56E-01	5.35E-02	1.50E-01	**1.06E+00**
GWP, TRACI 2.1 $_{BIOGENIC}$	kg CO_2 eq	0	0	0	**0**
GWP, TRACI 2.1 $_{FOSSIL}$	kg CO_2 eq	8.56E-01	5.35E-02	1.50E-01	**1.06E+00**
Ozone depletion	kg CFC-11 eq	2.99E-08	8.29E-10	6.44E-10	**3.13E-08**
Acidification	kg SO_2 eq	2.79E-03	6.35E-05	3.18E-04	**3.17E-03**
Eutrophication	kg N eq	6.28E-04	4.64E-06	4.69E-05	**6.80E-04**
Smog	kg O_3 eq	3.76E-02	9.76E-04	4.78E-03	**4.33E-02**
Respiratory effects	kg PM2.5 eq	4.62E-04	1.66E-05	3.78E-05	**5.16E-04**
Additional environmental information					
Carcinogenics	CTUh	52.74%	1.20%	46.06%	**100%**
Non-carcinogenics	CTUh	66.88%	12.94%	20.19%	**100%**
Ecotoxicity	CTUe	72.99%	15.32%	11.69%	**100%**
Fossil fuel depletion	MJ surplus	2.97E+00	1.02E-01	9.90E-02	**3.17E+00**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	3.48E-01	1.18E-03	2.07E-01	**5.56E-01**
Renewable primary resources with energy content used as material	MJ, NCV	0	0	0	**0**
Total use of renewable primary resources with energy content	MJ, NCV	3.48E-01	1.18E-03	2.07E-01	**5.56E-01**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.89E+01	7.69E-01	1.70E+00	**2.14E+01**
Non-renewable primary resources with energy content used as material	MJ, NCV	4.92E+00	0	0	**4.92E+00**
Total use of non-renewable primary resources with energy content	MJ, NCV	2.38E+01	7.69E-01	1.70E+00	**2.63E+01**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**
Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m3	1.89E+00	5.59E-03	6.94E-02	**1.97E+00**
Abiotic depletion (fossil fuels)	MJ, LHV	2.18E+01	7.22E-01	1.48E+00	**2.40E+01**
Output flows and waste category indicators					
Hazardous waste disposed	kg	8.34E+00	2.42E-01	6.64E-02	**8.65E+00**
Non-hazardous waste disposed	kg	2.27E-13	0	2.86E+02	**2.86E+02**
High-level radioactive waste, conditioned, to final repository	kg	1.90E-06	8.62E-09	1.57E-07	**2.06E-06**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	4.31E-06	1.67E-08	9.59E-07	**5.29E-06**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	0	0	-3.55E-04	**-3.55E-04**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	**0**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**

LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ TMP (Hampshire, IL)

Parameter	Unit	A1	A2	A3	Total
LCIA results					
GWP, IPCC $_{TOTAL}$	kg CO_2 eq	8.79E-01	7.83E-02	1.36E-01	**1.09E+00**
GWP, IPCC $_{BIOGENIC}$	kg CO_2 eq	0	0	0	**0**
GWP, IPCC $_{FOSSIL}$	kg CO_2 eq	8.79E-01	7.83E-02	1.36E-01	**1.09E+00**
GWP, TRACI 2.1 $_{TOTAL}$	kg CO_2 eq	8.56E-01	7.74E-02	1.53E-01	**1.09E+00**
GWP, TRACI 2.1 $_{BIOGENIC}$	kg CO_2 eq	0	0	0	**0**
GWP, TRACI 2.1 $_{FOSSIL}$	kg CO_2 eq	8.56E-01	7.74E-02	1.53E-01	**1.09E+00**
Ozone depletion	kg CFC-11 eq	2.99E-08	1.20E-09	1.24E-09	**3.23E-08**
Acidification	kg SO_2 eq	2.79E-03	9.19E-05	3.57E-04	**3.24E-03**
Eutrophication	kg N eq	6.28E-04	6.72E-06	5.04E-05	**6.86E-04**
Smog	kg O_3 eq	3.76E-02	1.41E-03	5.06E-03	**4.40E-02**
Respiratory effects	kg PM2.5 eq	4.62E-04	2.41E-05	4.00E-05	**5.26E-04**
Additional environmental information					
Carcinogenics	CTUh	52.07%	1.71%	46.21%	**100%**
Non-carcinogenics	CTUh	62.84%	17.60%	19.56%	**100%**
Ecotoxicity	CTUe	68.23%	20.74%	11.03%	**100%**
Fossil fuel depletion	MJ surplus	2.97E+00	1.48E-01	9.31E-02	**3.21E+00**
Resource use indicators					
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	3.48E-01	1.71E-03	1.87E-01	**5.36E-01**
Renewable primary resources with energy content used as material	MJ, NCV	0	0	0	**0**
Total use of renewable primary resources with energy content	MJ, NCV	3.48E-01	1.71E-03	1.87E-01	**5.36E-01**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.89E+01	1.11E+00	1.80E+00	**2.18E+01**
Non-renewable primary resources with energy content used as material	MJ, NCV	4.92E+00	0	0	**4.92E+00**
Total use of non-renewable primary resources with energy content	MJ, NCV	2.38E+01	1.11E+00	1.80E+00	**2.67E+01**
Secondary materials	kg	0	0	0	**0**
Renewable secondary fuels	MJ, NCV	0	0	0	**0**
Non-renewable secondary fuels	MJ, NCV	0	0	0	**0**
Recovered energy	MJ, NCV	0	0	0	**0**
Use of net fresh water resources	m3	1.89E+00	8.10E-03	7.99E-02	**1.98E+00**
Abiotic depletion (fossil fuels)	MJ, LHV	2.18E+01	1.05E+00	1.49E+00	**2.43E+01**
Output flows and waste category indicators					
Hazardous waste disposed	kg	8.34E+00	3.50E-01	6.67E-02	**8.76E+00**
Non-hazardous waste disposed	kg	2.27E-13	0	1.71E+02	**1.71E+02**
High-level radioactive waste, conditioned, to final repository	kg	1.90E-06	1.25E-08	1.57E-07	**2.07E-06**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	4.31E-06	2.42E-08	1.80E-06	**6.13E-06**
Components for re-use	kg	0	0	0	**0**
Materials for recycling	kg	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	**0**
Exported energy	MJ	0	0	0	**0**
Carbon emissions and removals					
Biogenic carbon removal from product	kg CO_2	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	0	0	-3.55E-04	**-3.55E-04**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	**0**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	**0**

SM Transparency Report (EPD)™

EPD	LCA
3rd-party reviewed	✓
Transparency Report (EPD)	
3rd-party verified	✓

Validity: 05/27/25 – 05/27/30
SM-WRM – 05272025 – 006

This Environmental Product Declaration (EPD) was externally verified by Lindita Bushi, PhD, Senior Research Associate at Athena, in accordance with ISO 21930:2017, ASTM International. (2023), Product Category Rules (PCR) for Preparing an Environmental Product Declaration (EPD) for Water-Resistive and Air Barriers as well as ISO 14025:2006.

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SUMMARY
Reference PCR
ASTM PCR for Water-Resistive and Air Barriers

Regions; system boundaries
North America; Cradle-to-gate

Declared unit: 1 m^2

LCIA methodology: TRACI 2.1

LCA software; LCI database
SimaPro Developer 9.6; ecoinvent v3.10, US EI 2.2

Public LCA:
LCA for W.R. MEADOWS Water-Resistive and Air Barriers

In accordance with ISO 14044 and the reference PCR, this life cycle assessment was conducted by Sustainable Minds and reviewed by Lindita Bushi, PhD, Senior Research Associate, at Athena.

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How we make it greener

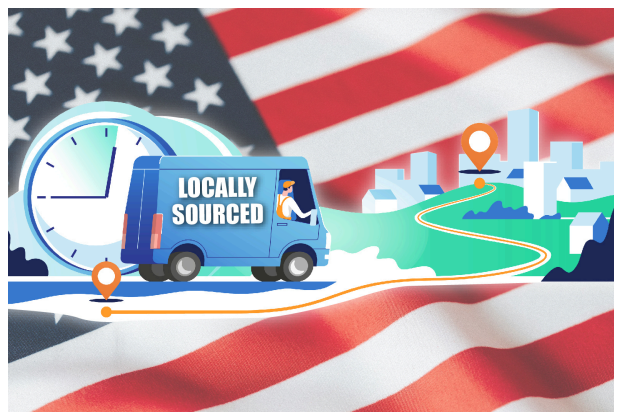
AIR-SHIELD™ LMP, LSR, TMP

Expand all

RAW MATERIALS ACQUISITION

W. R. MEADOWS sources many materials domestically. Sourcing materials locally is more sustainable and results in a smaller carbon footprint for several reasons. It reduces transportation emissions by avoiding long-distance and overseas shipping, cutting fuel use and greenhouse gas output.

Supporting domestic industries strengthens local economies and promotes sustainable practices, reducing reliance on global supply chains. Local sourcing ensures efficient logistics, as materials are transported over shorter distances, saving energy in storage and transit. Finally, it eliminates dependence on energy-intensive transport modes like cargo ships and planes, which consume large amounts of fossil fuels. Domestic sourcing supports the environment and creates more resilient, eco-friendly supply chains.



TRANSPORATION

W. R. MEADOWS manufactures in the USA.

Sourcing materials domestically can be more sustainable and result in a lower carbon footprint for several reasons:

- Reduced transportation emissions: Local sourcing eliminates the need for long-distance shipping, especially overseas transport, significantly reducing fuel consumption and greenhouse gas emissions.
- Support for local economies: Buying domestically strengthens local industries, encourages more sustainable practices, and reduces dependence on global supply chains.
- Efficient logistics: With materials sourced nearby, transportation and delivery are quicker and more efficient, requiring less energy for storage and transit.
- Improved quality control: Local suppliers are often easier to monitor, ensuring higher standards for sustainability practices in production.
- Lower reliance on energy-intensive transport modes: Overseas sourcing often depends on cargo ships and planes, which consume vast amounts of fossil fuels compared to domestic transportation.
- In short, domestic sourcing benefits the environment and helps create more resilient and eco-conscious supply chains



MANUFACTURING

W. R. MEADOWS utilizes Continuous Improvement in its daily standard work for all manufacturing activities.

Front-line supervisors are the champions of OEE (Overall Equipment Effectiveness), which plays a crucial role in reducing energy consumption in manufacturing. It highlights any inefficiencies and directs our efforts to minimize unnecessary energy use. By closely monitoring equipment performance, OEE identifies periods of downtime, slow speeds, and quality defects, which can all lead to wasted energy. Moreover, OEE-driven improvements have led Meadows to more streamlined processes, better scheduling, and reduced machine wear, all of which contribute to lower energy costs and a more sustainable operation. This proactive approach not only decreases energy consumption but also helps manufacturers meet environmental goals and reduce their carbon footprint.

Further, OEE has helped Meadows to identify and reduce scrap by providing insights into equipment performance, highlighting areas where defects or inefficiencies occur during production. With improved equipment efficiency and fewer production delays, OEE ensures that processes run optimally, resulting in fewer errors and reduced waste. Ultimately, this leads to a higher-quality product with less material being wasted during the manufacturing process.



USE & END OF LIFE

We understand the importance of end-of-life disposal. However, these products are meant to remain permanently adhered to their substrates, making them challenging to remove. As a result, they are typically landfilled during deconstruction or demolition.



SM Transparency Report (EPD)™

EPD	LCA
3rd-party reviewed	✓
	Transparency Report (EPD)
3rd-party verified	✓

Validity: 05/27/25 – 05/27/30
SM-WRM – 05272025 – 006

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Athena Sustainable Materials Institute

SUMMARY

Reference PCR
ASTM PCR for Water-Resistive and Air Barriers

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North America; Cradle-to-gate

Declared unit: 1 m^2

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LCA software; LCI database
SimaPro Developer 9.6; ecoinvent v3.10, US-EI 2.2

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LCA of W. R. MEADOWS Water-Resistive and Air Barriers

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