



## 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

3rd-party reviewed



Transparency Report (EPD)

3rd-party verified



Validity: 03/xx/25 – 03/xx/30  
SM-WRM – 03xx2025 – 001

#### LCA

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<sup>2</sup>

**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 TMP is a water-based air/liquid moisture barrier that cures to form a tough, seamless, elastomeric membrane. AIR-SHIELD TMP exhibits excellent resistance to air leakage. When properly applied as a drainage plane, AIR-SHIELD TMP prohibits liquid water intrusion into the substrate.

Declared unit

One square meter weighing 0.515 kg (0.515 kg/m<sup>2</sup>), typically applied at 16 mil wet thickness. The theoretical coverage rate (not including waste) at that thickness is approximately 100 ft<sup>2</sup>/gal (2.454 m<sup>2</sup>/L) to attain a 9 mil dry thickness on exterior gypsum sheathing.

Product density: 10.55 lbs/gal = 1.264 kg/  
Coverage rate (kg/m<sup>2</sup>): (1.264 kg/L)/(2.454 m<sup>2</sup>/L) = 0.515 kg/m<sup>2</sup>  
% solids by weight: 65%

Manufacturing data

Reporting period: January 2023 – December 2023

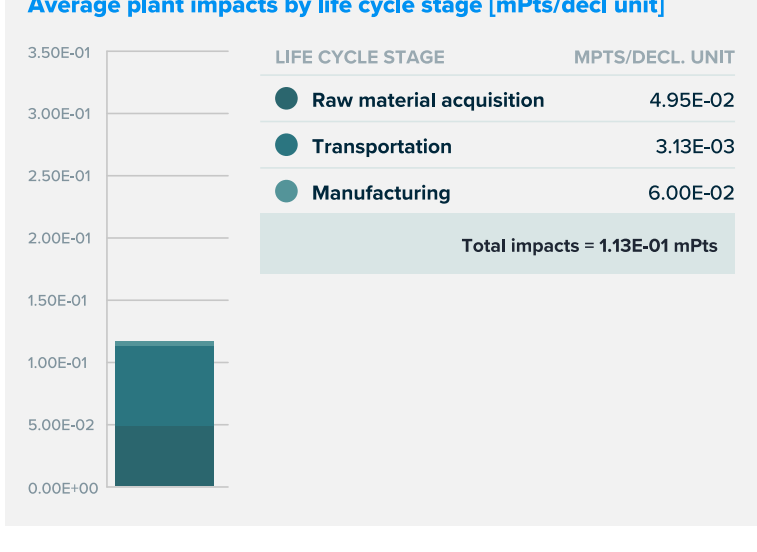
Location: Cartersville, GA; Fort Worth, TX; and Hampshire, IL

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<sub>2</sub>-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 LDPE resin could lower the total GWP by 13.8%. This shows that global warming potential is sensitive to the amount of LDPE resin present in the products.

| Material composition by wt% |        |
|-----------------------------|--------|
| MATERIAL                    | WT%    |
| Polymers                    | 35-40% |
| Mineral filler              | 15-20% |
| Additives                   | 10-15% |
| Calcium carbonate           | 10-15% |
| Water                       | 8-10%  |
| Oils                        | 3-5%   |
| Pigment                     | 1-3%   |
| Packaging, plastic pail     | 1-2%   |
| Packaging, steel drum       | <1%    |
| Packaging, stretch film     | <1%    |



LCA results

| LIFE CYCLE STAGE                                       | A1 RAW MATERIAL ACQUISITION     | A2 TRANSPORT     | A3 MANUFACTURING     |
|--------------------------------------------------------|---------------------------------|------------------|----------------------|
|                                                        | (X) A1 Raw material acquisition | (X) A2 Transport | (X) A3 Manufacturing |
| Information modules:<br>Included (X)   Excluded (MND)* |                                 |                  |                      |
| *Modules A4, A5, B, C, and D are excluded.             |                                 |                  |                      |

SM Single Score Learn about SM Single Score results

| Impacts per declared unit                                                          | 4.95E-02 mPts                                                     | 3.13E-03 mPts                                   | 6.00E-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™ TMP (Cartersville, GA)

| LIFE CYCLE STAGE | A1 RAW MATERIAL SUPPLY | A2 TRANSPORT | A3 MANUFACTURING |
|------------------|------------------------|--------------|------------------|
|------------------|------------------------|--------------|------------------|

Ecological damage

|                 |          |                       |   |          |          |          |
|-----------------|----------|-----------------------|---|----------|----------|----------|
| GWP, IPCC       | TOTAL    | kg CO <sub>2</sub> eq | ⑦ | 8.79E-01 | 2.98E-02 | 1.34E-01 |
| GWP, IPCC       | BIOGENIC | kg CO <sub>2</sub> eq | ⑦ | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| GWP, IPCC       | FOSSIL   | kg CO <sub>2</sub> eq | ⑦ | 8.79E-01 | 2.98E-02 | 1.34E-01 |
| GWP, TRACI 2.1  | TOTAL    | kg CO <sub>2</sub> eq | ⑦ | 8.56E-01 | 2.94E-02 | 1.52E-01 |
| GWP, TRACI 2.1  | BIOGENIC | kg CO <sub>2</sub> eq | ⑦ | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| GWP, TRACI 2.1  | FOSSIL   | kg CO <sub>2</sub> eq | ⑦ | 8.56E-01 | 2.94E-02 | 1.52E-01 |
| Ozone depletion |          | kg CFC-11 eq          | ⑦ | 2.99E-08 | 4.56E-10 | 8.22E-10 |
| Acidification   |          | kg SO <sub>2</sub> eq | ⑦ | 2.79E-03 | 3.49E-05 | 3.20E-04 |
| Eutrophication  |          | kg N eq               | ⑦ | 6.28E-04 | 2.56E-06 | 4.75E-05 |

Human health damage

Human health damage

|                                      |                         |   |          |          |          |
|--------------------------------------|-------------------------|---|----------|----------|----------|
| Respiratory effects                  | kg PM <sub>2.5</sub> eq | ? | 4.62E-04 | 9.16E-06 | 3.83E-05 |
| Additional environmental information |                         |   |          |          |          |

Additional environmental information

|                       |                  |                                                                                     |          |          |          |
|-----------------------|------------------|-------------------------------------------------------------------------------------|----------|----------|----------|
| Carcinogenics         | CTU <sub>h</sub> |  | 52.98%   | 0.66%    | 46.36%   |
| Non-carcinogenics     | CTU <sub>h</sub> |  | 70.71%   | 7.53%    | 21.76%   |
| Ecotoxicity           | CTU <sub>e</sub> |  | 78.36%   | 9.06%    | 12.59%   |
| Fossil fuel depletion | MJ surplus       |  | 2.97E+00 | 5.62E-02 | 1.01E-01 |

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

| LIFE CYCLE STAGE | A1 RAW MATERIAL SUPPLY | A2 TRANSPORT | A3 MANUFACTURING |
|------------------|------------------------|--------------|------------------|
|------------------|------------------------|--------------|------------------|

Ecological damage

| Impact category                        | Unit                  |                                                                                     |          |          |          |
|----------------------------------------|-----------------------|-------------------------------------------------------------------------------------|----------|----------|----------|
| GWP, IPCC <small>TOTAL</small>         | kg CO <sub>2</sub> eq |  | 8.79E-01 | 5.41E-02 | 1.33E-01 |
| GWP, IPCC <small>BIOGENIC</small>      | kg CO <sub>2</sub> eq |  | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| GWP, IPCC <small>FOSSIL</small>        | kg CO <sub>2</sub> eq |  | 8.79E-01 | 5.41E-02 | 1.33E-01 |
| GWP, TRACI 2.1 <small>TOTAL</small>    | kg CO <sub>2</sub> eq |  | 8.56E-01 | 5.35E-02 | 1.50E-01 |
| GWP, TRACI 2.1 <small>BIOGENIC</small> | kg CO <sub>2</sub> eq |  | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| GWP, TRACI 2.1 <small>FOSSIL</small>   | kg CO <sub>2</sub> eq |  | 8.56E-01 | 5.35E-02 | 1.50E-01 |
| Ozone depletion                        | kg CFC-11 eq          |  | 2.99E-08 | 8.29E-10 | 6.44E-10 |
| Acidification                          | kg SO <sub>2</sub> eq |  | 2.79E-03 | 6.35E-05 | 3.18E-04 |
| Eutrophication                         | kg N eq               |  | 6.28E-04 | 4.64E-06 | 4.69E-05 |

 Human health damage

Human health damage

|                     |                         |                                                                                     |          |          |          |
|---------------------|-------------------------|-------------------------------------------------------------------------------------|----------|----------|----------|
| Smog                | kg O <sub>3</sub> eq    |  | 3.76E-02 | 9.76E-04 | 4.78E-03 |
| Respiratory effects | kg PM <sub>2.5</sub> eq |  | 4.62E-04 | 1.66E-05 | 3.78E-05 |

Additional environmental information

| Impact category   | Unit             |   |        |        |        |
|-------------------|------------------|---|--------|--------|--------|
| Carcinogenics     | CTU <sub>h</sub> | ? | 52.74% | 1.20%  | 46.06% |
| Non-carcinogenics | CTU <sub>h</sub> | ? | 66.88% | 12.94% | 20.19% |
| Ecotoxicity       | CTU <sub>e</sub> | ? | 72.99% | 15.32% | 11.69% |

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

| LIFE CYCLE STAGE | A1 RAW MATERIAL SUPPLY | A2 TRANSPORT | A3 MANUFACTURING |
|------------------|------------------------|--------------|------------------|
|------------------|------------------------|--------------|------------------|

Ecological damage

| Impact category                        | Unit                  |                                                                                     |          |          |          |
|----------------------------------------|-----------------------|-------------------------------------------------------------------------------------|----------|----------|----------|
| GWP, IPCC <small>TOTAL</small>         | kg CO <sub>2</sub> eq |  | 8.79E-01 | 7.83E-02 | 1.36E-01 |
| GWP, IPCC <small>BIOGENIC</small>      | kg CO <sub>2</sub> eq |  | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| GWP, IPCC <small>FOSSIL</small>        | kg CO <sub>2</sub> eq |  | 8.79E-01 | 7.83E-02 | 1.36E-01 |
| GWP, TRACI 2.1 <small>TOTAL</small>    | kg CO <sub>2</sub> eq |  | 8.56E-01 | 7.74E-02 | 1.53E-01 |
| GWP, TRACI 2.1 <small>BIOGENIC</small> | kg CO <sub>2</sub> eq |  | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| GWP, TRACI 2.1 <small>FOSSIL</small>   | kg CO <sub>2</sub> eq |  | 8.56E-01 | 7.74E-02 | 1.53E-01 |
| Ozone depletion                        | kg CFC-11 eq          |  | 2.99E-08 | 1.20E-09 | 1.24E-09 |
| Acidification                          | kg SO <sub>2</sub> eq |  | 2.79E-03 | 9.19E-05 | 3.57E-04 |
| Eutrophication                         | kg N eq               |  | 6.28E-04 | 6.72E-06 | 5.04E-05 |

Human health damage

| Impact category     | Unit                    |   |          |          |          |
|---------------------|-------------------------|---|----------|----------|----------|
| Smog                | kg O <sub>3</sub> eq    | ? | 3.76E-02 | 1.41E-03 | 5.06E-03 |
| Respiratory effects | kg PM <sub>2.5</sub> eq | ? | 4.62E-04 | 2.41E-05 | 4.00E-05 |

Additional environmental information

| Additional environmental information |                  |   |        |       |        |
|--------------------------------------|------------------|---|--------|-------|--------|
| Impact category                      | Unit             |   |        |       |        |
| Carcinogenics                        | CTU <sub>h</sub> | ? | 52.07% | 1.71% | 46.21% |
| Non-carcinogenics                    | CTU <sub>h</sub> | ? | 62.84% | 17.6% | 19.56% |

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, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

ISO 21930:2017, "Sustainability in Building Construction -- Environmental Declaration of Building Products" serves as the core PCR.

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 purchasers 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 categories are being developed and defined and LCA 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 not 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.

What's causing the greatest impacts

All life cycle stages

Across all locations, the total potential CO<sub>2</sub>-equivalent emissions generated during the cradle-to-gate stage of 1 m<sup>2</sup> of AIR-SHIELD TMP production is 1.04-1.09 kg CO<sub>2</sub>-eq. Raw material supply contributes 0.824 kg CO<sub>2</sub>-eq, accounting for 80-90% of the total results. This is primarily due to the styrene butadiene copolymer used as a raw material input for this product. Ozone depletion, fossil fuel depletion, and eutrophication were the most impacted categories in this stage. The manufacturing stage was the second highest contributor (at 10-20% 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 polymers. The polymers also contribute the highest percentage to the material composition.

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 energy 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™ TMP is 1.06E+00 kg CO<sub>2</sub>-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, delays, 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](#)

## EPD additional content

**AIR-SHIELD™ LMP, LSR, TMP**

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

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

**Allocation** The W. R. MEADOWS facility produces multiple types of products

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 type.

All associated manufacturing resources and waste flows were allocated using

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

**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

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.

Results

The precision of the data is considered high. W. R. MEADOWS personnel provided a detailed bill of materials, and facility managers provided utility

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

The consistency of the model is considered high. Furthermore, the modeling

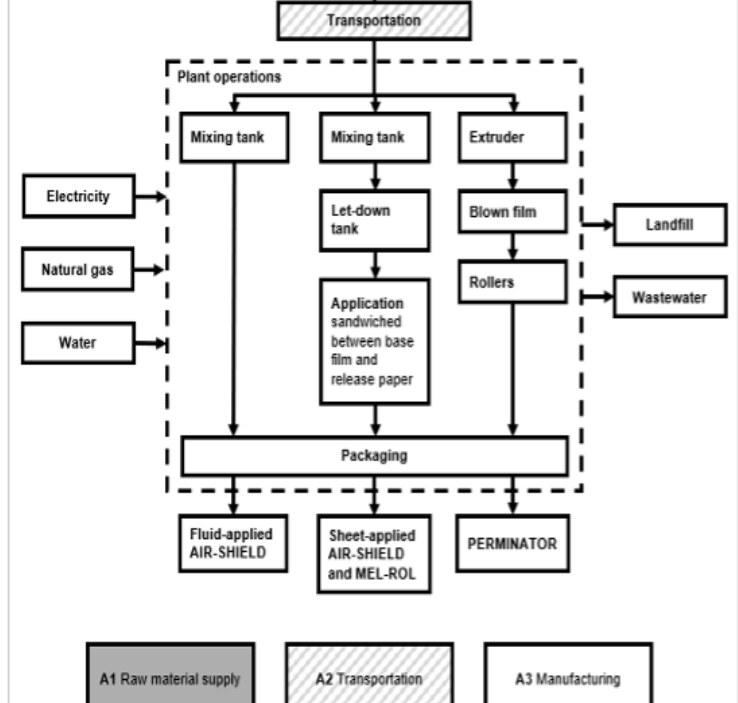
## ecoinvent v3.10 database.

- ### 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

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   | emission from packaging (A5) |
|----------------|------------------------------|
| AIR-SHIELD LMP | 4.94E-02 kg CO <sub>2</sub>  |
| AIR-SHIELD LSR | 3.55E-04 kg CO <sub>2</sub>  |
| AIR-SHIELD TMP | 3.55E-04 kg CO <sub>2</sub>  |

**Flow diagram**



- Generic data sets used for material inputs, transport, and waste processing are considered good quality, but actual impacts 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

**LCIA impact factors** required by the PCR are global warming, ozone depletion potential, acidification, eutrophication, smog, and fossil fuel

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 <sub>TOTAL</sub>                                                                            | kg CO <sub>2</sub> eq | 3.09E+00  | 1.10E-01 | 6.19E-01  | 3.82E+00  |
| GWP, IPCC <sub>BIOGENIC</sub>                                                                         | kg CO <sub>2</sub> eq | -1.20E-04 | 0        | 1.20E-04  | 0         |
| GWP, IPCC <sub>FOSSIL</sub>                                                                           | kg CO <sub>2</sub> eq | 3.09E+00  | 1.10E-01 | 6.19E-01  | 3.82E+00  |
| GWP, TRACI 2.1 <sub>TOTAL</sub>                                                                       | kg CO <sub>2</sub> eq | 3.01E+00  | 1.09E-01 | 6.68E-01  | 3.79E+00  |
| GWP, TRACI 2.1 <sub>BIOGENIC</sub>                                                                    | kg CO <sub>2</sub> eq | -1.20E-04 | 0        | 1.20E-04  | 0         |
| GWP, TRACI 2.1 <sub>FOSSIL</sub>                                                                      | kg CO <sub>2</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Biogenic carbon emission from product                                                                 | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Biogenic carbon removal from packaging                                                                | kg CO <sub>2</sub>    | -1.20E-04 | 0        | -4.94E-02 | -4.95E-02 |
| Biogenic carbon emission from packaging                                                               | kg CO <sub>2</sub>    | 0         | 0        | 1.20E-04  | 1.20E-04  |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Calcination carbon emissions                                                                          | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Carbonation carbon removals                                                                           | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes     | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |

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

| LCIA results                                                                                          |                       |           |          |           |  |           |
|-------------------------------------------------------------------------------------------------------|-----------------------|-----------|----------|-----------|--|-----------|
| GWP, IPCC <sub>TOTAL</sub>                                                                            | kg CO <sub>2</sub> eq | 3.09E+00  | 1.92E-01 | 6.06E-01  |  | 3.89E+00  |
| GWP, IPCC <sub>BIOGENIC</sub>                                                                         | kg CO <sub>2</sub> eq | -1.20E-04 | 0        | 1.20E-04  |  | 0         |
| GWP, IPCC <sub>FOSSIL</sub>                                                                           | kg CO <sub>2</sub> eq | 3.09E+00  | 1.92E-01 | 6.06E-01  |  | 3.89E+00  |
| GWP, TRACI 2.1 <sub>TOTAL</sub>                                                                       | kg CO <sub>2</sub> eq | 3.01E+00  | 1.90E-01 | 6.56E-01  |  | 3.86E+00  |
| GWP, TRACI 2.1 <sub>BIOGENIC</sub>                                                                    | kg CO <sub>2</sub> eq | -1.20E-04 | 0        | 1.20E-04  |  | 0         |
| GWP, TRACI 2.1 <sub>FOSSIL</sub>                                                                      | kg CO <sub>2</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>2</sub>    | 0         | 0        | 0         |  | 0         |
| Biogenic carbon emission from product                                                                 | kg CO <sub>2</sub>    | 0         | 0        | 0         |  | 0         |
| Biogenic carbon removal from packaging                                                                | kg CO <sub>2</sub>    | -1.20E-04 | 0        | -4.94E-02 |  | -4.95E-02 |
| Biogenic carbon emission from packaging                                                               | kg CO <sub>2</sub>    | 0         | 0        | 1.20E-04  |  | 1.20E-04  |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg CO <sub>2</sub>    | 0         | 0        | 0         |  | 0         |
| Calcination carbon emissions                                                                          | kg CO <sub>2</sub>    | 0         | 0        | 0         |  | 0         |
| Carbonation carbon removals                                                                           | kg CO <sub>2</sub>    | 0         | 0        | 0         |  | 0         |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes     | kg CO <sub>2</sub>    | 0         | 0        | 0         |  | 0         |

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

| LCIA results                                                         |                       |           |          |          |          |  |
|----------------------------------------------------------------------|-----------------------|-----------|----------|----------|----------|--|
| GWP, IPCC <sub>TOTAL</sub>                                           | kg CO <sub>2</sub> eq | 3.09E+00  | 2.41E-01 | 6.47E-01 | 3.98E+00 |  |
| GWP, IPCC <sub>BIOGENIC</sub>                                        | kg CO <sub>2</sub> eq | -1.20E-04 | 0        | 1.20E-04 | 0        |  |
| GWP, IPCC <sub>FOSSIL</sub>                                          | kg CO <sub>2</sub> eq | 3.09E+00  | 2.41E-01 | 6.46E-01 | 3.98E+00 |  |
| GWP, TRACI 2.1 <sub>TOTAL</sub>                                      | kg CO <sub>2</sub> eq | 3.01E+00  | 2.38E-01 | 6.96E-01 | 3.95E+00 |  |
| GWP, TRACI 2.1 <sub>BIOGENIC</sub>                                   | kg CO <sub>2</sub> eq | -1.20E-04 | 0        | 1.20E-04 | 0        |  |
| GWP, TRACI 2.1 <sub>FOSSIL</sub>                                     | kg CO <sub>2</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 |  |

|                                                                                                       |                    |           |          |           |           |
|-------------------------------------------------------------------------------------------------------|--------------------|-----------|----------|-----------|-----------|
| 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  | 6.72E-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 <sub>2</sub> | 0         | 0        | 0         | 0         |
| Biogenic carbon emission from product                                                                 | kg CO <sub>2</sub> | 0         | 0        | 0         | 0         |
| Biogenic carbon removal from packaging                                                                | kg CO <sub>2</sub> | -1.20E-04 | 0        | -4.94E-02 | -4.95E-02 |
| Biogenic carbon emission from packaging                                                               | kg CO <sub>2</sub> | 0         | 0        | 1.20E-04  | 1.20E-04  |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg CO <sub>2</sub> | 0         | 0        | 0         | 0         |
| Calcination carbon emissions                                                                          | kg CO <sub>2</sub> | 0         | 0        | 0         | 0         |
| Carbonation carbon removals                                                                           | kg CO <sub>2</sub> | 0         | 0        | 0         | 0         |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes     | kg CO <sub>2</sub> | 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 <sub>TOTAL</sub>                                                                            | kg CO <sub>2</sub> eq | 5.26E+00  | 1.29E-01 | 6.29E-01  | 6.02E+00  |
| GWP, IPCC <sub>BIOGENIC</sub>                                                                         | kg CO <sub>2</sub> eq | -5.72E-04 | 0        | 5.72E-04  | 0         |
| GWP, IPCC <sub>FOSSIL</sub>                                                                           | kg CO <sub>2</sub> eq | 5.26E+00  | 1.29E-01 | 6.28E-01  | 6.02E+00  |
| GWP, TRACI 2.1 <sub>TOTAL</sub>                                                                       | kg CO <sub>2</sub> eq | 5.11E+00  | 1.27E-01 | 7.48E-01  | 5.99E+00  |
| GWP, TRACI 2.1 <sub>BIOGENIC</sub>                                                                    | kg CO <sub>2</sub> eq | -1.20E-04 | 0        | 1.20E-04  | 0         |
| GWP, TRACI 2.1 <sub>FOSSIL</sub>                                                                      | kg CO <sub>2</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Biogenic carbon emission from product                                                                 | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Biogenic carbon removal from packaging                                                                | kg CO <sub>2</sub>    | -5.72E-04 | 0        | -3.55E-04 | -9.27E-04 |
| Biogenic carbon emission from packaging                                                               | kg CO <sub>2</sub>    | 0         | 0        | 5.72E-04  | 5.72E-04  |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Calcination carbon emissions                                                                          | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Carbonation carbon removals                                                                           | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes     | kg CO <sub>2</sub>    | 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 <sub>TOTAL</sub>                                                                            | kg CO <sub>2</sub> eq | 5.26E+00  | 5.91E-01 | 6.22E-01  | 6.48E+00  |
| GWP, IPCC <sub>BIOGENIC</sub>                                                                         | kg CO <sub>2</sub> eq | -5.72E-04 | 0        | 5.72E-04  | 0         |
| GWP, IPCC <sub>FOSSIL</sub>                                                                           | kg CO <sub>2</sub> eq | 5.26E+00  | 5.91E-01 | 6.21E-01  | 6.48E+00  |
| GWP, TRACI 2.1 <sub>TOTAL</sub>                                                                       | kg CO <sub>2</sub> eq | 5.11E+00  | 5.84E-01 | 7.42E-01  | 6.44E+00  |
| GWP, TRACI 2.1 <sub>BIOGENIC</sub>                                                                    | kg CO <sub>2</sub> eq | -1.20E-04 | 0        | 1.20E-04  | 0         |
| GWP, TRACI 2.1 <sub>FOSSIL</sub>                                                                      | kg CO <sub>2</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Biogenic carbon emission from product                                                                 | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Biogenic carbon removal from packaging                                                                | kg CO <sub>2</sub>    | -5.72E-04 | 0        | -3.55E-04 | -9.27E-04 |
| Biogenic carbon emission from packaging                                                               | kg CO <sub>2</sub>    | 0         | 0        | 5.72E-04  | 5.72E-04  |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Calcination carbon emissions                                                                          | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Carbonation carbon removals                                                                           | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes     | kg CO <sub>2</sub>    | 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 <sub>TOTAL</sub>                                                                            | kg CO <sub>2</sub> eq | 5.26E+00  | 3.61E-01 | 6.22E-01  | 6.25E+00  |
| GWP, IPCC <sub>BIOGENIC</sub>                                                                         | kg CO <sub>2</sub> eq | -5.72E-04 | 0        | 5.72E-04  | 0         |
| GWP, IPCC <sub>FOSSIL</sub>                                                                           | kg CO <sub>2</sub> eq | 5.26E+00  | 3.61E-01 | 6.21E-01  | 6.25E+00  |
| GWP, TRACI 2.1 <sub>TOTAL</sub>                                                                       | kg CO <sub>2</sub> eq | 5.11E+00  | 3.57E-01 | 7.42E-01  | 6.21E+00  |
| GWP, TRACI 2.1 <sub>BIOGENIC</sub>                                                                    | kg CO <sub>2</sub> eq | -1.20E-04 | 0        | 1.20E-04  | 0         |
| GWP, TRACI 2.1 <sub>FOSSIL</sub>                                                                      | kg CO <sub>2</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Biogenic carbon emission from product                                                                 | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Biogenic carbon removal from packaging                                                                | kg CO <sub>2</sub>    | -5.72E-04 | 0        | -3.55E-04 | -9.27E-04 |
| Biogenic carbon emission from packaging                                                               | kg CO <sub>2</sub>    | 0         | 0        | 5.72E-04  | 5.72E-04  |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Calcination carbon emissions                                                                          | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Carbonation carbon removals                                                                           | kg CO <sub>2</sub>    | 0         | 0        | 0         | 0         |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes     | kg CO <sub>2</sub>    | 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 <sub>TOTAL</sub>         | kg CO <sub>2</sub> eq | 8.79E-01 | 2.98E-02 | 1.34E-01 | 1.04E+00 |
| GWP, IPCC <sub>BIOGENIC</sub>      | kg CO <sub>2</sub> eq | 0        | 0        | 0        | 0        |
| GWP, IPCC <sub>FOSSIL</sub>        | kg CO <sub>2</sub> eq | 8.79E-01 | 2.98E-02 | 1.34E-01 | 1.04E+00 |
| GWP, TRACI 2.1 <sub>TOTAL</sub>    | kg CO <sub>2</sub> eq | 8.56E-01 | 2.94E-02 | 1.52E-01 | 1.04E+00 |
| GWP, TRACI 2.1 <sub>BIOGENIC</sub> | kg CO <sub>2</sub> eq | 0        | 0        | 0        | 0        |

|                                                                                                       |                       |          |          |           |           |
|-------------------------------------------------------------------------------------------------------|-----------------------|----------|----------|-----------|-----------|
| GWP, TRACI 2.1 <sup>-FOSSIL</sup>                                                                     | kg CO <sub>2</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Biogenic carbon emission from product                                                                 | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Biogenic carbon removal from packaging                                                                | kg CO <sub>2</sub>    | 0        | 0        | -3.55E-04 | -3.55E-04 |
| Biogenic carbon emission from packaging                                                               | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Calcination carbon emissions                                                                          | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Carbonation carbon removals                                                                           | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes     | kg CO <sub>2</sub>    | 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 <sub>TOTAL</sub>                                                                            | kg CO <sub>2</sub> eq | 8.79E-01 | 5.41E-02 | 1.33E-01  | 1.07E+00  |
| GWP, IPCC <sub>BIOGENIC</sub>                                                                         | kg CO <sub>2</sub> eq | 0        | 0        | 0         | 0         |
| GWP, IPCC <sub>FOSSIL</sub>                                                                           | kg CO <sub>2</sub> eq | 8.79E-01 | 5.41E-02 | 1.33E-01  | 1.07E+00  |
| GWP, TRACI 2.1 <sub>TOTAL</sub>                                                                       | kg CO <sub>2</sub> eq | 8.56E-01 | 5.35E-02 | 1.50E-01  | 1.06E+00  |
| GWP, TRACI 2.1 <sub>BIOGENIC</sub>                                                                    | kg CO <sub>2</sub> eq | 0        | 0        | 0         | 0         |
| GWP, TRACI 2.1 <sub>FOSSIL</sub>                                                                      | kg CO <sub>2</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Biogenic carbon emission from product                                                                 | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Biogenic carbon removal from packaging                                                                | kg CO <sub>2</sub>    | 0        | 0        | -3.55E-04 | -3.55E-04 |
| Biogenic carbon emission from packaging                                                               | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Calcination carbon emissions                                                                          | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Carbonation carbon removals                                                                           | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes     | kg CO <sub>2</sub>    | 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 <sub>TOTAL</sub>                                                                            | kg CO <sub>2</sub> eq | 8.79E-01 | 7.83E-02 | 1.36E-01  | 1.09E+00  |
| GWP, IPCC <sub>BIOGENIC</sub>                                                                         | kg CO <sub>2</sub> eq | 0        | 0        | 0         | 0         |
| GWP, IPCC <sub>FOSSIL</sub>                                                                           | kg CO <sub>2</sub> eq | 8.79E-01 | 7.83E-02 | 1.36E-01  | 1.09E+00  |
| GWP, TRACI 2.1 <sub>TOTAL</sub>                                                                       | kg CO <sub>2</sub> eq | 8.56E-01 | 7.74E-02 | 1.53E-01  | 1.09E+00  |
| GWP, TRACI 2.1 <sub>BIOGENIC</sub>                                                                    | kg CO <sub>2</sub> eq | 0        | 0        | 0         | 0         |
| GWP, TRACI 2.1 <sub>FOSSIL</sub>                                                                      | kg CO <sub>2</sub> 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 <sub>2</sub> 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 <sub>3</sub> 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 <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Biogenic carbon emission from product                                                                 | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Biogenic carbon removal from packaging                                                                | kg CO <sub>2</sub>    | 0        | 0        | -3.55E-04 | -3.55E-04 |
| Biogenic carbon emission from packaging                                                               | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Calcination carbon emissions                                                                          | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Carbonation carbon removals                                                                           | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes     | kg CO <sub>2</sub>    | 0        | 0        | 0         | 0         |



EPD

3rd-party reviewed

Transparency Report (EPD)

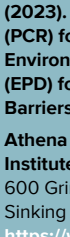
3rd-party verified

Validity: 03/xx/25 – 03/xx/30  
SM-WRM – 03xx2025 – 001

LCA

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<sup>2</sup>  
  
LCIA methodology: TRACI 2.1  
  
LCIA software; LCI database  
SimaPro Developer 9.6; ecoinvent v3.10, US-EI 2.2  
  
Public LCA:  
LCA of 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

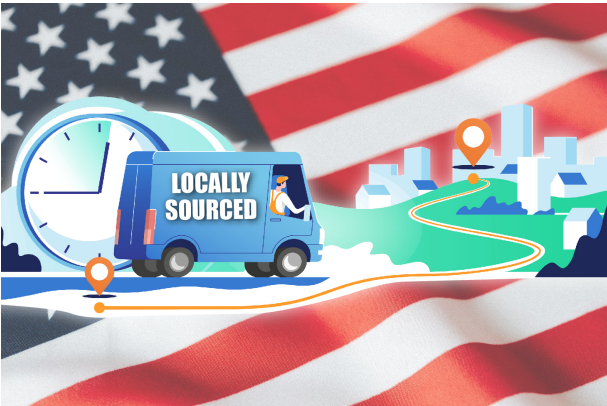
AIR-SHIELD™ LMP, LSR, TMP

–

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.



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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



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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.



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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: 03/xx/25 – 03/xx/30  
SM-WRM – 03xx2025 – 001

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### SUMMARY

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