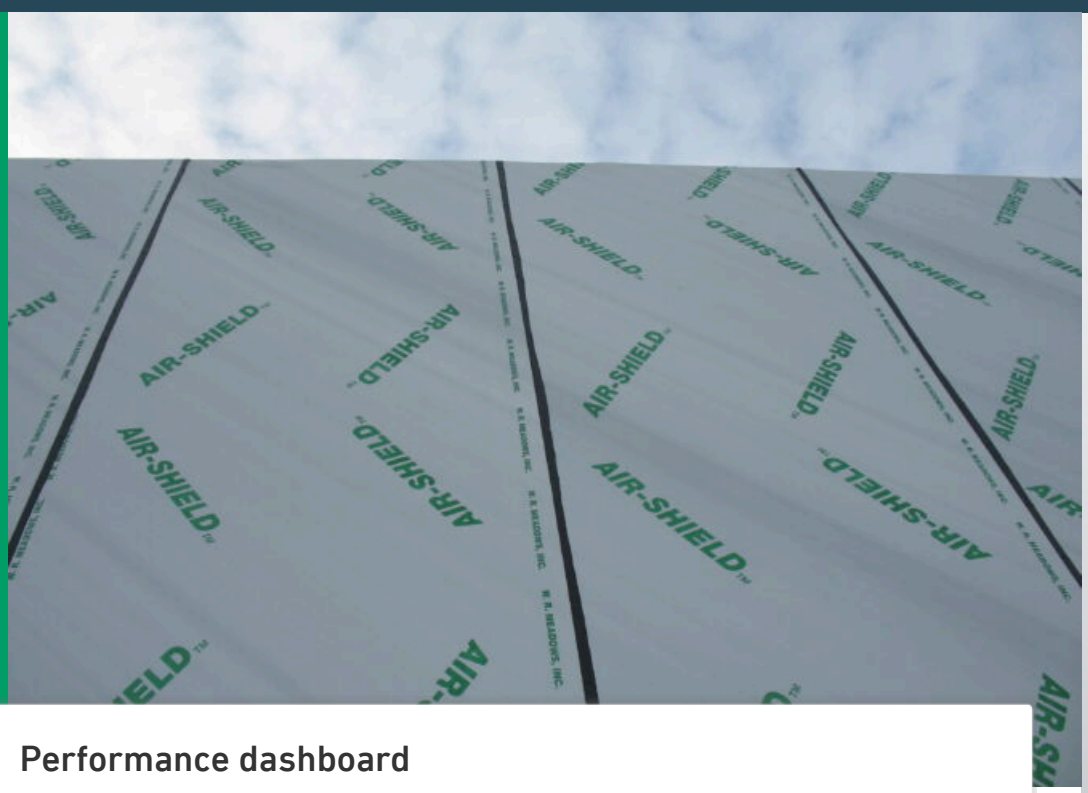
# AIR-SHIELD™
# AIR-SHIELD™ THRU-WALL FLASHING
# AIR-SHIELD™ LOW TEMP
# AIR-SHIELD™ XLT

AIR-SHIELD self-adhering air/vapor and liquid moisture barrier is a part of a total system to complete the building envelope. It is a roll-type product that is nominally 40 mils thick. This unique, self-adhesive membrane, protected by a special release paper, is strong and durable. It remains flexible when surface mounted and will adhere to most primed surfaces at minimum temperatures of 40° F (4° C).





## Performance dashboard

### Features & functionality

Low permeability

Prevents the transmission of air and inhibits moisture vapor through porous building materials

Provides a complete above-grade air, vapor, and water barrier on a variety of construction materials

Controlled thickness membrane is ideal for air barrier applications

Cross-laminated polyethylene film has excellent tensile strength, elongation, and tear resistance

Modified membrane is flexible at low temperatures

**Visit W.R. MEADOWS for more product information:**

AIR-SHIELD™
AIR-SHIELD™ THRU-WALL FLASHING TAPE
AIR-SHIELD™ LOW TEMP
AIR-SHIELD™ XLT

**MasterFormat® 07 27 13**
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

**Certifications, rating systems & disclosures:**

Health Product Declaration

Build America, Buy America Act compliant (AIR-SHIELD™ THRU-WALL FLASHING, AIR-SHIELD™ LOW TEMP, AIR-SHIELD™ XLT)

See LCA, interpretation & rating systems

## SM Transparency Report (EPD)™

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

Validity: 05/27/25 – 05/27/30
SM-WRM – 05272025 – 007

**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.**

**Athena Sustainable Materials Institute**
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Athena Sustainable Materials Institute

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

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

**Declared unit:** 1 $m^2$

**LCIA methodology:** TRACI 2.1

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

**Public LCA:**
LCA of W. R. MEADOWS 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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# LCA results & interpretation

AIR-SHIELD™

AIR-SHIELD™ | AIR-SHIELD™ THRU-WALL FLASHING | AIR-SHIELD™ LOW TEMP | AIR-SHIELD™ XLT | EPD additional content

## Scope and summary

☑ **Cradle to gate** ○ Cradle to gate with options ○ Cradle to grave

### Application
AIR-SHIELD XLT is a sheet-applied air barrier designed for extreme cold weather conditions, adhering at temperatures as low as 0°F (-18°C). It features a 40mil membrane made from cross-laminated polyethylene and modified asphalt, meeting the Massachusetts Commercial Energy Code and ABAA Section 07261.

### Declared unit
Coverage rate (kg/m$^2$) = 1.328 kg/m$^2$

### Manufacturing data
**Reporting period:** January 2023 – December 2023
**Location:** Hampshire, IL

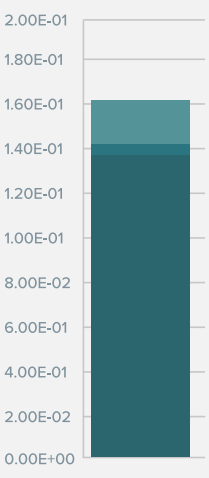
### Sensitivity analysis
Sensitivity analyses were performed to check the robustness of the results where the highest potential environmental impacts are occurring. Since there were two raw materials which contributed the most to total impacts across air and vapor barrier products evaluated, sensitivity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

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

### Material composition by wt%

| MATERIAL | WT% |
|---|---|
| SBS-modified bitumen mixture | 40-45% |
| Limestone | 15-20% |
| Plastic film | 5-10% |
| Packaging, wood pallet | 5-10% |
| Packaging, paper | <5% |
| Packaging, carton | <5% |

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




| LIFE CYCLE STAGE | MPTS/DECL. UNIT |
|---|---|
| Raw material acquisition | 1.36E-01 |
| Transportation | 6.73E-03 |
| Manufacturing | 1.83E-02 |
| Total impacts = 1.61E-01 mPts | |

## What's causing the greatest impacts

### All life cycle stages
**The raw material acquisition stage dominates the results, accounting for over 70% of the total impacts for nine out of ten TRACI 2.1 impact categories, followed by the manufacturing stage.** For global warming, eutrophication, carcinogenics, and non-carcinogens, manufacturing accounted for second-highest contributor and over 20% of the total results. Among the raw materials, the polyethylene resin was the largest contributor to the total results.

### Raw material acquisition
**The raw material acquisition (A1) stage has the most significant contribution to most impact categories, primarily due to the polyethylene resin.** The polyethylene resin also contributes 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.

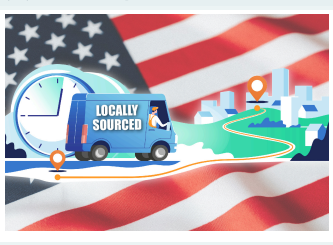
### Embodied carbon
Embodied carbon can be defined as the cradle-to-gate (A1-A3) global warming potential impacts. The total embodied carbon per declared unit of AIR-SHIELD™ XLT is 2.02E+00 kg $CO_2$-eq.

### How we're making it greener

- W. R. MEADOWS utilizes OEE (Overall Equipment Effectiveness) to optimize manufacturing processes and reduce energy consumption.
- OEE identifies inefficiencies and wasted energy: By monitoring equipment performance, it uncovers downtime, slow speeds, and quality defects.
- Energy-saving improvements through OEE: Meadows has achieved streamlined processes, better scheduling, reduced machine wear, and lower energy costs.
- Reduction in scrap and waste: OEE insights help identify performance issues, reducing defects, 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

## 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:** **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 | 1.36E-01 mPts | 6.73E-03 mPts | 1.83E-02 mPts |
|---|---|---|---|
| **Materials or processes contributing >20% to total impacts in each life cycle stage** | Extraction and preprocessing of polymers, mastic asphalt, 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

| LIFE CYCLE STAGE | A1 RAW MATERIAL SUPPLY | A2 TRANSPORT | A3 MANUFACTURING |
|---|---|---|---|
| **Ecological damage** | | | |
| Impact category / Unit | | | |
| GWP, IPCC $_{TOTAL}$ — kg $CO_2$ eq | 1.73E+00 | 1.13E-01 | 2.14E-01 |
| GWP, IPCC $_{BIOGENIC}$ — kg $CO_2$ eq | -1.52E-02 | 0.00E+00 | 1.52E-02 |
| GWP, IPCC $_{FOSSIL}$ — kg $CO_2$ eq | 1.74E+00 | 1.13E-01 | 1.99E-01 |
| GWP, TRACI 2.1 $_{TOTAL}$ — kg $CO_2$ eq | 1.69E+00 | 1.11E-01 | 2.21E-01 |
| GWP, TRACI 2.1 $_{BIOGENIC}$ — kg $CO_2$ eq | -1.52E-02 | 0.00E+00 | 1.52E-02 |
| GWP, TRACI 2.1 $_{FOSSIL}$ — kg $CO_2$ eq | 1.70E+00 | 1.11E-01 | 2.06E-01 |
| Ozone depletion — kg CFC-11 eq | 3.51E-07 | 1.60E-09 | 8.75E-09 |
| Acidification — kg $SO_2$ eq | 6.56E-03 | 2.75E-04 | 1.02E-03 |
| Eutrophication — kg N eq | 1.40E-03 | 1.87E-05 | 3.54E-04 |
| **Human health damage** | | | |
| Impact category / Unit | | | |
| Smog — kg $O_3$ eq | 8.63E-02 | 7.05E-03 | 1.73E-02 |
| Respiratory effects — kg $PM_{2.5}$ eq | 1.00E-03 | 3.78E-05 | 1.93E-04 |
| **Additional environmental information** | | | |
| Impact category / Unit | | | |
| Carcinogenics — $CTU_h$ | 77.14% | 0.79% | 22.07% |
| Non-carcinogenics — $CTU_h$ | 50.56% | 6.99% | 42.45% |
| Ecotoxicity — $CTU_e$ | 88.27% | 5.94% | 5.79% |
| Fossil fuel depletion — MJ surplus | 6.54E+00 | 2.12E-01 | 2.44E-01 |

## References

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

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

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

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

**Download PDF** SM Transparency Report/ EPD

**SM Transparency Reports (TR) are ISO 14025 Type III environmental declarations (EPD) that enable 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. LCIA 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.

## Rating systems

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

### LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization

**Environmental product declarations**

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

### LEED BD+C: New Construction | v4.1 - LEED v4.1
Building product disclosure and optimization

**Environmental product declarations**

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

### Collaborative for High Performance Schools National Criteria
**MW C5.1 – Environmental Product Declarations**

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

### Green Globes for New Construction and Sustainable Interiors
**Materials and resources**

| | |
|---|---|
| ☑ NC 3.5.1.2 Path B: Prescriptive Path for Building Core and Shell | |
| ☑ NC 3.5.2.2 and SI 4.1.2 Path B: Prescriptive Path for Interior Fit-outs | |

### BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products

**Environmental Product Declarations (EPD)**

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

# EPD additional content

AIR-SHIELD™

AIR-SHIELD™ | AIR-SHIELD™ THRU-WALL FLASHING | AIR-SHIELD™ LOW TEMP | AIR-SHIELD™ XLT
EPD additional content

## Data

**Background** This product-specific plant-specific declaration was created by collecting production data from the facility in Hampshire, IL. All unit processes were modeled using primary data. Secondary data sources include those available in the ecoinvent v3.10 and US-EI 2.2 databases.

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

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

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

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

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

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

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

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

**Major system boundary exclusions**

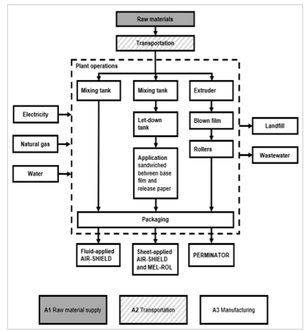
- Manufacture and transport of packaging not associated with final product
- Construction of major capital equipment
- Maintenance and operation of support equipment
- Human labor and employee transport
- Disposal of final product, except for biogenic carbon balance reporting

## Scenarios and additional technical information

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

| Product name | Biogenic carbon emission from packaging (A5) |
|---|---|
| AIR-SHIELD | 5.48E-01 Kg CO2 |
| AIR-SHIELD THRU-WALL FLASHING | 5.48E-01 Kg CO2 |
| AIR-SHIELD LOW TEMP | 6.93E-01 Kg CO2 |
| AIR-SHIELD XLT | 4.18E-01 Kg CO2 |

**Flow diagram**




**Major assumptions and limitations**

- 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 between products.

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

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

| Parameter | Unit | A1 | A2 | A3 | Total |
|---|---|---|---|---|---|
| **LCIA results** | | | | | |
| GWP, IPCC$_{TOTAL}$ | kg $CO_2$ eq | 1.22E+00 | 1.05E-01 | 1.98E-01 | **1.52E+00** |
| GWP, IPCC$_{BIOGENIC}$ | kg $CO_2$ eq | -1.39E-02 | 0 | 1.39E-02 | **0** |
| GWP, IPCC$_{FOSSIL}$ | kg $CO_2$ eq | 1.23E+00 | 1.05E-01 | 1.84E-01 | **1.52E+00** |
| GWP, TRACI 2.1$_{TOTAL}$ | kg $CO_2$ eq | 1.19E+00 | 1.04E-01 | 2.04E-01 | **1.50E+00** |
| GWP, TRACI 2.1$_{BIOGENIC}$ | kg $CO_2$ eq | -1.39E-02 | 0 | 1.39E-02 | **0** |
| GWP, TRACI 2.1$_{FOSSIL}$ | kg $CO_2$ eq | 1.21E+00 | 1.04E-01 | 1.90E-01 | **1.50E+00** |
| Ozone depletion | kg CFC-11 eq | 3.39E-07 | 1.49E-09 | 7.59E-09 | **3.48E-07** |
| Acidification | kg $SO_2$ eq | 4.62E-03 | 2.56E-04 | 9.52E-04 | **5.83E-03** |
| Eutrophication | kg N eq | 8.34E-04 | 1.74E-05 | 3.31E-04 | **1.18E-03** |
| Smog | kg $O_3$ eq | 6.24E-02 | 6.58E-03 | 1.62E-02 | **8.52E-02** |
| Respiratory effects | kg PM2.5 eq | 7.35E-04 | 3.53E-05 | 1.78E-04 | **9.48E-04** |
| **Additional environmental information** | | | | | |
| Carcinogenics | CTUh | 71.69% | 1.02% | 27.29% | **100%** |
| Non-carcinogenics | CTUh | 44.79% | 8.36% | 46.86% | **100%** |
| Ecotoxicity | CTUe | 83.34% | 8.72% | 7.95% | **100%** |
| Fossil fuel depletion | MJ surplus | 4.54E+00 | 1.98E-01 | 2.22E-01 | **4.96E+00** |
| **Resource use indicators** | | | | | |
| Renewable primary energy used as energy carrier (fuel) | MJ, NCV | 7.50E+00 | 2.28E-03 | 5.82E+00 | **1.33E+01** |
| Renewable primary resources with energy content used as material | MJ, NCV | 4.48E+00 | 0 | 0 | **4.48E+00** |
| Total use of renewable primary resources with energy content | MJ, NCV | 1.20E+01 | 2.28E-03 | 5.82E+00 | **1.78E+01** |
| Non-renewable primary resources used as an energy carrier (fuel) | MJ, NCV | 1.22E+01 | 1.49E+00 | 2.56E+00 | **1.62E+01** |
| Non-renewable primary resources with energy content used as material | MJ, NCV | 2.55E+01 | 0 | 0 | **2.55E+01** |
| Total use of non-renewable primary resources with energy content | MJ, NCV | 3.77E+01 | 1.49E+00 | 2.56E+00 | **4.17E+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 | 2.40E+00 | 1.11E-02 | 5.87E-01 | **2.99E+00** |
| Abiotic depletion (fossil fuels) | MJ, LHV | 3.46E+01 | 1.40E+00 | 2.17E+00 | **3.82E+01** |
| **Output flows and waste category indicators** | | | | | |
| Hazardous waste disposed | kg | 2.33E-02 | 3.25E-04 | 1.02E-02 | **3.38E-02** |
| Non-hazardous waste disposed | kg | 1.50E+00 | 1.29E-03 | 6.43E-02 | **1.57E+00** |
| High-level radioactive waste, conditioned, to final repository | kg | 9.19E-07 | 0 | 4.53E-06 | **5.45E-06** |
| Intermediate- and low-level radioactive waste, conditioned, to final repository | kg | 2.12E-06 | 7.08E-08 | 1.11E-05 | **1.33E-05** |
| Components for re-use | kg | 0 | 0 | 0 | **0** |
| Materials for recycling | kg | 0 | 0 | 0 | **0** |
| Materials for energy recovery | kg | 0 | 0 | 0 | **0** |
| Exported energy | MJ | 0 | 0 | 0 | **0** |
| **Carbon emissions and removals** | | | | | |
| Biogenic carbon removal from product | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Biogenic carbon emission from product | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Biogenic carbon removal from packaging | kg $CO_2$ | -1.39E-02 | 0 | -5.48E-01 | **-5.61E-01** |
| Biogenic carbon emission from packaging | kg $CO_2$ | 0 | 0 | 1.39E-02 | **1.39E-02** |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Calcination carbon emissions | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Carbonation carbon removals | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes | kg $CO_2$ | 0 | 0 | 0 | **0** |

### LCIA results, resource use, output and waste flows, and carbon emissions & removals per declared unit (1m2) of AIR-SHIELD™ THRU WALL FLASHING TAPE

| Parameter | Unit | A1 | A2 | A3 | Total |
|---|---|---|---|---|---|
| **LCIA results** | | | | | |
| GWP, IPCC$_{TOTAL}$ | kg $CO_2$ eq | 1.22E+00 | 1.05E-01 | 1.98E-01 | **1.52E+00** |
| GWP, IPCC$_{BIOGENIC}$ | kg $CO_2$ eq | -1.39E-02 | 0 | 1.39E-02 | **0** |
| GWP, IPCC$_{FOSSIL}$ | kg $CO_2$ eq | 1.23E+00 | 1.05E-01 | 1.84E-01 | **1.52E+00** |
| GWP, TRACI 2.1$_{TOTAL}$ | kg $CO_2$ eq | 1.19E+00 | 1.04E-01 | 2.04E-01 | **1.50E+00** |
| GWP, TRACI 2.1$_{BIOGENIC}$ | kg $CO_2$ eq | -1.39E-02 | 0 | 1.39E-02 | **0** |
| GWP, TRACI 2.1$_{FOSSIL}$ | kg $CO_2$ eq | 1.21E+00 | 1.04E-01 | 1.90E-01 | **1.50E+00** |
| Ozone depletion | kg CFC-11 eq | 3.39E-07 | 1.49E-09 | 7.59E-09 | **3.48E-07** |
| Acidification | kg $SO_2$ eq | 4.62E-03 | 2.56E-04 | 9.52E-04 | **5.83E-03** |
| Eutrophication | kg N eq | 8.34E-04 | 1.74E-05 | 3.31E-04 | **1.18E-03** |
| Smog | kg $O_3$ eq | 6.24E-02 | 6.58E-03 | 1.62E-02 | **8.52E-02** |
| Respiratory effects | kg PM2.5 eq | 7.35E-04 | 3.53E-05 | 1.78E-04 | **9.48E-04** |
| **Additional environmental information** | | | | | |
| Carcinogenics | CTUh | 71.69% | 1.02% | 27.29% | **100%** |
| Non-carcinogenics | CTUh | 44.79% | 8.36% | 46.86% | **100%** |
| Ecotoxicity | CTUe | 83.34% | 8.72% | 7.95% | **100%** |
| Fossil fuel depletion | MJ surplus | 4.54E+00 | 1.98E-01 | 2.22E-01 | **4.96E+00** |
| **Resource use indicators** | | | | | |
| Renewable primary energy used as energy carrier (fuel) | MJ, NCV | 7.50E+00 | 2.28E-03 | 5.82E+00 | **1.33E+01** |
| Renewable primary resources with energy content used as material | MJ, NCV | 4.48E+00 | 0 | 0 | **4.48E+00** |
| Total use of renewable primary resources with energy content | MJ, NCV | 1.20E+01 | 2.28E-03 | 5.82E+00 | **1.78E+01** |
| Non-renewable primary resources used as an energy carrier (fuel) | MJ, NCV | 1.22E+01 | 1.49E+00 | 2.56E+00 | **1.62E+01** |
| Non-renewable primary resources with energy content used as material | MJ, NCV | 2.55E+01 | 0 | 0 | **2.55E+01** |
| Total use of non-renewable primary resources with energy content | MJ, NCV | 3.77E+01 | 1.49E+00 | 2.56E+00 | **4.17E+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 | 2.40E+00 | 1.11E-02 | 5.87E-01 | **2.99E+00** |
| Abiotic depletion (fossil fuels) | MJ, LHV | 3.46E+01 | 1.40E+00 | 2.17E+00 | **3.82E+01** |
| **Output flows and waste category indicators** | | | | | |
| Hazardous waste disposed | kg | 2.33E-02 | 3.25E-04 | 1.02E-02 | **3.38E-02** |
| Non-hazardous waste disposed | kg | 1.50E+00 | 1.29E-03 | 6.43E-02 | **1.57E+00** |
| High-level radioactive waste, conditioned, to final repository | kg | 9.19E-07 | 0 | 4.53E-06 | **5.45E-06** |
| Intermediate- and low-level radioactive waste, conditioned, to final repository | kg | 2.12E-06 | 7.08E-08 | 1.11E-05 | **1.33E-05** |
| Components for re-use | kg | 0 | 0 | 0 | **0** |
| Materials for recycling | kg | 0 | 0 | 0 | **0** |
| Materials for energy recovery | kg | 0 | 0 | 0 | **0** |
| Exported energy | MJ | 0 | 0 | 0 | **0** |
| **Carbon emissions and removals** | | | | | |
| Biogenic carbon removal from product | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Biogenic carbon emission from product | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Biogenic carbon removal from packaging | kg $CO_2$ | -1.39E-02 | 0 | -5.48E-01 | **-5.61E-01** |
| Biogenic carbon emission from packaging | kg $CO_2$ | 0 | 0 | 1.39E-02 | **1.39E-02** |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Calcination carbon emissions | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Carbonation carbon removals | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes | kg $CO_2$ | 0 | 0 | 0 | **0** |

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

| Parameter | Unit | A1 | A2 | A3 | Total |
|---|---|---|---|---|---|
| **LCIA results** | | | | | |
| GWP, IPCC$_{TOTAL}$ | kg $CO_2$ eq | 1.97E+00 | 1.38E-01 | 2.52E-01 | **2.36E+00** |
| GWP, IPCC$_{BIOGENIC}$ | kg $CO_2$ eq | -1.80E-02 | 0 | 1.80E-02 | **0** |
| GWP, IPCC$_{FOSSIL}$ | kg $CO_2$ eq | 1.98E+00 | 1.38E-01 | 2.34E-01 | **2.36E+00** |
| GWP, TRACI 2.1$_{TOTAL}$ | kg $CO_2$ eq | 1.92E+00 | 1.37E-01 | 2.60E-01 | **2.32E+00** |
| GWP, TRACI 2.1$_{BIOGENIC}$ | kg $CO_2$ eq | -1.80E-02 | 0 | 1.80E-02 | **0** |
| GWP, TRACI 2.1$_{FOSSIL}$ | kg $CO_2$ eq | 1.94E+00 | 1.37E-01 | 2.42E-01 | **2.32E+00** |
| Ozone depletion | kg CFC-11 eq | 3.58E-07 | 1.97E-09 | 9.62E-09 | **3.69E-07** |
| Acidification | kg $SO_2$ eq | 7.58E-03 | 3.38E-04 | 1.21E-03 | **9.13E-03** |
| Eutrophication | kg N eq | 1.61E-03 | 2.30E-05 | 4.22E-04 | **2.06E-03** |
| Smog | kg $O_3$ eq | 1.00E-01 | 8.67E-03 | 2.07E-02 | **1.30E-01** |
| Respiratory effects | kg PM2.5 eq | 1.16E-03 | 4.65E-05 | 2.27E-04 | **1.44E-03** |
| **Additional environmental information** | | | | | |
| Carcinogenics | CTUh | 77.89% | 0.82% | 21.29% | **100%** |
| Non-carcinogenics | CTUh | 51.84% | 7.53% | 40.63% | **100%** |
| Ecotoxicity | CTUe | 87.85% | 6.41% | 5.75% | **100%** |
| Fossil fuel depletion | MJ surplus | 7.46E+00 | 2.61E-01 | 2.81E-01 | **8.00E+00** |
| **Resource use indicators** | | | | | |
| Renewable primary energy used as energy carrier (fuel) | MJ, NCV | 1.02E+01 | 3.01E-03 | 7.44E+00 | **1.76E+01** |
| Renewable primary resources with energy content used as material | MJ, NCV | 5.67E+00 | 0 | 0 | **5.67E+00** |
| Total use of renewable primary resources with energy content | MJ, NCV | 1.58E+01 | 3.01E-03 | 7.44E+00 | **2.33E+01** |
| Non-renewable primary resources used as an energy carrier (fuel) | MJ, NCV | 3.33E+01 | 1.96E+00 | 3.25E+00 | **3.86E+01** |
| Non-renewable primary resources with energy content used as material | MJ, NCV | 2.84E+01 | 0 | 0 | **2.84E+01** |
| Total use of non-renewable primary resources with energy content | MJ, NCV | 6.17E+01 | 1.96E+00 | 3.25E+00 | **6.69E+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 | 2.67E+00 | 1.14E-02 | 6.15E-01 | **3.30E+00** |
| Abiotic depletion (fossil fuels) | MJ, LHV | 5.68E+01 | 1.84E+00 | 2.76E+00 | **6.14E+01** |
| **Output flows and waste category indicators** | | | | | |
| Hazardous waste disposed | kg | 3.85E-02 | 4.29E-04 | 1.30E-02 | **5.19E-02** |
| Non-hazardous waste disposed | kg | 1.80E+00 | 1.70E-03 | 8.30E-02 | **1.88E+00** |
| High-level radioactive waste, conditioned, to final repository | kg | 1.41E-06 | 0 | 5.51E-06 | **6.92E-06** |
| Intermediate- and low-level radioactive waste, conditioned, to final repository | kg | 3.25E-06 | 9.33E-08 | 1.35E-05 | **1.68E-05** |
| Components for re-use | kg | 0 | 0 | 0 | **0** |
| Materials for recycling | kg | 0 | 0 | 0 | **0** |
| Materials for energy recovery | kg | 0 | 0 | 0 | **0** |
| Exported energy | MJ | 0 | 0 | 0 | **0** |
| **Carbon emissions and removals** | | | | | |
| Biogenic carbon removal from product | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Biogenic carbon emission from product | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Biogenic carbon removal from packaging | kg $CO_2$ | -1.80E-02 | 0 | -6.93E-01 | **-7.11E-01** |
| Biogenic carbon emission from packaging | kg $CO_2$ | 0 | 0 | 1.80E-02 | **1.80E-02** |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Calcination carbon emissions | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Carbonation carbon removals | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes | kg $CO_2$ | 0 | 0 | 0 | **0** |

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

| Parameter | Unit | A1 | A2 | A3 | Total |
|---|---|---|---|---|---|
| **LCIA results** | | | | | |
| GWP, $IPCC_{TOTAL}$ | kg $CO_2$ eq | 1.73E+00 | 1.13E-01 | 2.14E-01 | **2.05E+00** |
| GWP, $IPCC_{BIOGENIC}$ | kg $CO_2$ eq | -1.52E-02 | 0 | 1.52E-02 | **0** |
| GWP, $IPCC_{FOSSIL}$ | kg $CO_2$ eq | 1.74E+00 | 1.13E-01 | 1.99E-01 | **2.05E+00** |
| GWP, TRACI $2.1_{TOTAL}$ | kg $CO_2$ eq | 1.69E+00 | 1.11E-01 | 2.21E-01 | **2.02E+00** |
| GWP, TRACI $2.1_{BIOGENIC}$ | kg $CO_2$ eq | -1.52E-02 | 0 | 1.52E-02 | **0** |
| GWP, TRACI $2.1_{FOSSIL}$ | kg $CO_2$ eq | 1.70E+00 | 1.11E-01 | 2.06E-01 | **2.02E+00** |
| Ozone depletion | kg CFC-11 eq | 3.51E-07 | 1.60E-09 | 8.75E-09 | **3.62E-07** |
| Acidification | kg $SO_2$ eq | 6.56E-03 | 2.75E-04 | 1.02E-03 | **7.85E-03** |
| Eutrophication | kg N eq | 1.40E-03 | 1.87E-05 | 3.54E-04 | **1.77E-03** |
| Smog | kg $O_3$ eq | 8.63E-02 | 7.05E-03 | 1.73E-02 | **1.11E-01** |
| Respiratory effects | kg PM2.5 eq | 1.00E-03 | 3.78E-05 | 1.93E-04 | **1.23E-03** |
| **Additional environmental information** | | | | | |
| Carcinogenics | CTUh | 77.14% | 0.79% | 22.07% | **100%** |
| Non-carcinogenics | CTUh | 50.56% | 6.99% | 42.45% | **100%** |
| Ecotoxicity | CTUe | 88.27% | 5.94% | 5.79% | **100%** |
| Fossil fuel depletion | MJ surplus | 6.54E+00 | 2.12E-01 | 2.44E-01 | **6.99E+00** |
| **Resource use indicators** | | | | | |
| Renewable primary energy used as energy carrier (fuel) | MJ, NCV | 7.64E+00 | 2.24E-03 | 3.30E+01 | **4.06E+01** |
| Renewable primary resources with energy content used as material | MJ, NCV | 3.42E+00 | 0 | 0 | **3.42E+00** |
| Total use of renewable primary resources with energy content | MJ, NCV | 1.11E+01 | 2.24E-03 | 3.30E+01 | **4.41E+01** |
| Non-renewable primary resources used as an energy carrier (fuel) | MJ, NCV | 2.32E+01 | 1.42E+00 | 1.75E+01 | **4.22E+01** |
| Non-renewable primary resources with energy content used as material | MJ, NCV | 2.08E+01 | 0 | 0 | **2.08E+01** |
| Total use of non-renewable primary resources with energy content | MJ, NCV | 4.41E+01 | 1.42E+00 | 1.75E+01 | **6.30E+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 | 3.32E+00 | 1.21E-02 | 6.18E-01 | **3.95E+00** |
| Abiotic depletion (fossil fuels) | MJ, LHV | 7.32E-01 | 3.21E-03 | 2.29E-01 | **9.63E-01** |
| **Output flows and waste category indicators** | | | | | |
| Hazardous waste disposed | kg | 3.33E-02 | 3.49E-04 | 1.04E-02 | **4.40E-02** |
| Non-hazardous waste disposed | kg | 1.62E+00 | 1.38E-03 | 7.21E-02 | **1.69E+00** |
| High-level radioactive waste, conditioned, to final repository | kg | 1.21E-06 | 0 | 2.88E-06 | **4.10E-06** |
| Intermediate- and low-level radioactive waste, conditioned, to final repository | kg | 2.80E-06 | 7.59E-08 | 7.64E-06 | **1.05E-05** |
| Components for re-use | kg | 0 | 0 | 0 | **0** |
| Materials for recycling | kg | 0 | 0 | 0 | **0** |
| Materials for energy recovery | kg | 0 | 0 | 0 | **0** |
| Exported energy | MJ | 0 | 0 | 0 | **0** |
| **Carbon emissions and removals** | | | | | |
| Biogenic carbon removal from product | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Biogenic carbon emission from product | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Biogenic carbon removal from packaging | kg $CO_2$ | -1.52E-02 | 0 | -4.18E-01 | **-4.34E-01** |
| Biogenic carbon emission from packaging | kg $CO_2$ | 0 | 0 | 1.52E-02 | **1.52E-02** |
| Biogenic carbon emission from combustion of waste from renewable sources used in production processes | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Calcination carbon emissions | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Carbonation carbon removals | kg $CO_2$ | 0 | 0 | 0 | **0** |
| Carbon emissions from combustion of waste from non-renewable sources used in production processes | kg $CO_2$ | 0 | 0 | 0 | **0** |


**SM Transparency Report (EPD)™**

**EPD** LCA

**3rd-party reviewed** ✓

Transparency Report (EPD)

**3rd-party verified** ✓

Validity: 05/27/25 – 05/27/30
SM-WRM – 05272025 – 007

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

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Athena Sustainable Materials Institute

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

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

**Declared unit:** 1 $m^2$

**LCIA methodology:** TRACI 2.1

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

**Public LCA:**
LCA of W.R. MEADOWS 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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Contact us

# How we make it greener

AIR-SHIELD™

Expand all

## RAW MATERIALS ACQUISITION

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

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


## TRANSPORATION

**W. R. MEADOWS manufactures AIR-SHIELD, AIR-SHIELD THRU-WALL FLASHING, AIR-SHIELD LOW TEMP, and AIR-SHIELD XLT in the USA.** Sourcing materials domestically can be more sustainable and result in a lower carbon footprint for several reasons:

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

In short, domestic sourcing benefits the environment and helps create more resilient and eco-conscious supply chains!


## MANUFACTURING

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

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

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

## USE & END OF LIFE

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

## SM Transparency Report (EPD)™

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

Validity: 05/27/25 – 05/27/30
SM-WRM – 05272025 – 007

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