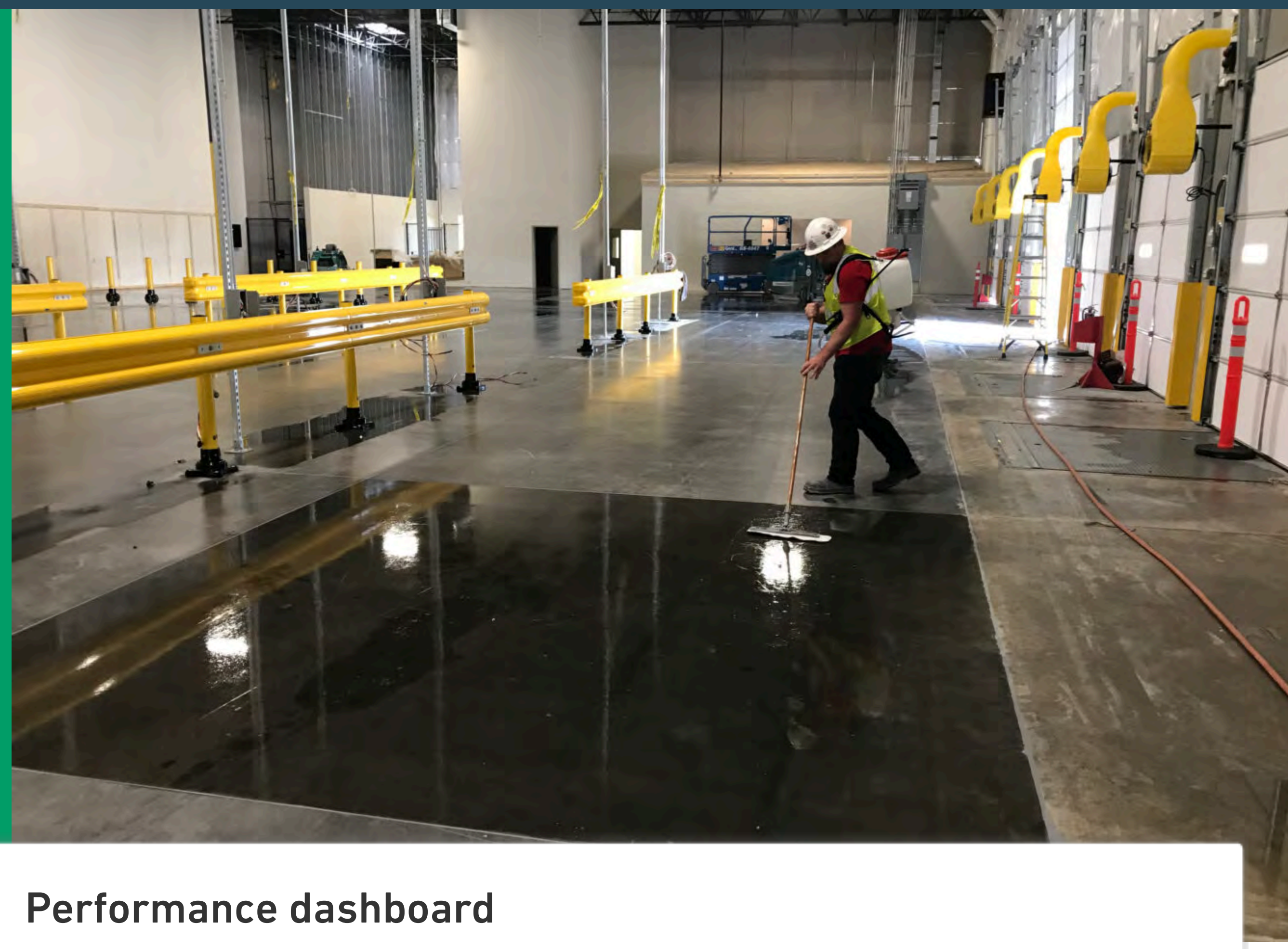
W. R. MEADOWS®

LIQUI-HARD®, LIQUI-HARD® ULTRA

LIQUI-HARD concrete densifier and chemical hardener compound is a proprietary, water-based, ready-to-use, clear silicate liquid, formulated with chemically reactive raw materials to harden and dustproof concrete.

LIQUI-HARD ULTRA molecular concrete densifier and chemical hardener is a waterborne, lithium-silicate-based, ready-to-use, colorless liquid, which hardens and dustproofs concrete at a molecular level.



Performance dashboard

Features & functionality

Penetrates deeply into concrete to densify and harden surfaces to deter water protection and other foreign matter

Dustproofs and improves chemical, petroleum, and abrasion resistance of treated surfaces

Provides a permanent, attractive sheen with the ability to polish

Provides tough, protected surface that won't after-yellow, discolor, or show pedestrian or vehicular traffic wear marks

Improves light reflectance

Ready to use from container and easy to apply

Visit W.R. MEADOWS for more product information:

LIQUI-HARD®
LIQUI-HARD® ULTRA

MasterFormat® 03 35 00
LIQUI-HARD Technical data sheet, Guide spec
LIQUI-HARD ULTRA Technical data sheet, Guide spec

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

Environment & materials

Improved by:

LIQUI-HARD Made in the United States and Canada

LIQUI-HARD ULTRA Made in the United States

LIQUI-HARD VOC Content: 0 g/L

LIQUI-HARD ULTRA VOC Content: 0g/L

Certifications, rating systems & disclosures:

Health Product Declaration

CDPH Standard Method v1.2, MAS Certified Green® Low-Emitting Materials

USGBC member

CAGBC member

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)™

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

Validity: 06/23/26 – 06/23/31
SM-WRM – 06232026 – 004

This environmental product declaration (EPD) was externally verified by Lindita Bushi, PhD, Senior Research Associate at Athena, according to ISO 21930:2017; NSF PCR for Architectural Coatings; and ISO 14025:2006.

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Athena Sustainable Materials Institute

SUMMARY

Reference PCR
NSF PCR for Architectural Coatings v2

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

Functional unit: 1 m^2

LCIA methodology: TRACI 2.1

LCA software; LCI database
SimaPro Analyst 10.2.0.2; ecoinvent v3.11, US-EI 2.2

Public LCA:
LCA of W. R. MEADOWS SIL-CRETE, TUFF-FLEX, MED-CURE, LIQUI-HARD, LIQUI-HARD ULTRA

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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EPD additional content

LIQUI-HARD®

Data

Background This product-specific plant-specific declaration was created by collecting production data from the facilities in Ft. Worth, TX; Goodyear, AZ; Hampshire, IL; Milton, Ontario, Canada; Pomona, CA; and Sherwood Park, Alberta, Canada.

Allocation

The allocation of electricity and natural gas consumption of each product was calculated based on the proportion of each product's annual production (by mass) relative to the plant's total production. This approach assigns manufacturing activities proportionally to each product type. Similarly, waste disposal outputs were allocated based on the ratio of total plant production to each product's production and then normalized to functional unit mass. There are no co-products produced during their manufacturing processes.

The model used in this report 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 emissions of inputs or outputs through allocation is occurring. The allocation procedures used in background data sets were accepted without modification.

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.

Major system boundary exclusions

- Personnel impacts and business travel
- Research and development activities
- Secondary packaging (pallets)
- Coating applicator
- Major capital equipment & point of sale infrastructure
- Maintenance and operation of support equipment
- Human labor and employee transport
- Manufacturing facility non-production water use

Major assumptions and limitations

- It is not recommended to mix or dilute with any other products or liquids, including colorants; only colorants that were added during the manufacturing stage were included in the scope of this study, and colorants added at the point of sale were excluded
- 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

Scenarios and additional technical information

Data quality assessment

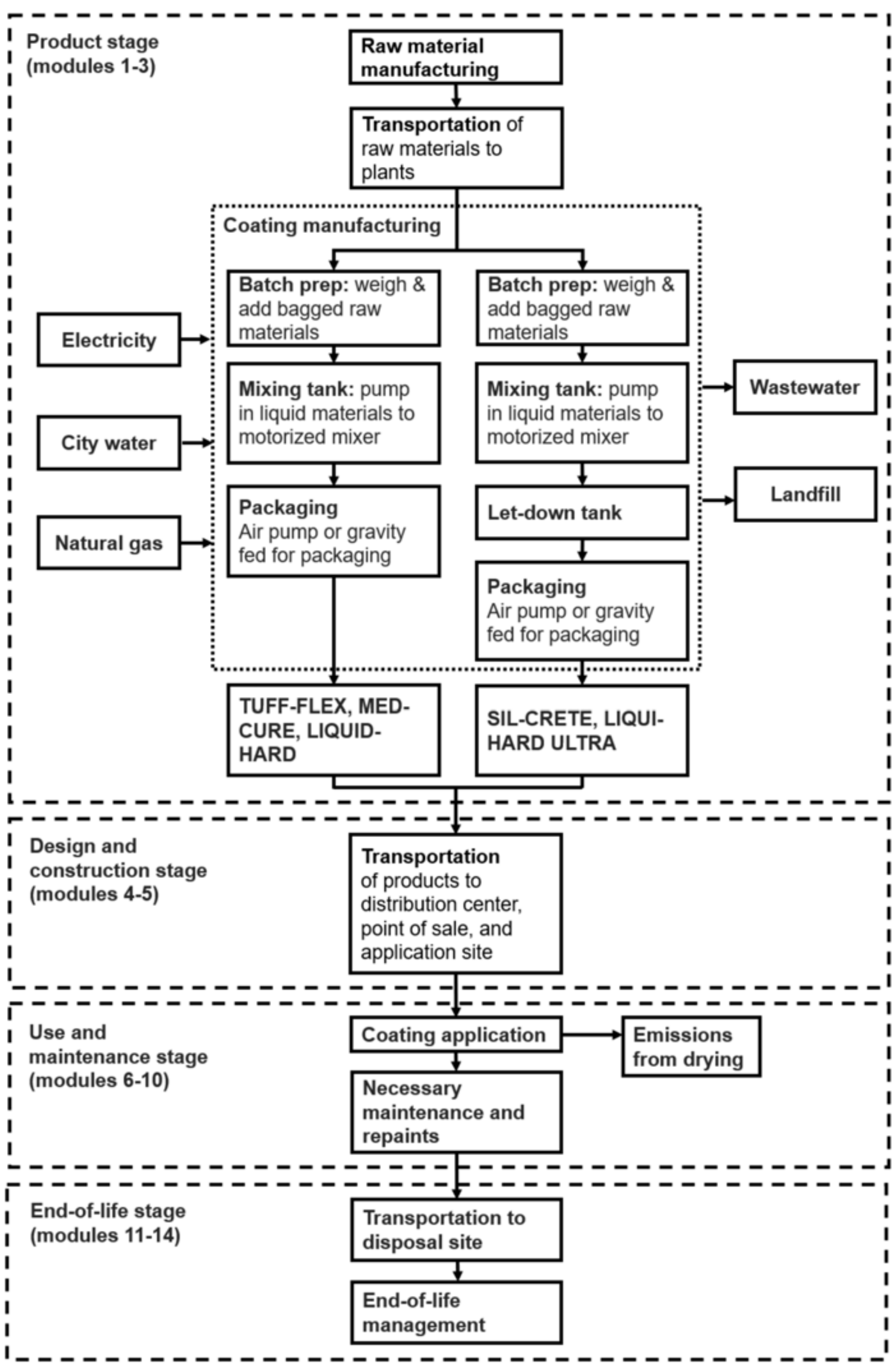
Precision: The precision of the data is considered high. Product engineers provided detailed bills of materials, and facility managers provided utility information for the manufacturing facilities. The raw material transportation distances were calculated based on the raw material manufacturers' addresses, extracted from the relevant SDSs. Proxy datasets were utilized in the LCA model when secondary data were not available.

Completeness: 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.

Consistency: The consistency of the model is considered high. The bills of materials provided by the product engineers were developed for multiple internal departments use and are maintained regularly.

The LCA practitioner also cross-referenced the installation documents and other relevant information to ensure consistency. Furthermore, modeling assumptions were consistent across the model, with preference given towards SimaPro data, where available.

Flow diagram



LIQUI-HARD: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit (Fort worth, TX)

Impact category	Unit	1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2
Total global warming potential, GWPfossil	kg CO2 eq	1.17E-01	3.43E-04	2.42E-02	3.37E-02	1.85E-02	1.70E-02	1.21E-02	0	1.89E+00	1.23E-02	2.45E-03
Ozone depletion	kg CFC-11 eq	1.70E-09	6.83E-11	2.91E-10	6.71E-09	3.69E-09	3.95E-10	1.74E-10	0	1.11E-07	2.00E-10	3.82E-11
Acidification	kg SO2 eq	5.36E-04	1.07E-06	8.25E-05	1.05E-04	5.76E-05	1.94E-05	5.50E-05	0	7.28E-03	5.85E-05	2.03E-05
Eutrophication	kg N eq	4.62E-05	1.44E-07	1.63E-05	1.42E-05	7.77E-06	1.34E-06	4.78E-06	0	7.71E-04	3.67E-06	1.27E-06
Smog	kg O3 eq	6.39E-03	2.82E-05	1.19E-03	2.77E-03	1.52E-03	2.25E-04	6.82E-04	0	1.09E-01	1.81E-03	6.39E-04
Respiratory effects	kg PM2.5 eq	6.80E-05	6.71E-08	2.65E-05	6.59E-06	3.62E-06	2.73E-06	6.98E-06	0	9.73E-04	7.36E-06	2.80E-06
Additional environmental information (optional)												
Carcinogenics	CTUh	2.01%	0.00%	8.06%	0.12%	0.07%	0.06%	0.20%	0%	89.45%	0.02%	0.01%
Non carcinogenics	CTUh	4.66%	0.01%	3.30%	1.01%	0.56%	0.47%	0.47%	0%	89.07%	0.43%	0.03%
Ecotoxicity	CTUe	3.75%	0.02%	2.35%	1.88%	1.03%	1.09%	0.38%	0%	89.32%	0.15%	0.02%
Fossil fuel depletion	MJ surplus	1.89E-01	6.55E-04	2.75E-02	6.44E-02	3.53E-02	3.00E-02	1.94E-02	0	3.12E+00	2.26E-02	4.34E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	5.85E-02	8.02E-06	2.39E-02	7.88E-04	4.33E-04	6.22E-04	6.74E-03	0	8.49E-01	2.94E-04	1.47E-04
Renewable primary resources with energy content used as material	MJ, NCV	8.77E-03	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary resources with energy content	MJ, NCV	6.73E-02	8.02E-06	2.39E-02	7.88E-04	4.33E-04	6.22E-04	6.74E-03	0	8.49E-01	2.94E-04	1.47E-04
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.76E+00	4.87E-03	3.52E-01	4.78E-01	2.63E-01	2.24E-01	1.82E-01	0	2.80E+01	1.68E-01	3.32E-02
Non-renewable primary resources with energy content used as material	MJ, NCV	2.80E-02	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary resources with energy content	MJ, NCV	1.79E+00	4.87E-03	3.52E-01	4.78E-01	2.63E-01	2.24E-01	1.82E-01	0	2.80E+01	1.68E-01	3.32E-02
Abiotic depletion (fossil fuels)	MJ, LHV	1.63E+00	4.56E-03	3.12E-01	4.48E-01	2.46E-01	2.10E-01	1.66E-01	0	2.56E+01	1.58E-01	3.11E-02
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0
Renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Non-renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Recovered energy	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Use of net freshwater resources	m3	1.08E-01	2.03E-05	3.87E-02	1.99E-03	1.12E-03	1.59E-03	1.22E-02	0	0	3.91E-05	2.93E-04
Output flows and waste category indicators												
Hazardous waste disposed	kg	2.33E+00	0	6.37E+00	0	0	2.08E-02	2.33E-01	0	7.61E+01	6.69E-03	5.37E-03
Non-hazardous waste disposed	kg	1.21E-01	0	9.41E-02	0	0	2.28E-04	1.33E-02	0	1.94E+00	1.37E-04	3.18E-05
High-level radioactive waste, conditioned, to final repository	kg	1.38E-07	7.90E-11	7.39E-08	7.76E-09	4.26E-09	2.73E-09	1.38E-08	0	2.04E-06	2.04E-09	5.40E-10
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	3.41E-07	1.76E-10	1.62E-07	1.73E-08	9.50E-09	8.61E-09	3.42E-08	0	4.86E-06	4.38E-09	1.23E-09
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy	MJ	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbonation Carbon Removals	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0

LIQUI-HARD: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit (Goodyear, AZ)

Impact category	Unit	1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2
Total global warming potential, GWPfossil	kg CO_2 eq	1.17E-01	5.00E-03	2.48E-02	1.15E-02	1.85E-02	1.70E-02	1.41E-02	0	1.77E+00	1.23E-02	2.45E-03
Ozone depletion	kg CFC-11 eq	1.70E-09	9.96E-10	8.28E-10	2.29E-09	3.69E-09	3.95E-10	1.86E-10	0	8.57E-08	2.00E-10	3.82E-11
Acidification	kg SO_2 eq	5.36E-04	1.56E-05	6.60E-05	3.58E-05	5.76E-05	1.94E-05	5.94E-05	0	6.72E-03	5.85E-05	2.03E-05
Eutrophication	kg N eq	4.62E-05	2.10E-06	7.00E-06	4.83E-06	7.77E-06	1.34E-06	5.60E-06	0	6.36E-04	3.67E-06	1.27E-06
Smog	kg O_3 eq	6.39E-03	4.11E-04	9.18E-04	9.45E-04	1.52E-03	2.25E-04	7.38E-04	0	9.47E-02	1.81E-03	6.39E-04
Respiratory effects	kg PM2.5 eq	6.80E-05	9.78E-07	1.03E-05	2.25E-06	3.62E-06	2.73E-06	8.34E-06	0	8.18E-04	7.36E-06	2.80E-06
Additional environmental information (optional)												
Carcinogenics	CTUh	7.81%	0.07%	1.07%	0.16%	0.26%	0.23%	0.91%	0%	89.37%	0.09%	0.03%
Non carcinogenics	CTUh	6.78%	0.22%	0.70%	0.50%	0.81%	0.68%	0.77%	0%	88.88%	0.62%	0.04%
Ecotoxicity	CTUe	5.05%	0.37%	0.75%	0.86%	1.39%	1.47%	0.60%	0%	89.26%	0.20%	0.03%
Fossil fuel depletion	MJ surplus	1.89E-01	9.55E-03	8.81E-02	2.20E-02	3.53E-02	3.00E-02	2.01E-02	0	3.35E+00	2.26E-02	4.34E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	5.85E-02	1.17E-04	9.47E-03	2.69E-04	4.33E-04	6.22E-04	8.08E-03	0	7.34E-01	2.94E-04	1.47E-04
Renewable primary resources with energy content used as material	MJ, NCV	8.77E-03	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary resources with energy content	MJ, NCV	6.73E-02	1.17E-04	9.47E-03	2.69E-04	4.33E-04	6.22E-04	8.08E-03	0	7.34E-01	2.94E-04	1.47E-04
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.76E+00	7.10E-02	7.20E-01	1.63E-01	2.63E-01	2.24E-01	1.95E-01	0	2.91E+01	1.68E-01	3.32E-02
Non-renewable primary resources with energy content used as material	MJ, NCV	2.80E-02	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary resources with energy content	MJ, NCV	1.79E+00	7.10E-02	7.20E-01	1.63E-01	2.63E-01	2.24E-01	1.95E-01	0	2.91E+01	1.68E-01	3.32E-02
Abiotic depletion (fossil fuels)	MJ, LHV	1.63E+00	6.64E-02	6.56E-01	1.53E-01	2.46E-01	2.10E-01	1.76E-01	0	2.67E+01	1.58E-01	3.11E-02
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0
Renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Non-renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Recovered energy	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Use of net freshwater resources	m3	1.51E-01	2.96E-04	4.93E-02	6.81E-04	1.09E-03	1.85E-03	2.63E-02	0	0	3.91E-05	3.64E-04
Output flows and waste category indicators												
Hazardous waste disposed	kg	2.33E+00	0	4.36E-01	0	0	2.08E-02	2.94E-01	0	2.62E+01	6.69E-03	5.37E-03
Non-hazardous waste disposed	kg	1.21E-01	0	1.03E-01	0	0	2.28E-04	4.02E-02	0	2.25E+00	1.37E-04	3.18E-05
High-level radioactive waste, conditioned, to final repository	kg	1.38E-07	1.15E-09	5.43E-08	2.65E-09	4.26E-09	2.73E-09	2.07E-08	0	1.90E-06	2.04E-09	5.40E-10
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	3.41E-07	2.57E-09	1.40E-07	5.90E-09	9.50E-09	8.61E-09	5.02E-08	0	4.74E-06	4.38E-09	1.23E-09
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy	MJ	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Carbonation Carbon Removals	kg CO_2	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0

LIQUI-HARD: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit (Hampshire, IL)

Impact category	Unit	1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2
Total global warming potential, GWPfossil	kg CO_2 eq	1.17E-01	1.82E-04	6.56E-02	9.53E-03	1.85E-02	1.70E-02	1.42E-02	0	2.06E+00	1.23E-02	2.45E-03
Ozone depletion	kg CFC-11 eq	1.70E-09	3.63E-11	1.79E-09	1.90E-09	3.69E-09	3.95E-10	1.89E-10	0	8.25E-08	2.00E-10	3.82E-11
Acidification	kg SO_2 eq	5.36E-04	5.67E-07	1.91E-04	2.97E-05	5.76E-05	1.94E-05	6.04E-05	0	7.60E-03	5.85E-05	2.03E-05
Eutrophication	kg N eq	4.62E-05	7.64E-08	2.70E-05	4.00E-06	7.77E-06	1.34E-06	5.65E-06	0	7.82E-04	3.67E-06	1.27E-06
Smog	kg O_3 eq	6.39E-03	1.50E-05	3.05E-03	7.83E-04	1.52E-03	2.25E-04	7.68E-04	0	1.08E-01	1.81E-03	6.39E-04
Respiratory effects	kg PM2.5 eq	6.80E-05	3.56E-08	3.93E-05	1.86E-06	3.62E-06	2.73E-06	8.46E-06	0	1.05E-03	7.36E-06	2.80E-06
Additional environmental information (optional)												
Carcinogenics	CTUh	1.76%	0.00%	8.42%	0.03%	0.06%	0.05%	0.21%	0%	89.45%	0.02%	0.01%
Non carcinogenics	CTUh	4.51%	0.01%	4.18%	0.28%	0.54%	0.45%	0.51%	0%	89.08%	0.41%	0.03%
Ecotoxicity	CTUe	3.93%	0.01%	3.31%	0.56%	1.08%	1.15%	0.47%	0%	89.31%	0.16%	0.02%
Fossil fuel depletion	MJ surplus	1.89E-01	3.48E-04	1.43E-01	1.82E-02	3.53E-02	3.00E-02	2.04E-02	0	3.71E+00	2.26E-02	4.34E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	5.85E-02	4.26E-06	3.30E-02	2.23E-04	4.33E-04	6.22E-04	8.08E-03	0	9.32E-01	2.94E-04	1.47E-04
Renewable primary resources with energy content used as material	MJ, NCV	8.77E-03	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary resources with energy content	MJ, NCV	6.73E-02	4.26E-06	3.30E-02	2.23E-04	4.33E-04	6.22E-04	8.08E-03	0	9.32E-01	2.94E-04	1.47E-04
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.76E+00	2.58E-03	1.35E+00	1.35E-01	2.63E-01	2.24E-01	1.97E-01	0	3.37E+01	1.68E-01	3.32E-02
Non-renewable primary resources with energy content used as material	MJ, NCV	2.80E-02	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary resources with energy content	MJ, NCV	1.79E+00	2.58E-03	1.35E+00	1.35E-01	2.63E-01	2.24E-01	1.97E-01	0	3.37E+01	1.68E-01	3.32E-02
Abiotic depletion (fossil fuels)	MJ, LHV	1.63E+00	2.42E-03	1.18E+00	1.27E-01	2.46E-01	2.10E-01	1.79E-01	0	3.04E+01	1.58E-01	3.11E-02
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0
Renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Non-renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Recovered energy	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Use of net freshwater resources	m3	1.08E-01	1.08E-05	7.77E-02	5.64E-04	1.08E-03	1.59E-03	1.91E-02	0	0	3.91E-05	2.93E-04
Output flows and waste category indicators												
Hazardous waste disposed	kg	2.33E+00	0	7.64E+00	0	0	2.08E-02	2.94E-01	0	8.74E+01	6.69E-03	5.37E-03
Non-hazardous waste disposed	kg	1.21E-01	0	1.62E-01	0	0	2.28E-04	4.00E-02	0	2.74E+00	1.37E-04	3.18E-05
High-level radioactive waste, conditioned, to final repository	kg	1.38E-07	4.19E-11	2.68E-07	2.19E-09	4.26E-09	2.73E-09	2.07E-08	0	3.70E-06	2.04E-09	5.40E-10
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	3.41E-07	9.34E-11	6.09E-07	4.89E-09	9.50E-09	8.61E-09	5.03E-08	0	8.69E-06	4.38E-09	1.23E-09
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy	MJ	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging	kg CO_2	-4.00E-04	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Packaging	kg CO_2	0	0	4.00E-04	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions	kg CO_2	0	0	0	0	0	0	0	0	0	0	0
Carbonation Carbon Removals	kg CO_2	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0

LIQUI-HARD: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit (Milton, Ontario, Canada)

Impact category	Unit	1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2
Total global warming potential, GWPfossil	kg CO2 eq	1.17E-01	3.25E-04	2.17E-02	4.63E-03	5.80E-03	1.02E-02	1.34E-02	0	1.58E+00	1.23E-02	2.45E-03
Ozone depletion	kg CFC-11 eq	1.70E-09	6.47E-11	4.62E-10	9.22E-10	1.16E-09	2.37E-10	1.86E-10	0	6.17E-08	2.00E-10	3.82E-11
Acidification	kg SO2 eq	5.36E-04	1.01E-06	6.82E-05	1.44E-05	1.81E-05	1.16E-05	5.94E-05	0	6.36E-03	5.85E-05	2.03E-05
Eutrophication	kg N eq	4.62E-05	1.37E-07	1.17E-05	1.94E-06	2.44E-06	8.02E-07	5.36E-06	0	6.28E-04	3.67E-06	1.27E-06
Smog	kg O3 eq	6.39E-03	2.67E-05	9.84E-04	3.80E-04	4.76E-04	1.35E-04	7.39E-04	0	8.65E-02	1.81E-03	6.39E-04
Respiratory effects	kg PM2.5 eq	6.80E-05	6.36E-08	1.86E-05	9.06E-07	1.13E-06	1.64E-06	8.34E-06	0	8.60E-04	7.36E-06	2.80E-06
Additional environmental information (optional)												
Carcinogenics	CTUh	2.94%	0.00%	7.07%	0.02%	0.03%	0.05%	0.34%	0%	89.49%	0.03%	0.01%
Non carcinogenics	CTUh	5.94%	0.01%	2.65%	0.18%	0.22%	0.36%	0.67%	0%	89.39%	0.54%	0.04%
Ecotoxicity	CTUe	5.17%	0.02%	2.15%	0.36%	0.45%	0.90%	0.58%	0%	90.13%	0.21%	0.03%
Fossil fuel depletion	MJ surplus	1.89E-01	6.21E-04	4.82E-02	8.84E-03	1.11E-02	1.80E-02	2.01E-02	0	2.72E+00	2.26E-02	4.34E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	5.85E-02	7.60E-06	1.47E-02	1.08E-04	1.36E-04	3.73E-04	8.08E-03	0	7.74E-01	2.94E-04	1.47E-04
Renewable primary resources with energy content used as material	MJ, NCV	8.77E-03	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary resources with energy content	MJ, NCV	6.73E-02	7.60E-06	1.47E-02	1.08E-04	1.36E-04	3.73E-04	8.08E-03	0	7.74E-01	2.94E-04	1.47E-04
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.76E+00	4.61E-03	4.61E-01	6.57E-02	8.23E-02	1.35E-01	1.95E-01	0	2.48E+01	1.68E-01	3.32E-02
Non-renewable primary resources with energy content used as material	MJ, NCV	2.80E-02	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary resources with energy content	MJ, NCV	1.79E+00	4.61E-03	4.61E-01	6.57E-02	8.23E-02	1.35E-01	1.95E-01	0	2.48E+01	1.68E-01	3.32E-02
Abiotic depletion (fossil fuels)	MJ, LHV	1.63E+00	4.32E-03	4.17E-01	6.15E-02	7.70E-02	1.26E-01	1.76E-01	0	2.26E+01	1.58E-01	3.11E-02
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0
Renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Non-renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Recovered energy	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Use of net freshwater resources	m3	1.08E-01	1.92E-05	3.49E-02	2.74E-04	3.42E-04	9.54E-04	1.91E-02	0	0	3.91E-05	2.93E-04
Output flows and waste category indicators												
Hazardous waste disposed	kg	2.33E+00	0	3.88E+00	0	0	1.25E-02	2.94E-01	0	5.54E+01	6.69E-03	5.37E-03
Non-hazardous waste disposed	kg	1.21E-01	0	8.00E-02	0	0	1.37E-04	3.60E-02	0	2.01E+00	1.37E-04	3.18E-05
High-level radioactive waste, conditioned, to final repository	kg	1.38E-07	7.48E-11	5.53E-08	1.07E-09	1.34E-09	1.64E-09	2.07E-08	0	1.88E-06	2.04E-09	5.40E-10
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	3.41E-07	1.67E-10	1.28E-07	2.38E-09	2.98E-09	5.16E-09	5.02E-08	0	4.56E-06	4.38E-09	1.23E-09
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy	MJ	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbonation Carbon Removals	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0

LIQUI-HARD: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit (Pomona, CA)

Impact category	Unit	1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2
Total global warming potential, GWPfossil	kg CO2 eq	1.17E-01	1.19E-03	2.25E-02	7.90E-01	1.85E-02	1.70E-02	1.30E-02	0	8.32E+00	1.23E-02	2.45E-03
Ozone depletion	kg CFC-11 eq	1.70E-09	2.37E-10	7.78E-10	1.31E-08	3.69E-09	3.95E-10	1.77E-10	0	1.70E-07	2.00E-10	3.82E-11
Acidification	kg SO2 eq	5.36E-04	3.71E-06	6.16E-05	2.80E-03	5.76E-05	1.94E-05	5.56E-05	0	3.00E-02	5.85E-05	2.03E-05
Eutrophication	kg N eq	4.62E-05	5.00E-07	5.80E-06	1.74E-04	7.77E-06	1.34E-06	5.20E-06	0	2.04E-03	3.67E-06	1.27E-06
Smog	kg O3 eq	6.39E-03	9.78E-05	8.12E-04	8.01E-02	1.52E-03	2.25E-04	6.81E-04	0	7.63E-01	1.81E-03	6.39E-04
Respiratory effects	kg PM2.5 eq	6.80E-05	2.33E-07	8.92E-06	1.30E-04	3.62E-06	2.73E-06	7.05E-06	0	1.88E-03	7.36E-06	2.80E-06
Additional environmental information (optional)												
Carcinogenics	CTUh	4.35%	0.01%	0.55%	4.88%	0.14%	0.13%	0.46%	0%	89.42%	0.05%	0.02%
Non carcinogenics	CTUh	0.73%	0.01%	0.07%	9.47%	0.09%	0.07%	0.08%	0%	89.41%	0.07%	0.00%
Ecotoxicity	CTUe	2.33%	0.04%	0.26%	6.31%	0.64%	0.68%	0.26%	0%	89.38%	0.09%	0.01%
Fossil fuel depletion	MJ surplus	1.89E-01	2.27E-03	7.72E-02	1.49E+00	3.53E-02	3.00E-02	1.94E-02	0	1.57E+01	2.26E-02	4.34E-03

Resource use indicators												
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	5.85E-02	2.78E-05	3.14E-02	1.86E-02	4.33E-04	6.22E-04	7.58E-03	0	1.07E+00	2.94E-04	1.47E-04
Renewable primary resources with energy content used as material	MJ, NCV	8.77E-03	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary resources with energy content	MJ, NCV	6.73E-02	2.78E-05	3.14E-02	1.86E-02	4.33E-04	6.22E-04	7.58E-03	0	1.07E+00	2.94E-04	1.47E-04
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.76E+00	1.69E-02	6.45E-01	1.11E+01	2.63E-01	2.24E-01	1.85E-01	0	1.21E+02	1.68E-01	3.32E-02
Non-renewable primary resources with energy content used as material	MJ, NCV	2.80E-02	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary resources with energy content	MJ, NCV	1.79E+00	1.69E-02	6.45E-01	1.11E+01	2.63E-01	2.24E-01	1.85E-01	0	1.21E+02	1.68E-01	3.32E-02
Abiotic depletion (fossil fuels)	MJ, LHV	1.63E+00	1.58E-02	5.72E-01	1.04E+01	2.46E-01	2.10E-01	1.67E-01	0	1.12E+02	1.58E-01	3.11E-02
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0
Renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Non-renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Recovered energy	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Use of net freshwater resources	m3	1.51E-01	7.04E-05	1.09E-01	7.59E-02	3.62E-03	1.85E-03	2.04E-02	0	0	3.91E-05	3.64E-04
Output flows and waste category indicators												
Hazardous waste disposed	kg	2.33E+00	0	3.49E-01	4.18E-01	0	2.08E-02	2.40E-01	0	2.85E+01	6.69E-03	5.37E-03
Non-hazardous waste disposed	kg	1.21E-01	0	7.91E-02	6.64E-03	0	2.28E-04	2.73E-02	0	1.99E+00	1.37E-04	3.18E-05
High-level radioactive waste, conditioned, to final repository	kg	1.38E-07	2.74E-10	9.12E-08	1.31E-07	4.26E-09	2.73E-09	2.00E-08	0	3.29E-06	2.04E-09	5.40E-10
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	3.41E-07	6.11E-10	2.18E-07	2.82E-07	9.50E-09	8.61E-09	5.55E-08	0	7.78E-06	4.38E-09	1.23E-09
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy	MJ	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbonation Carbon Removals	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0

Resource use indicators												
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	5.85E-02	2.78E-05	3.14E-02	1.86E-02	4.33E-04	6.22E-04	7.58E-03	0	1.07E+00	2.94E-04	1.47E-04
Renewable primary resources with energy content used as material	MJ, NCV	8.77E-03	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary resources with energy content	MJ, NCV	6.73E-02	2.78E-05	3.14E-02	1.86E-02	4.33E-04	6.22E-04	7.58E-03	0	1.07E+00	2.94E-04	1.47E-04
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.76E+00	1.69E-02	6.45E-01	1.11E+01	2.63E-01	2.24E-01	1.85E-01	0	1.21E+02	1.68E-01	3.32E-02
Non-renewable primary resources with energy content used as material	MJ, NCV	2.80E-02	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary resources with energy content	MJ, NCV	1.79E+00	1.69E-02	6.45E-01	1.11E+01	2.63E-01	2.24E-01	1.85E-01	0	1.21E+02	1.68E-01	3.32E-02
Abiotic depletion (fossil fuels)	MJ, LHV	1.63E+00	1.58E-02	5.72E-01	1.04E+01	2.46E-01	2.10E-01	1.67E-01	0	1.12E+02	1.58E-01	3.11E-02
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0
Renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Non-renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Recovered energy	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Use of net freshwater resources	m3	1.51E-01	7.04E-05	1.09E-01	7.59E-02	3.62E-03	1.85E-03	2.04E-02	0	0	3.91E-05	3.64E-04
Output flows and waste category indicators												
Hazardous waste disposed	kg	2.33E+00	0	3.49E-01	4.18E-01	0	2.08E-02	2.40E-01	0	2.85E+01	6.69E-03	5.37E-03
Non-hazardous waste disposed	kg	1.21E-01	0	7.91E-02	6.64E-03	0	2.28E-04	2.73E-02	0	1.99E+00	1.37E-04	3.18E-05
High-level radioactive waste, conditioned, to final repository	kg	1.38E-07	2.74E-10	9.12E-08	1.31E-07	4.26E-09	2.73E-09	2.00E-08	0	3.29E-06	2.04E-09	5.40E-10
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	3.41E-07	6.11E-10	2.18E-07	2.82E-07	9.50E-09	8.61E-09	5.55E-08	0	7.78E-06	4.38E-09	1.23E-09
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy	MJ	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbonation Carbon Removals	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0

LIQUI-HARD: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit (Sherwood, Alberta, Canada)

Impact category	Unit	1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2
Total global warming potential, GWPfossil	kg CO2 eq	1.17E-01	1.05E-03	2.79E-01	4.55E-03	1.85E-02	1.70E-02	1.33E-02	0	3.83E+00	1.23E-02	2.45E-03
Ozone depletion	kg CFC-11 eq	1.70E-09	2.09E-10	1.50E-09	9.07E-10	3.69E-09	3.95E-10	1.86E-10	0	7.29E-08	2.00E-10	3.82E-11
Acidification	kg SO2 eq	5.36E-04	3.27E-06	4.11E-04	1.42E-05	5.76E-05	1.94E-05	5.94E-05	0	9.36E-03	5.85E-05	2.03E-05
Eutrophication	kg N eq	4.62E-05	4.41E-07	5.93E-05	1.91E-06	7.77E-06	1.34E-06	5.32E-06	0	1.04E-03	3.67E-06	1.27E-06
Smog	kg O3 eq	6.39E-03	8.63E-05	5.01E-03	3.74E-04	1.52E-03	2.25E-04	7.37E-04	0	1.22E-01	1.81E-03	6.39E-04
Respiratory effects	kg PM2.5 eq	6.80E-05	2.05E-07	3.95E-05	8.91E-07	3.62E-06	2.73E-06	8.33E-06	0	1.05E-03	7.36E-06	2.80E-06
Additional environmental information (optional)												
Carcinogenics	CTUh	2.44%	0.00%	7.63%	0.02%	0.08%	0.07%	0.28%	0%	89.44%	0.03%	0.01%
Non carcinogenics	CTUh	4.62%	0.03%	4.16%	0.14%	0.55%	0.47%	0.52%	0%	89.07%	0.42%	0.03%
Ecotoxicity	CTUe	4.42%	0.07%	2.72%	0.30%	1.21%	1.29%	0.49%	0%	89.29%	0.18%	0.03%
Fossil fuel depletion	MJ surplus	1.89E-01	2.01E-03	5.09E-01	8.70E-03	3.53E-02	3.00E-02	2.01E-02	0	6.75E+00	2.26E-02	4.34E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	5.85E-02	2.46E-05	5.33E-01	1.06E-04	4.33E-04	6.22E-04	8.08E-03	0	5.18E+00	2.94E-04	1.47E-04
Renewable primary resources with energy content used as material	MJ, NCV	8.77E-03	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary resources with energy content	MJ, NCV	6.73E-02	2.46E-05	5.33E-01	1.06E-04	4.33E-04	6.22E-04	8.08E-03	0	5.18E+00	2.94E-04	1.47E-04
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	1.76E+00	1.49E-02	4.04E+00	6.46E-02	2.63E-01	2.24E-01	1.95E-01	0	5.60E+01	1.68E-01	3.32E-02
Non-renewable primary resources with energy content used as material	MJ, NCV	2.80E-02	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary resources with energy content	MJ, NCV	1.79E+00	1.49E-02	4.04E+00	6.46E-02	2.63E-01	2.24E-01	1.95E-01	0	5.60E+01	1.68E-01	3.32E-02
Abiotic depletion (fossil fuels)	MJ, LHV	1.63E+00	1.39E-02	3.64E+00	6.05E-02	2.46E-01	2.10E-01	1.76E-01	0	5.08E+01	1.58E-01	3.11E-02
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0
Renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Non-renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Recovered energy	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Use of net freshwater resources	m3	1.08E-01	2.30E-06	2.96E-02	9.98E-06	2.13E-05	1.59E-03	1.91E-02	0	0	3.91E-05	2.93E-04
Output flows and waste category indicators												
Hazardous waste disposed	kg	2.33E+00	0	3.83E+00	0	0	2.08E-02	2.94E-01	0	5.50E+01	6.69E-03	5.37E-03
Non-hazardous waste disposed	kg	1.21E-01	0	6.74E-02	0	0	2.28E-04	3.54E-02	0	1.90E+00	1.37E-04	3.18E-05
High-level radioactive waste, conditioned, to final repository	kg	1.38E-07	2.42E-10	6.66E-08	1.05E-09	4.26E-09	2.73E-09	2.07E-08	0	1.98E-06	2.04E-09	5.40E-10
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	3.41E-07	5.39E-10	1.51E-07	2.34E-09	9.50E-09	8.61E-09	5.02E-08	0	4.79E-06	4.38E-09	1.23E-09
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy	MJ	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbonation Carbon Removals	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0

LIQUI-HARD ULTRA: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Impact category	Unit	1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2
Total global warming potential, GWPfossil	kg CO2 eq	3.71E-02	1.60E-03	1.58E-02	2.62E-03	5.00E-03	1.68E-02	1.31E-02	0	6.90E-01	6.87E-03	2.45E-03
Ozone depletion	kg CFC-11 eq	7.28E-10	3.19E-10	2.44E-10	5.22E-10	9.96E-10	3.90E-10	1.84E-10	0	2.54E-08	1.12E-10	3.82E-11
Acidification	kg SO2 eq	2.31E-04	4.98E-06	4.88E-05	8.17E-06	1.56E-05	1.91E-05	5.88E-05	0	2.90E-03	3.28E-05	2.03E-05
Eutrophication	kg N eq	2.40E-04	6.72E-07	8.43E-06	1.10E-06	2.10E-06	1.32E-06	5.23E-06	0	1.94E-03	2.05E-06	1.27E-06
Smog	kg O3 eq	2.74E-03	1.31E-04	6.92E-04	2.15E-04	4.11E-04	2.22E-04	7.18E-04	0	3.84E-02	1.01E-03	6.39E-04
Respiratory effects	kg PM2.5 eq	4.03E-05	3.13E-07	1.38E-05	5.13E-07	9.78E-07	2.70E-06	8.25E-06	0	5.01E-04	4.12E-06	2.80E-06
Additional environmental information (optional)												
Carcinogenics	CTUh	4.16%	0.01%	6.87%	0.02%	0.04%	0.13%	0.53%	0%	88.20%	0.03%	0.02%
Non carcinogenics	CTUh	7.12%	0.09%	2.29%	0.14%	0.27%	0.85%	0.95%	0%	87.81%	0.44%	0.05%
Ecotoxicity	CTUe	4.18%	0.22%	2.54%	0.36%	0.70%	2.70%	1.03%	0%	88.00%	0.21%	0.06%
Fossil fuel depletion	MJ surplus	4.94E-02	3.06E-03	2.26E-02	5.01E-03	9.55E-03	2.96E-02	1.99E-02	0	1.04E+00	1.27E-02	4.34E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel)	MJ, NCV	3.29E-02	3.74E-05	2.07E-02	6.13E-05	1.17E-04	6.14E-04	8.07E-03	0	4.69E-01	1.64E-04	1.47E-04
Renewable primary resources with energy content used as material	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary resources with energy content	MJ, NCV	3.29E-02	3.74E-05	2.07E-02	6.13E-05	1.17E-04	6.14E-04	8.07E-03	0	4.69E-01	1.64E-04	1.47E-04
Non-renewable primary resources used as an energy carrier (fuel)	MJ, NCV	5.14E-01	2.27E-02	2.50E-01	3.72E-02	7.10E-02	2.22E-01	1.93E-01	0	9.85E+00	9.40E-02	3.32E-02
Non-renewable primary resources with energy content used as material	MJ, NCV	3.84E-03	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary resources with energy content	MJ, NCV	5.18E-01	2.27E-02	2.50E-01	3.72E-02	7.10E-02	2.22E-01	1.93E-01	0	9.85E+00	9.40E-02	3.32E-02
Abiotic depletion (fossil fuels)	MJ, LHV	4.58E-01	2.12E-02	2.20E-01	3.48E-02	6.64E-02	2.08E-01	1.75E-01	0	8.87E+00	8.83E-02	3.11E-02
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0
Renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Non-renewable secondary fuels	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Recovered energy	MJ, NCV	0	0	0	0	0	0	0	0	0	0	0
Use of net freshwater resources	m3	1.39E-01	9.47E-05	6.31E-02	1.55E-04	2.93E-04	1.83E-03	2.63E-02	0	0	2.19E-05	3.64E-04
Output flows and waste category indicators												
Hazardous waste disposed	kg	9.19E+00	0	2.40E+00	0	0	2.05E-02	2.94E-01	0	8.93E+01	3.75E-03	5.37E-03
Non-hazardous waste disposed	kg	7.93E-02	0	4.64E-02	0	0	2.25E-04	3.45E-02	0	1.20E+00	7.69E-05	3.18E-05
High-level radioactive waste, conditioned, to final repository	kg	1.03E-07	3.68E-10	5.51E-08	6.03E-10	1.15E-09	2.69E-09	2.07E-08	0	1.38E-06	1.14E-09	5.40E-10
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	2.57E-07	8.21E-10	1.23E-07	1.35E-09	2.57E-09	8.50E-09	5.01E-08	0	3.33E-06	2.45E-09	1.23E-09
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy	MJ	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Packaging	kg CO2	-2.77E-06	0	0	0	0	0	0	0	-1.38E-05	0	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO2	0	0	2.77E-06	0	0	0	0	0	1.38E-05	0	0
Calcination Carbon Emissions	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbonation Carbon Removals	kg CO2	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	kg CO2	0	0	0	0	0	0	0	0	0	0	0

LCA results & interpretation

LIQUI-HARD®

LIQUI-HARD | LIQUI-HARD ULTRA | EPD additional content

Scope and summary

◯ Cradle to gate ◯ Cradle to gate with options ✔ **Cradle to grave**

Application

LIQUI-HARD ULTRA concrete densifier and chemical hardener is a waterborne, lithium-silicate-based, ready-to-use, colorless liquid, which hardens and dustproofs concrete at a molecular level. After proper application, the finished surface offers substantial improvement in abrasion and chemical resistance and will significantly improve the durability of the surface when compared to untreated concrete.

Functional unit

1 m^2 of covered and protected substrate for a period of 60 years (the assumed average lifetime of a building).

LIQUI-HARD ULTRA has a technical life of 10 years, so five repaints are required during the 60-year lifespan of the building. The results in this report are presented per functional unit.

Density: 8.9 lb/gal
Coverage: 960 ft^2/gal (23.6 m^2/L) on freshly and uncured concrete surface, 623 ft^2/gal (15.3 m^2/L) for repaints
Reference flow: 0.045 kg/functional unit

Modeling assumptions

Products are shipped varying distances to distribution centers and then shipped 505 miles by truck and trailer from the manufacturing facility to project sites. After the coating is applied, 10% of the coating is assumed to be unused and landfilled along with the packaging. At the end of the life of the building, the coating is disposed with the substrate in a landfill.

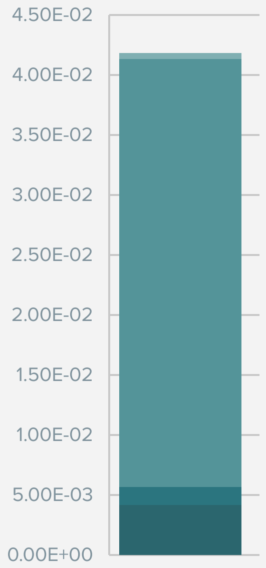
Manufacturing data

Reporting period: January 2025 – December 2025
Location: Hampshire, IL

Material composition by wt%

MATERIAL	%WT.
Silica blends	40-50%
Water	40-50%
EDTA	<1%
Agent	<1%
Packaging, plastic	<5%
Packaging, steel	5-10%

Impacts by life cycle stage [mPts/func unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Product stage	3.81E-03
Design & construction	6.89E-04
Use & maintenance	3.76E-02
End of life	3.20E-04

Total impacts = 4.24E-02 mPts
per 60 years average lifetime of a building

What's causing the greatest impacts

All life cycle stages

The use stage dominates the results for all impact categories. The number of repaints over its lifetime and the maintenance and emissions accounted for contribute the most to the overall impact across all categories. The production stage also has significant contributions, but to a lesser extent. End-of-life activities show small but nonzero contributions, which reflect packaging waste and disposal-related emissions.

Production

Raw material extraction dominates impacts in the production stage, accounting for approximately 1–12% across impact categories and locations. The upstream manufacturing of the silica blends accounts for much of the impacts, especially for eutrophication. Transportation contributes a small amount to production impacts. Manufacturing activities such as blending and pumping account for a significant portion of non-carcinogenics results in this stage, at about 12% of the total life cycle impacts.

Design & construction

Transportation to the installation site via truck is the primary contributor in the construction stage. Transportation to the site accounts for 14% of total ozone depletion potential results and less than 6% for all other impact categories.

Use & maintenance

Use-stage impacts are the largest contributor across all impact categories. They account for over 80% of total life cycle burdens across all impact categories, driven by the additional coatings required over the service life of the building. At each reapplication, the production of new coatings is accounted for in this stage.

End of life

Overall, the end-of-life stage plays a limited role, with most impacts confined to waste treatment processes. At the end of life, LIQUI-HARD ULTRA remains adhered to concrete surfaces and is not designed for removal before demolition. The dominant impacts in this stage is from the landfilling of the residual product coated on concrete debris. These contributions appear in global warming, acidification, and ecotoxicity categories but remain below 4% of the total life cycle impacts. Packaging materials also contribute minor burdens during disposal, particularly in the fossil fuel depletion and respiratory effects categories.

- 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	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Information modules: Included (X) | Excluded (MND)*	**(X) 1-1 Raw materials manufacturing**	**(X) 2-1 Transportation to distribution center**	**(X) 3-1 Coating application**	**(X) 4-1 Transportation to disposal site**
	(X) 1-2 Transportation of raw materials to plants	**(X) 2-2 Transportation to point of sale/ Installation**	**(X) 3-2 Emission from drying**	**(X) 4-2 End-of-life management**
	(X) 1-3 Coating manufacturing	**(X) 2-3 Transportation to application site**	**(X) 3-3 Necessary maintenance and repair**	
				

SM Single Score

Learn about SM Single Score results

Impacts per functional unit	6.10E-03 mPts	2.23E-03 mPts	5.43E-02 mPts	5.38E-04 mPts
Use phase contributing >50% to total impacts in each life cycle stage	Silica blend upstream manufacturing processes.	Transportation of the product to the installation site.	Coating reapplications over the life of the building.	Transport to waste facilities, landfilling of coating product with concrete, and disposal of packaging waste.

IPCC & TRACI v2.1 results per functional unit

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage					
Impact category	Unit				
Global warming	**kg CO_2 eq**	5.45E-02	2.44E-02	7.03E-01	9.32E-03
Ozone depletion	**kg CFC-11 eq**	1.29E-09	1.91E-09	2.56E-08	1.50E-10
Acidification	**kg SO_2 eq**	2.85E-04	4.29E-05	2.96E-03	5.30E-05
Eutrophication	**kg N eq**	2.49E-04	4.52E-06	1.95E-03	3.33E-06
Human health damage					
Impact category	Unit				
Smog	**kg O_3 eq**	3.56E-03	8.48E-04	3.92E-02	1.65E-03
Respiratory effects	**kg $PM_{2.5}$ eq**	5.44E-05	4.19E-06	5.10E-04	6.92E-06
Additional environmental information					
Impact category	Unit				
Carcinogenics	**CTU_h**	11.04%	0.19%	88.72%	0.04%
Non carcinogenics	**CTU_h**	9.49%	1.26%	88.76%	0.49%
Ecotoxicity	**CTU_e**	6.95%	3.76%	89.03%	0.27%
Fossil fuel depletion	**MJ surplus**	7.51E-02	4.42E-02	1.06E+00	1.70E-02

References

LCA Background Report
LCA of W. R. MEADOWS Concrete curing products, 2026. 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 10.2.0.2 software, and ecoinvent v3.11 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

NSF Product Category Rule for Environmental Product Declarations: Architectural Coatings: NAICS 325510, version 2 extended through June 30, 2026.

Download LIQUI-HARD ULTRA 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 life-cycle environmental performance.

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

- ☐ Industry-wide (generic) EPD
- ☑ Product-specific Type III EPD

LEED BD+C: New Construction | v.5 - LEED v5
MR Credit 4: Building Materials Resources Credit (BPSP)

- ☑ Product-specific Type III EPD — Multi-attribute score: 1

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
- ☑ Product-specific EPD — 1 point

LCA results & interpretation

LIQUI-HARD®

LIQUI-HARD | LIQUI-HARD ULTRA | EPD additional content

Scope and summary

◯ Cradle to gate ◯ Cradle to gate with options ✔ **Cradle to grave**

Application

LIQUI-HARD concrete densifier and chemical hardener compound is a proprietary, water-based, ready-to-use, clear silicate liquid, formulated with chemically reactive raw materials to harden and dustproof concrete. This waterborne solution, when properly applied, offers substantial improvement in abrasion and chemical resistance and will significantly improve the durability of the concrete surface when compared to untreated concrete.

Functional unit

1 m^2 of covered and protected substrate for a period of 60 years (the assumed average lifetime of a building).

LIQUI-HARD has a technical life of 10 years, so five repaints are required during the 60-year lifespan of the building. The results in this report are presented per functional unit.

Density: 10 lb/gal
Coverage: 300 ft^2/gal (7.36 m^2/L) on fresh concrete; 200 ft^2/gal (4.9 m^2/L) for repaints
Reference flow: 0.163 kg/functional unit

Modeling assumptions

Products are shipped varying distances to distribution centers and then shipped 505 miles by truck and trailer from the manufacturing facility to project sites. After the coating is applied, 10% of the coating is assumed to be unused and landfilled along with the packaging. At the end of the life of the building, the coating is disposed with the substrate in a landfill.

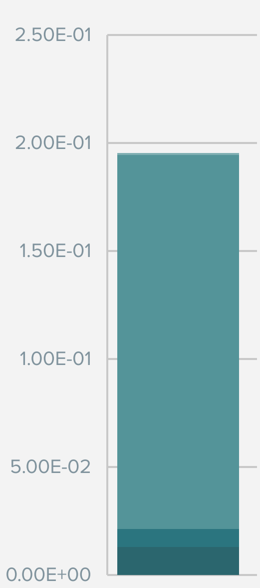
Manufacturing data

Reporting period: January 2025 – December 2025
Location: Fort Worth, TX; Goodyear, AZ; Hampshire, IL; Milton, Ontario, CAN; Pomona, CA; Sherwood, Alberta, CAN

Material composition by wt%

MATERIAL	%WT.
Sodium silicate	50-60%
Water	40-50%
EDTA	<1%
Agent	<1%
Packaging, plastic	<1%
Packaging, steel	<1%

Plant average by life cycle stage [mPts/func unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Product stage	1.33E-02
Design & construction	6.42E-03
Use & maintenance	1.71E-01
End of life	8.75E-04

Total impacts = 1.92E-01 mPts
per 60 years average lifetime of a building

What's causing the greatest impacts

All life cycle stages

The use stage dominates the results for all impact categories. The number of repaints over its lifetime and the maintenance and emissions accounted for contribute the most to the overall impact across all categories. The production stage also has significant contributions, but to a lesser extent. End-of-life activities show small but nonzero contributions, which reflect packaging waste and disposal-related emissions.

Production

Raw material extraction dominates impacts in the production stage, accounting for approximately 5–14% across impact categories and locations. The upstream manufacturing of sodium silicates is energy-intensive, made by fusing silica sand and soda ash at high temperatures in industrial furnaces. Transportation to the production facilities and facility manufacturing activities contribute a relatively minor amount compared to raw material extraction.

Design & construction

Transportation to the installation site via truck is the primary contributor in the construction stage. Transportation to the site remains small, for an average contribution of 5% of the total across all plants. Regional differences in transport distances and logistics create slight variation.

Use & maintenance

Use-stage impacts are the largest contributor across all impact categories. They account for over two thirds of total life cycle burdens across all impact categories, driven by the additional coatings required over the service life of the building. At each reapplication, the production of new coatings is accounted for in this stage.

End of life

Overall, the end-of-life stage plays a limited role, with most impacts confined to waste treatment processes. At the end of life, LIQUI-HARD remains adhered to concrete surfaces and is not designed for removal before demolition. The dominant impacts in this stage is from the landfilling of the residual product coated on concrete debris. These contributions appear in global warming, acidification, and ecotoxicity categories but remain below 5% of the total life cycle impacts. Packaging materials also contribute minor burdens during disposal, particularly in the fossil fuel depletion and respiratory effects categories.

- 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	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Information modules: **Included (X)** | Excluded (MND)*	**(X) 1-1 Raw materials manufacturing**	**(X) 2-1 Transportation to distribution center**	**(X) 3-1 Coating application**	**(X) 4-1 Transportation to disposal site**
	(X) 1-2 Transportation of raw materials to plants	**(X) 2-2 Transportation to point of sale/ Installation**	**(X) 3-2 Emission from drying**	**(X) 4-2 End-of-life management**
	(X) 1-3 Coating manufacturing	**(X) 2-3 Transportation to application site**	**(X) 3-3 Necessary maintenance and repair**	
				

SM Single Score (plant average)

Learn about SM Single Score results

Impacts per functional unit	1.33E-02 mPts	6.42E-03 mPts	1.71E-01 mPts	8.75E-04 mPts
Use phase contributing >50% to total impacts in each life cycle stage	Sodium silicate upstream manufacturing processes.	Transportation of the product to the installation site.	Coating reapplications over the life of the building.	Transport to waste facilities, landfilling of coating product with concrete, and disposal of packaging waste.

IPCC & TRACI v2.1 results per functional unit (Fort Worth, TX)

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage					
Impact category	Unit				
Global warming	**kg CO_2 eq**	1.42E-01	6.92E-02	1.91E+00	1.47E-02
Ozone depletion	**kg CFC-11 eq**	2.06E-09	1.08E-08	1.11E-07	2.38E-10
Acidification	**kg SO_2 eq**	6.20E-04	1.82E-04	7.34E-03	7.88E-05
Eutrophication	**kg N eq**	6.26E-05	2.33E-05	7.76E-04	4.94E-06
Human health damage					
Impact category	Unit				
Smog	**kg O_3 eq**	7.60E-03	4.51E-03	1.09E-01	2.45E-03
Respiratory effects	**kg $PM_{2.5}$ eq**	9.46E-05	1.29E-05	9.80E-04	1.02E-05
Additional environmental information					
Impact category	Unit				
Carcinogenics	**CTU_h**	10.07%	0.25%	89.65%	0.03%
Non carcinogenics	**CTU_h**	7.97%	2.04%	89.54%	0.45%
Ecotoxicity	**CTU_e**	6.12%	4.00%	89.70%	0.17%
Fossil fuel depletion	**MJ surplus**	2.17E-01	1.30E-01	3.13E+00	2.70E-02

IPCC & TRACI v2.1 results per functional unit (Goodyear, AZ)

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage					
Impact category	Unit				
Global warming	**kg CO_2 eq**	1.47E-01	4.70E-02	1.78E+00	1.47E-02
Ozone depletion	**kg CFC-11 eq**	3.53E-09	6.37E-09	8.59E-08	2.38E-10
Acidification	**kg SO_2 eq**	6.18E-04	1.13E-04	6.78E-03	7.88E-05
Eutrophication	**kg N eq**	5.53E-05	1.39E-05	6.42E-04	4.94E-06
Human health damage					
Impact category	Unit				
Smog	**kg O_3 eq**	7.72E-03	2.69E-03	9.55E-02	2.45E-03
Respiratory effects	**kg $PM_{2.5}$ eq**	7.93E-05	8.60E-06	8.26E-04	1.02E-05
Additional environmental information					
Impact category	Unit				
Carcinogenics	**CTU_h**	8.96%	0.65%	90.28%	0.12%
Non carcinogenics	**CTU_h**	7.70%	2.00%	89.65%	0.66%
Ecotoxicity	**CTU_e**	6.18%	3.72%	89.86%	0.24%
Fossil fuel depletion	**MJ surplus**	2.87E-01	8.73E-02	3.37E+00	2.70E-02

IPCC & TRACI v2.1 results per functional unit (Hampshire, IL)

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE

Ecological damage

Impact category	Unit				
Global warming	kg CO_2 eq	1.83E-01	4.50E-02	2.07E+00	1.47E-02
Ozone depletion	kg CFC-11 eq	3.53E-09	5.98E-09	8.26E-08	2.38E-10
Acidification	kg SO_2 eq	7.28E-04	1.07E-04	7.66E-03	7.88E-05
Eutrophication	kg N eq	7.33E-05	1.31E-05	7.88E-04	4.94E-06

Human health damage

Impact category	Unit				
Smog	kg O_3 eq	9.46E-03	2.53E-03	1.09E-01	2.45E-03
Respiratory effects	kg $PM_{2.5}$ eq	1.07E-04	8.22E-06	1.06E-03	1.02E-05

Additional environmental information

Impact category	Unit				
Carcinogenics	CTU_h	10.18%	0.14%	89.66%	0.03%
Non carcinogenics	CTU_h	8.70%	1.27%	89.60%	0.44%
Ecotoxicity	CTU_e	7.25%	2.78%	89.78%	0.18%
Fossil fuel depletion	MJ surplus	3.33E-01	8.35E-02	3.73E+00	2.70E-02

IPCC & TRACI v2.1 results per functional unit (Milton, Ontario, Canada)

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE

Ecological damage

Impact category	Unit				
Global warming	kg CO_2 eq	1.39E-01	2.06E-02	1.59E+00	1.47E-02
Ozone depletion	kg CFC-11 eq	2.23E-09	2.31E-09	6.19E-08	2.38E-10
Acidification	kg SO_2 eq	6.06E-04	4.41E-05	6.42E-03	7.88E-05
Eutrophication	kg N eq	5.80E-05	5.18E-06	6.33E-04	4.94E-06

Human health damage

Impact category	Unit				
Smog	kg O_3 eq	7.40E-03	9.92E-04	8.72E-02	2.45E-03
Respiratory effects	kg $PM_{2.5}$ eq	8.66E-05	3.68E-06	8.68E-04	1.02E-05

Additional environmental information

Impact category	Unit				
Carcinogenics	CTU_h	10.02%	0.11%	89.84%	0.04%
Non carcinogenics	CTU_h	8.60%	0.76%	90.06%	0.58%
Ecotoxicity	CTU_e	7.34%	1.70%	90.71%	0.24%
Fossil fuel depletion	MJ surplus	2.38E-01	3.79E-02	2.74E+00	2.70E-02

IPCC & TRACI v2.1 results per functional unit (Pomona CA)

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE

Ecological damage

Impact category	Unit				
Global warming	kg CO_2 eq	1.41E-01	8.25E-01	8.34E+00	1.47E-02
Ozone depletion	kg CFC-11 eq	2.72E-09	1.72E-08	1.71E-07	2.38E-10
Acidification	kg SO_2 eq	6.02E-04	2.88E-03	3.01E-02	7.88E-05
Eutrophication	kg N eq	5.25E-05	1.83E-04	2.05E-03	4.94E-06

Human health damage

Impact category	Unit				
Smog	kg O_3 eq	7.30E-03	8.18E-02	7.64E-01	2.45E-03
Respiratory effects	kg $PM_{2.5}$ eq	7.71E-05	1.37E-04	1.88E-03	1.02E-05

Additional environmental information

Impact category	Unit				
Carcinogenics	CTU_h	4.91%	5.15%	89.87%	0.06%
Non carcinogenics	CTU_h	0.81%	9.63%	89.49%	0.07%
Ecotoxicity	CTU_e	2.63%	7.62%	89.64%	0.11%
Fossil fuel depletion	MJ surplus	2.69E-01	1.56E+00	1.57E+01	2.70E-02

IPCC & TRACI v2.1 results per functional unit (Sherwood, Alberta, Canada)

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE

Ecological damage

Impact category	Unit				
Global warming	kg CO_2 eq	3.97E-01	4.00E-02	3.84E+00	1.47E-02
Ozone depletion	kg CFC-11 eq	3.41E-09	4.99E-09	7.31E-08	2.38E-10
Acidification	kg SO_2 eq	9.51E-04	9.12E-05	9.42E-03	7.88E-05
Eutrophication	kg N eq	1.06E-04	1.10E-05	1.04E-03	4.94E-06

Human health damage

IPCC & TRACI v2.1 results per functional unit (Milton, Ontario, Canada)

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage					
Impact category	Unit				
Global warming	**kg CO_2 eq**	1.39E-01	2.06E-02	1.59E+00	1.47E-02
Ozone depletion	**kg CFC-11 eq**	2.23E-09	2.31E-09	6.19E-08	2.38E-10
Acidification	**kg SO_2 eq**	6.06E-04	4.41E-05	6.42E-03	7.88E-05
Eutrophication	**kg N eq**	5.80E-05	5.18E-06	6.33E-04	4.94E-06
Human health damage					
Impact category	Unit				
Smog	**kg O_3 eq**	7.40E-03	9.92E-04	8.72E-02	2.45E-03
Respiratory effects	**kg $PM_{2.5}$ eq**	8.66E-05	3.68E-06	8.68E-04	1.02E-05
Additional environmental information					
Impact category	Unit				
Carcinogenics	**CTU_h**	10.02%	0.11%	89.84%	0.04%
Non carcinogenics	**CTU_h**	8.60%	0.76%	90.06%	0.58%
Ecotoxicity	**CTU_e**	7.34%	1.70%	90.71%	0.24%
Fossil fuel depletion	**MJ surplus**	2.38E-01	3.79E-02	2.74E+00	2.70E-02

IPCC & TRACI v2.1 results per functional unit (Pomona CA)

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage					
Impact category	Unit				
Global warming	**kg CO_2 eq**	1.41E-01	8.25E-01	8.34E+00	1.47E-02
Ozone depletion	**kg CFC-11 eq**	2.72E-09	1.72E-08	1.71E-07	2.38E-10
Acidification	**kg SO_2 eq**	6.02E-04	2.88E-03	3.01E-02	7.88E-05
Eutrophication	**kg N eq**	5.25E-05	1.83E-04	2.05E-03	4.94E-06
Human health damage					
Impact category	Unit				
Smog	**kg O_3 eq**	7.30E-03	8.18E-02	7.64E-01	2.45E-03
Respiratory effects	**kg $PM_{2.5}$ eq**	7.71E-05	1.37E-04	1.88E-03	1.02E-05
Additional environmental information					
Impact category	Unit				
Carcinogenics	**CTU_h**	4.91%	5.15%	89.87%	0.06%
Non carcinogenics	**CTU_h**	0.81%	9.63%	89.49%	0.07%
Ecotoxicity	**CTU_e**	2.63%	7.62%	89.64%	0.11%
Fossil fuel depletion	**MJ surplus**	2.69E-01	1.56E+00	1.57E+01	2.70E-02

IPCC & TRACI v2.1 results per functional unit (Sherwood, Alberta, Canada)

LIFE CYCLE STAGE		PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage					
Impact category	Unit				
Global warming	**kg CO_2 eq**	3.97E-01	4.00E-02	3.84E+00	1.47E-02
Ozone depletion	**kg CFC-11 eq**	3.41E-09	4.99E-09	7.31E-08	2.38E-10
Acidification	**kg SO_2 eq**	9.51E-04	9.12E-05	9.42E-03	7.88E-05
Eutrophication	**kg N eq**	1.06E-04	1.10E-05	1.04E-03	4.94E-06

Human health damage

Impact category	Unit				
Smog	**kg O_3 eq**	1.15E-02	2.12E-03	1.23E-01	2.45E-03
Respiratory effects	**kg $PM_{2.5}$ eq**	1.08E-04	7.24E-06	1.06E-03	1.02E-05

Additional environmental information

Impact category	Unit				
Carcinogenics	**CTU_h**	10.07%	0.17%	89.72%	0.04%
Non carcinogenics	**CTU_h**	8.81%	1.15%	89.59%	0.45%
Ecotoxicity	**CTU_e**	7.21%	2.80%	89.78%	0.21%
Fossil fuel depletion	**MJ surplus**	7.00E-01	7.40E-02	6.77E+00	2.70E-02

References

LCA Background Report
LCA of W. R. MEADOWS Concrete curing products, 2026. 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 10.2.0.2 software, and ecoinvent v3.11 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

NSF Product Category Rule for Environmental Product Declarations: Architectural Coatings: NAICS 325510, version 2 extended through June 30, 2026.

Download LIQUI-HARD 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 life-cycle environmental performance.

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

- ☐ Industry-wide (generic) EPD
- ☑ Product-specific Type III EPD

LEED BD+C: New Construction | v.5 - LEED v5
MR Credit 4: Building Materials Resources Credit (BPSP)

- ☑ Product-specific Type III EPD — Multi-attribute score: 1

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
- ☑ Product-specific EPD — 1 point

How we make it greener

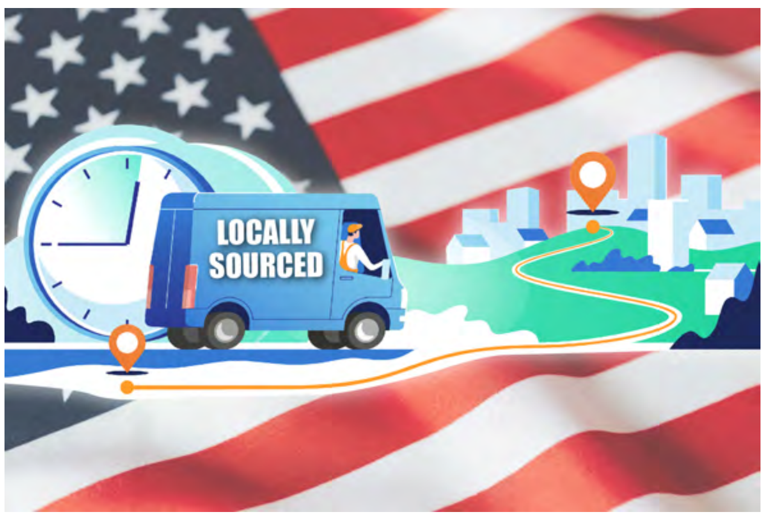
LIQUI-HARD®

Collapse 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.



TRANSPORTATION

W. R. MEADOWS manufactures in the USA and Canada. 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.