**Environmental Product Declaration**

# Center for Regenerative Design & Collaboration (CRDC) Global RESIN8 Lightweight Manufactured Synthetic Aggregate

LIGHTWEIGHT SYNTHETIC AGGREGATE / HYBRID MINERAL POLYMER ADDITIVE


CRDC Global is an innovative building materials company that creates value from the world's plastic waste. By transforming post-consumer and post-industrial plastics into high-performance building materials, we are diverting waste from landfills and the environment, and contributing to a greener planet and more sustainable construction industry.

RESIN8 is a high performance manufactured buiding material that can be used as a lightweight aggregate replacement in structural and non-structural concrete applications or as an additive in asphalt.

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and EN 15804+A2. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

| | |
|---|---|
| EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE | ASTM International<br>100 Barr Harbor Drive West Conshohocken, PA 19428 USA |
| GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER | ASTM, General Program Instructions, v8.0, April 29, 2020. |
| MANUFACTURER NAME AND ADDRESS | Center for Regenerative Design & Collaboration (CRDC) Global<br>390 Eberts Lane York, PA 17403 |
| DECLARATION NUMBER | 793 |
| DECLARED PRODUCT & DECLARED UNIT | Center for Regenerative Design & Collaboration (CRDC) Global RESIN8 Lightweight Manufactured Synthetic Aggregate<br>Declared Unit = 1 kilogram of RESIN8 |
| REFERENCE PCR AND VERSION NUMBER | PCR for “Construction Products” 2019:14, version 1.3.4 (The International EPD System, 2024-04-30), VALID UNTIL: 2025-06-20. |
| DESCRIPTION OF PRODUCT(S) APPLICATION/USE | RESIN8 is a synthetic lightweight aggregate in Dry Cast applications. In Asphalt, a more accurate description is Hybrid Mineral-Polymer Additive. A more general description that covers both these uses could be 'Versatile high perfomance manufactured building material' |
| MARKETS OF APPLICABILITY | Global |
| DATE OF ISSUE | 12/13/2024 |
| PERIOD OF VALIDITY | 5 years |
| EPD TYPE | Product Specific |
| DATASET VARIABILITY | N/A |
| EPD SCOPE | Cradle-to-Gate |
| YEAR(S) OF REPORTED PRIMARY DATA | June - November 2023, extrapolated conservatively for 1 year. |
| LCA SOFTWARE & VERSION NUMBER | SimaPro 9.5.0.2 |
| LCI DATABASE(S) & VERSION NUMBER | Ecoinvent v3.5 & USLCI v2.0 |
| LCIA METHODOLOGY & VERSION NUMBER | TRACI 2.1; EN 15804+A2 |
| The sub-category PCR review was conducted by: | The Technical Committee of the International EPD System |
| This declaration was independently verified in accordance with ISO 14025: 2006. The ASTM, General Program Instructions, v8.0, April 29, 2020., based on EN 15804+A2 serves as the core PCR.<br>☐ INTERNAL ☒ EXTERNAL | Tim Brooke, ASTM International |
| This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by: | Lindita Bushi, PhD, Athena Sustainable Materials Institute |

EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same version number up to the first two digits20) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison.

The EPD owner has the sole ownership, liability and responsibility of the EPD

## General Information

### Description of Company/Organization

CRDC Global is an innovative building materials company.
CRDC Global's approach (Recover, Enrich, Appreciate, Prosper) is based on a collaborative net-zero circular economy model that views the plastic and construction industries as a connected system.
We make RESIN8 – a range of Low carbon hybrid mineral polymer building materials specifically designed for the construction industry. As part of our holistic approach we work with a range of stakeholders to prevent plastic from entering the environment, and to create affordable social housing.

### Product Description

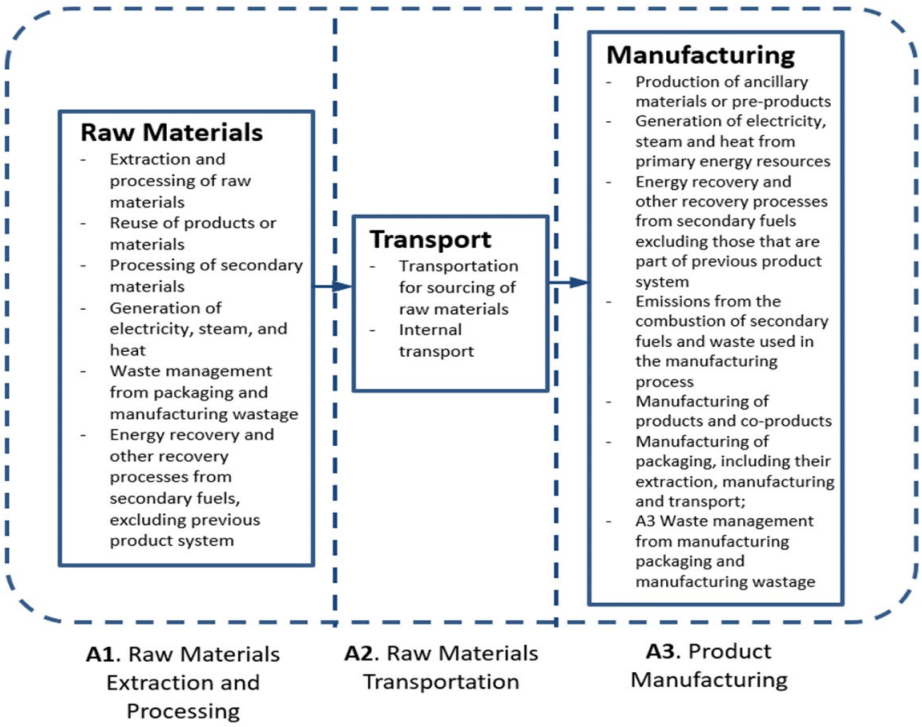
Product Name: RESIN8

Product Characteristic: Lightweight synthetic aggregate / Hybrid Mineral Polymer additive

RESIN8 is a high performance manufactured buiding material that can be used as a lightweight aggregate replacement in structural and non-structural concrete applications or as an additive in asphalt. Benefits in concrete applications include:
- Low embodied carbon
- 80%+ recycled and reused materials
- Maintains mechanical properties
- Improves acoustic insulation properties
- Improves thermal insulation properties
- Maintains visual appearance of fine aggregate.

RESIN8 is fully recyclable at end-of-life. Benefits in asphalt include:
- Low embodied carbon
- Increases Marshall stability
- Improves viscosity properties
- Keeps the Marshall flow
- Does not increase air voids
- Prolongs temperature during the laydown and compaction operations
- No special equipment required for incorporation
- In recommended dosage ranges it does not modify the aggregate gradation
- Does not modify the asphalt content
- Improves workability
- Increases stiffness (dynamic module)
- Reduces permanent deformation and fatigue
- Increases the expected life of the pavement

## Flow Diagram




## Manufacturer Specific EPD

This product-specific EPD was developed based on the Cradle-to-Gate Life Cycle Assessment. The EPD accounts for raw material extraction and processing, transport, and product manufacturing. Manufacturing data were gathered directly from company personnel. When updated company-specific data were not available the ratio of production units, within the June - November 2023, extrapolated conservatively for 1 year.  calendar year, was used as a proxy. This product-specific Environmental Product Declaration (EPD) was developed based on a cradle-to-gate life cycle assessment. It encompasses raw material extraction, processing, transport, product manufacturing, and concludes at the gate before distribution. Manufacturing data were obtained directly from company personnel. This EPD does not include grouping.

## Application

RESIN8 is ideal for a wide range of structural and non structural applications including but not limited to: masonry blocks, pipes, pavers, prefabricated tiles, columns, decorative features, curbs, channels, ready-mixed concrete, lightweight concrete, and dry bagged concrete, as well as various types of mortar applications like bagged dry mortars, finishing mortars, and premixed mortars, among others.

## Material Composition

The primary product components and/or materials must be indicated as a percentage mass to enable the user of the EPD to understand the composition of the product in delivery status.

The average composition of RESIN8 is as follows:

| | Resin8 | | |
|---|---|---|---|
| **Material** | **Quantity (kg)** | **Quantity (% By Weight)** | **Recycled Content (kg)** |
| Commingled Waste Plastic | 8.00E-01 | 79.5% | 8.00E-01 |
| Hydrated Lime | 1.00E-01 | 9.9% | 0.00E+00 |
| Fly Ash/Pozzolan | 1.00E-01 | 9.9% | 0.00E+00 |
| Municipal Water | 6.85E-03 | 0.7% | 0.00E+00 |
| Total | 1.01E+00 | 100.0% | 8.00E-01 |

The product is composed of 79.5% post-consumer recycled content.

## Technical Data

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

| Technical Data | | |
|---|---|---|
| **Requirement** | **Specification** | **Unit** |
| Maximum nominal size | 6.35 | $mm^2$ (ASTM C136) |
| Dry bulk unitary weight | 400 - 500 | $kg/m^3$ (ASTM C29) |
| Specific gravity | 1.09 | (ASTM C128) |
| Absorption | 14.5% | (ASTM C128) |
| Material finer than mesh #200 | < 3.0% | (ASTM C117) |
| Clay lumps and friable particles | < 3.0% | (ASTM C142) |
| Organic contamination | none | (ASTM C40) |
| Decomposition Temperature | Varies, >200 | C |
| Relative Density | .38 to .48 | ($g/cm^3$ at 23°C) |
| UNSPSC code | 30111803 | |

## Placing on the Market / Application Rules

The standards that can be applied for RESIN8 are:
(ASTM D75) Standard Practice for Sampling Aggregates.
(ASTM C117) Standard Test Method for Materials Finer than 75-µm (No.200) Sieve in Mineral Aggregates by Washing.
(ASTM C136) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

## Properties of Declared Product as Shipped

RESIN8 is typically packed in bulk bags (800mm x 800mm) weighing approximately 500kg.

## Methodological Framework

### Declared Unit

The declaration refers to the declared unit of 1 kilogram of Center for Regenerative Design & Collaboration (CRDC) Global RESIN8 Lightweight Manufactured Synthetic Aggregate as specified in the PCR.

| | Resin8 | |
|---|---|---|
| **Name** | **Value** | **Unit** |
| Declared unit | 1 kg | |
| Density | 480.00 | $kg/m^3$ |

### System Boundary

This is a Cradle-to-Gate Environmental Product Declaration. The following life cycle phases were considered:

| **Product Stage** | | | **Construction Process Stage** | | **Use Stage** | | | | | | | **End of Life Stage*** | | | | **Benefits and Loads Beyond the System Boundaries** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply | Transport | Manufacturing | Transport from gate to the site | Construction/ installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction /demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling potential |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| X | X | X | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

**Description of the System Boundary Stages Corresponding to the PCR**

**(X = Included; MND = Module Not Declared)**

*This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

### Allocation

Allocation was determined on a per kilogram basis for primary data. For secondary data, cut-off methodology was used.

### Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No processes were neglected or excluded. Capital items for the production processes (machine, buildings, etc.) were not taken into consideration.

## Data Sources

Primary data were collected for every process in the product system under the control of Center for Regenerative Design & Collaboration (CRDC) Global. Secondary data from the SimaPro Ecoinvent v3.5 & USLCI v2.0 databases were utilized. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the Lightweight Manufactured Synthetic Aggregate product category.

## Data Quality

The data sources used are complete and representative of United States in terms of the geographic and technological coverage and are a recent vintage (i.e. less than ten years old).The data used for primary data are based on direct information sources of the manufacturer. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows.Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

## Period Under Review

The period under review is the full calendar year of June - November 2023.

## Treatment of Biogenic Carbon

The uptake and release of biogenic carbon throughout the product life cycle follows EN 15804+A2 .

## Comparability and Benchmarking

A comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to EN 15804+A2 and the building context, respectively the product-specific characteristics of performance, are taken into account. Environmental declarations from different programs may not be comparable. Full conformance with the ASTM, General Program Instructions, v8.0, April 29, 2020. and PCR for “Construction Products” 2019:14, version 1.3.4 (The International EPD System, 2024-04-30), VALID UNTIL: 2025-06-20. allows EPD comparability only when all stages of the product's life cycle have been considered. However, variations and deviations are possible.

## Units

The LCA results within this EPD are reported in SI units.

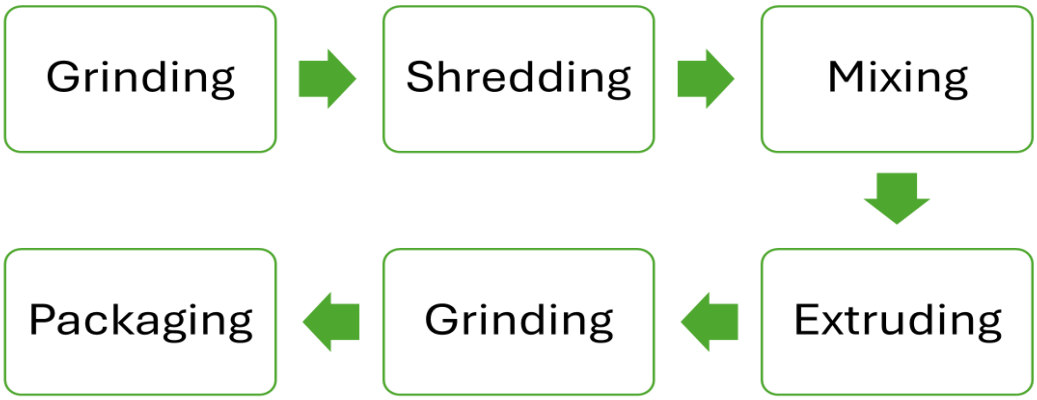
## Additional Environmental Information

### Background data

For life cycle modeling of the considered products, SimaPro is used. The SimaPro database contains consistent and documented datasets which are documented in the online SimaPro documentation. To ensure comparability of results in the LCA, the basic data of the SimaPro database were used for energy, transportation and auxiliary materials.

### Manufacturing

Bags of plastic waste are collected via a program known as "The Bag That Builds". The plastic waste material is transported to a manufacturing facility located in York, PA, USA and the placed onto conveyors where it is transported to the grinder. The material is then reduced even further in a shredder. After granulation is finished, the plastics are driven to the mixing area where fly ash, plastic, lime, and water are combined and mixed. The resultant mixture is then extruded to produce the desired final product.




### Packaging

All packaging is fully recyclable. The packaging material is composed by paper, polypropylene, and wood.The packaging material is composed by polypropylene and wood. About 88.23% of the packaging is biogenic carbon.

| | Resin8 | | |
|---|---|---|---|
| **Material** | **Quantity (kg)** | **Quantity (% By Weight)** | **Biogenic Carbon (kg)** |
| Wood Pallets | 4.42E-04 | 88.21% | 2.21E-04 |
| Bulk Bags | 5.09E-05 | 11.76% | 0.00E+00 |
| Paper Labels | 1.18E-07 | 0.02% | 5.90E-08 |
| **Total** | **4.93E-04** | **100%** | **2.21E-04** |

## Resin8 Results per Declared Unit

Results shown below were calculated using EN 15804+A2 (EF 3.1) Methodology.

**EN 15804+A2 Impact Assessment**

| Parameter | Parameter | Unit | A1 | A2 | A3 | Total |
|---|---|---|---|---|---|---|
| GWP-total | Global warming potential - total | kg $CO_2$-Eq. | 3.81E-01 | 1.16E-02 | 1.54E-01 | **5.46E-01** |
| GWP-fossil | Global warming potential - fossil | kg $CO_2$-Eq. | 3.80E-01 | 1.16E-02 | 6.42E-02 | **4.56E-01** |
| GWP-biogenic | Global warming potential - biogenic | kg $CO_2$-Eq. | 8.24E-04 | 0.00E+00 | 8.94E-02 | **9.02E-02** |
| GWP-lulc | Global warming potential - land use and land use change | kg $CO_2$-Eq. | 5.12E-05 | 0.00E+00 | 1.04E-05 | **6.16E-05** |
| ODP | Depletion potential of the stratospheric ozone layer | kg CFC-11 Eq. | 2.28E-09 | 3.01E-13 | 6.11E-11 | **2.34E-09** |
| AP | Acidification potential | mol $H^+$-Eq. | 2.18E-03 | 6.30E-05 | 3.98E-05 | **2.29E-03** |
| EP-freshwater | Eutrophication potential - freshwater | kg P-Eq. | 2.32E-05 | 0.00E+00 | 5.85E-06 | **2.90E-05** |
| EP-marine | Eutrophication potential - marine | kg N-Eq. | 2.44E-04 | 2.96E-05 | 2.16E-05 | **2.95E-04** |
| EP-terrestrial | Eutrophication potential - terrestrial | mol N-Eq. | 2.66E-03 | 3.23E-04 | 1.84E-04 | **3.16E-03** |
| POCP | Formation potential of tropospheric ozone | kg NMVOC-Eq. | 9.92E-04 | 8.62E-05 | 1.31E-04 | **1.21E-03** |
| ADP-minerals&metals[2] | Abiotic depletion potential - minerals & metals | kg Sb-Eq. | 7.83E-07 | 0.00E+00 | 9.50E-09 | **7.92E-07** |
| ADP-fossil | Abiotic depletion potential - fossil | MJ | 5.48E+00 | 1.50E-01 | 4.54E-02 | **5.68E+00** |
| WDP[2] | Water deprivation potential | $m^3$ depriv. | 1.77E-02 | 0.00E+00 | 4.97E-03 | **2.26E-02** |
| Acronyms | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | | | | | | |
| Disclaimers | Disclaimer 1 - This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycled. It does not consider side effectes due to possible nuclear accidents, occuplational exposure nor due to radio active waste disposal in underground facilities. Potential ionizing radition from the soil, from radon and from some construction materials is also not measured by this indicator.<br><br>Disclaimer 2 - The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limted experienced with the indicator. | | | | | |

Results shown below were calculated using TRACI 2.1 Methodology.

**TRACI 2.1 Impact Assessment**

| Parameter | Parameter | Unit | A1 | A2 | A3 | Total |
|---|---|---|---|---|---|---|
| GWP | Global warming potential | kg $CO_2$-Eq. | 3.76E-01 | 1.15E-02 | 6.43E-02 | **4.52E-01** |
| ODP | Depletion potential of the stratospheric ozone layer | kg CFC-11 Eq. | 2.51E-09 | 4.40E-13 | 6.64E-11 | **2.57E-09** |
| AP Air | Acidification potential for air emissions | kg $SO_2$-Eq. | 1.80E-03 | 6.90E-05 | 3.65E-05 | **1.91E-03** |
| EP | Eutrophication potential | kg N-Eq. | 3.06E-04 | 3.84E-06 | 1.18E-04 | **4.28E-04** |
| SP | Smog formation potential | kg $O_3$-Eq. | 1.52E-02 | 1.89E-03 | 2.32E-03 | **1.94E-02** |
| FFD | Fossil Fuel Depletion | MJ-surplus | 1.65E-01 | 2.21E-02 | 7.82E-04 | **1.88E-01** |

Results below contain the resource use throughout the life cycle of the product.

**Resource Use**

| Parameter | Parameter | Unit | A1 | A2 | A3 | Total |
|---|---|---|---|---|---|---|
| PERE | Renewable primary energy as energy carrier | MJ | 0.00E+00 | 0.00E+00 | 1.36E-03 | **1.36E-03** |
| PERM | Renewable primary energy resources as material utilization | MJ | 5.97E-01 | 0.00E+00 | 0.00E+00 | **0.00E+00** |
| PERT | Renewable primary energy resources as material utilization | MJ | 5.97E-01 | 0.00E+00 | 1.36E-03 | **5.98E-01** |
| PENRE | Nonrenewable primary energy as energy carrier | MJ | 0.00E+00 | 1.49E-01 | 1.49E-02 | **1.63E-01** |
| PENRM | Nonrenewable primary energy as material utilization | MJ | 2.99E+01 | 0.00E+00 | 0.00E+00 | **2.99E+01** |
| PENRT | Total non-renewable primary energy | MJ | 2.99E+01 | 1.49E-01 | 1.49E-02 | **3.00E+01** |
| SM | Use of secondary material | kg | 8.99E-01 | 0.00E+00 | 0.00E+00 | **8.99E-01** |
| RSF | Use of renewable secondary fuels | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** |
| NRSF | Use of nonrenewable secondary fuels | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** |
| FW | Use of net fresh water | $m^3$ | 4.73E-04 | 0.00E+00 | 1.36E-04 | **6.09E-04** |

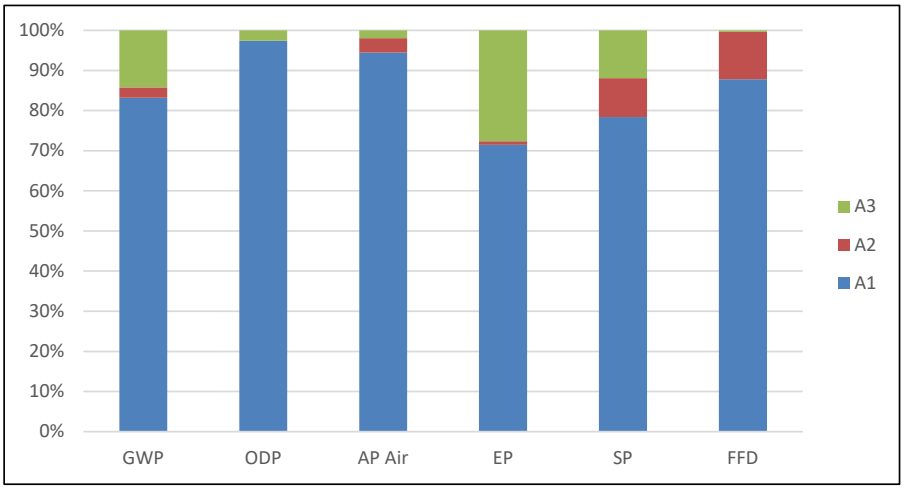
Results below contain the output flows and wastes throughout the life cycle of the product.

**Output Flows and Waste Categories**

| Parameter | Parameter | Unit | A1 | A2 | A3 | Total |
|---|---|---|---|---|---|---|
| HWD | Hazardous waste disposed | kg | 1.75E-05 | 0.00E+00 | 3.86E-07 | **1.79E-05** |
| NHWD | Non-hazardous waste disposed | kg | 2.11E-02 | 0.00E+00 | 3.20E-02 | **5.31E-02** |
| HLRW | High-level radioactive waste | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** |
| ILLRW | Intermediate- and low-level radioactive waste | kg | 7.39E-07 | 0.00E+00 | 1.60E-08 | **7.55E-07** |
| CRU | Components for re-use | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** |
| MR | Materials for recycling | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** |
| MER | Materials for energy recovery | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** |
| EE | Recovered energy exported from system | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** |

## Resin8 LCA Interpretation

The raw material extraction and processing life cycle stage dominates the impacts across all impact categories.




## Additional Environmental Information

### Environmental and Health During Manufacturing

CRDC is an impact-conscientious company that manufactures construction products using primarily post-use plastics. Utilizing Industry Best Practices, we ensure that all applicable Environmental, Health, and Safety (EHS) regulations are met during the manufacturing process. CRDC is on a mission to create value from the World's plastic waste.

### Extraordinary Effects

**Fire**
No danger to the environment can be anticipated.
**Water**
Contains no known substance that have any impact on water in case of flood.
**Mechanical Destruction**
No danger to the environment can be anticiapted during mechanical destruction. RESIN8 becomes completey encapsulated in the concrete

### Delayed Emissions

Global warming potential is calculated using the TRACI 2.1 and CML 4.1 impact assessment methodologies. Delayed emissions are not considered.

### Environmental Activities and Certifications

ASTM C29
ASTM C40
ASTM D75
ASTM C117
ASTM C128
ASTM C136
ASTM C142

### Further Information

390 Eberts Lane York, PA 17403

## References


- Program Instructions — ASTM, General Program Instructions, v8.0, April 29, 2020.
- PCR — PCR for “Construction Products” 2019:14, version 1.3.4 (The International EPD System, 2024-04-30), VALID
- SimaPro 9.5.0.2 — PRe Sustainability. SimaPro Life Cycle Assessment version 9.1 (software).
- ISO 14025 — ISO 14025:2006, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.
- ISO 14040 — ISO 14040:2006/Amd1:2020, Environmental management — Life cycle assessment — Principles and
- ISO 14044 — ISO 14044:2006/Amd1:2017/Amd2:2020, Environmental management — Life cycle assessment — Requirements and guidelines.
- EN 15804+A2 — CEN (2021): EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
- ASTM C136 — Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- ASTM C29 — Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
- ASTM C128 — Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate
- ASTM C117 — Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
- ASTM C142 — Standard Test Method for Clay Lumps and Friable Particles in Aggregates
- ASTM C40 — Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
- Characterization Method — IPCC. 2014. Climate Change 2013. The Physical Science Basis. Cambridge University Press. (http://www.ipcc.ch/report/ar5/wg1/).
- Characterization Method — WMO. 1999. Scientific Assessment of Ozone Depletion: 1998, World Meteorological Organization Global Ozone Research and Monitoring Project - Report No. 44, WMO, Geneva.
- Characterization Method — Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers- version 1.2, January 2017.

## Contact Information

### Study Commissioner

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### LCA Practitioner

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