Environmental Product Declaration

Northeast Precast Structural Precast Concrete

NORTHEAST PRECAST

With over 20 years in precast manufacturing, Northeast Precast continues to improve its operation in a sustainable way to support employees, customers and the environment. With this EPD, Northeast Precast intends to provide architects and engineers the life-cycle environmental impact of prestressed precast concrete.

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and ISO 21930. 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 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	Northeast Precast 4081 S. Lincoln Avenue Vineland, NJ 08361
DECLARATION NUMBER	EPD 621
DECLARED PRODUCT & DECLARED UNIT	Northeast Precast Structural Precast Concrete Declared Unit = 1 metric tonne of Structural Precast Concrete
REFERENCE PCR AND VERSION NUMBER	ASTM: Product Category Rule for Environmental Product Declarations: PCR for Precast Concrete – UNCPC: 37550, Version 3.0, Published May 2021
DESCRIPTION OF PRODUCT(S) APPLICATION/USE	A total precast structure uses precast concrete components for the construction of an entire building, combining structural and cladding functions into one system. A total precast structure often includes horizontal members such as floor and roof elements, and vertical members such as walls and columns.
MARKETS OF APPLICABILITY	US
DATE OF ISSUE	1/16/2024
PERIOD OF VALIDITY	5 years
EPD TYPE	Product Specific
DATASET VARIABILITY	N/A
EPD SCOPE	Cradle-to-Gate
YEAR(S) OF REPORTED PRIMARY DATA	2022
LCA SOFTWARE & VERSION NUMBER	SimaPro 9.4
LCI DATABASE(S) & VERSION NUMBER	Ecoinvent v3.9 & USLCI v2.0
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1; CML 4.1
METHODOLOGY LIMITATIONS	Some LCA impact categories and inventory items are still under development and can have high levels of uncertainty. To promote uniform guidance on the data collection, calculation, and reporting of results, the ACLCA methodology (ACLCA 2019) was used.
The sub-category PCR review was conducted by:	Dr. Thomas P. Gloria, PhD, t.gloria@industrial-ecology.com Mr. Bill Stough Dr. Michael Overcash
This declaration was independently verified in accordance with ISO 21930:2017 and ISO 14025: 2006. Timothy S. Brooke, ASTM International ☐ INTERNAL ☒ EXTERNAL	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Lindita Bushi, PhD, Athena Sustainable Materials Institute

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 §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.

General Information

Description of Company/Organization

Northeast Precast (NEP) delivers “Total Precast Solutions” from design & value engineering to manufacturing, logistics and installation of precast products. NEP serves industrial warehousing, highway infrastructure, total precast buildings, parking garages and residential housing. **Northeast Precast is a PCI and NPCA Certified plant.**

Product Description

10" Prestressed Solid Wall Panels: A prestressed solid wall panel consists of a single layer of solid reinforced concrete, often used to resist lateral and gravity building loads.

Prestressed Double Tee: A prestressed double tee is a horizontal precast concrete component used for structural floors and roofs. The structural efficiency of the member shape, which consists of a wide, flat flange on top, combined with two stems underneath, allows a long span capable of carrying high loads.

Column: A precast column is a vertical reinforced concrete component used mainly to carry the gravity loads of the structure. In a total precast structure, the columns may incorporate corbels and ledges to support precast beams or floor members.

Prestressed Beam: A prestressed beam is a horizontal precast concrete component that spans between columns and usually supports precast floor or roof members. Prestressed beams are typically designed with a rectangular, L-shaped, or inverted tee cross section.

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 2022 calendar year, was used as a proxy. For any product group EPDs, an impact assessment was completed for each product and the highest impacts were reported as conservative representations of the product group. Product grouping was considered appropriate if the individual product impacts differed by no more than ±10% in any impact category.

Application

Structural precast refers to reinforced concrete components fabricated in a controlled environment, and installed on site as part of the load-resisting system of a structure. Structural precast can also be used to meet other needs of a structure, such as aesthetic, thermal, and functional requirements.

Material Composition

This sub-category PCR recognizes fly ash, silica fume, and granulated blast furnace slag as recovered materials and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a precast concrete material input.

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 Structural Precast Concrete is as follows:

Material	10" Prestressed Solid Wall	Prestressed Double Tee	Column	Prestressed Beam
Minerals (Gypsum, TiO2, Na2CO3, etc.)	89.06%	91.44%	90.17%	89.41%
Water Reducer	0.09%	0.13%	0.12%	0.12%
Air Entrainer	0.01%	0.03%	0.03%	0.03%
Water	6.30%	6.18%	6.10%	6.05%
Steel	4.53%	2.22%	3.58%	4.39%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Placing on the Market / Application Rules

The Structural Precast Concrete conforms to the certifications and regulations below:
- PCI Policy 20
  - MNL-116 Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products
  - MNL-117 Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products
  - MNL-130 Manual for Quality Control for Plants and Production of Glass Fiber Reinforced Concrete Products
  - MNL-135 Tolerance Manual for Precast and Prestressed Concrete Construction
- ISO 9001:2015
- Including IAF Code 16 for Concrete and Construction
- Including IAF Code 28 for Concrete and Construction
- UNCPC: 37550

Properties of Declared Product as Shipped

The finished panels are hoisted onto a truck bed using a crane and strapped into place for transport. All packaging includes the ratchet straps that are used to strap the concrete into place. These racthet straps are regularly reused.

Methodological Framework

Declared Unit

The declaration refers to the declared unit of 1 metric tonne of product as specified in the PCR.

	10" Prestressed Solid Wall Panels		Prestressed Double Tee		Column		Prestressed Beam	
Name	**Value**	**Unit**	**Value**	**Unit**	**Value**	**Unit**	**Value**	**Unit**
Declared unit	1 metric tonne of Structural Precast Concrete product.							
UNCPC code	37550							
Density	2555.7	kg/m^3	2457.9	kg/m^3	2447.3	kg/m^3	2265.2	kg/m^4

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)

Cradle-to-Gate EPDs are intended for Business to Business communication.

Allocation

Allocation was determined on a per metric tonne basis for primary data. For secondary data, cut-off methodology was used. All upstream recycling benefits that would have been accounted for in module A1 were nullified and accounted for in module D to avoid allocation by system expansion within the system boundaries.

Cut-off Criteria

This LCA follows the attributional LCA approach. 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 Northeast Precast. Secondary data from the SimaPro Ecoinvent v3.9 & USLCI v2.0 databases were utilized. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the Precast Concrete product category.

Data Quality

The data sources used are complete and representative of North America 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. No "green power" certificates are used in this EPD.

Period Under Review

The period under review is the full calendar year of 2022.

Treatment of Biogenic Carbon

The uptake and release of biogenic carbon throughout the product life cycle follows ISO 21930 Section 7.2.7

Comparability and Benchmarking

Environmental declarations from different programs (ISO 14025) may not be comparable. EPDs are comparable only if they use the same PCR (or sub-category PCR where applicable), include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works. 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. However, variations and deviations are possible. Example of variations: different LCA software and background LCI datasets may lead to different results for the life cycle stages declared.

Estimates and Assumptions

A1 - A3
Four suppliers supplied EPD-specific information. EPDs for XPS and EPS (less than 1% by mass contribution) were created to EN15804 and not ISO 21930, a proxy was used for incompatible cradle-to-gate material impact category data.

Units

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

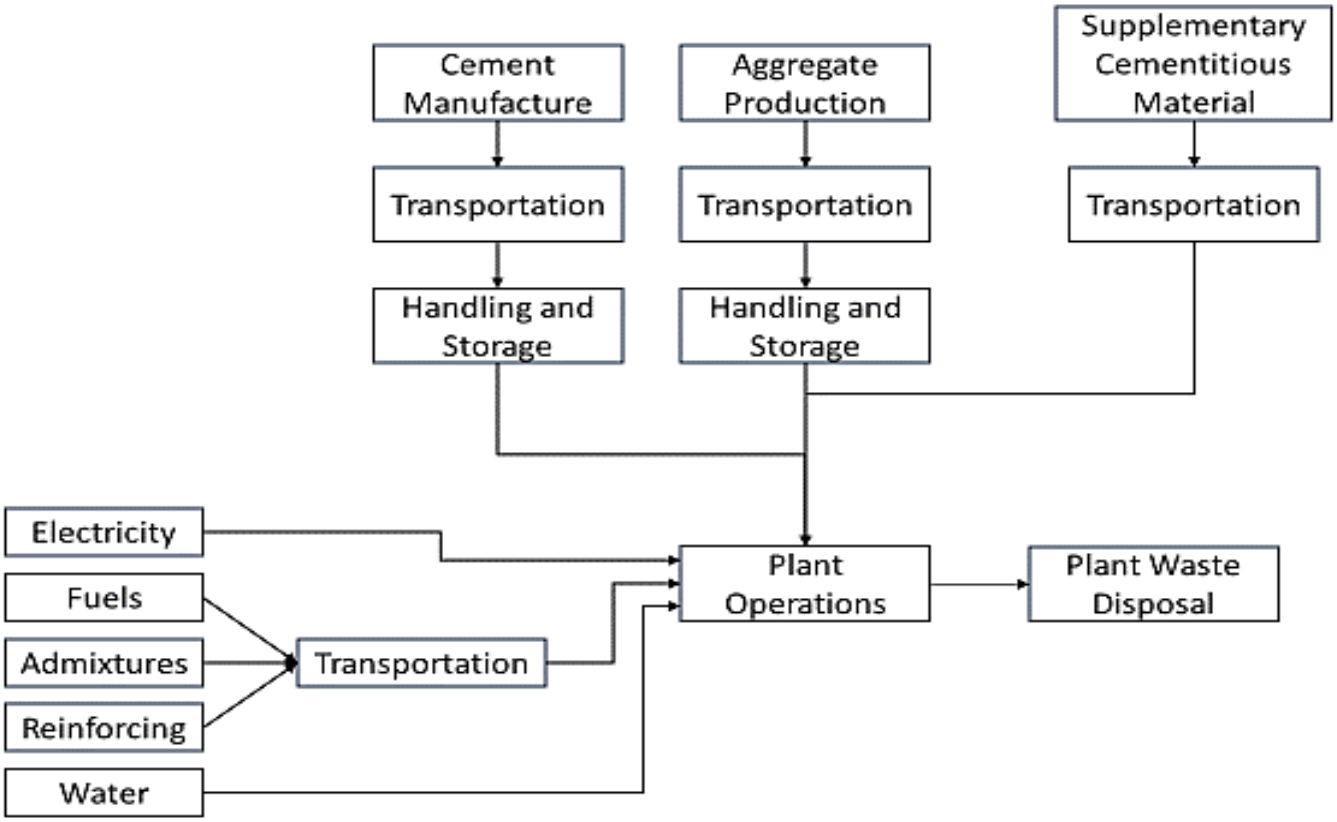
Additional Environmental Information

Background data

For life cycle modeling of the considered products, the SimaPro v9.4.0.2 software is used. Primary data were collected from the Northeast Precast owned facility. Secondary data was used for upstream raw material production and downstream inventory flows. This secondary data was sourced from either the Ecoinvent v3.9 or USLCI databases.

Manufacturing

Manufacturing of the precast concrete product starts with raw materials which are transported to a plant where they are mixed in batches to create concrete. The uncured concrete is then loaded into concrete mixing trucks and driven to the casting location. The uncured concrete is cast into a reusable mold along with steel reinforcement. The precast concrete is then left to cure.



10' Wall Panel Results per Declared Unit

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 (IPCC 2007 AR4)	kg CO_2-Eq.	2.13E+02	1.09E+01	2.09E+01	**2.45E+02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	7.33E-06	2.71E-06	2.02E-06	**1.21E-05**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	8.72E-01	6.92E-02	1.06E-01	**1.05E+00**
EP	Eutrophication potential	kg N-Eq.	6.01E-01	1.31E-02	6.38E-03	**6.21E-01**
SP	Smog formation potential	kg O_3-Eq.	1.01E+01	1.88E+00	2.12E+00	**1.41E+01**
FFD	Fossil fuel depletion	MJ-surplus	1.34E+02	2.27E+01	4.58E+01	**2.02E+02**

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1	A2	A3	Total
GWP	Global warming potential (IPCC 2013 AR5)	kg CO_2-Eq.	2.14E+02	1.10E+01	2.11E+01	**2.46E+02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	6.45E-06	2.03E-06	1.71E-06	**1.02E-05**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	9.07E-01	5.66E-02	9.72E-02	**1.06E+00**
EP	Eutrophication potential	$kg(PO_4)^3$-Eq.	3.73E-01	1.33E-02	1.20E-02	**3.98E-01**
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	3.18E-02	1.62E-03	8.80E-03	**4.22E-02**
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	1.52E-02	2.51E-05	1.46E-05	**1.52E-02**
ADPF	Abiotic depletion potential for fossil resources	MJ	7.24E+02	1.68E+02	3.25E+02	**1.22E+03**

**Not all LCA datasets for upstream materials include these impact categories and thus results may be incomplete. Use caution when interpreting data in these categories.*

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

Resource Use

Parameter	Parameter	Unit	A1	A2	A3	Total
RPR_E	Renewable primary energy as energy carrier	MJ	1.29E+02	1.40E+00	7.68E-01	**1.31E+02**
RPR_M	Renewable primary energy resources as material utilization	MJ	1.75E+01	4.76E-01	1.57E-01	**1.81E+01**
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	7.80E+02	1.81E+02	3.57E+02	**1.32E+03**
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	6.83E+02	0.00E+00	0.00E+00	**6.83E+02**
SM	Use of secondary material	kg	1.59E+01	0.00E+00	0.00E+00	**1.59E+01**
RSF	Use of renewable secondary fuels	MJ	9.01E+00	0.00E+00	0.00E+00	**9.01E+00**
NRSF	Use of nonrenewable secondary fuels	MJ	8.68E+01	0.00E+00	0.00E+00	**8.68E+01**
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
FW	Use of net fresh water	m^3	1.51E+00	1.88E-02	1.97E-03	**1.53E+00**

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	1.13E-02	4.14E-04	2.62E-04	**1.19E-02**
NHWD	Non-hazardous waste disposed	kg	7.56E+01	1.55E+01	6.21E+00	**9.74E+01**
HLRW	High-level radioactive waste	kg	2.93E-03	1.12E-03	3.88E-05	**4.09E-03**
ILLRW	Intermediate- and low-level radioactive waste	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
MR	Materials for recycling	kg	8.63E-02	0.00E+00	0.00E+00	**8.63E-02**
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
RE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

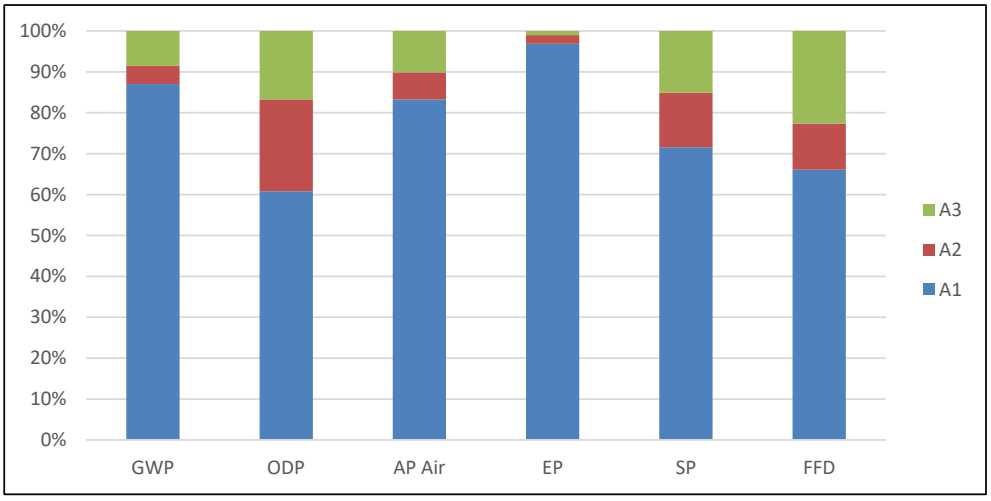
**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

Resource Use						
Parameter	**Parameter**	**Unit**	**A1**	**A2**	**A3**	**Total**
BCRP	Biogenic Carbon Removal from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CCE	Calcination Carbon Emissions	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CCR	Carbonation Carbon Removal	kg CO_2	7.97E+01	0.00E+00	0.00E+00	**7.97E+01**
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

10' Wall Panel LCA Interpretation

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



Double Tee Results per Declared Unit

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 (IPCC 2007 AR4)	kg CO_2-Eq.	2.21E+02	1.11E+01	2.09E+01	**2.53E+02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	6.33E-06	2.76E-06	2.02E-06	**1.11E-05**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	7.41E-01	7.04E-02	1.06E-01	**9.17E-01**
EP	Eutrophication potential	kg N-Eq.	4.70E-01	1.33E-02	6.38E-03	**4.90E-01**
SP	Smog formation potential	kg O_3-Eq.	9.52E+00	1.91E+00	2.12E+00	**1.35E+01**
FFD	Fossil fuel depletion	MJ-surplus	1.38E+02	2.31E+01	4.58E+01	**2.07E+02**

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1	A2	A3	Total
GWP	Global warming potential (IPCC 2013 AR5)	kg CO_2-Eq.	2.22E+02	1.11E+01	2.11E+01	**2.54E+02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	5.86E-06	2.07E-06	1.71E-06	**9.64E-06**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	7.67E-01	5.75E-02	9.72E-02	**9.22E-01**
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	3.35E-01	1.36E-02	1.20E-02	**3.60E-01**
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	1.98E-02	1.64E-03	8.80E-03	**3.03E-02**
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	1.13E-02	2.55E-05	1.46E-05	**1.13E-02**
ADPF	Abiotic depletion potential for fossil resources	MJ	4.46E+02	1.71E+02	3.25E+02	**9.42E+02**

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

Resource Use

Parameter	Parameter	Unit	A1	A2	A3	Total
RPR_E	Renewable primary energy as energy carrier	MJ	9.88E+01	1.42E+00	7.68E-01	**1.01E+02**
RPR_M	Renewable primary energy resources as material utilization	MJ	1.11E+01	4.84E-01	1.57E-01	**1.17E+01**
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	4.32E+02	1.84E+02	3.57E+02	**9.73E+02**
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	8.44E+02	0.00E+00	0.00E+00	**8.44E+02**
SM	Use of secondary material	kg	1.96E+01	0.00E+00	0.00E+00	**1.96E+01**
RSF	Use of renewable secondary fuels	MJ	1.11E+01	0.00E+00	0.00E+00	**1.11E+01**
NRSF	Use of nonrenewable secondary fuels	MJ	1.07E+02	0.00E+00	0.00E+00	**1.07E+02**
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
FW	Use of net fresh water	m^3	1.17E+00	1.91E-02	1.97E-03	**1.19E+00**

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	9.03E-03	4.21E-04	2.62E-04	**9.71E-03**
NHWD	Non-hazardous waste disposed	kg	7.50E+01	1.58E+01	6.21E+00	**9.70E+01**
HLRW	High-level radioactive waste	kg	2.20E-03	1.14E-03	3.88E-05	**3.38E-03**
ILLRW	Intermediate- and low-level radioactive waste	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
MR	Materials for recycling	kg	1.07E-01	0.00E+00	0.00E+00	**1.07E-01**
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
RE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

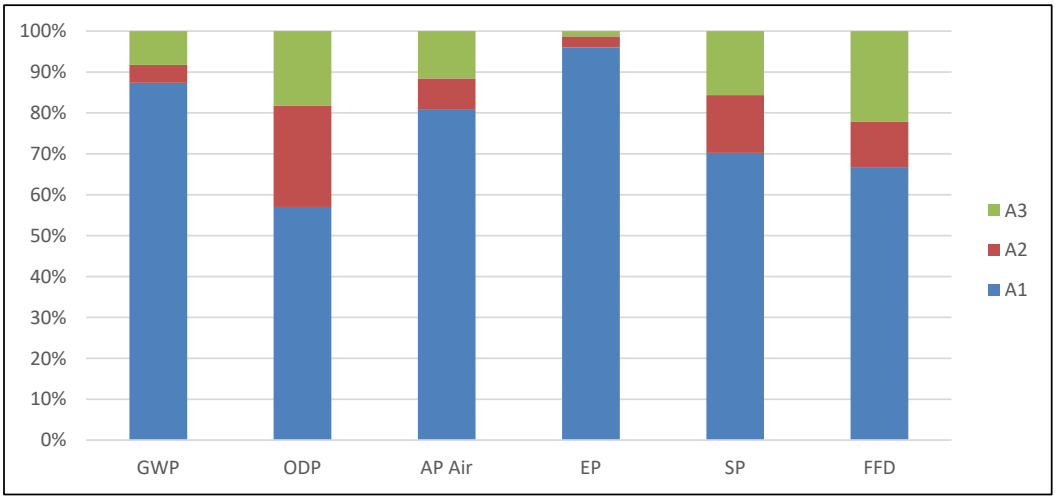
**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

Resource Use						
Parameter	**Parameter**	**Unit**	**A1**	**A2**	**A3**	**Total**
BCRP	Biogenic Carbon Removal from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CCE	Calcination Carbon Emissions	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CCR	Carbonation Carbon Removal	kg CO_2	9.84E+01	0.00E+00	0.00E+00	**9.84E+01**
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

Double Tee LCA Interpretation

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



Column Results per Declared Unit

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 (IPCC 2007 AR4)	kg CO_2-Eq.	2.42E+02	9.91E+00	2.09E+01	**2.73E+02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	7.72E-06	2.46E-06	2.02E-06	**1.22E-05**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	5.70E-01	6.27E-02	1.06E-01	**7.39E-01**
EP	Eutrophication potential	kg N-Eq.	4.38E-01	1.18E-02	6.38E-03	**4.56E-01**
SP	Smog formation potential	kg O_3-Eq.	9.61E+00	1.70E+00	2.12E+00	**1.34E+01**
FFD	Fossil fuel depletion	MJ-surplus	1.52E+02	2.06E+01	4.58E+01	**2.18E+02**

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1	A2	A3	Total
GWP	Global warming potential (IPCC 2013 AR5)	kg CO_2-Eq.	2.42E+02	9.93E+00	2.11E+01	**2.73E+02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	6.94E-06	1.84E-06	1.71E-06	**1.05E-05**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	5.64E-01	5.12E-02	9.72E-02	**7.12E-01**
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	3.20E-01	1.21E-02	1.20E-02	**3.44E-01**
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	1.47E-02	1.46E-03	8.80E-03	**2.50E-02**
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	3.23E-04	2.27E-05	1.46E-05	**3.61E-04**
ADPF	Abiotic depletion potential for fossil resources	MJ	6.47E+02	1.53E+02	3.25E+02	**1.12E+03**

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

Resource Use

Parameter	Parameter	Unit	A1	A2	A3	Total
RPR_E	Renewable primary energy as energy carrier	MJ	7.01E+01	1.27E+00	7.68E-01	**7.21E+01**
RPR_M	Renewable primary energy resources as material utilization	MJ	1.01E+01	4.31E-01	1.57E-01	**1.07E+01**
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	6.62E+02	1.64E+02	3.57E+02	**1.18E+03**
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	8.48E+02	0.00E+00	0.00E+00	**8.48E+02**
SM	Use of secondary material	kg	1.97E+01	0.00E+00	0.00E+00	**1.97E+01**
RSF	Use of renewable secondary fuels	MJ	1.12E+01	0.00E+00	0.00E+00	**1.12E+01**
NRSF	Use of nonrenewable secondary fuels	MJ	1.08E+02	0.00E+00	0.00E+00	**1.08E+02**
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
FW	Use of net fresh water	m^3	1.48E+00	1.70E-02	1.97E-03	**1.50E+00**

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	2.26E-03	3.75E-04	2.62E-04	**2.90E-03**
NHWD	Non-hazardous waste disposed	kg	2.94E+01	1.41E+01	6.21E+00	**4.97E+01**
HLRW	High-level radioactive waste	kg	4.85E-03	1.02E-03	3.88E-05	**5.91E-03**
ILLRW	Intermediate- and low-level radioactive waste	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
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**
RE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

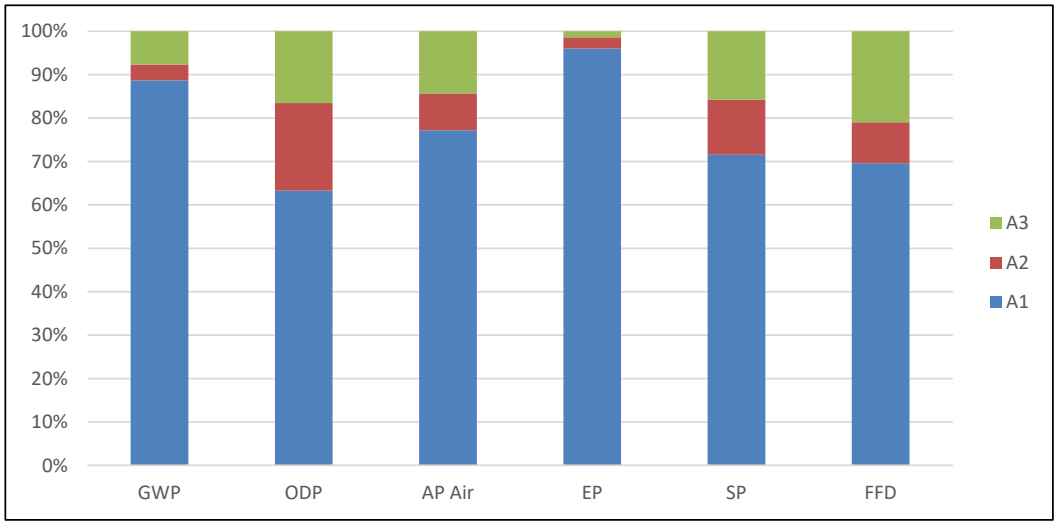
**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

Resource Use						
Parameter	**Parameter**	**Unit**	**A1**	**A2**	**A3**	**Total**
BCRP	Biogenic Carbon Removal from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CCE	Calcination Carbon Emissions	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CCR	Carbonation Carbon Removal	kg CO_2	9.89E+01	0.00E+00	0.00E+00	**9.89E+01**
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

Column LCA Interpretation

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



Beam Results per Declared Unit

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 (IPCC 2007 AR4)	kg CO_2-Eq.	2.70E+02	1.36E+01	2.09E+01	**3.05E+02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	8.74E-06	3.36E-06	2.02E-06	**1.41E-05**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.11E+00	8.57E-02	1.06E-01	**1.31E+00**
EP	Eutrophication potential	kg N-Eq.	7.39E-01	1.62E-02	6.38E-03	**7.62E-01**
SP	Smog formation potential	kg O_3-Eq.	1.26E+01	2.33E+00	2.12E+00	**1.71E+01**
FFD	Fossil fuel depletion	MJ-surplus	1.72E+02	2.82E+01	4.58E+01	**2.46E+02**

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1	A2	A3	Total
GWP	Global warming potential (IPCC 2013 AR5)	kg CO_2-Eq.	2.71E+02	1.36E+01	2.11E+01	**3.05E+02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	7.80E-06	2.52E-06	1.71E-06	**1.20E-05**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.16E+00	7.01E-02	9.72E-02	**1.33E+00**
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	4.70E-01	1.65E-02	1.20E-02	**4.99E-01**
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	3.83E-02	2.00E-03	8.80E-03	**4.91E-02**
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	2.08E-02	3.11E-05	1.46E-05	**2.09E-02**
ADPF	Abiotic depletion potential for fossil resources	MJ	8.03E+02	2.09E+02	3.25E+02	**1.34E+03**

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

Resource Use

Parameter	Parameter	Unit	A1	A2	A3	Total
RPR_E	Renewable primary energy as energy carrier	MJ	1.63E+02	1.73E+00	7.68E-01	**1.65E+02**
RPR_M	Renewable primary energy resources as material utilization	MJ	2.07E+01	5.90E-01	1.57E-01	**2.15E+01**
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	8.45E+02	2.25E+02	3.57E+02	**1.43E+03**
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	9.18E+02	0.00E+00	0.00E+00	**9.18E+02**
SM	Use of secondary material	kg	2.14E+01	0.00E+00	0.00E+00	**2.14E+01**
RSF	Use of renewable secondary fuels	MJ	1.21E+01	0.00E+00	0.00E+00	**1.21E+01**
NRSF	Use of nonrenewable secondary fuels	MJ	1.17E+02	0.00E+00	0.00E+00	**1.17E+02**
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
FW	Use of net fresh water	m^3	1.70E+00	2.33E-02	1.97E-03	**1.73E+00**

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	1.49E-02	5.13E-04	2.62E-04	**1.56E-02**
NHWD	Non-hazardous waste disposed	kg	9.43E+01	1.93E+01	6.21E+00	**1.20E+02**
HLRW	High-level radioactive waste	kg	3.43E-03	1.39E-03	3.88E-05	**4.86E-03**
ILLRW	Intermediate- and low-level radioactive waste	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
MR	Materials for recycling	kg	1.16E-01	0.00E+00	0.00E+00	**1.16E-01**
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
RE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

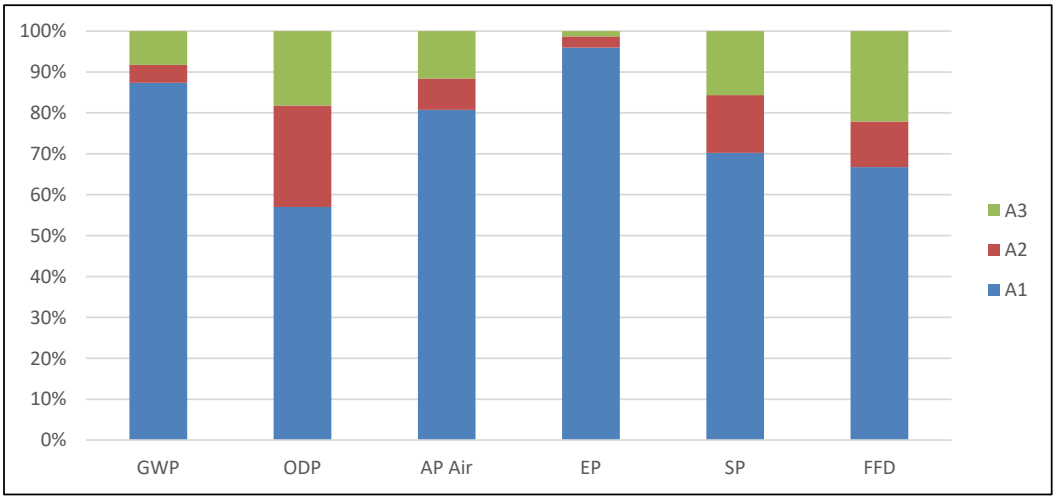
**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

Resource Use						
Parameter	**Parameter**	**Unit**	**A1**	**A2**	**A3**	**Total**
BCRP	Biogenic Carbon Removal from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CCE	Calcination Carbon Emissions	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
CCR	Carbonation Carbon Removal	kg CO_2	1.07E+02	0.00E+00	0.00E+00	**1.07E+02**
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

Beam 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

Northeast Precast is a PCI and NPCA certified plant.

Environmental and Health During Installation

There is no harmful emissive potential. No damage to health or impairment is expected under normal use of the product.

Extraordinary Effects

Fire
No danger to the environment is anticipated during exposure to fire.
Water
No substances are used which have a negative impact on ecological water quality on contact by the product with water.
Mechanical Destruction
No danger to the environment is anticipated during mechanical destruction.

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

Northeast Precast is at the forefront of our industry in sustainability initiatives. NEP is committed to sustainability through innovation. We demonstrate this dedication through lean manufacturing practices, state-of-the-art batch plant reclaiming systems, turning concrete waste into reusable material, energy efficient plants and harnessing new technologies to reduce environmental impacts. NEP is continuously seeking new ways to strengthen performance and reduce environmental impacts.

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Contact Information

Study Commissioner

Northeast Precast
4081 S. Lincoln Avenue Vineland, NJ 08361
Renee Fabbri- Quality Assurance Manager
rfabbri@northeastprecast.com
856-765-9088

LCA Practitioner

Sustainable Solutions Corporation
155 Railroad Plaza, Suite 203
Royersford, PA 19468 USA
(+1) 610 569-1047
info@sustainablesolutionscorporation.com
www.sustainablesolutionscorporation.com