ENVIRONMENTAL **PRODUCT DECLARATION**

HYDRODUCT®

DRAINAGE COMPOSITE

- **HYDRODUCT® 220**
- **HYDRODUCT® 660**

GCP is a leading global provider of construction products that include high-performance specialty construction chemicals and building materials.

Program Operator	NSF Certification LLC 789 N. Dixboro, Ann Arbor, MI 48105 www.nsf.org
General Program Instructions	NSF Program Operator Rules, February 2015
Manufacturer Name and Address	GCP Applied Technologies Inc. 2325 Lakeview Parkway Alpharetta GA 30009 USA
Declaration Number	EPD10785
Declared Product and Functional Unit	HYDRODUCT® 220, HYDRODUCT® 660 Functional Unit: 1 m2 of product
Reference PCR and Version Number	ASTM International Water-Resistive and Air Barriers
Product's intended Application and Use	Waterproofing Systems
Product RSL	Not Applicable
Markets of Applicability	North America
Date of Issue	September 26, 2022
Period of Validity	5 years from date of issue
EPD Type	Product Specific
Intended Audience	Business-to-Business
Range of Dataset Variability	N/A
EPD Scope	Cradle to Gate
Year of reported manufacturer primary data	2020
LCA Software and Version Number	GaBi 10.6.1.35
LCI Database and Version Number	GaBi Database 2022.1

LCIA Methodology and Version Number	TRACI 2.1
The PCR Review was Conducted By:	Thomas Gloria, PhD (chair) Graham Finch Paul H. Shipp
This declaration was independently verified in accordance with ISO 14025:2006. ISO 21930:2017 serves as the core PCR along with EN 15804 (2012) and UL PCR Part A, v3.1 (2018), with additional considerations from the UL PCR Part B: Insulated Metal Panels Metal Composite Panels and Metal Cladding - Roof and Wall Panels. ☐ **Internal** ☑ **External**	 Tony Favilla afavilla@nsf.org
This Reference Life Cycle Assessment was Conducted in Accordance with ISO 14044 and the Reference PCRs By:	WAP Sustainability Consulting
This Life Cycle Assessment was Independently Verified in Accordance with ISO 14044 and the Reference PCR By:	 Jack Geibig jgeibig@ecoform.com

Limitations:

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of Products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR. Full conformance with the PCR for Products allows EPD comparability only when all stages of a life cycle have been considered. 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. As this EPD is based on a declared unit, the results cannot be used to compare between products.

1 Product Definition and Information

1.1 DESCRIPTION OF COMPANY

GCP is a leading global provider of construction products that include high-performance specialty construction chemicals and building materials. GCP partners with producers, contractors, designers, and engineers to achieve performance and sustainability goals. The company has a legacy of first to market and award-winning solutions that have been used to build some of the world's most renowned structures. GCP is focused on continuous improvement for its customers, end-users, and the environment.

1.2 PRODUCT DESCRIPTION

HYDRODUCT® products are designed for a variety of applications, from green roofs to basement subfloors.

HYDRODUCT® 220

HYDRODUCT® 220 is designed primarily for use with waterproofing materials in vertical installations.

HYDRODUCT® 220 has been specially developed to provide a simple and highly practical collector and deflector of unwanted ground water on foundation walls, retaining walls, tunnels and planters. It can be used with PREPRUFE®, PROCOR®, or BITUTHENE® waterproof membranes. When installed it protects the membrane from damage and minimizes the build-up of percolated surface water against the structure. The construction of the studded sheet also creates an air void to isolate the structure from the effects of the surrounding ground.

HYDRODUCT® 660

HYDRODUCT® 660 Drainage Composite is designed to collect and transport water to drainage outlets. It can be used on all horizontal applications regardless of the type of overburden and serves as a combination drainage and protection course for all GCP waterproofing membranes.

The high strength, nonwoven geotextile is designed to maintain permeability while protecting the drainage composite from job site damage prior to, and during, the installation of the overburden. The high permittivity of the nonwoven geotextile facilitates the removal of water from a concrete pour, thus enhancing the concrete cure, as well as providing drainage after installation. The geotextile is securely bonded to the core to prevent intrusion of the fabric into the core during service. The high modulus backing film ensures compatibility when used with GCP other waterproofing products.

1.3 APPLICATION

A waterproofing membrane is a layer of water-tight material that lies on a surface to prevent water leaks or damages. The products assessed here are pre-formed sheet membranes. The objective of waterproofing is to secure a building from all kinds of water damages and prevent further repair work on the structure. HYDRODUCT® can be placed over GCP waterproofing membranes.

1.4 PRODUCT DESCRIPTION

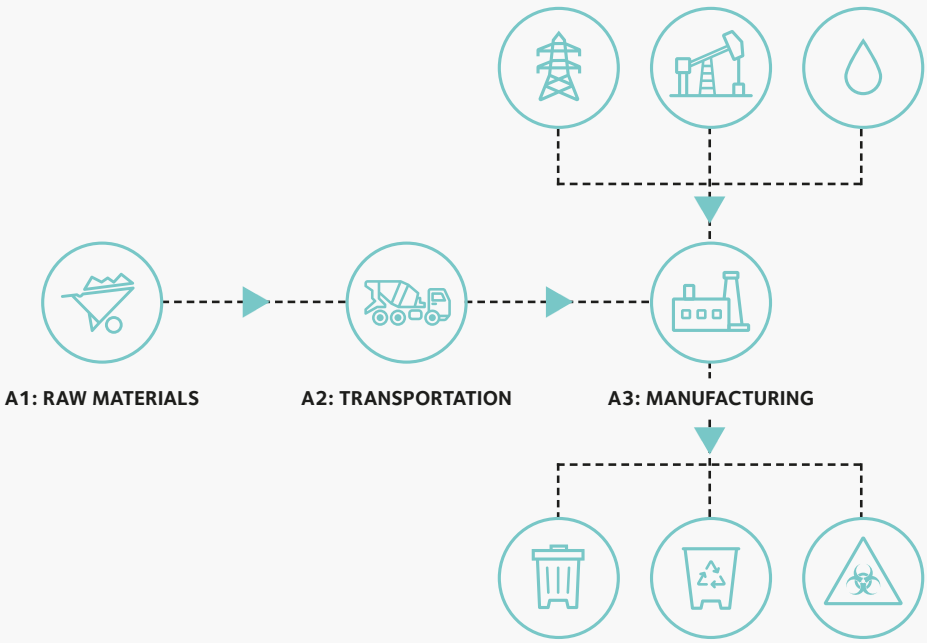
Table 1: Technical Data by Product

Parameter	Typical Value (HYDRODUCT® 220)	Typical Value (HYDRODUCT® 660)	Test Method
Color	Black	Black	
	Drainage Core		
Thickness	0.40 in. (10 mm) nominal	0.40 in. (10 mm) nominal	ASTM D1777
Compressive Strength	15,000 lbs/ft^2 (718 kPa)	21,000 lbs/ft^2(1005kPa)	ASTM D1621
Flow Rate (Gradient 1.0,)	21 gal/min./ft (260 L/min./m)	23 gal/min./ft (286 L/min./m)	ASTM D4716
	Geotextile		
Tensile Strength	100 lbs (445 N)	205 lbs (912N)	ASTM D4632
Apparent Opening Size	70 U.S. sieve (0.21 mm)	80 U.S. sieve (0.177 mm)	ASTM D4751
Flow Rate	140 gal/min./ft^2 (5704 L/min./m^2)	95gal/min./ft^2 (3870 L/min./m^2)	ASTM D4491
CBR Puncture	250 lbs (1.11 kN)	500 lbs (2.22 kN)	ASTM D6241

1.5 DECLARATION OF METHODOLOGICAL FRAMEWORK

This EPD is considered a Cradle-to-Gate study. A summary of the life cycle stages included in this EPD is presented in 2.2. No known flows are deliberately excluded from this EPD. Third party verified ISO 14040/44 secondary LCI data sets contribute more than 67% of total impacts in all impact categories required by the PCR.

1.6 PROCESS FLOW DIAGRAM



1.7 MANUFACTURING

Raw materials are sourced from the suppliers within North America and are transported to the toll manufacturing facility located in the southeastern US by a combination of truck and train transportation.

1.8 MATERIAL COMPOSITION

Table 2: Material Composition per declared unit of 1 m² of product for installation

Materials	HYDRODUCT® 220	HYDRODUCT® 660
Polyethylene	94.3%	94.3%
Other Materials	5.7%	5.7%

This product contains no regulated substances.

1.9 PACKAGING

Table 3: Packaging requirements per functional unit of 1 m² of product for installation

	HYDRODUCT® 220	HYDRODUCT® 660	Unit
Plastic	0.0394	0.0420	kg/m²

2 Life Cycle Assessment Background Information

2.1 DECLARED UNIT

The declared unit according to the PCR is 1 m^2 of product for installation.

Table 4: Declared Unit

	HYDRODUCT® 220	HYDRODUCT® 660
Declared Unit	1m^2	1 m^2
Weight (kg)	1.18	1.18

2.2 SYSTEM BOUNDARY

This EPD is considered a Cradle-to-Gate study. A summary of the life cycle modules included in this EPD is presented in Table 3. Modules A4-A5, B1-B4 and C1-C4 were not declared. Infrastructure flows have been excluded.

Table 5: Summary of Included Life-Cycle Modules

Module	Description
A1	Product Stage: Raw Material Supply
A2	Product Stage: Transport
A3	Product Stage: Manufacturing

2.3 ESTIMATES AND ASSUMPTIONS

All estimates and assumptions are within the requirements of ISO 14040/44. Most of the estimations are within the primary data. The primary data was collected as annual totals including all material inputs, utility usage and production information. For the LCA, the total utility usage information was divided by the annual input of all materials and then allocated to the product based on its material composition.

2.4 CUTOFF CRITERIA

Material inputs greater than 1% (based on total mass of the final product) were included within the scope of analysis. Material inputs less than 1% were included if sufficient data was available to warrant inclusion and/or the material input was thought to have significant environmental impact. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the functional unit. No known flows are deliberately excluded from this EPD.

2.5 DATA SOURCES

Primary data were collected by GCP associates for onsite energy, water, and waste during manufacturing. Whenever available, supplier data were used for raw materials used in the production process. When primary data did not exist, secondary data for raw material production were used from GaBi Database 2022.1. All calculation procedures adhere to ISO 14044.

2.6 DATA QUALITY

The geographical scope of the manufacturing portion of the life cycle is southeastern US. All primary data were collected from the manufacturer. The geographic coverage of primary data is considered excellent. Primary data were provided by the manufacturer and represent all information for calendar year 2020. Secondary data meets the requirement of the PCR that all data be updated within a 10- year period. Primary data provided by the manufacturer is specific to the technology that the company uses in manufacturing their product. It is site-specific and considered of good quality. Data used to allocate energy and water on a per unit of product produced includes overhead energy such as lighting, heating, and sanitary use of water. Sub-metering was not available to extract process only energy and water use from the total energy use. Sub-metering would improve the technological coverage of data quality.

2.7 PERIOD UNDER REVIEW

The period under review is calendar year 2020.

2.8 ALLOCATION

General principles of allocation were based on ISO 14040/44. The manufacturing processes at GCP studied in this LCA, produces different types of construction products that are similar in product specifications. A mass-based allocation method was adopted for this study. The manufacturing inputs and wastes were allocated on a mass basis to the product. As a default, secondary GaBi datasets use a physical mass basis for allocation. Throughout the study recycled materials were accounted for via the cut-off method.

3 Life Cycle Assessment Results

All results are given per functional unit, which is 1m^2 of applied waterproofing or air-barrier. Environmental impacts were calculated using the GaBi software platform. Impact results have been calculated using both TRACI 2.1 and IPCC characterization factors. 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. Emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in these categories.

Table 6: Description of the System Boundary Modules

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw Material Supply	Transport	Manufacturing	Transport From Gate to Site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste Processing	Disposal	Reuse, Recovery, Recycling Potential
CRADLE TO GRAVE	X			MND		MND							MND				MND

Table 7: LCIA Indicators

Abbreviation	Parameter	Unit
	IPCC AR 5	
GWP	Global warming potential (100 years, excludes biogenic CO_2)	kg CO_2 eq
	TRACI 2.1	
AP	Acidification potential of soil and water	kg SO_2 eq

EP	Eutrophication potential	kg N eq
GWP	Global warming potential (100 years, excludes biogenic CO_2)	kg CO_2 eq
ODP	Depletion of stratospheric ozone layer	kg CFC 11 eq
SFP	Smog formation potential	kg O_3 eq

In addition to the environmental parameters described in the previous section, the following resource use and waste categories are also disclosed.

Table 8: Resource Use, Waste, and Output Flow Indicators

Abbreviation	Parameter	Unit
	Resource Use Parameters	
RPR_E	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value (LHV)
RPR_M	Use of renewable primary energy resources used as raw materials	MJ, net calorific value
$NRPR_E$	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value
$NRPR_M$	Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value
SM	Use of secondary materials	kg
RSF	Use of renewable secondary fuels	MJ, net calorific value
NRSF	Use of non-renewable secondary fuels	MJ, net calorific value
RE	Recovered energy	MJ, net calorific value
FW	Net use of fresh water	m^3

Waste Parameters and Output Flows		
HWD	Disposed-of-hazardous waste	kg
NHWD	Disposed-of non-hazardous waste	kg
HLRW	High-level radioactive waste, conditioned, to final repository	kg
ILLRW	Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
CRU	Components for reuse	kg
MR	Materials for recycling	kg
MER	Materials for energy recovery	kg
EEE	Exported electrical energy	MJ
EET	Exported thermal energy	MJ

In order to align with the PCR, which references ISO 21930:2007, primary energy consumption results also need to be reported for the higher heating value (HHV) / gross calorific value, as well as material resource consumption.

Table 9: Additional indicator results (ISO 21930:2007)

Parameter	Unit
Total Primary Energy Consumption	
Nonrenewable Fossil	MJ, gross calorific value (HHV)
Nonrenewable Nuclear	MJ, gross calorific value (HHV)
Renewable (Solar, Wind, Hydro, Geo)	MJ, gross calorific value (HHV)
Renewable (Biomass)	MJ, gross calorific value (HHV)

Material Resources Consumption	
Nonrenewable Material Resources	kg
Renewable Material Resources	kg

3.1 RESULTS (ISO 21930:2017)

Table 10: LCIA results for HYDRODUCT® products, per 1 m²

Impact Category	HYDRODUCT® 220 A1	HYDRODUCT® 220 A2	HYDRODUCT® 220 A3	HYDRODUCT® 220 A1-A3	HYDRODUCT® 660 A1	HYDRODUCT® 660 A2	HYDRODUCT® 660 A3	HYDRODUCT® 660 A1-A3
IPCC AR5								
GWP [kg CO2 eq]	7.14E-01	7.51E-02	2.48E-01	**1.04E+00**	7.60E-01	8.01E-02	2.64E-01	**1.10E+00**
TRACI								
AP [kg SO2 eq]	1.14E-03	1.13E-04	4.69E-04	**1.72E-03**	1.21E-03	1.20E-04	5.00E-04	**1.83E-03**
EP [kg N eq]	7.68E-05	1.59E-05	3.27E-05	**1.25E-04**	8.18E-05	1.69E-05	3.49E-05	**1.34E-04**
GWP [kg CO2 eq]	6.78E-01	7.41E-02	2.39E-01	**9.91E-01**	7.22E-01	7.90E-02	2.55E-01	**1.06E+00**
ODP [kg CFC 11 eq]	1.55E-14	1.41E-16	1.02E-14	**2.58E-14**	1.65E-14	1.50E-16	1.09E-14	**2.75E-14**
SFP [kg O3 eq]	2.78E-02	2.54E-03	4.35E-03	**3.47E-02**	2.96E-02	2.70E-03	4.63E-03	**3.70E-02**
Resource Use Indicators								
RPRE [MJ]	6.86E-01	4.07E-02	5.19E-01	**1.25E+00**	7.32E-01	4.34E-02	5.53E-01	**1.33E+00**
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
NRPRE [MJ]	1.04E+01	1.05E+00	4.02E+00	**1.55E+01**	1.11E+01	1.12E+00	4.28E+00	**1.65E+01**
NRPRM [MJ]	1.16E+01	0.00E+00	0.00E+00	**1.16E+01**	1.24E+01	0.00E+00	0.00E+00	**1.24E+01**
SM [kg]	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
FW [m3]	4.42E-03	1.46E-04	1.13E-03	**5.70E-03**	4.71E-03	1.56E-04	1.21E-03	**6.07E-03**
Output Flows and Waste Categories								
HWD [kg]	1.04E-09	4.35E-12	1.71E-10	**1.21E-09**	1.11E-09	4.64E-12	1.82E-10	**1.29E-09**
NHWD [kg]	4.62E-03	9.00E-05	9.27E-03	**1.40E-02**	4.92E-03	9.59E-05	9.88E-03	**1.49E-02**
HLRW [kg]	3.58E-07	3.44E-09	4.91E-07	**8.53E-07**	3.81E-07	3.67E-09	5.24E-07	**9.09E-07**
ILLRW [kg]	2.99E-04	2.90E-06	4.10E-04	**7.13E-04**	3.19E-04	3.09E-06	4.37E-04	**7.59E-04**
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
MR [kg]	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
MER [kg]	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**
EEE [MJ]	0.00E+00	0.00E+00	2.32E-03	**2.32E-03**	0.00E+00	0.00E+00	2.47E-03	**2.47E-03**
EET [MJ]	0.00E+00	0.00E+00	1.09E-03	**1.09E-03**	0.00E+00	0.00E+00	1.16E-03	**1.16E-03**

3.2 ADDITIONAL RESULTS (ISO 21930:2007)

Table 11: Additional indicator results for HYDRODUCT® products, per 1 m²

	HYDRODUCT® 220 A1	HYDRODUCT® 220 A2	HYDRODUCT® 220 A3	HYDRODUCT® 220 A1-A3	HYDRODUCT® 660 A1	HYDRODUCT® 660 A2	HYDRODUCT® 660 A3	HYDRODUCT® 660 A1-A3
Total Primary Energy Consumption [MJ (HHV)]								
Nonrenewable Fossil	2.33E+01	1.12E+00	3.20E+00	**2.76E+01**	2.48E+01	1.19E+00	3.41E+00	**2.94E+01**
Nonrenewable Nuclear	7.66E-01	7.39E-03	1.05E+00	**1.83E+00**	8.17E-01	7.88E-03	1.12E+00	**1.95E+00**
Renewable (Solar, Wind, Hydro, Geo)	6.86E-01	4.07E-02	5.19E-01	**1.25E+00**	7.32E-01	4.34E-02	5.53E-01	**1.33E+00**
Renewable (Biomass)	-	-	-	**-**	-	-	-	**-**
Material Resources Consumption (kg)								
Nonrenewable Material Resources	1.14E+00	8.06E-03	3.45E-01	**1.49E+00**	1.21E+00	8.59E-03	3.67E-01	**1.59E+00**
Renewable Material Resources	1.08E-02	1.03E-02	2.05E-02	**4.16E-02**	1.15E-02	1.10E-02	2.18E-02	**4.43E-02**

4 Life Cycle Assessment **Interpretation**

For the selected HYDRODUCT® products, the primary contributors to the GWP impacts are the raw materials found in module A1. Within the raw materials, polyethylene is the single largest contributor with close to 75% contribution within module A1. Manufacturing (A3) is the next most significant contributor, driven by electricity.

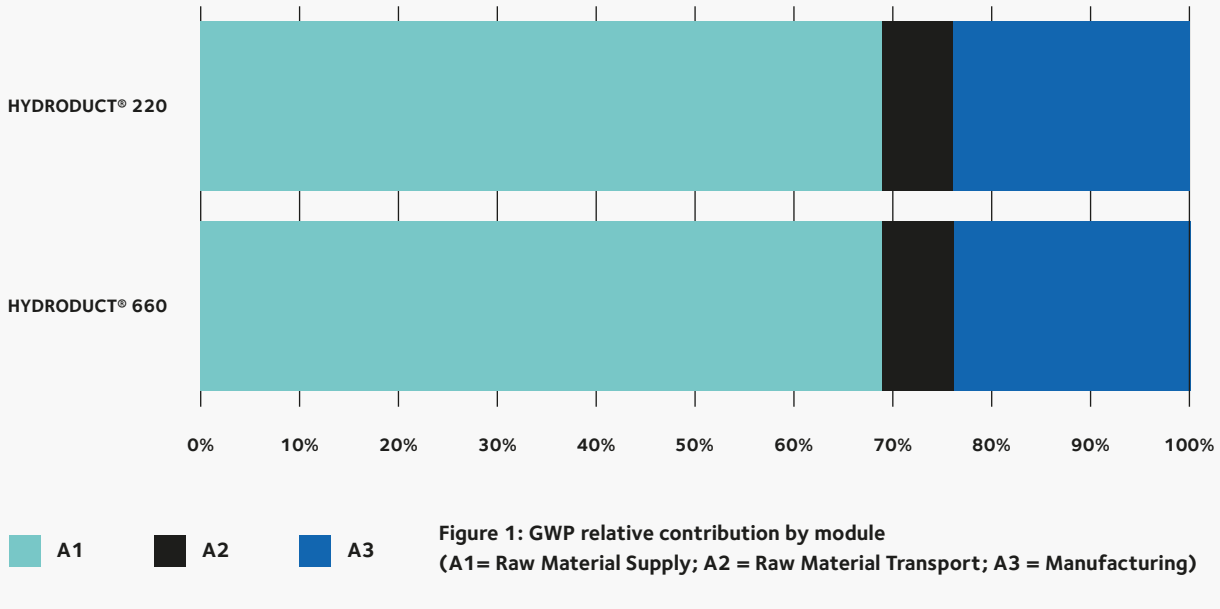


Figure 1: GWP relative contribution by module
(A1= Raw Material Supply; A2 = Raw Material Transport; A3 = Manufacturing)

5 Life Cycle Assessment **Interpretation**

1. IPCC. (2013). Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

2. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.

3. ISO 14044: 2006/ Amd 1:2017 Environmental Management – Life cycle assessment – Requirements and Guidelines – Amendment 1.

4. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.

5. ISO 21930:2007 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.

6. ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.

7. TRACI: The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts. Version 2.1 – User Guide - https://nepis.epa.gov/Adobe/PDF/P100HN53.pdf.

8. ASTM International PCR: Water-Resistive and Air Barriers (UNCPC 54530 and/or CSI MasterFormat DESIGNATIONS 072500, 072600 and 072700)