An Environmental Product Declaration

According to ISO 14025:2006 and ISO 21930:2017

A product-specific cradle-to-gate EPD for

Euclid Canada Inc. Chemical Admixtures for Concrete

AIR ENTRAINERS
SET ACCELERATORS
SET RETARDERS
WATER REDUCERS
SPECIALTY ADMIXTURERS

EUCLID CANADA

ASTM International Certified Environmental Product Declaration

This document is a Type III environmental product declaration (EPD) for 30 chemical admixtures for concrete as manufactured at Euclid's St. Hubert, QC, Toronto, ON and Calgary, AB facilities for the reference year 2022-23.

This declaration has been prepared according to the requirements of ISO 21930 (1), ISO 14025 (2), ISO 14040/44 (3), (4), and ASTM General Program Instructions for Type III EPD (5).

The intent of this document is to further the development of environmentally compatible and more sustainable construction methods by providing comprehensive environmental information related to potential impacts of chemical admixtures for concrete in accordance with international standards.

Environmental Product Declaration Summary

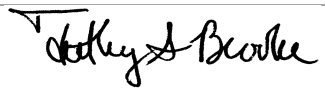
General Information	
EPD Commissioner	**Euclid Canada Inc.** 595 Canarctic Drive North York, ON M3J 2P9 https://www.euclidchemical.com/ The Euclid Chemical Company is a leading manufacturer of products for the concrete and masonry construction industry in North America. For over a century, Euclid Chemical has developed strong relationships with contractors, specifiers, owners, building materials suppliers and concrete producers, offering high quality products and industry leading technical support.
Manufacturer and production facility	**Toronto** 595 Canarctic Drive North York, Ontario, M3J 2P9 **St. Hubert** 2835 Grande-Allee St. Hubert, Quebec, J4T 2R4 **Calgary** 3915 78th Ave SE Calgary, Alberta, T2C 2L8 *The manufacturer of the declared products is liable for the underlying information and evidence.*

Products, Product Groups and Names	**Air Entrainers**: AIREX-L™, EUCON™ AIR MAC6, EUCON™ AIR MAC12, EUCON™ AEA-92 **Set Accelerators**: ACCELGUARD® 90, ACCELGUARD® G3, ACCELGUARD® NCA **Set Retarders**: EUCON™ 727, EUCON™ STASIS, EUCON™ DS **Water Reducers**: EUCON™ WR, EUCON™ MR, EUCON™ SE, EUCON™ DX, PLASTOL™ 341, PLASTOL™ 6420 **High Range Water Reducers**: EUCON™ 37, PLASTOL™ 5000, PLASTOL 5000/5000 SCC, PLASTOL™ 6200EXT, PLASTOL™ 6400 **Specialty Admixtures**: EUCON® ECO-STRENGTH, EUCON™ CIA, EUCON™ SRA FLOOR, EUCON™ SRA-XT, EUCON™ VANDEX™ AM-10L, EUCON™ AWA-P20/EUCOSHIELD™, PLASTOL™ AMP-X³, VISCTROL™
Product Category Rule (PCR)	ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services (1).
Certification Period	28/06/2024 – 5-year validity
Declared Unit	1 kg of chemical admixture for concrete
ASTM Declaration Number	EPD – 729
EPD Information	
Program Operator	ASTM International 100 Barr Harbor Drive, PO Box C700 West Conshohocken, PA 19428-2959 USA https://www.astm.org/products-services/certification/environmental-product-declarations/epd-pcr.html

Declaration Type
A “cradle-to-gate” production stage EPD for chemical admixtures for concrete. Production stage activities covered include the raw material supply, transport, and manufacturing (modules A1 to A3). The declaration is intended for Business-to-Business (B-to-B) communication.

Applicable Countries
United States and Canada

Product Applicability
Concrete admixtures are used as constituent materials to produce concrete, mortar and grout (unreinforced concrete, reinforced and prestressed concrete, site-mixed and ready-mixed concrete, precast concrete).

This EPD was independently verified by ASTM in accordance with ISO 14025 and the ISO 21930:		
Internal	**External**	Tim Brooke 100 Barr Harbor Drive West Conshohocken, PA 19428-2959 USA https://www.astm.org/
	X	

EPD Project Report Information	
EPD Project Report	A Cradle-to-Gate Life Cycle Assessment of Euclid Canada Inc. Chemical Admixtures for Concrete, Prepared for: Euclid Canada Inc., June 2024.
Prepared by 	Athena Sustainable Materials Institute 280 Albert St, Suite 404 Ottawa, ON K1P 5G8 Canada info@athenasmi.org www.athenasmi.org
This EPD project report was independently verified by and in accordance with ISO 14025, ISO 14040/44, and ISO 21930:	Thomas P. Gloria, Ph.D. Industrial Ecology Consultants 35 Bracebridge Road Newton, MA 02459-1728 USA
EPD explanatory material	For any explanatory material regarding this EPD, please contact the program operator: ASTM International Environmental Product Declarations 100 Barr Harbor Drive West Conshohocken, PA 19428-2959 USA http://www.astm.org

1 PRODUCT IDENTIFICATION

1.1 PRODUCT DEFINITION AND SPECIFICATIONS

Euclid admixtures are liquid agents that are introduced in small amounts (typically < 5% by mass of the cement content) to concrete while it is being mixed and that enhance the properties of the fresh and/or hardened concrete. This EPD covers six admixture categories including 30 chemical admixture products (see Tables 1.1 to 1.6). For further product details, see the Technical Data Sheets, Safety Data Sheets, and Specifications in the Euclid Admixture website: https://www.euclidchemical.com/products/admixtures/

Table 1.1 Euclid Products – Air Entrainers (liquid, relative density: 1.01-1.03)

Admixture	Admixture Category	Category Description
AIREX-L™	Air Entrainer	Air entraining admixtures are used to stabilize microscopic air bubbles in concrete, which will improve the durability of concrete when experiencing freezing and thawing weather.
EUCON™ AIR MAC6	Air Entrainer	
EUCON™ AIR MAC12	Air Entrainer	
EUCON™ AEA-92	Air Entrainer	

Table 1.2 Euclid Products – Set Accelerators (liquid, relative density: 1.2-1.5)

Admixture	Admixture Category	Category Description
ACCELGUARD® 90	Set Accelerator	Accelerating admixtures are added to shorten the set time of concrete and speed up early strength development.
ACCELGUARD® G3	Set Accelerator	
ACCELGUARD® NCA	Set Accelerator	

Table 1.3 Euclid Products – Set Retarders (liquid, relative density: 1.1-1.2)

Admixture	Admixture Category	Category Description
EUCON™ 727	Set Retarder	Set retarding admixtures are used to slow the setting time of concrete. By slowing initial set time, concrete mixtures are able to maintain fresh plastic properties for a longer period of time. This will reduce permeability, cracking, improve late age strength of heat-treated concrete and extend the workability in hot weather.
EUCON™ STASIS	Set Retarder	
EUCON™ DS	Set Retarder	

Table 1.4 Euclid Products – Water Reducers (liquid, relative density: 1.0-1.3)

Admixture	Admixture Category	Category Description
EUCON™ WR	Water Reducer	Normal Water Reducers are used to give longer and better workability, slump retention, and can reduce water demand by 5 -10%. Mid-Range Water Reducers are used to reduce the water demand between 5% and 15%, achieve longer slump retention, and give greater workability to concrete than normal ASTM C 494 Type A water reducers.
EUCON™ MR	Water Reducer	
EUCON™ SE	Water Reducer	
EUCON™ DX	Water Reducer	
PLASTOL™ 341	Water Reducer	
PLASTOL™ 6420	Water Reducer	

Table 1.5 Euclid Products – High Range Water Reducers (liquid, relative density: 1.0-1.2)

Admixture	Admixture Category	Category Description
EUCON™ 37	High Range Water Reducer	High-Range Water Reducers are used to reduce water demand by 12 -30%, giving the best workability, having superior slump retention and aiding in the production of High-Performance Concrete (HPC) and Self Consolidating Concrete (SCC).
PLASTOL™ 5000	High Range Water Reducer	
PLASTOL 5000/5000 SCC	High Range Water Reducer	
PLASTOL™ 6200EXT	High Range Water Reducer	
PLASTOL™ 6400	High Range Water Reducer	

Table 1.6 Euclid Products – Specialty Admixtures (liquid, relative density: 1.0-1.3)

Admixture	Admixture Category	Category Description
EUCON® ECO-STRENGTH	Specialty Admixture	Euclid Chemical provides a range of specialty concrete admixtures and additives to help produce, place, and finish various types of concrete mixtures.
EUCON™ CIA	Specialty Admixture	
EUCON™ SRA FLOOR	Specialty Admixture	
EUCON™ SRA-XT	Specialty Admixture	
EUCON™ VANDEX™ AM-10L	Specialty Admixture	
EUCON™ AWA-P20/EUCOSHIELD™	Specialty Admixture	
PLASTOL™ AMP-X[3]	Specialty Admixture	
VISCTROL™	Specialty Admixture	

Note: EUCON AWA-P20 is also marketed as EUCOSHIELD for different applications.

1.2 PRODUCT SPECIFICATIONS

Tables 2.1 to 2.6 show the product specifications and compliances for 30 declared products.

Table 2.1 Admixture Specifications/Compliances – Air Entrainers

Admixture	Specifications/Compliances	Master Format
AIREX-L™	ASTM C260 Approved by the Quebec and Ontario Ministry of Transportation	03 30 00 03 40 00 03 70 00
EUCON™ AIR MAC6	ASTM C260 AASHTO M154 ANSI / NSF STD 61	03 30 00 03 40 00 03 70 00
EUCON™ AIR MAC12	ASTM C260 AASHTO M154 ANSI / NSF STD 61	03 30 00 03 40 00 03 70 00
EUCON™ AEA-92	Corps of Engineers CRD C-13 ASTM C260 AASHTO M154 ANSI / NSF STD 61	03 30 00 03 40 00 03 70 00

Table 2.2 Admixture Specifications/Compliances – Set Accelerators

Admixture	Specifications/Compliances	Master Format
ACCELGUARD® 90	ASTM C494, Type C and E AASHTO M194 ASTM C1622 for Cold Weather Admixture Systems ACI 201, Guide for Durable Concrete, ACI 302 Guide for Concrete Floor and Slab Construction prohibit the use of chlorides in many types of concrete. ACCELGUARD 90 may be used in these types of concrete.	03 30 00 03 40 00
ACCELGUARD® G3	ASTM C494, Type C and E AASHTO M194 ASTM C1622 for Cold Weather Admixture Systems ACI 201, Guide for Durable Concrete ACI 302 Guide for Concrete Floor and Slab Construction prohibit the use of chlorides in many types of concrete. ACCELGUARD G3 may be used in these types of concrete.	03 30 00 03 40 00

ACCELGUARD® NCA	ANSI / NSF STD 61 ASTM C494, Type C and E AASHTO M194 ACI 201, Guide for Durable Concrete ACI 302 Guide for Concrete Floor and Slab Construction prohibit the use of chlorides in many types of concrete. ACCELGUARD NCA may be used in these types of concrete. ACCELGUARD G3 is effective in concrete of any temperature, particularly in freeze-resistant concrete admixture systems and contains no added chlorides or chemicals known to promote the corrosion of steel.	03 30 00 03 40 00

Table 2.3 Admixture Compliances – Set Retarders

Admixture	Specifications/Compliances	Master Format
EUCON™ 727	ASTM C494, Type D Approved by the Quebec and Ontario Ministry of Transportation	03 30 00 03 40 00 03 70 00
EUCON™ STASIS	ASTM C494 Type B & D ANSI / NSF STD 61	03 30 00 03 40 00 03 70 00
EUCON™ DS	ASTM C494 Type B & D ANSI / NSF STD 61	03 30 00 03 40 00 03 70 00

Table 2.4 Admixture Specifications/Compliances – Water Reducers

Admixture	Specifications/Compliances	Master Format
EUCON™ WR	ASTM C494, Type A & D AASHTO M194	03 30 00 03 40 00 03 70 00
EUCON™ MR	ASTM C494, Type A & F AASHTO M 194 ANSI/NSF STD 61	03 30 00 03 40 00 03 70 00
EUCON™ SE	ASTM C494, Type A & D AASHTO M194	03 30 00 03 40 00 03 70 00
EUCON™ DX	ASTM C494, Type A Approved by the Quebec and Ontario Ministry of Transportation	03 30 00 03 40 00 03 70 00

PLASTOL™ 341	ASTM C494, Type A & F AASHTO M194	03 30 00 03 40 00 03 70 00
PLASTOL™ 6420	ANSI / NSF STD 61 ASTM C494, Type A & F AASHTO M194	03 30 00 03 40 00 03 70 00

Table 2.5 Admixture Specifications/Compliances – High Range Water Reducers

Admixture	Specifications/Compliances	Master Format
EUCON™ 37	ASTM C494, Type A & F ASTM C1017 Type I AASHTO M194	03 30 00 03 40 00 03 70 00
PLASTOL™ 5000	ASTM C494, Type A & F ASTM C1017 Type I	03 30 00 03 40 00 03 70 00
PLASTOL 5000/5000 SCC	ASTM C 494, Type A and F AASHTO M 194 Type A and F ASTM C1017 Type I Approved by the Quebec and Ontario Ministry of Transportation	03 30 00 03 40 00 03 70 00
PLASTOL™ 6200EXT	ASTM C494, Type A & F ASTM C1017 Type I AASHTO M194	03 30 00 03 40 00 03 70 00
PLASTOL™ 6400	ASTM C494, Type A & F ASTM C1017 Type I AASHTO M194 ANSI / NSF STD 61	03 30 00 03 40 00 03 70 00

Table 2.6 Admixture Specifications/Compliances – Specialty Admixtures

Admixture	Specifications/Compliances	Master Format
EUCON® ECO-STRENGTH	ASTM C494 Type S ASTM C494 Type A, Pending	03 30 00 03 40 00 03 70 00
EUCON™ CIA	ASTM C1582 ASTM C494 Type C & E AASHTO M194 Type C Corps of Engineers Classification CRD C87 Type C	03 30 00 03 40 00 03 70 00
EUCON™ SRA FLOOR	AASHTO M194 ASTM C494 Type S	03 30 00 03 40 00 03 70 00
EUCON™ SRA-XT	AASHTO M194 ASTM C494 Type S	03 30 00 03 40 00 03 70 00
EUCON™ VANDEX™ AM-10L	ASTM C494 Type S	03 30 00 03 40 00 03 70 00
EUCON™ AWA-P20/EUCOSHIELD™	ASTM C494 Type S US Corps of Engineers CRD-C661	03 30 00 03 40 00 03 70 00
PLASTOL™ AMP-X³	ASTM C494, Type S MTQ	03 30 00 03 40 00 03 70 00
VISCTROL™	ASTM C494 Type S	03 30 00 03 40 00 03 70 00

2 DECLARED UNIT

The declared unit is defined as the quantity of a construction product for use as a reference unit in an EPD based on LCA for the expression of environmental information in information modules (1). The declared unit is 1 kg of chemical admixture for concrete.

3 MATERIAL COMPOSITION

Tables 3.1 to 3.6 provide the publicly available admixture composition as disclosed in SDS (Safety Data Sheets). The complete confidential product formulations were used to calculate the EPD results. All concentrations are percent by weight.

Table 3.1 Admixture Composition – Air Entrainers

Admixture	Ingredients	CAS number	Content in percent (%)
AIREX-L™	Sodium (C14-16) Olefin Sulfonate 4-Chloro-3-methylphenol (PCMC)	68439-57-6 59-50-7	3 - <5% 0.1 - <1%
EUCON™ AIR MAC6	Sodium (C14-16) Olefin Sulfonate Sodium hydroxide	68439-57-6 1310-73-2	1 - <3% 0.1 - <1%
EUCON™ AIR MAC12	Sodium (C14-16) Olefin Sulfonate Sodium hydroxide	68439-57-6 1310-73-2	1 - <3% 1 - <3%
EUCON™ AEA-92	Sodium (C14-16) Olefin Sulfonate	68439-57-6	5 - <10%

Table 3.2 Admixture Composition – Set Accelerators

Admixture	Ingredients	CAS number	Content in percent (%)
ACCELGUARD® 90	Calcium nitrate tetrahydrate Sodium thiocyanate	13477-34-4 540-72-7	50 - <100% 10 - <20%
ACCELGUARD® G3	Calcium nitrate tetrahydrate Sodium thiocyanate	13477-34-4 540-72-7	50 - <100% 1 - <5%
ACCELGUARD® NCA	Calcium nitrate tetrahydrate Sodium thiocyanate	13477-34-4 540-72-7	50 - <100% 1 - <5%

Table 3.3 Admixture Composition – Set Retarders

Admixture	Ingredients	CAS number	Content in percent (%)
EUCON™ 727	Sucrose 4-Chloro-3-methylphenol (PCMC)	57-50-1 59-50-7	10 - <20% 0.1 - <1%
EUCON™ STASIS	Sodium hydroxide p-Dioxane	1310-73-2 123-91-1	3 - <5% 0.1 - <1%
EUCON™ DS	The components are not hazardous or are below required disclosure limits.		

Table 3.4 Admixture Composition – Water Reducers

Admixture	Ingredients	CAS number	Content in percent (%)
EUCON™ WR	Triethanolamine	102-71-6	1 - 5%
EUCON™ MR	Calcium nitrate tetrahydrate Sodium thiocyanate Sodium hydroxide	13477-34-4 540-72-7 1310-73-2	20 - <50% 1 - <5% 0.1 - <1%
EUCON™ SE	Dimethylformocarbothialdine	533-74-4	0.1 - <1%
EUCON™ DX	Triethanolamine Sodium hydroxide	102-71-6 1310-73-2	1 - <5% 0.1 - <1%
PLASTOL™ 341	The components are not hazardous or are below required disclosure limits.		
PLASTOL™ 6420	The components are not hazardous or are below required disclosure limits.		

Table 3.5 Admixture Composition – High Range Water Reducers

Admixture	Ingredients	CAS number	Content in percent (%)
EUCON™ 37	The components are not hazardous or are below required disclosure limits.		
PLASTOL™ 5000	The components are not hazardous or are below required disclosure limits.		
PLASTOL 5000/5000 SCC	Sodium hydroxide	1310-73-2	0.1 - <1%
PLASTOL™ 6200EXT	Methacrylic acid	79-41-4	0.1 - <1%
PLASTOL™ 6400	The components are not hazardous or are below required disclosure limits.		

Table 3.6 Admixture Composition/Information on Ingredients – Specialty Admixtures

Admixture	Ingredients	CAS number	Content in percent (%)
EUCON® ECO-STRENGTH	Calcium nitrate tetrahydrate Sodium thiocyanate Diethanolamine Triethanolamine Acetic acid D-Gluconic acid	13477-34-4 540-72-7 111-42-2 102-71-6 64-19-7	20 - <50% 10 - <25% 5 - <10% 1 - <5% 1 - <3% 1 - <5%
EUCON™ CIA	The components are not hazardous or are below required disclosure limits.		
EUCON™ SRA FLOOR	Poly ethylene glycol mono butyl ether 2-(2-(2-Butoxyethoxy)ethoxy)ethanol Tetraethylene glycol Sodium hydroxide	9004-77-7 143-22-6 112-60-7 1310-73-2	25 - <50% 20 - <30% 1 - <5% 1 - <3%
EUCON™ SRA-XT	Poly ethylene glycol mono butyl ether 2-(2-(2-Butoxyethoxy)ethoxy)ethanol Tetraethylene glycol Sodium hydroxide	9004-77-7 143-22-6 112-60-7 1310-73-2	25 - <50% 20 - <30% 1 - <5% 1 - <3%
EUCON™ VANDEX™ AM-10L	The components are not hazardous or are below required disclosure limits.		
EUCON™ AWA-P20/EUCOSHIELD™	3(2H)-Isothiazolone, 5-chloro-2-methyl- 3(2H)-Isothiazolone, 2-methyl-		0.0015 - <0.06% 0.0015 - <0.1%
PLASTOL™ AMP-X[3]	Sodium hydroxide	1310-73-2	0.1 - <1%
VISCTROL™	The components are not hazardous or are below required disclosure limits.		

4 LIFE CYCLE STAGES

Figure 1 shows the life cycle stages and information modules that are included within the cradle-to-gate LCA system boundary of this EPD. The boundary is "cradle-to-gate," which includes the *Production stage* (A1 to A3 modules). *Construction, Use, and End-of-Life stages* are excluded from the system boundary. The *Production stage* system boundary is shown in Figure 2. Per ISO 21930, 7.1.7.2.1 (1), *the system boundary with nature (natural environment) includes those technical processes that provide the material and energy inputs into the system and the subsequent manufacturing and transport processes up to the factory gate, as well as the processing of any waste arising from those processes.*

Figure 1 Life Cycle Stages and Modules

Production stage			Construction stage		Use stage							End-of-life stage			
Extraction and upstream production	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-Construction/ Demolition	Transport to waste processing or disposal	Waste processing	Disposal of waste
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
X			MND												
X- module is included in system boundary; MND- module is not declared (excluded from system boundary)															

A1, Extraction and upstream production

This information module includes the cradle-to-gate production of all input chemicals/ ingredients, including formulation water, used in the production of all chemical admixtures. Euclid provided the solids content or active substance/solution strength for all input chemicals/ ingredients, which were then modeled in SimaPro LCA Software accordingly[1]. Facility-specific formulations are used for material and formulation water inputs. Input ingredients include

[1] Special attention was paid to correctly model all input chemicals in SimaPro LCA Software. In ecoinvent v3, chemicals are always expressed in 100 % active substance. Therefore, 1 kg of the chemical, example "*sodium hydroxide, without water, in 50 % solution state*", refers to 1 kg pure NaOH. The 50 % solution is merely given as a hint of the most frequent solution state the chemical might be found. This is explained in ecoinvent report 3, "*for dissolved chemicals, the traditional nomenclature of the chemical industry is to indicate the active substance and then add the water separately, so that e.g. 1 kg of "sodium hydroxide, without water, in 50% solution state", refers to the production of 2 kg NaOH solution with a water content of 50%, i.e., 1 kg pure NaOH plus 1 kg pure H2O (by specifying "without water" we seek to avoid the possible confusion that occurred with the naming convention in ecoinvent v1 & v2 where the name of this dataset was "sodium hydroxide, 50% in H2O")* (11).

acids, salts, defoamers, biocides, emulsifiers, amines, surfactants, and other chemicals. Facility-specific formulations are used for ingredients and formulation water inputs.

A2, Transport to factory

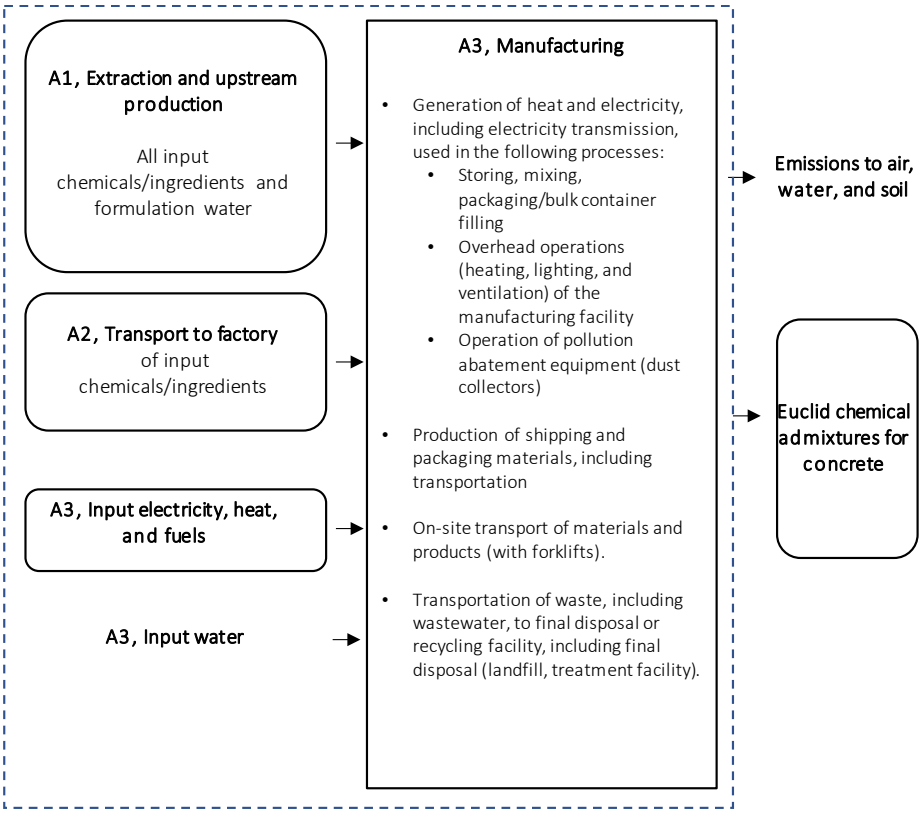
This information module includes transportation by truck, rail or ocean freighter of all input chemicals/ingredients, including empty backhauls.

A3, Manufacturing

This information module includes:

- A3, upstream production of shipping and packaging materials, including transportation; over 95% of the Euclid chemical admixtures were shipped in bulk (truck tanker); less than 5% of Euclid admixtures were shipped in 1000 L, 205L, and 20L containers;
- A3, generation of heat and electricity, used in manufacturing, including electricity transmission; extraction, refining and transport of fuel supply (liquified propane), including fuel combustion;
- A3, water consumption;
- A3, manufacturing of declared products; and
- A3, transportation of waste to the recycler or final disposal including the final disposal (landfill, treatment facility).

Figure 2 Production stage (module A1 to A3) system boundary of chemical admixtures for concrete



5 LIFE CYCLE INVENTORY

5.1 DATA COLLECTION, SOURCES, AND CALCULATIONS

LCI data collection was based on one customized LCI survey. The LCI survey covered the primary data for Euclid's St. Hubert, QC, Toronto, ON, and Calgary, AB facilities for the reference year 2022-2023 (12 consecutive months).

Data calculation procedures follow ISO 14044 (4), and ISO 21930 (1). The LCA model was developed using SimaPro v.9.5.0.2 2024 (6). SimaPro LCA software contains recognized databases (e.g., ecoinvent v3.9.1, 2023 database, Allocation, Cut-off by classification and U.S. LCI Database, 2015) that provide LCI datasets for upstream, core, and downstream material and processes. SimaPro 9.5.0.2 2024 also contains the U.S. EPA TRACI v2.1 2012 LCIA methodology, CML-baseline version 4.7 2016 LCIA methodology, and the Cumulative Energy Demand, LHV (NCV) version 1.0 November 2018 which are used for this LCA study. Per ISO 21930, 7.2.2 (1), when transforming the inputs and outputs of combustible material into inputs and outputs of energy, the net calorific value (lower heating value) of fuels is applied according to scientifically based and accepted values specific to the combustible material.

5.2 DATA QUALITY REQUIREMENTS AND ASSESSMENTS

A detailed description of collected data and the data quality assessment regarding ISO 14044 (4) and ISO 21930 (1) is provided in the LCA report (7). Data quality is assessed based on its representativeness (technology coverage, geographic coverage, time coverage), completeness, consistency, reproducibility, transparency, and uncertainty (Table 4).

Table 1. Data Quality Requirements and Assessments

Data Quality Requirements	Description
Technology Coverage	The data represents the prevailing technology at Euclid's St. Hubert, QC, Toronto, ON and Calgary, AB manufacturing facilities. Whenever available, technological-specific, or average industry LCI datasets were utilized for all upstream and core materials and processes. *Technological representativeness is characterized as "high."*
Geographic Coverage	The geographic region considered is Canada. Whenever available, for all upstream and core material and processes, geographic specific LCI datasets were utilized. *Geographical representativeness is characterized as "high."*
Time Coverage	Activity data are representative. - Chemical admixture manufacturing process- primary data collected for the St. Hubert, QC, Toronto, ON, and Calgary, AB facilities for the reference year 2022-23 (12 consecutive months). - In-bound/ out-bound transportation data- primary data collected for the St. Hubert, QC, Toronto, ON, Calgary, AB facilities for the reference year 2022-23 (12 consecutive months). - Generic data: the most appropriate LCI datasets were used as found in the ecoinvent v.3.9.1 database for US and global and US LCI Database, and modeled in SimaPro LCA software v.9.5.0.2, 2024 (6). *Temporal representativeness is characterized as "medium" to "high."*
Completeness	All relevant, specific processes, including inputs (raw materials, energy, and ancillary and packaging materials) and outputs (emissions and production volume) were considered and modeled. The relevant background materials and processes were taken from the ecoinvent v 3.9.1 LCI database for Canada and global and US LCI Database and modeled in SimaPro LCA software v.9.5.0.2, 2024 (6). The completeness of the cradle-to-gate process chain in terms of process steps is rigorously assessed for all products and documented in the LCA report.
Consistency	To ensure consistency, the input/output LCI modeling of the chemical admixtures used the same LCI modeling structure, which consisted of input raw, secondary (if applicable), ancillary and packaging materials (if applicable), intermediate products (if applicable), energy flows, water resource inputs, product outputs, co-products, emissions to air, water and soil, and solid and liquid waste disposal (if applicable). Crosschecks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the facility level to maintain a high level of consistency.
Reproducibility	Internal reproducibility is possible since the data and the models are stored and available in Athena's Euclid LCI database developed in SimaPro, 2024. A high level of transparency is provided throughout the reviewed LCA report as the LCI profile is presented for the declared products. Key primary (manufacturer specific) and secondary (generic) LCI data sources are summarized in the supporting LCA report.
Transparency	Activity and LCI datasets are transparently disclosed in the LCA report, including data sources.
Uncertainty	A *sensitivity check* was conducted to assess the reliability of the EPD results and conclusions by determining how they are affected by uncertainties in the data or assumptions on calculation of LCIA and energy indicator results. The LCA report includes the results of a *sensitivity analysis* and *Monte Carlo uncertainty analysis of background data sets.*

5.3 ALLOCATION RULES

"Mass" based, plant-specific formulation data for 1 kg of declared chemical admixture were used in this EPD. "Mass" was used as the physical parameter for allocating flows between the products of interest and other co-products to calculate the input energy flows (electricity, natural gas, liquified propane gas), ancillary and packaging materials used at the facility, process emissions to air and water, and waste flows (as applicable). In addition, allocation related to transport is based on the mass of transported inputs and outputs.

Per ISO 21930, 7.1 (1), this EPD follows the attributional LCA approach. The ecoinvent system model used was "Ecoinvent 3 - allocation, cut-off by classification", 2023. *The system model 'allocation, recycled content' or 'cut-off' is based on the approach that primary production of materials is always allocated to the primary user of a material. If a material is recycled, the primary producer does not receive any credit for the provision of any recyclable materials. The consequence is that recyclable materials are available burden-free to recycling processes and secondary (recycled) materials bear only the impacts of the recycling processes. Also, producers of waste do not receive any credit for the recycling or re-use of products resulting out of any waste treatment* (6).

5.4 CUT OFF RULES

The cut-off criteria as per ISO 21930, 7.1.8 (1) were followed:
In cases of insufficient input data or data gaps for a unit process, the cut-off criteria shall be 1 % of renewable primary resource (energy), 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 shall be a maximum of 5 % of energy usage, mass, and environmental impacts. When assumptions are used in combination with plausibility considerations and expert judgement to demonstrate compliance with these criteria, the assumptions shall be conservative.

Per ISO 21930, 7.1.8 (1), all input/output data collected at the Euclid manufacturing facilities were included in the LCI modelling of the admixtures developed using SimaPro v.9.5.0.2 2024 (6). None of the input/output was knowingly excluded from the system boundary. Any data gaps in the Safety Data Sheet (SDS) of input chemicals were filled in with two (proxy) generic LCI datasets, as appropriate (conservative assumptions): *Chemical, organic {GLO}| market for | Cut-off, U; Chemical, inorganic {GLO}| market for | Cut-off, U.*

This EPD excludes the following processes:

- production, manufacture, and construction of manufacturing capital goods and infrastructure;
- production and manufacture of production equipment, delivery vehicles, and laboratory equipment;
- personnel-related activities (travel, furniture, and office supplies); and
- energy and water use related to company management and sales activities that may be located either within the factory site or at another location.

6 LIFE CYCLE ASSESSMENT RESULTS

Tables 5 to 10 present the “cradle-to-gate” LCA results for 1 kg of chemical admixtures for concrete.

As per the US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), version 2.1, 2012 (8) impact categories are used as they provide a North American context for the mandatory category indicators to be included in this EPD. *These are relative expressions only and do not predict category impact endpoints, the exceeding of thresholds, safety margins or risks* (4). Per ISO 21930, 7.1.7.1 (1), “individual indicators for information modules A1, A2 and A3 may be aggregated to a total for each indicator in the production stage.”

“*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* (9) *was used.”*

Table 5 Production stage EPD Results (Total A1 to A3) – 1 kg Air Entrainers

Impact category and inventory indicators	Unit	Liquid AIREX-L™	Liquid EUCON™ AIR MAC6	Liquid EUCON™ AIR MAC12	Liquid EUCON™ AEA-92
GWP 100[1)]	kg CO_2 eq	8.5E-02	1.5E-01	2.7E-01	1.5E-01
ODP[1)]	kg CFC-11 eq	8.7E-10	1.0E-08	1.7E-08	1.1E-09
SFP[1)]	kg O_3 eq	5.4E-03	1.1E-02	2.6E-02	2.5E-02
AP[1)]	kg SO_2 eq	4.4E-04	6.3E-04	1.3E-03	1.3E-03
EP[1)]	kg N eq	1.6E-04	6.0E-04	1.1E-03	2.4E-04
FFD[1)]	MJ surplus, LHV	1.4E-06	4.4E-07	8.5E-07	1.9E-06
ADPf[2)]	MJ, LHV	1.8E+00	2.4E+00	4.1E+00	2.9E+00
RPRE	MJ, LHV	1.1E-01	2.5E+00	5.0E+00	1.2E-01
RPRM[3)]	MJ, LHV	0	0	0	0
NRPRE	MJ, LHV	2.0E+00	2.6E+00	4.5E+00	3.1E+00
NRPRM[4)]	MJ, LHV	0	0	0	0
SM[5)]	kg	0	0	0	0
RSF[6)]	MJ, LHV	0	0	0	0
NRSF[7)]	MJ, LHV	0	0	0	0
RE[8)]	MJ, LHV	0	0	0	0
FW[9)]	m^3	2.2E-03	2.7E-03	3.6E-03	2.5E-03
HWD[10)]	kg	0	0	0	0
NHWD[11)]	kg	5.1E-04	5.1E-04	5.1E-04	5.1E-04
HLRW[12)]	m^3	4.5E-10	4.3E-10	5.9E-10	4.6E-10
ILLRW[13)]	m^3	7.1E-10	5.5E-10	1.9E-09	7.4E-10
CRU[14)]	kg	0	0	0	0
MR[15)]	kg	0	0	0	0
MER[16)]	kg	0	0	0	0
EE[17)]	MJ, LHV	0	0	0	0

Table 6 Production stage EPD Results (Total A1 to A3) – 1 kg Set Accelerators

Impact category and inventory indicators	Unit	Liquid ACCELGUARD® 90	Liquid ACCELGUARD® G3	Liquid ACCELGUARD® NCA
GWP 100[1)]	kg CO_2 eq	1.7E+00	1.3E+00	1.9E+00
ODP[1)]	kg CFC-11 eq	1.2E-07	3.0E-08	1.9E-08
SFP[1)]	kg O_3 eq	9.7E-02	5.0E-02	8.8E-02
AP[1)]	kg SO_2 eq	8.7E-03	4.5E-03	6.6E-03
EP[1)]	kg N eq	2.0E-03	9.6E-04	1.1E-03
FFD[1)]	MJ surplus, LHV	5.2E-07	1.3E-07	1.4E-07
ADPf[2)]	MJ, LHV	1.4E+01	8.8E+00	1.2E+01
RPRE	MJ, LHV	5.2E-01	2.0E-01	1.6E-01
RPRM[3)]	MJ, LHV	0	0	0
NRPRE	MJ, LHV	1.4E+01	9.1E+00	1.2E+01
NRPRM[3)]	MJ, LHV	0	0	0
SM[3)]	kg	0	0	0
RSF[3)]	MJ, LHV	0	0	0
NRSF[3)]	MJ, LHV	0	0	0
RE[3)]	MJ, LHV	0	0	0
FW[3)]	m^3	1.8E-02	1.3E-02	1.6E-02
HWD[3)]	kg	0	0	0
NHWD[3)]	kg	5.1E-04	5.1E-04	5.1E-04
HLRW[3)4)]	m^3	8.5E-10	5.5E-10	0.0E+00
ILLRW[3)4)]	m^3	4.0E-09	1.5E-09	0.0E+00
CRU[3)]	kg	0	0	0
MR[3)]	kg	0	0	0
MER[3)]	kg	0	0	0
EE[3)]	MJ, LHV	0	0	0

Table 7 Production stage EPD Results (Total A1 to A3) – 1 kg Set Retarders

Impact category and inventory indicators	Unit	Liquid EUCON™ 727	Liquid EUCON™ STASIS	Liquid EUCON™ DS
GWP 100[1)]	kg CO_2 eq	5.5E-01	4.6E-01	3.8E-01
ODP[1)]	kg CFC-11 eq	8.0E-09	5.3E-08	7.6E-09
SFP[1)]	kg O_3 eq	5.4E-02	5.8E-02	2.2E-02
AP[1)]	kg SO_2 eq	3.5E-03	6.5E-03	3.4E-03
EP[1)]	kg N eq	2.5E-03	4.4E-03	2.4E-03
FFD[1)]	MJ surplus, LHV	5.9E-07	1.5E-05	8.3E-06
ADPf[2)]	MJ, LHV	5.9E+00	5.1E+00	4.1E+00
RPRE	MJ, LHV	5.8E+00	9.0E-01	2.5E-01
RPRM[3)]	MJ, LHV	0	0	0
NRPRE	MJ, LHV	6.6E+00	5.6E+00	4.4E+00
NRPRM[3)]	MJ, LHV	0	0	0
SM[3)]	kg	0	0	0
RSF[3)]	MJ, LHV	0	0	0
NRSF[3)]	MJ, LHV	0	0	0
RE[3)]	MJ, LHV	0	0	0
FW[3)]	m^3	3.9E-02	2.9E-02	1.6E-02
HWD[3)]	kg	0	0	0
NHWD[3)]	kg	5.1E-04	5.1E-04	5.1E-04
HLRW[3)4)]	m^3	7.4E-10	7.2E-10	5.4E-10
ILLRW[3)4)]	m^3	3.1E-09	2.8E-09	1.4E-09
CRU[3)]	kg	0	0	0
MR[3)]	kg	0	0	0
MER[3)]	kg	0	0	0
EE[3)]	MJ, LHV	0	0	0

Table 8.1 Production stage EPD Results (Total A1 to A3) – 1 kg Water Reducers

Impact category and inventory indicators	Unit	Liquid EUCON™ WR	Liquid EUCON™ MR	Liquid EUCON™ SE
GWP 100[1)]	kg CO_2 eq	6.4E-01	1.2E+00	5.6E-01
ODP[1)]	kg CFC-11 eq	2.3E-08	6.9E-08	3.9E-08
SFP[1)]	kg O_3 eq	6.6E-02	9.1E-02	5.8E-02
AP[1)]	kg SO_2 eq	6.2E-03	7.8E-03	3.5E-03
EP[1)]	kg N eq	3.9E-03	3.0E-03	2.5E-03
FFD[1)]	MJ surplus, LHV	2.6E-07	2.5E-07	4.3E-07
ADPf[2)]	MJ, LHV	6.3E+00	1.0E+01	6.7E+00
RPRE	MJ, LHV	1.0E+01	6.1E+00	3.9E+00
RPRM[3)]	MJ, LHV	0	0	0
NRPRE	MJ, LHV	6.9E+00	1.1E+01	7.4E+00
NRPRM[3)]	MJ, LHV	0	0	0
SM[3)]	kg	0	0	0
RSF[3)]	MJ, LHV	0	0	0
NRSF[3)]	MJ, LHV	0	0	0
RE[3)]	MJ, LHV	0	0	0
FW[3)]	m^3	1.5E-02	1.8E-02	2.9E-02
HWD[3)]	kg	0	0	0
NHWD[3)]	kg	5.1E-04	5.1E-04	5.1E-04
HLRW[3)4)]	m^3	7.1E-10	3.5E-10	7.5E-10
ILLRW[3)4)]	m^3	3.4E-09	3.1E-09	3.2E-09
CRU[3)]	kg	0	0	0
MR[3)]	kg	0	0	0
MER[3)]	kg	0	0	0
EE[3)]	MJ, LHV	0	0	0

Table 8.2 Production stage EPD Results (Total A1 to A3) – 1 kg Water Reducers (continued)

Impact category and inventory indicators	Unit	Liquid EUCON™ DX	Liquid PLASTOL™ 341	Liquid PLASTOL™ 6420
GWP 100[1)]	kg CO_2 eq	6.2E-01	5.6E-01	5.3E-01
ODP[1)]	kg CFC-11 eq	8.2E-09	2.4E-08	2.3E-08
SFP[1)]	kg O_3 eq	6.9E-02	3.4E-02	5.3E-02
AP[1)]	kg SO_2 eq	4.0E-03	1.8E-03	2.7E-03
EP[1)]	kg N eq	2.5E-03	1.1E-03	9.1E-04
FFD[1)]	MJ surplus, LHV	5.1E-07	2.2E-07	1.2E-07
ADPf[2)]	MJ, LHV	8.1E+00	1.1E+01	1.3E+01
RPRE	MJ, LHV	4.9E+00	1.1E+00	2.2E-01
RPRM[3)]	MJ, LHV	0	0	0
NRPRE	MJ, LHV	8.8E+00	1.1E+01	1.4E+01
NRPRM[3)]	MJ, LHV	0	0	0
SM[3)]	kg	0	0	0
RSF[3)]	MJ, LHV	0	0	0
NRSF[3)]	MJ, LHV	0	0	0
RE[3)]	MJ, LHV	0	0	0
FW[3)]	m^3	3.4E-02	1.4E-02	7.8E-03
HWD[3)]	kg	0	0	0
NHWD[3)]	kg	5.1E-04	5.1E-04	5.1E-04
HLRW[3)4)]	m^3	7.6E-10	6.0E-10	5.9E-10
ILLRW[3)4)]	m^3	3.3E-09	2.0E-09	1.9E-09
CRU[3)]	kg	0	0	0
MR[3)]	kg	0	0	0
MER[3)]	kg	0	0	0
EE[3)]	MJ, LHV	0	0	0

Table 9 Production stage EPD Results (Total A1 to A3) – 1 kg High Range Water Reducers

Impact category and inventory indicators	Unit	Liquid EUCON™ 37	Liquid PLASTOL™ 5000	Liquid PLASTOL 5000/5000 SCC	Liquid PLASTOL™ 6200EXT	Liquid PLASTOL™ 6400
GWP 100[1)]	kg CO_2 eq	6.2E-01	1.0E+00	1.0E+00	1.2E+00	1.1E+00
ODP[1)]	kg CFC-11 eq	6.0E-08	6.4E-08	6.7E-08	2.0E-08	2.2E-08
SFP[1)]	kg O_3 eq	5.2E-02	4.6E-02	5.0E-02	6.8E-02	4.8E-02
AP[1)]	kg SO_2 eq	3.8E-03	2.8E-03	2.9E-03	3.0E-03	2.3E-03
EP[1)]	kg N eq	1.5E-03	2.9E-03	3.1E-03	1.6E-03	1.4E-03
FFD[1)]	MJ surplus, LHV	7.3E-06	2.3E-07	2.4E-07	2.7E-07	2.4E-07
ADPf[2)]	MJ, LHV	1.2E+01	2.0E+01	2.0E+01	2.4E+01	2.3E+01
RPRE	MJ, LHV	4.5E-01	4.3E-01	4.4E-01	3.4E-01	3.2E-01
RPRM[3)]	MJ, LHV	0	0	0	0	0
NRPRE	MJ, LHV	1.3E+01	2.0E+01	2.1E+01	2.5E+01	2.4E+01
NRPRM[3)]	MJ, LHV	0	0	0	0	0
SM[3)]	kg	0	0	0	0	0
RSF[3)]	MJ, LHV	0	0	0	0	0
NRSF[3)]	MJ, LHV	0	0	0	0	0
RE[3)]	MJ, LHV	0	0	0	0	0
FW[3)]	m^3	9.6E-03	1.2E-02	1.2E-02	9.8E-03	9.4E-03
HWD[3)]	kg	0	0	0	0	0
NHWD[3)]	kg	5.1E-04	5.1E-04	5.1E-04	5.1E-04	5.1E-04
HLRW[3)4)]	m^3	8.6E-10	8.1E-10	8.3E-10	7.0E-10	6.8E-10
ILLRW[3)4)]	m^3	4.1E-09	3.7E-09	3.9E-09	2.8E-09	2.7E-09
CRU[3)]	kg	0	0	0	0	0
MR[3)]	kg	0	0	0	0	0
MER[3)]	kg	0	0	0	0	0
EE[3)]	MJ, LHV	0	0	0	0	0

Table 10.1 Production stage EPD Results (Total A1 to A3) – 1 kg Specialty Admixtures

Impact category and inventory indicators	Unit	Liquid EUCON® ECO-STRENGTH	Liquid EUCON™ CIA	Liquid EUCON™ SRA FLOOR	Liquid EUCON™ SRA-XT
GWP 100[1)]	kg CO_2 eq	2.1E+00	9.5E-01	3.0E+00	3.0E+00
ODP[1)]	kg CFC-11 eq	2.0E-07	6.2E-09	2.4E-08	1.7E-08
SFP[1)]	kg O_3 eq	1.2E-01	3.3E-02	2.6E-01	2.5E-01
AP[1)]	kg SO_2 eq	9.7E-03	2.9E-03	1.5E-02	1.4E-02
EP[1)]	kg N eq	7.3E-03	7.1E-04	8.9E-03	8.0E-03
FFD[1)]	MJ surplus, LHV	3.9E-07	8.1E-08	8.6E-07	7.5E-07
ADPf[2)]	MJ, LHV	2.7E+01	5.9E+00	6.6E+01	6.5E+01
RPRE	MJ, LHV	1.6E+00	1.0E-01	1.3E+00	1.2E+00
RPRM[3)]	MJ, LHV	0	0	0	0
NRPRE	MJ, LHV	2.9E+01	6.0E+00	6.8E+01	6.8E+01
NRPRM[3)]	MJ, LHV	0	0	0	0
SM[3)]	kg	0	0	0	0
RSF[3)]	MJ, LHV	0	0	0	0
NRSF[3)]	MJ, LHV	0	0	0	0
RE[3)]	MJ, LHV	0	0	0	0
FW[3)]	m^3	3.1E-02	8.5E-03	2.5E-02	2.4E-02
HWD[3)]	kg	0	0	0	0
NHWD[3)]	kg	5.1E-04	5.1E-04	5.1E-04	5.1E-04
HLRW[3)4)]	m^3	1.5E-09	4.6E-10	1.5E-09	1.4E-09
ILLRW[3)4)]	m^3	9.4E-09	7.9E-10	8.3E-09	7.7E-09
CRU[3)]	kg	0	0	0	0
MR[3)]	kg	0	0	0	0
MER[3)]	kg	0	0	0	0
EE[3)]	MJ, LHV	0	0	0	0

Table 10.2 Production stage EPD Results (Total A1 to A3) – 1 kg Specialty Admixtures (continued)

Impact category and inventory indicators	Unit	Liquid EUCON™ VANDEX™ AM-10L	Liquid EUCON™ AWA-P20/EUCOSHIELD™	Liquid PLASTOL™ AMP-X[3]	Liquid VISCTROL™
GWP 100[1)]	kg CO_2 eq	9.2E-02	7.4E-02	1.1E+00	6.1E-01
ODP[1)]	kg CFC-11 eq	7.1E-10	9.8E-09	1.3E-08	5.4E-08
SFP[1)]	kg O_3 eq	5.9E-03	4.7E-03	7.7E-02	3.9E-02
AP[1)]	kg SO_2 eq	5.3E-04	2.5E-04	4.6E-03	3.4E-03
EP[1)]	kg N eq	1.8E-04	1.5E-04	2.3E-03	1.8E-03
FFD[1)]	MJ surplus, LHV	1.8E-07	3.8E-08	1.7E-07	6.4E-06
ADPf[2)]	MJ, LHV	1.2E+00	1.2E+00	2.5E+01	1.1E+01
RPRE	MJ, LHV	1.2E-01	5.2E-01	7.9E-01	1.7E+00
RPRM[3)]	MJ, LHV	0	0	0	0
NRPRE	MJ, LHV	1.3E+00	1.4E+00	2.6E+01	1.2E+01
NRPRM[3)]	MJ, LHV	0	0	0	0
SM[3)]	kg	0	0	0	0
RSF[3)]	MJ, LHV	0	0	0	0
NRSF[3)]	MJ, LHV	0	0	0	0
RE[3)]	MJ, LHV	0	0	0	0
FW[3)]	m^3	3.3E-03	2.0E-03	1.6E-02	1.7E-02
HWD[3)]	kg	0	0	0	0
NHWD[3)]	kg	5.1E-04	5.1E-04	5.1E-04	5.1E-04
HLRW[3)4)]	m^3	4.5E-10	4.7E-10	1.1E-09	8.7E-10
ILLRW[3)4)]	m^3	7.2E-10	8.3E-10	6.2E-09	4.2E-09
CRU[3)]	kg	0	0	0	0
MR[3)]	kg	0	0	0	0
MER[3)]	kg	0	0	0	0
EE[3)]	MJ, LHV	0	0	0	0

See notes on next page.

Notes to Tables 5 to 10.2:

[1)] Calculated as per U.S EPA TRACI 2.1, v1.08, SimaPro v 9.5.0.2 GWP-100, excludes biogenic CO_2 removals and emissions associated with any biobased products, including bio-based packaging. There is no biogenic content in the declared product. CO_2 emissions from calcination and carbonation are not applicable to the declared product; 100-year time horizon GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5), TRACI 2.1, v1.05 (8). FFD is required in LEED v4.1 MR Credit: Building Product Disclosure and Optimization – Environmental Product Declarations (10).

[2)] Calculated as per CML-IA Baseline v3.09, SimaPro v 9.5.0.2. ADP_f is also required in LEED v4.1 MR2 Credit: Building Product Disclosure and Optimization – Environmental Product Declarations (10).

[3)] Calculated as per ACLCA ISO 21930 Guidance (9), respective sections 6.2 to 10.8.

[4)] It should be noted that the foreground system (A3 manufacturing process) does not generate any HLRW or ILLRW. High, intermediate, or low-level radioactive waste is generated by electricity production (spent fuel from reactors, routine facility maintenance and operations)" (ISO 21930:2017, clause 7.2.14). High-level radioactive waste, e.g., when generated by electricity production, consists mostly of spent fuel from reactors." (ISO 21930:2017, clause 7.2.14).

[6)] The following abbreviations are used for Impact category and inventory indicators:

Global warming potential, GWP-100
Ozone depletion potential, ODP
Smog formation potential, SFP
Acidification potential, AP
Eutrophication potential, EP
Fossil fuel depletion, FFD
Abiotic depletion potential, fossil ADPf
Renewable primary resources used as an energy carrier (fuel), RPR_E
Renewable primary resources with energy content used as material, RPR_M
Non-renewable primary resources used as an energy carrier (fuel), $NRPR_E$
Non-renewable primary resources with energy content used as material, $NRPR_M$ Secondary materials, SM
Renewable secondary fuels, RSF
Non-renewable secondary fuels, NRSF
Recovered energy, RE
Consumption of freshwater, FW
Hazardous waste disposed, HWD
Non-hazardous waste disposed, NHWD
High-level radioactive waste, conditioned, to final repository, HLRW
Intermediate- and low-level radioactive waste, conditioned, to final repository, ILLRW
Components for re-use, CRU
Materials for recycling, MR
Materials for energy recovery, MER
Recovered energy exported from the product system, EE

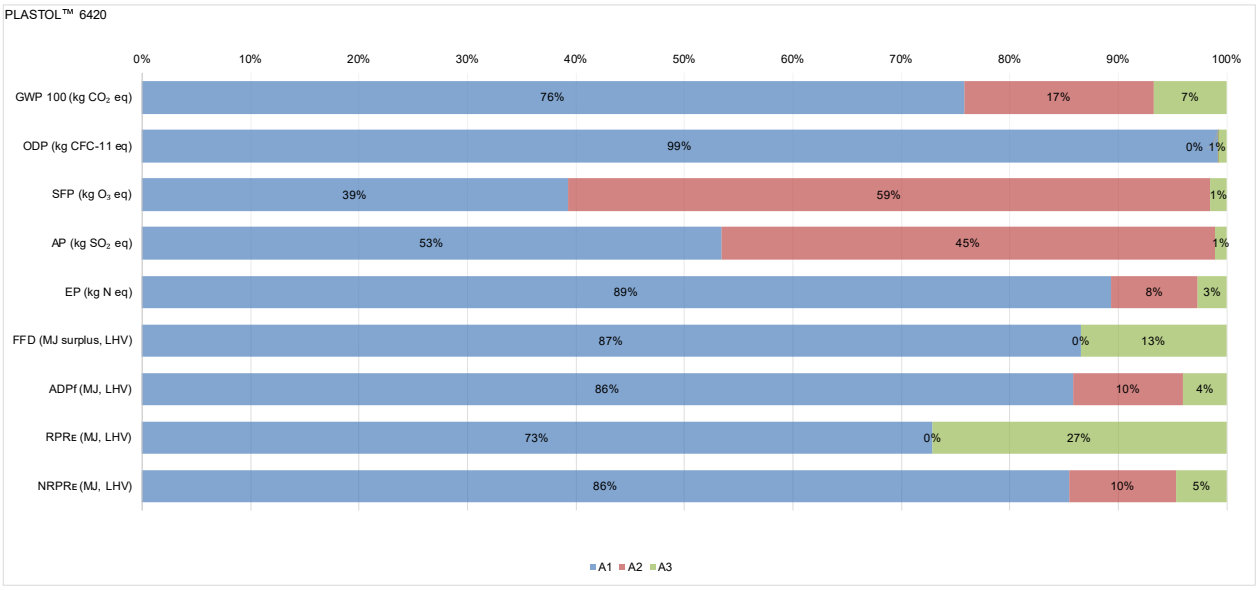
7 INTERPRETATION

The chemical admixtures EPD results represent the "cradle-to-gate" environmental profiles for 1 kg of chemical admixture manufactured at Euclid's St. Hubert, QC, Toronto, ON, and Calgary, AB facilities for the reference year 2022-2023 (12 consecutive months).

Figures 3 presents a percent contribution analysis by information module for the impact assessment and energy indicator results for PLASTOL™ 341 as a typical chemical admixture.

For PLASTOL™ 341, Module A1 Extraction and upstream material input production contributes the largest share of the LCIA category and energy indicator results, accounting for between 71% (SFP) and 98% (ODP) of the potential environmental burdens. Module A2 Transportation contributed less than 5% to the overall potential impact of the production stage, except for SFP (27%) and AP (17%). Module A3 Manufacturing contributed less than 7% to the overall potential environmental impacts of the declared product. Similar results can be expected for the rest of the chemical admixtures.

Figure 3 PLASTOL™ 341- Impact assessment and energy indicator results by information module



8 ADDITIONAL ENVIRONMENTAL INFORMATION

In general, Euclid facilities use dust collectors as pollution abatement equipment.

9 DECLARATION TYPE

This “cradle-to-gate” EPD applies to Euclid chemical admixtures for concrete. Production activities covered include *the extraction and upstream production, transport to factory, manufacturing* (modules A1 to A3). The declaration is intended for Business-to-Business (B-to-B) communication.

The EPD for Euclid chemical admixtures for concrete falls under the description:

- *A product-specific EPD, from one manufacturer*.

10 EPD COMPARABILITY LIMITATION STATEMENT

The following ISO 14025 and ISO 21930 statements indicate the EPD comparability limitations and intent to avoid any market distortions or misinterpretation of EPDs.

- *Environmental declarations from different programmes may not be comparable* (2).
- Only EPDs prepared from cradle-to-grave life cycle results and based on the same function, Reference Service Life, quantified by the same functional unit, and meeting all the conditions for comparability listed in ISO 14025:2006 and ISO 21930:2017 can be used to compare between products.

11 REFERENCES

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

2. ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.

3. ISO 14040/Amd1:2020 Environmental Management – Life Cycle Assessment – Principles and Framework, International Organization for Standardization, 2006.

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