An Environmental Product Declaration
According to ISO 14025:2006 and ISO 21930:2017

A Corporate Average Cradle-to-gate EPD for
Standard, Medium and High & Ultra High-Density Spray-applied Fire-Resistive Materials (SFRMs)

This EPD has been prepared in conformance with ISO 14025, 14040, 14044 standards and according to the requirements of ISO 21930:2017 and ASTM International’s EPD program operator rules. This EPD was commissioned by the GCP Applied Technologies and is verified by ASTM International to conform to the requirements of ISO 14040, 14044, 14025 and 21930.
# Environmental Product Declaration Summary

## General Summary

### Owner of the EPD
GCP Applied Technologies Inc. (GCPAT)
2325 Lakeview Parkway Suite 450,
Alpharetta, GA 30009 U.S.A.
Link (URL): [https://gcpat.com](https://gcpat.com)

With roughly 2,000 employees and 50 manufacturing facilities worldwide, GCP Applied Technologies serves customers in more than 100 countries.

GCPAT was formed in February 2016 by the spin-off of W. R. Grace & Co.’s construction products segment and its packaging technologies business.

The owner of the declaration is liable for the underlying information and evidence.

### SFRM Manufacturing Facilities

- **Ajax, Canada**
  294 Clements Rd. West
  Ajax, Ontario L1S 3C6

- **Irondale, United States**
  2601 Commerce Blvd.
  Irondale, Alabama 35210

- **Santa Ana, United States**
  2500 & 2502 S. Garnsey Street
  Santa Ana, California 92707

### Product Group and Name
Spray-applied Fire-Resistive Material (SFRM),
UN CPC 54650.

### Product Description
SFRM is composed primarily of binding agents such as cement or gypsum and often contains other materials such as mineral wool, quartz, perlite, vermiculite, or bauxite along with various other ingredients.

### Reference Product Category Rules (PCR)
ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.

### Certification Period
04.15.2022 - 04.15.2027

### Declared Unit
1,000 kg of SFRM

### Declaration Number
EPD 060
EPD and Project Report Information

<table>
<thead>
<tr>
<th>Program Operator</th>
<th>ASTM International</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declaration Holder</td>
<td>GCP Applied Technologies Inc.</td>
</tr>
</tbody>
</table>

Declaration Type

A “Cradle-to-gate” EPD (Production stage) of GCPAT’s production of standard, medium and high & ultra-high-density spray-applied fire-resistive material. The declaration presents a weighted average profile for all three North American facilities operated by GCP Applied Technologies Inc. that manufacture SFRMs. Product 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

SFRMs are used as part of a building’s passive fire resistance strategy. SFRMs have thermal and acoustical properties and assists in controlling condensation. However, its main use is in insulating steel, metal decking and other assemblies from the high temperatures found during a fire. SFRMs are used to delay (or prevent) the weakening of steel and the spalling of concrete in structures that are exposed to the high temperatures found during a fire. They do this by thermally insulating the structural members to keep them below the temperatures that cause failure.

Content of the Declaration

This declaration follows Section 9; Content of an EPD, ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.

This EPD was independently verified by ASTM in accordance with ISO 14025 and the core PCR ISO 21930:2017:

Internal  X  External

The Project Report

Note that the Project Report is not part of the public communication (ISO 21930, 10.1).

Prepared by

Lindita Bushi, PhD, Mr. Jamie Meil and Mr. Grant Finlayson
Athena Sustainable Materials Institute
280 Albert Street, Suite 404
Ottawa, Ontario, Canada K1P 5G8
info@athenasmii.org
www.athenasmii.org

This EPD project report was independently verified by in accordance with ISO 14025, ISO 14040/44, and the core PCR ISO 21930:2017:

Thomas P. Gloria, Ph. D.
Industrial Ecology Consultants

ASTM International
West Conshohocken, PA
www.astm.org

Date of issue: 04.15.2022
Period of validity: 5 years
Declaration #: EPD 060
1 PRODUCT IDENTIFICATION

1.1 PRODUCT DEFINITION

Spray-applied fire-resistive materials (UN CPC 54650) are composed primarily of binding agents such as cement or gypsum and often contain other materials such as quartz or bauxite along with various other ingredients. The other materials are used to help lighten the solution or to add air as an insulator. Chemical hardeners are sometimes used to either speed up hardening or to make the final fireproofing harder than the original.

Passive fire protection materials (commonly referred to as fireproofing) are used to prevent or delay the failure of steel and concrete structures exposed to fire. These materials are intended to insulate the structural members during the event of a fire, delaying any loss of the integrity of the structural members. There is an array of available fireproofing materials that can be used depending upon the specific application. Applied fireproofing is available as a wet or dry formula. It is typically sprayed but can also be troweled on. The fireproofing is generally delivered as a dry powder in bag, which is then mixed with water in the field. Modern formulas are asbestos-free and don't contain free crystalline silica.

This is a company-specific EPD representing an array of available SFRMs produced at three of GCPAT’s facilities located in North America and produced to various specifications as noted in Table 1. Table 1 summarizes key technical data for GCPAT SFRMs for the 2019 reference year (12 months). GCPAT SFRMs are classified in three major sub-categories based on the dry density minimum average values in pcf (pound per cubic foot). Full material selection guide and literature and the material safety data sheets are available for each of these fireproofing materials at https://gcpat.com.

Table 1. Technical Data for GCPAT SFRMs

<table>
<thead>
<tr>
<th>Primary Binding Agent</th>
<th>GCPAT SFRM-Sub-category</th>
<th>Dry density, minimum average- in kg/m$^3$ (pcf)</th>
<th>GCPAT Brand Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement- or gypsum-based or a blend</td>
<td>High &amp; ultra-high density</td>
<td>640 (40)</td>
<td>Z-146, Z-146PC, Z-146T, Z-156, Z-156PC, Z-156T</td>
</tr>
</tbody>
</table>
1.2 PRODUCT STANDARD

The physical characteristics of SFRM are determined according to various ASTM standards such as, but not limited to:

- E605/E605M-19, Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members

2 DECLARED UNIT

The declared unit is 1,000 kg, 1 metric ton of spray-applied fire-resistive materials (SFRM).

3 MATERIAL CONTENT

Table 2 shows the weighted average generic formulations for all three sub-categories of GCPAT fireproofing materials as produced at GCPAT’s three manufacturing locations. For reasons of confidentiality a portion of each SFRM is reported as “additives”.

Table 2: Weighted Average Generic Formulations for Standard, Medium, High & Ultra High Density SFRMs

<table>
<thead>
<tr>
<th>Material composition</th>
<th>Standard Density</th>
<th>Medium Density</th>
<th>High &amp; Ultra High Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stucco (CaSO4 ½H2O)</td>
<td>87%</td>
<td>Stucco (CaSO4 ½H2O)</td>
<td>54%</td>
</tr>
<tr>
<td>Recovered paper</td>
<td>5%</td>
<td>Portland cement</td>
<td>31%</td>
</tr>
<tr>
<td>Limestone</td>
<td>3%</td>
<td>Clay</td>
<td>6%</td>
</tr>
<tr>
<td>Rest- additives</td>
<td>5%</td>
<td>Rest- additives</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 3 shows the amount of packaging materials per 1,000 kg of GCPAT SFRMs. Paper sacks are used for transporting fireproofing materials. The sacks are typically made of high-quality and weight kraft paper, usually virgin fiber.

**Table 3: Packaging Materials for GCPAT SFRMs**

<table>
<thead>
<tr>
<th>Packaging materials</th>
<th>Quantity</th>
<th>Units (per 1,000 kg SFRM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper Sacks</td>
<td>22.00</td>
<td>kg</td>
</tr>
<tr>
<td>Cardboard Core</td>
<td>0.30</td>
<td>kg</td>
</tr>
</tbody>
</table>

4 PRODUCTION STAGE

For this EPD, the boundary is “cradle-to-gate” or the *Production stage*, which includes the extraction of raw materials (cradle) through the manufacture of SFRM packaged ready for shipment (gate). Downstream activity stages - Construction, Use, End-of-life, and Optional supplementary information beyond the system boundary - are excluded from the system boundary (Figure 1).
Figure 1 Common four life cycle stages and their information modules for construction products and the optional supplementary module [2]

The Production stage (modules A1 to A3) includes the following processes:

**A1 Extraction and upstream production**: Extraction and processing of input raw materials used in the production of standard, medium, high & ultra-high-density SFRMs, including fuels used in extraction and transport within the process.

**A2 Transportation to factory**: Transportation of input raw materials (including recovered materials) from extraction site or source to manufacturing facilities, including empty backhauls.

**A3 Manufacturing**: Manufacturing of the SFRMs, including all on-site energy and ancillary materials required and emissions to air, water and land and wastes produced. This also includes transportation from manufacturing site to landfill for on-site wastes, including empty backhauls and the waste disposal process. The A3 module includes grinding, mixing, blending, pneumatic conveying, high-speed auger packaging, lighting and heating, ventilation and air conditioning, operation of environmental equipment (baghouses and bin vents), on-site transportation (loading and unloading) and storage of SFRMs.
5 LIFE CYCLE INVENTORY

5.1 DATA COLLECTION, SOURCE AND CALCULATIONS

LCI data collection was based on a customized survey of all three GCPAT’s SFRM manufacturing sites. All facility specific LCI data were weighted based on facility level total annual production to calculate the weighted average LCI profile for each product type (per 1,000 kg). Data calculation procedures follow ISO 14044. Per ISO 21930, 7.2.2 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 the core PCR requirements and ISO 14044 is provided in the LCA report. Data quality is assessed based on its representativeness (technology coverage, geographic coverage, time coverage), completeness, consistency, reproducibility, transparency, and uncertainty (Table 4).

Table 4 Data Quality Requirements and Assessments

<table>
<thead>
<tr>
<th>Data Quality Requirements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Coverage</td>
<td>Data represents the prevailing company technology in use in U.S. and Canada. Whenever available, for all upstream and core material and processes, North American typical or average industry LCI datasets were utilized. <em>Technological representativeness is characterized as “high”.</em></td>
</tr>
<tr>
<td>Geographic Coverage</td>
<td>The geographic region considered is U.S. and Canada. The geographic coverage of all LCI databases and datasets is given in in the LCA background report. <em>Geographical representativeness is characterized as “high”.</em></td>
</tr>
<tr>
<td>Time Coverage</td>
<td>Activity data are representative as of 2019. - SFRM manufacturing process- primary data collected from 3 facilities: reference year 2019 (12 months); - In-bound/ out-bound transportation data- primary data collected from 3 facilities: reference year 2019 (12 months); - Generic data: the most appropriate LCI datasets were used as found in the US LCI Database, ecoinvent v.3.7.1 database, 2021. <em>Temporal representativeness is characterized as “high”.</em></td>
</tr>
<tr>
<td>Completeness</td>
<td>The relevant background materials and processes were taken from the US LCI Database, ecoinvent v3.7.1 LCI database, and modeled in SimaPro v9.2.0.2, 2021. The completeness of the cradle-to-gate process chain in terms of process steps is rigorously assessed for SFRM products of interest and documented in the LCA background report.</td>
</tr>
</tbody>
</table>
5.3 ALLOCATION AND CUT-OFF RULES

“Mass” was deemed as the most appropriate physical parameter for allocation used for the SFRMs manufacturing system to calculate the input energy flows (electricity, natural gas, and propane), packaging materials and waste flows per declared unit of 1,000 kg of SFRM. LCI modeling accounts for the plant specific fabrication yields in accordance with ISO 14044, 4.3.4.2.

Secondary materials such as hammermilled newsprint and post-industrial polystyrene are considered recovered materials. However, only the materials, water, energy, emissions, and other elemental flows associated with reprocessing, handling, sorting, and transportation from the generating industrial process to their use in the production process are considered. Any allocated burdens before reprocessing are allocated to the original product. Allocation related to transport are based on the mass of transported product.

The cut-off criteria as per ISO 21930, were followed for this EPD. All input/output data required were collected and included in the LCI modelling. No substances with hazardous and toxic properties that pose a concern for human health and/or the environment were identified in the framework of this EPD. Any data gaps for the reference year 2019 - e.g., packaging materials were filled in with plant generic data from previous years.
The Production Stage excludes the following processes:

- Capital goods and infrastructure;
- Human activity and personnel related activity (travel, furniture, office operations and supplies);
- 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

6.1 RESULTS OF THE LIFE CYCLE ASSESSMENT

This section summarizes the product stage life cycle impact assessment (LCIA) results including resource use and waste generated metrics based on the cradle-to-gate life cycle inventory inputs and outputs analysis. Table 5 presents the calculated results for each product density based on 1,000 kg (1 metric ton). It is noted that LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks [2], [3].
## Table 5 Production Stage (A1-A3), EPD Results for 1,000 kg standard, medium, high & ultra-high density SFRMs

<table>
<thead>
<tr>
<th>Impact category and inventory indicators</th>
<th>Unit</th>
<th>Standard Density (min 15 pcf)</th>
<th>Medium Density (min 22 pcf)</th>
<th>High &amp; Ultra High Density (min 40 pcf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global warming potential, GWP 100(^1), AR5</td>
<td>kg CO(_2) eq</td>
<td>210</td>
<td>493</td>
<td>621</td>
</tr>
<tr>
<td>Ozone depletion potential, ODP(^1)</td>
<td>kg CFC-11 eq</td>
<td>1.2E-04</td>
<td>1.3E-04</td>
<td>1.4E-04</td>
</tr>
<tr>
<td>Smog formation potential, SFP(^1)</td>
<td>kg O(_3) eq</td>
<td>29.1</td>
<td>35.3</td>
<td>52.5</td>
</tr>
<tr>
<td>Acidification potential, AP(^1)</td>
<td>kg SO(_2) eq</td>
<td>1.4</td>
<td>1.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Eutrophication potential, EP(^1)</td>
<td>kg N eq</td>
<td>0.33</td>
<td>0.67</td>
<td>0.89</td>
</tr>
<tr>
<td>ADP elements, CML(^2)</td>
<td>kg Sb eq</td>
<td>1.0E-04</td>
<td>6.6E-04</td>
<td>1.8E-03</td>
</tr>
<tr>
<td>ADP surplus, TRACI(^1)</td>
<td>MJ surplus</td>
<td>515</td>
<td>607</td>
<td>683</td>
</tr>
<tr>
<td>Renewable primary resources used as an energy carrier (fuel), RPR(_E)^3</td>
<td>MJ LHV</td>
<td>166.9</td>
<td>405.6</td>
<td>450.3</td>
</tr>
<tr>
<td>Renewable primary resources with energy content used as material, RPR(_M)^3</td>
<td>MJ LHV</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Non-renewable primary resources used as an energy carrier (fuel), NRPR(_E)^3</td>
<td>MJ LHV</td>
<td>3,849</td>
<td>5,051</td>
<td>5,833</td>
</tr>
<tr>
<td>Non-renewable primary resources with energy content used as material, NRPR(_M)^3</td>
<td>MJ LHV</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Secondary materials, SM(^3)</td>
<td>kg</td>
<td>71</td>
<td>90</td>
<td>63</td>
</tr>
<tr>
<td>Renewable secondary fuels, RSF(^3)</td>
<td>MJ LHV</td>
<td>0.080</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>Non-renewable secondary fuels, NRSF(^3)</td>
<td>MJ LHV</td>
<td>0.77</td>
<td>167</td>
<td>218</td>
</tr>
<tr>
<td>Recovered energy, RE(^3)</td>
<td>MJ LHV</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Consumption of freshwater, FW(^3)</td>
<td>m(^3)</td>
<td>0.31</td>
<td>0.62</td>
<td>0.64</td>
</tr>
<tr>
<td>Hazardous waste disposed, HWD(^3)</td>
<td>kg</td>
<td>0.035</td>
<td>0.027</td>
<td>0.009</td>
</tr>
<tr>
<td>Non-hazardous waste disposed, NHWD(^3)</td>
<td>kg</td>
<td>19.9</td>
<td>116.0</td>
<td>143.5</td>
</tr>
<tr>
<td>High-level radioactive waste, conditioned, to final repository, HLRW(^3)</td>
<td>m(^3)</td>
<td>9.8E-07</td>
<td>9.8E-07</td>
<td>1.0E-06</td>
</tr>
<tr>
<td>Intermediate- and low-level radioactive waste, conditioned, to final repository, ILLRW(^3)</td>
<td>m(^3)</td>
<td>2.8E-06</td>
<td>3.3E-06</td>
<td>5.0E-06</td>
</tr>
<tr>
<td>Components for re-use, CRU(^3)</td>
<td>kg</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Materials for recycling, MR(^3)</td>
<td>kg</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Materials for energy recovery, MER(^3)</td>
<td>kg</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Recovered energy exported from the product system, EE(^3)</td>
<td>MJ LHV</td>
<td>0.0029</td>
<td>0.62</td>
<td>0.81</td>
</tr>
<tr>
<td>Global warming potential - biogenic, GWP-100 bio(^4)</td>
<td></td>
<td>1.1E-03</td>
<td>0.23</td>
<td>0.30</td>
</tr>
<tr>
<td>Emissions from calcination(^5)</td>
<td></td>
<td>0.71</td>
<td>152.3</td>
<td>200.0</td>
</tr>
</tbody>
</table>
### Impact category and inventory indicators

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Standard Density (min 15 pcf)</th>
<th>Medium Density (min 22 pcf)</th>
<th>High &amp; Ultra High Density (min 40 pcf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions from combustion of waste from renewable sources(^1)(^4)</td>
<td>3.00E-04</td>
<td>0.064</td>
<td>0.085</td>
<td></td>
</tr>
<tr>
<td>Emissions from combustion of waste from non-renewable sources(^2)(^4)</td>
<td>0.072</td>
<td>15.5</td>
<td>20.3</td>
<td></td>
</tr>
<tr>
<td>Removals associated with biogenic carbon content of the bio-based product(^3)</td>
<td>-98.0</td>
<td>-66.2</td>
<td>-41.5</td>
<td></td>
</tr>
<tr>
<td>Removals associated with biogenic carbon content of the bio-based packaging(^3)</td>
<td>-40.9</td>
<td>-40.9</td>
<td>-40.9</td>
<td></td>
</tr>
</tbody>
</table>

**Table Notes:**

\(^1\) Calculated as per U.S EPA TRACI 2.1, v1.05, SimaPro v 9.2.0.2. GWP\(_{100}\), excludes biogenic CO\(_2\) removals and emissions; 100-year time horizon GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5), TRACI 2.1, with AR5, v1.05.

\(^2\) Calculated as per CML-IA Baseline V3.05, SimaPro v 9.2.0.2.

\(^3\) Calculated as per ACLCA ISO 21930 Guidance, respective sections 6.2 to 10.8.

\(^4\) Applicable for Portland cement only, used in manufacturing of the GCPAT SFRM [11].

### 6.2 INTERPRETATION

The cradle-to-gate manufacture of **standard density SFRM** embodies about 4 GJ of primary energy (LHV) and emits 210 kg CO\(_2\) eq of greenhouse gases per ton of product. Around 96% of the total primary energy input is derived from non-renewable primary energy resources. Across the three standard density production information modules, Module A1 extraction and upstream production contributes the largest share of the LCIA and energy indicator results – accounting for between 60% (NRPRE) and 54% (GWP-100) of the potential environmental burdens. Module A3 Manufacturing is generally the second largest contributor to the overall potential environmental impacts – accounting for 32% of GWP and non-renewable energy use, respectively. Except for acidification (26%) and smog potential impacts (35%), Module A2 Transportation is generally a minor contributor (<15%) to the overall potential environmental impacts of standard density SFRM production.

The cradle-to-gate manufacture of **medium density SFRM** embodies about 5.5 GJ of primary energy (LHV) and emits 493 kg CO\(_2\) eq of greenhouse gases per ton of product. About 93% of the total primary energy input is derived from non-renewable primary energy resources. Across the three medium density production information modules, Module A1 extraction and upstream production contributes the largest share of the LCIA and energy indicator results – accounting for 82% (GWP-100), 72% (NRPRE) and over 50% of both acidification and smog formation burdens. Unlike standard density SFRM, Module A3 Manufacturing is a more minor contributor to the overall potential environmental impacts of medium density SFRM – accounting for 17% of NRPRE and 9% of GWP-100. Module A2 Transportation is a significant contributor to SFP (37%), AP (27%) and GWP (9%) to the overall potential environmental impacts of medium density SFRM manufacture.
The cradle-to-gate manufacture of high and ultra-high density SFRM embodies about 6.3 GJ of primary energy (LHV) and emits 621 kg CO2 eq of greenhouse gases per ton of product. Almost 93% of the total primary energy input is derived from non-renewable primary energy resources. Across the three high and ultra-high density production information modules, Module A1 extraction and upstream production contributes the largest share of the key LCIA and energy indicator results – accounting for 80% (GWP-100), 67% (NRPRE) and 78% of eutrophication potential burden. Similar to medium density SFRM, Module A3 Manufacturing is a more minor contributor to the overall potential environmental impacts of high and ultra-high density SFRM – accounting for 15% of NRPRE and 13% of GWP-100. Module A2 Transportation is a significant contributor to SFP (53%), AP (39%) and GWP (9%) to the overall potential environmental impacts of high and ultra-high density SFRM manufacture.

7 ADDITIONAL ENVIRONMENTAL INFORMATION

Standard, medium and high & ultra-high density SFRMs use between 2% to 7% recovered materials (hammermilled newsprint and post-industrial polystyrene).

8 DECLARATION TYPE

GCPAT SFRM EPD is categorized as follows:
- A corporate specific product EPD, averaged across the manufacturer’s plants.
This declaration presents a weighted average EPD for three SFRM North American facilities operated by GCPAT. Product 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.

9 DECLARATION COMPARABILITY LIMITATION STATEMENT

- Only EPDs prepared from cradle-to-grave life cycle results and based on the same function, RSL, 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 comparison between products.
10  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,
http://www.astm.org

11  REFERENCES

1. ISO 14025:2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.
2. ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.
6. ISO 14021:2016 Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling).
7. PRé 2019.SimaPro LCA Software v9.2.0.2, 2021,
   https://simapro.com/
    https://aclca.org/aclca-iso-21930-guidance/