SENTINEL HOLDING
INSTITUT

SHI PRODUCT PASSPORT

Find products. Certify buildings.

SHI Product Passport No.:

15000-10-1004

Fassadenpaneele Cedral

Product group: Facade cladding - Cement boards

etex inspiring ways of living

Etex Germany Exteriors GmbH
Dyckerhoffstraße 95-105
59269 Beckum

Product qualities:

- QNG Qualitätssiegel Nachhaltiges Gebäude
- DGNB NEW CONSTRUCTION 2023.2
- DGNB NEW CONSTRUCTION 2023
- DGNB NEW CONSTRUCTION 2018
- BNB-BN NEUBAU V2015
- BREEAM DE NEUBAU 2018
- LEED v4.1 (outside US)

CERTIFIED SUSTAINABLE PRODUCT
SHI PRODUCT PASSPORT
SENTINEL HOLDING INSTITUT
www.sentinel-holding.eu

Köttner

Helmut Köttner
Scientific Director
Freiburg, 26 August 2026

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

Contents

QNG - Qualitätssiegel Nachhaltiges Gebäude	1
DGNB New Construction 2023	3
DGNB New Construction 2018	4
BNB-BN Neubau V2015	5
BREEAM DE Neubau 2018	6
LEED v4.1	7
Product labels	8
Legal notices	9
Technical data sheet/attachments	9

The SHI Database is the first and only database for construction products whose comprehensive processes and data accuracy are regularly verified by the independent auditing company SGS-TÜV Saar

SENTINEL HOLDING
INSTITUT

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

QNG - Qualitätssiegel Nachhaltiges Gebäude

The Qualitätssiegel Nachhaltiges Gebäude (Quality Seal for Sustainable Buildings), developed by the German Federal Ministry for Housing, Urban Development and Building (BMWSB), defines requirements for the ecological, socio-cultural, and economic quality of buildings. The Sentinel Holding Institut evaluates construction products in accordance with QNG requirements for certification and awards the QNG ready label. Compliance with the QNG standard is a prerequisite for eligibility for the KfW funding programme. For certain product groups, the QNG currently has no specific requirements defined. Although classified as not assessment-relevant, these products remain suitable for QNG-certified projects.

Criteria	Pos. / product group	Considered substances	QNG assessment
3.1.3 Schadstoffvermeidung in Baumaterialien			QNG ready - Not relevant for assessment
Verification: Für diese Produktart hat das QNG keine Anforderungen definiert			

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

DGNB New Construction 2023.2

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact			Not relevant for assessment

SENTINEL HOLDING
INSTITUT

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

DGNB New Construction 2023

The DGNB System (German Sustainable Building Council) assesses the sustainability of various types of buildings. It can be applied to both large-scale private and commercial projects as well as smaller residential buildings. The 2023 version sets high standards for ecological, economic, socio-cultural, and functional aspects throughout the entire life cycle of a building.

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact, 03.05.2024 (3rd edition)			Not relevant for assessment
Verification: Für diese Produktart hat die DGNB keine Anforderungen definiert.			

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact, 29.05.2025 (4th edition)			Not relevant for assessment
Verification: Für diese Produktart hat die DGNB keine Anforderungen definiert.			

SENTINEL HOLDING
INSTITUT

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

DGNB New Construction 2018

The DGNB System (German Sustainable Building Council) assesses the sustainability of various types of buildings. It can be applied to both large-scale private and commercial projects as well as smaller residential buildings.

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact			Not relevant for assessment
Verification: Für diese Produktart hat die DGNB keine Anforderungen definiert.			

SENTINEL HOLDING
INSTITUT

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

BNB-BN Neubau V2015

The Bewertungssystem Nachhaltiges Bauen (Assessment System for Sustainable Building) is a tool for evaluating public office and administrative buildings, educational facilities, laboratory buildings, and outdoor areas in Germany. The BNB was developed by the former Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and is now overseen by the Federal Ministry for Housing, Urban Development and Building (BMWSB).

Criteria	Pos. / product type	Considered substance group	Quality level
1.1.6 Risiken für die lokale Umwelt			Not relevant for assessment

SENTINEL HOLDING
INSTITUT

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

BREEAM DE Neubau 2018

BREEAM (Building Research Establishment Environmental Assessment Methodology) is a UK-based building assessment system that evaluates the sustainability of new constructions, refurbishments, and conversions. Developed by the Building Research Establishment (BRE), the system aims to assess and improve the environmental, economic, and social performance of buildings.

Criteria	Product category	Considered substances	Quality level
Hea 02 Indoor Air Quality			Not relevant for assessment

SENTINEL HOLDING
INSTITUT

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

LEED v4.1

LEED (Leadership in Energy and Environmental Design) is an internationally recognised building certification system developed by the U.S. Green Building Council. It is one of the most widely used sustainability standards for buildings worldwide and is particularly applied in internationally oriented projects. LEED assesses buildings holistically across categories such as energy efficiency, resource conservation, material selection, indoor environmental quality and site sustainability. Depending on the number of points achieved, projects are awarded one of the certification levels: LEED Certified, Silver, Gold or Platinum.

Criteria	Product category	Considered substances	Assessment
EQ Credit: Low-Emitting Materials			Not relevant for assessment

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

Product labels

In the construction industry, high-quality materials are crucial for a building's indoor air quality and sustainability. Product labels and certificates offer guidance to meet these requirements. However, the evaluation criteria of these labels vary, and it is important to carefully assess them to ensure products align with the specific needs of a construction project.

The IBU ("Institut Bauen und Umwelt e.V.") is an initiative of building product manufacturers committed to sustainability in construction. It serves as the programme operator for Environmental Product Declarations (EPDs) in accordance with the EN 15804 standard. The IBU EPD programme provides comprehensive life cycle assessments and environmental impact data for construction products, supported by independent third-party verification.

Products bearing the Sentinel Holding Institute QNG-ready seal are suitable for projects aiming to achieve the "Qualitätssiegel Nachhaltiges Gebäude" (Quality Seal for Sustainable Buildings). QNG-ready products meet the requirements of QNG Appendix Document 3.1.3, "Avoidance of Harmful Substances in Building Materials." The KfW loan program Climate-Friendly New Construction with QNG may allow for additional funding.

SENTINEL HOLDING INSTITUT

Product:
Fassadenpaneele Cedral

SHI Product Passport no.:
15000-10-1004

etex inspiring ways of living

Legal notices

(*) These criteria apply to the construction project as a whole. While individual products can positively contribute to the overall building score through proper planning, the evaluation is always conducted at the building level. The information was provided entirely by the manufacturer.

Find our criteria here: https://www.sentinel-holding.eu/de/Themenwelten/Pr%C3%BCfkriterien%20f%C3%BCr%20Produkte

The SHI Database is the first and only database for construction products whose comprehensive processes and data accuracy are regularly verified by the independent auditing company SGS-TÜV Saar

SGS TÜV SAAR

Publisher

Sentinel Holding Institut GmbH
Bötzinger Str. 38
79111 Freiburg im Breisgau
Germany
Tel.: +49 761 590 481-70
info@sentinel-holding.eu
www.sentinel-holding.eu

1. Bezeichnung des Produkts und des Unternehmens

Handelsname:
Cedral Lap

Verwendungszweck:
Dampfdruckerhärtete Faserzement Fassadenpaneele für vorgehängte hinterlüftete Fassaden

Hersteller/Lieferant:
UAB "Eternit Baltic"
J.Dalinkevičiaus g. 2H
LT – 85118 Naujoji Akmenė, Lithuania
Telefon: +37 425 568 49
E-Mail: eternit@eternit.lt

Inverkehrbringer für den D/A/CH Markt:
Etex Germany Exteriors GmbH
Dyckerhoffstraße 95-105
D - 59269 Beckum
E-Mail: info.exteriors.de@etexgroup.com

Notrufnummer:
+49 2525 69 555
Montag bis Donnerstag von 08:00 bis 17:00 Uhr und Freitag von 8:00 bis 15:00 Uhr

2. Mögliche Gefahren

Beschreibung der Gefahren:

- Das eingebaute Produkte bei seiner endgültigen Anwendung:
  - Keine Gefahren bekannt

- Gefahren durch mechanische Bearbeitung (Bohren, Sägen, Schleifen usw.) des Produkts:
  - vorübergehende Reizung exponierter Schleimhäute (Augen, Rachen, Bronchien)
  - Längerer Hautkontakt kann bei empfindlichen Personen leichte Hautreizungen hervorrufen
  - Wie bei den meisten organischen und nicht organischen Staubarten kann das Einatmen übermäßiger Staubkonzentrationen über längere Zeiträume eine chronische Entzündung der Bronchien (berufsbedingte Bronchitis) hervorrufen

Für weitere Informationen:
Tel: +49 2525 69555 Fax: +49 2525 691555 E-mail: info.germany@cedral.world
Etex Germany Exteriors GmbH, Sitz Beckum, Registergericht: Münster HRB 18895
Vorsitzender des Aufsichtsrats: Dirk Altgassen - Geschäftsführer: Rolf Haberlah

etex inspiring ways of living

- Das Einatmen von quarzhaltigem Staub, insbesondere das Einatmen feiner (inhalierbarer) Staubpartikel, in hohen Konzentrationen oder über längere Zeiträume, kann Lungenerkrankungen (Silikose) verursachen und zu einem erhöhten Lungenkrebsrisiko führen. Dieses Risiko kann durch die Einhaltung sicherer Arbeitsgewohnheiten minimiert werden (siehe Abschnitt 7 und 8)

3. Zusammensetzung/Angaben zu Bestandteilen

Beschreibung:
Fassadenpaneele aus Faserzement

Chemische Charakterisierung:
Bei diesem Produkt handelt es sich nicht um einen Stoff oder eine Zubereitung, sondern um ein Fertigprodukt. Es setzt sich aus Zement, Quarzsand, Zellstoff, natürliches Kalziumsilikat, Arcylatbeschichtung, Wasser und Zusatzstoffen zusammen.

4. Erste-Hilfe-Maßnahmen

Einatmen: (nur bei maschineller Bearbeitung), bei gesundheitlichen Problemen frische Luft zuführen und ggf. einen Arzt aufsuchen
Hautkontakt: (nur bei maschineller Bearbeitung), Haut mit Wasser abspülen, bei anhaltenden Hautirretationen einen Arzt aufsuchen
Augenkontakt: (nur bei maschineller Bearbeitung) nicht reiben, sofort mit Wasser ausspülen

5. Maßnahmen zur Brandbekämpfung

Klassifizierung des Brandverhaltens: A2-s1, d0 gemäß DIN EN 13501-1. Das Produkt ist nichtbrennbar, gemäß Tabelle 1.3.1 Muster-Verwaltungsvorschrift Technische Baubestimmungen.

6. Maßnahmen bei unbeabsichtigter Freisetzung

Nicht anwendbar

7. Handhabung und Lagerung

Ziel ist die Vermeidung von Staub bei der mechanischen Bearbeitung durch technische und organisatorische Maßnahmen wie z. B.:

- bei der Verwendung von motorbetriebenen Bearbeitungswerkzeugen sind geeignete Filter mit Staubabsaugung sicherzustellen
- Verbot des Trockenkehrens
- Sicherstellung einer ausreichenden Belüftung am Arbeitsplatz
- regelmäßige Reinigung der Betriebseinrichtungen; Arbeitsbereiche abspritzen oder feucht wischen
- Vermeidung von Haut- und Augenkontakt

Lagerung:

- Die Paletten sind auf ebenem Unterlage trocken und vollflächig zu lagern. Gestapeltes Material bauseitig mit Bauplane gegen Feuchtigkeit und Verschmutzung schützen. Während des Transports sind die Produkte abzudecken.

8. Begrenzung und Überwachung der Exposition/Persönliche Schutzausrüstungen

Aktuelle Arbeitsplatzgrenzwerte (AGW) für Schadstoffe in der Luft:

- Allgemeiner Staubgrenzwert TRGS 900 – Arbeitsplatzgrenzwerte
  Fraktion/ Wert : Alveolengängige (A) 1,25 mg/m³
  Einatembare (E) 10 mg/m³
  Ausgabe: Januar 2006, geändert und ergänzt März 2020

- Beurteilungsmaßstab für Quarz (A-Staub) gemäß TRGS 559 – Quarzhaltiger Staub
  Fraktion/ Werte: Alveolengängige (A) 50 µg/m³
  Ausgabe: April 2020

Sofern die allgemeinen Staubgrenzwerte und der Beurteilungsmaßstab für Quarz überschritten werden, ist ein Schutzmaßnahmenkonzept gemäß geltenden Technischen Regeln für Gefahrstoffen (TRGS), Berufsgenossenschaftliche Regeln für Sicherheit und Gesundheit bei der Arbeit (BG-Regeln) zu entwickeln und anzuwenden. Sofern organisatorische Maßnahmen zur Einhaltung der AGW nicht umgesetzt werden können oder einer Ermittlung der Arbeitsplatz bezogenen Staubwerte nicht vorliegt, sind geeignete Atemschutzmasken zu tragen. In der Regel sind Halbmasken mit Partikelfilter der Kategorie P2 bzw. filtrierende Halbmasken FFP2 ausreichend.

Persönliche empfohlene Schutzausrüstung bei mechanischer Bearbeitung:

- Augenschutz:
  Schutzbrille tragen
- Körperschutz:
  Zum Schutz vor Verletzungen und direktem Hautkontakt geeignete Schutzkleidung tragen
- Atemschutzmasken:
  Sofern erforderlich

Zum Thema Arbeitsplatzgrenzwerte und Schutzausrüstung beachten Sie bitte auch die ergänzenden Informationen im Anhang.

9. Physikalische und chemische Eigenschaften

Allgemeine Angaben:

- Aussehen: Fassadenpaneele mit beschichteter Oberfläche in verschiedenen Farben
- Form: Fest
- Geruch: ohne

Sicherheitsrelevante Eigenschaften:

- Siedepunkt: Nicht anwendbar
- Schmelzpunkt: Nicht anwendbar
- Flammpunkt: Nicht anwendbar
- Entzündbarkeit: Nicht anwendbar
- Selbstentzündbarkeit: Nicht anwendbar
- Explosionsgefahr: Nicht anwendbar
- Brandfördernde Eigenschaften: Nicht anwendbar
- Dampfdruck: Nicht anwendbar
- Rohdichte: >1,30 kg/dm³
- Wasserlöslichkeit: Wasserunlöslich
- Fettlöslichkeit: Nicht anwendbar
- pH-Wert: 10-12
- Verteilungskoeffizient: Nicht anwendbar
- Viskosität: Nicht anwendbar

10. Stabilität und Reaktivität

Stabilität: Stabil
Unverträglichkeit (zu vermeidende Stoffe): starke Säuren

11. Toxikologische Angaben

Akute Toxizität:
Keine akute Toxizität mit Ausnahme von vorübergehender Reizung exponierter Schleimhäute (Augen, Rachen, Bronchien) und hautreizend bei Bearbeitung.

Zusätzliche Hinweise bei der mechanischen Bearbeitung (Bohren, Sägen, Schleifen usw.) des Produktes:

- Augenkontakt mit Staub kann eine vorübergehende Reizung oder eine Entzündung der Augen hervorrufen
- Längerer Hautkontakt kann bei empfindlichen Personen leichte Hautreizungen hervorrufen
- Wie bei den meisten organischen und nicht organischen Staubarten kann das Einatmen übermäßiger Staubkonzentrationen über längere Zeiträume eine chronische Entzündung der Bronchien (berufsbedingte Bronchitis) hervorrufen
- Das Einatmen von quarzhaltigem Staub, insbesondere das Einatmen feiner (inhalierbarer) Staubpartikel, in hohen Konzentrationen oder über längere Zeiträume, kann Lungenerkrankungen (Silikose) verursachen und zu einem erhöhten Lungenkrebsrisiko führen. Dieses Risiko kann durch die Einhaltung sicherer Arbeitsgewohnheiten minimiert werden (siehe Abschnitt 8)

12. Umweltbezogene Angaben

Keine Angaben

13. Hinweise zur Entsorgung

Entsorgung gemäß den behördlichen Vorschriften oder Baustoffaufbereitung.
Abfallschlüsselnummer Abfallbezeichnung (Quelle: Europäischer Abfallkatalog):

- 101311 - Abfälle aus der Herstellung Verbundstoffe auf Zementbasis
- 170101 - Beton
- 170904 - gemischte Bau- und Abbruchabfälle mit Ausnahme derjenigen, die unter 170901, 170902, 170903 (stark verunreinigt) fallen

Gem. Steckbrief „Asbestfreie Faserzementprodukte“ 25.7 von der Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Würtemberg ist eine Deponierung in der Deponieklasse II möglich, sofern eine Verwertung technisch oder wirtschaftlich nicht zumutbar ist. Eine Rückführung von Faserzementabfällen mit gesicherter Herkunft zum Hersteller ist derzeit nicht gegeben.

In der Regel ist wegen der Überschreitung des Zuordnungswertes für den TOC bei einer Ablagerung auf einer Deponie der Klasse II eine Zustimmung zur Ablagerung eines Abfalls mit leicht erhöhtem Organikanteil von der für die Deponie zuständigen Behörde erforderlich.

14. Angaben zum Transport

Landtransport: Das Produkt ist nicht als gefährlich eingestuft
Binnenschiffstransport: Das Produkt ist nicht als gefährlich eingestuft
Seeschiffstransport: Das Produkt ist nicht als gefährlich eingestuft
Lufttransport: Das Produkt ist nicht als gefährlich eingestuft

15. Rechtsvorschriften

Kennzeichnung gemäß EG-Richtlinen / GefStoffV:
Bei diesem Produkt handelt es sich nicht um einen Stoff oder eine Zubereitung, sondern um ein Fertigprodukt. Das Produkt ist nach den Vorschriften der Europäischen Union nicht kennzeichnungspflichtig.

16. Sonstige Angaben

Die Empfehlungen für die mechanische Bearbeitung und den Einbau des oben genannten Produktes sind gem. den Herstellervorschriften zu befolgen.

Nach dem Stand unserer Kenntnisse und Erfahrungen zum Zeitpunkt der Erstellung sind die hier enthaltenen Angaben zu Sicherheit und Gesundheitsschutz zutreffend. Für Schäden oder Verletzungen, die aus der Verwendung dieses Sicherheitsinformationsblatt entstehen, wird keine Haftung übernommen. Das Sicherheitsinformationsblatt dient als Leitfaden für die sichere Handhabung, Lagerung und Verwendung des Produkts unter normalen Bedingungen. Bei kundenspezifischen Anforderungen ist es gegebenenfalls erforderlich, weitere Informationen oder Beratung einzuholen.

Das vorliegende Sicherheitsinformationsblatt und die darin enthaltenen Informationen ersetzen keine bestehenden Verkaufsbedingungen und stellen keine Spezifikation dar. Die Angaben in diesem Sicherheitsinformationsblatt sind nicht als Empfehlung für die Verwendung auszulegen, sofern dadurch gegen Patentgesetze oder geltende Gesetze oder Vorschriften verstoßen wird.

Weitere Informationen finden Sie in der Planung und Anwendung Cedral Fassadenpaneele.

Haftungsausschluss:
Alle Informationen in diesem Sicherheitsinformationsblatt entsprechen dem derzeitigen technischen Stand zum Zeitpunkt der Veröffentlichung sowie unseren darauf beruhenden Erfahrungen. Wegen der ständigen Weiterentwicklung von Produkten und Systemen behalten wir uns vor, diese Informationen ohne vorherige Ankündigung zu ergänzen oder zu ändern. Kontaktieren Sie bitte Ihren Cedral Ansprechpartner für die neueste Version. Eine Haftung der Etex Germany Exteriors GmbH ist ausgeschlossen. Dies betrifft auch Druckfehler und nachträgliche Änderungen.

Anhang

1. Definition Arbeitsplatzgrenzwert

Die Beratungsgesellschaft für Arbeits- und Gesundheitsschutz liefert nachfolgende Definition, die sich mit allen einschlägigen/ zuständigen Quellen (GefStoffV) deckt.

https://www.bfga.de/arbeitsschutz-lexikon-von-a-bis-z/fachbegriffe-a-b/agw-fachbegriff/

Arbeitsplatzgrenzwert (AGW):

Nach der Gefahrstoffverordnung (GefStoffV) ist der Arbeitsplatzgrenzwert (AGW) der Grenzwert für die zeitlichgewichtete durchschnittliche Konzentration eines Stoffes in der Luft am Arbeitsplatz in Bezug auf einen gegebenen Referenzzeitraum. Er gibt an, bis zu welcher Konzentration eines Stoffs akute oder chronische schädliche Auswirkungen auf die Gesundheit von Beschäftigten im Allgemeinen nicht zu erwarten sind.
Arbeitsplatzgrenzwerte sind Schichtmittelwerte bei in der Regel täglich achtstündiger Exposition an 5 Tagen pro Woche während der Lebensarbeitszeit. Expositionsspitzen während einer Schicht werden entsprechend Nummer 2.3 der Technischen Regeln für Gefahrstoffe „Ermitteln und Beurteilen der Gefährdungen bei Tätigkeiten mit Gefahrstoffen: Inhalative Exposition“ (TRGS 402) mit Kurzzeitwerten beurteilt.

2. Spezifikation von Atemschutzmasken

FFP1:

FFP1 Atemschutzmasken dürfen nur in Arbeitsumgebungen eingesetzt werden, in denen keine giftigen oder fibrogene Aerosole oder Stäube vorhanden sind. Der 4-fache Arbeitsplatzgrenzwert (AGW) von FFP1 Atemschutzmasken darf nicht überschritten werden. Bei einem Abscheidegrad von 78% dürfen bei einer FFP1 Atemschutzmaske höchstens 25% der Partikel durch die Maske gehen (Gesamtleckage). FFP1 Masken werden überwiegend im Baugewerbe oder in der Lebensmittelindustrie eingesetzt.

FFP2:

In Arbeitsumgebungen, in denen sich gesundheitsgefährdende und erbgutverändernde Stoffe in der Atemluft befinden, sollten FFP2 Atemschutzmasken verwendet werden. FFP2 Atemschutzmasken haben einen Abscheidegradvon 92%. Der Arbeitsplatzgrenzwert (AGW) darf 10-fach so hoch sein wie der branchenübliche Wert.
FFP2 Schutzmasken schützen vor mindergiftigen Stäuben, Nebel und Rauchen.

Beispielhafte Bezugsquellen für FFP2 Atemschutzmasken:

https://www.saw-arbeitsschutz.de/atemschutz/feinstaubmasken/ffp2-feinstaubmaske/286

https://ats-arbeitsschutz.de/125-ffp2

Bild 1: FFP1 Atemschutzmaske (Beispiel)



Bild 2: FFP2 Atemschutzmaske (Beispiel)



1. Bezeichnung des Produkts und des Unternehmens

Handelsname:
Cedral Click

Verwendungszweck:
Dampfdruckerhärtete Faserzement Fassadenpaneele für vorgehängte hinterlüftete Fassaden

Hersteller/Lieferant:
Eternit nv
Kuiermansstraat 1
B-1880 Kapelle-op-den-Bos
Telefon: +32 157 171 71
E-Mail: info.benelux@cedral.world

Inverkehrbringer für den D/A/CH Markt:
Etex Germany Exteriors GmbH
Dyckerhoffstraße 95-105
D - 59269 Beckum
E-Mail: info.exteriors.de@etexgroup.com

Notrufnummer:
+49 2525 69 555
Montag bis Donnerstag von 08:00 bis 17:00 Uhr und Freitag von 8:00 bis 15:00 Uhr

2. Mögliche Gefahren

Beschreibung der Gefahren:

- Das eingebaute Produkte bei seiner endgültigen Anwendung:
  - Keine Gefahren bekannt

- Gefahren durch mechanische Bearbeitung (Bohren, Sägen, Schleifen usw.) des Produkts:
  - vorübergehende Reizung exponierter Schleimhäute (Augen, Rachen, Bronchien)
  - Längerer Hautkontakt kann bei empfindlichen Personen leichte Hautreizungen hervorrufen
  - Wie bei den meisten organischen und nicht organischen Staubarten kann das Einatmen übermäßiger Staubkonzentrationen über längere Zeiträume eine chronische Entzündung der Bronchien (berufsbedingte Bronchitis) hervorrufen

Für weitere Informationen:
Tel: +49 2525 69555 Fax: +49 2525 691555 E-mail: info.germany@cedral.world
Etex Germany Exteriors GmbH, Sitz Beckum, Registergericht: Münster HRB 18895
Vorsitzender des Aufsichtsrats: Dirk Altgassen - Geschäftsführer: Rolf Haberlah

etex inspiring ways of living

- Das Einatmen von quarzhaltigem Staub, insbesondere das Einatmen feiner (inhalierbarer) Staubpartikel, in hohen Konzentrationen oder über längere Zeiträume, kann Lungenerkrankungen (Silikose) verursachen und zu einem erhöhten Lungenkrebsrisiko führen. Dieses Risiko kann durch die Einhaltung sicherer Arbeitsgewohnheiten minimiert werden (siehe Abschnitt 7 und 8)

3. Zusammensetzung/Angaben zu Bestandteilen

Beschreibung:
Fassadenpaneele aus Faserzement

Chemische Charakterisierung:
Bei diesem Produkt handelt es sich nicht um einen Stoff oder eine Zubereitung, sondern um ein Fertigprodukt. Es setzt sich aus Zement, Quarzsand, Zellstoff, natürliches Kalziumsilikat, Arcylatbeschichtung, Wasser und Zusatzstoffen zusammen.

4. Erste-Hilfe-Maßnahmen

Einatmen: (nur bei maschineller Bearbeitung), bei gesundheitlichen Problemen frische Luft zuführen und ggf. einen Arzt aufsuchen
Hautkontakt: (nur bei maschineller Bearbeitung), Haut mit Wasser abspülen, bei anhaltenden Hautirretationen einen Arzt aufsuchen
Augenkontakt: (nur bei maschineller Bearbeitung) nicht reiben, sofort mit Wasser ausspülen

5. Maßnahmen zur Brandbekämpfung

Klassifizierung des Brandverhaltens: A2-s1, d0 gemäß DIN EN 13501-1. Das Produkt ist nichtbrennbar, gemäß Tabelle 1.3.1 Muster-Verwaltungsvorschrift Technische Baubestimmungen.

6. Maßnahmen bei unbeabsichtigter Freisetzung

Nicht anwendbar

7. Handhabung und Lagerung

Ziel ist die Vermeidung von Staub bei der mechanischen Bearbeitung durch technische und organisatorische Maßnahmen wie z. B.:

- bei der Verwendung von motorbetriebenen Bearbeitungswerkzeugen sind geeignete Filter mit Staubabsaugung sicherzustellen
- Verbot des Trockenkehrens
- Sicherstellung einer ausreichenden Belüftung am Arbeitsplatz
- regelmäßige Reinigung der Betriebseinrichtungen; Arbeitsbereiche abspritzen oder feucht wischen
- Vermeidung von Haut- und Augenkontakt

Lagerung:

- Die Paletten sind auf ebenem Unterlage trocken und vollflächig zu lagern. Gestapeltes Material bauseitig mit Bauplane gegen Feuchtigkeit und Verschmutzung schützen. Während des Transports sind die Produkte abzudecken.

8. Begrenzung und Überwachung der Exposition/Persönliche Schutzausrüstungen

Aktuelle Arbeitsplatzgrenzwerte (AGW) für Schadstoffe in der Luft:

- Allgemeiner Staubgrenzwert TRGS 900 – Arbeitsplatzgrenzwerte
  Fraktion/ Wert : Alveolengängige (A) 1,25 mg/m³
  Einatembare (E) 10 mg/m³
  Ausgabe: Januar 2006, geändert und ergänzt März 2020

- Beurteilungsmaßstab für Quarz (A-Staub) gemäß TRGS 559 – Quarzhaltiger Staub
  Fraktion/ Werte: Alveolengängige (A) 50 µg/m³
  Ausgabe: April 2020

Sofern die allgemeinen Staubgrenzwerte und der Beurteilungsmaßstab für Quarz überschritten werden, ist ein Schutzmaßnahmenkonzept gemäß geltenden Technischen Regeln für Gefahrstoffen (TRGS), Berufsgenossenschaftliche Regeln für Sicherheit und Gesundheit bei der Arbeit (BG-Regeln) zu entwickeln und anzuwenden. Sofern organisatorische Maßnahmen zur Einhaltung der AGW nicht umgesetzt werden können oder einer Ermittlung der Arbeitsplatz bezogenen Staubwerte nicht vorliegt, sind geeignete Atemschutzmasken zu tragen. In der Regel sind Halbmasken mit Partikelfilter der Kategorie P2 bzw. filtrierende Halbmasken FFP2 ausreichend.

Persönliche empfohlene Schutzausrüstung bei mechanischer Bearbeitung:

- Augenschutz:
  Schutzbrille tragen
- Körperschutz:
  Zum Schutz vor Verletzungen und direktem Hautkontakt geeignete Schutzkleidung tragen
- Atemschutzmasken:
  Sofern erforderlich

Zum Thema Arbeitsplatzgrenzwerte und Schutzausrüstung beachten Sie bitte auch die ergänzenden Informationen im Anhang.

9. Physikalische und chemische Eigenschaften

Allgemeine Angaben:

- Aussehen: Fassadenpaneele mit beschichteter Oberfläche in verschiedenen Farben
- Form: Fest
- Geruch: ohne

Sicherheitsrelevante Eigenschaften:

- Siedepunkt: Nicht anwendbar
- Schmelzpunkt: Nicht anwendbar
- Flammpunkt: Nicht anwendbar
- Entzündbarkeit: Nicht anwendbar
- Selbstentzündbarkeit: Nicht anwendbar
- Explosionsgefahr: Nicht anwendbar
- Brandfördernde Eigenschaften: Nicht anwendbar
- Dampfdruck: Nicht anwendbar
- Rohdichte: >1,30 kg/dm³
- Wasserlöslichkeit: Wasserunlöslich
- Fettlöslichkeit: Nicht anwendbar
- pH-Wert: 10-12
- Verteilungskoeffizient: Nicht anwendbar
- Viskosität: Nicht anwendbar

10. Stabilität und Reaktivität

Stabilität: Stabil
Unverträglichkeit (zu vermeidende Stoffe): starke Säuren

11. Toxikologische Angaben

Akute Toxizität:
Keine akute Toxizität mit Ausnahme von vorübergehender Reizung exponierter Schleimhäute (Augen, Rachen, Bronchien) und hautreizend bei Bearbeitung.

Zusätzliche Hinweise bei der mechanischen Bearbeitung (Bohren, Sägen, Schleifen usw.) des Produktes:

- Augenkontakt mit Staub kann eine vorübergehende Reizung oder eine Entzündung der Augen hervorrufen
- Längerer Hautkontakt kann bei empfindlichen Personen leichte Hautreizungen hervorrufen
- Wie bei den meisten organischen und nicht organischen Staubarten kann das Einatmen übermäßiger Staubkonzentrationen über längere Zeiträume eine chronische Entzündung der Bronchien (berufsbedingte Bronchitis) hervorrufen
- Das Einatmen von quarzhaltigem Staub, insbesondere das Einatmen feiner (inhalierbarer) Staubpartikel, in hohen Konzentrationen oder über längere Zeiträume, kann Lungenerkrankungen (Silikose) verursachen und zu einem erhöhten Lungenkrebsrisiko führen. Dieses Risiko kann durch die Einhaltung sicherer Arbeitsgewohnheiten minimiert werden (siehe Abschnitt 8)

12. Umweltbezogene Angaben

Keine Angaben

13. Hinweise zur Entsorgung

Entsorgung gemäß den behördlichen Vorschriften oder Baustoffaufbereitung.
Abfallschlüsselnummer Abfallbezeichnung (Quelle: Europäischer Abfallkatalog):

- 101311 - Abfälle aus der Herstellung Verbundstoffe auf Zementbasis
- 170101 - Beton
- 170904 - gemischte Bau- und Abbruchabfälle mit Ausnahme derjenigen, die unter 170901, 170902, 170903 (stark verunreinigt) fallen

Gem. Steckbrief „Asbestfreie Faserzementprodukte“ 25.7 von der Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Würtemberg ist eine Deponierung in der Deponieklasse II möglich, sofern eine Verwertung technisch oder wirtschaftlich nicht zumutbar ist. Eine Rückführung von Faserzementabfällen mit gesicherter Herkunft zum Hersteller ist derzeit nicht gegeben.

In der Regel ist wegen der Überschreitung des Zuordnungswertes für den TOC bei einer Ablagerung auf einer Deponie der Klasse II eine Zustimmung zur Ablagerung eines Abfalls mit leicht erhöhtem Organikanteil von der für die Deponie zuständigen Behörde erforderlich.

14. Angaben zum Transport

Landtransport: Das Produkt ist nicht als gefährlich eingestuft
Binnenschiffstransport: Das Produkt ist nicht als gefährlich eingestuft
Seeschiffstransport: Das Produkt ist nicht als gefährlich eingestuft
Lufttransport: Das Produkt ist nicht als gefährlich eingestuft

15. Rechtsvorschriften

Kennzeichnung gemäß EG-Richtlinen / GefStoffV:
Bei diesem Produkt handelt es sich nicht um einen Stoff oder eine Zubereitung, sondern um ein Fertigprodukt. Das Produkt ist nach den Vorschriften der Europäischen Union nicht kennzeichnungspflichtig.

16. Sonstige Angaben

Die Empfehlungen für die mechanische Bearbeitung und den Einbau des oben genannten Produktes sind gem. den Herstellervorschriften zu befolgen.

Nach dem Stand unserer Kenntnisse und Erfahrungen zum Zeitpunkt des Erstellung sind die hier enthaltenen Angaben zu Sicherheit und Gesundheitsschutz zutreffend. Für Schäden oder Verletzungen, die aus der Verwendung dieses Sicherheitsinformationsblatt entstehen, wird keine Haftung übernommen. Das Sicherheitsinformationsblatt dient als Leitfaden für die sichere Handhabung, Lagerung und Verwendung des Produkts unter normalen Bedingungen. Bei kundenspezifischen Anforderungen ist es gegebenenfalls erforderlich, weitere Informationen oder Beratung einzuholen.

Das vorliegende Sicherheitsinformationsblatt und die darin enthaltenen Informationen ersetzen keine bestehenden Verkaufsbedingungen und stellen keine Spezifikation dar. Die Angaben in diesem Sicherheitsinformationsblatt sind nicht als Empfehlung für die Verwendung auszulegen, sofern dadurch gegen Patentgesetze oder geltende Gesetze oder Vorschriften verstoßen wird.

Weitere Informationen finden Sie in der Planung und Anwendung Cedral Fassadenpaneele.

Haftungsausschluss:
Alle Informationen in diesem Sicherheitsinformationsblatt entsprechen dem derzeitigen technischen Stand zum Zeitpunkt der Veröffentlichung sowie unseren darauf beruhenden Erfahrungen. Wegen der ständigen Weiterentwicklung von Produkten und Systemen behalten wir uns vor, diese Informationen ohne vorherige Ankündigung zu ergänzen oder zu ändern. Kontaktieren Sie bitte Ihren Cedral Ansprechpartner für die neueste Version. Eine Haftung der Etex Germany Exteriors GmbH ist ausgeschlossen. Dies betrifft auch Druckfehler und nachträgliche Änderungen.

Anhang

1. Definition Arbeitsplatzgrenzwert

Die Beratungsgesellschaft für Arbeits- und Gesundheitsschutz liefert nachfolgende Definition, die sich mit allen einschlägigen/ zuständigen Quellen (GefStoffV) deckt.

https://www.bfga.de/arbeitsschutz-lexikon-von-a-bis-z/fachbegriffe-a-b/agw-fachbegriff/

Arbeitsplatzgrenzwert (AGW):

Nach der Gefahrstoffverordnung (GefStoffV) ist der Arbeitsplatzgrenzwert (AGW) der Grenzwert für die zeitlichgewichtete durchschnittliche Konzentration eines Stoffes in der Luft am Arbeitsplatz in Bezug auf einen gegebenen Referenzzeitraum. Er gibt an, bis zu welcher Konzentration eines Stoffs akute oder chronische schädliche Auswirkungen auf die Gesundheit von Beschäftigten im Allgemeinen nicht zu erwarten sind. Arbeitsplatzgrenzwerte sind Schichtmittelwerte bei in der Regel täglich achtstündiger Exposition an 5 Tagen pro Woche während der Lebensarbeitszeit. Expositionsspitzen während einer Schicht werden entsprechend Nummer 2.3 der Technischen Regeln für Gefahrstoffe „Ermitteln und Beurteilen der Gefährdungen bei Tätigkeiten mit Gefahrstoffen: Inhalative Exposition“ (TRGS 402) mit Kurzzeitwerten beurteilt.

2. Spezifikation von Atemschutzmasken

FFP1:

FFP1 Atemschutzmasken dürfen nur in Arbeitsumgebungen eingesetzt werden, in denen keine giftigen oder fibrogene Aerosole oder Stäube vorhanden sind. Der 4-fache Arbeitsplatzgrenzwert (AGW) von FFP1 Atemschutzmasken darf nicht überschritten werden. Bei einem Abscheidegrad von 78% dürfen bei einer FFP1 Atemschutzmaske höchstens 25% der Partikel durch die Maske gehen (Gesamtleckage). FFP1 Masken werden überwiegend im Baugewerbe oder in der Lebensmittelindustrie eingesetzt.

FFP2:

In Arbeitsumgebungen, in denen sich gesundheitsgefährdende und erbgutverändernde Stoffe in der Atemluft befinden, sollten FFP2 Atemschutzmasken verwendet werden. FFP2 Atemschutzmasken haben einen Abscheidegradvon 92%. Der Arbeitsplatzgrenzwert (AGW) darf 10-fach so hoch sein wie der branchenübliche Wert.
FFP2 Schutzmasken schützen vor mindergiftigen Stäuben, Nebel und Rauchen.

Beispielhafte Bezugsquellen für FFP2 Atemschutzmasken:

https://www.saw-arbeitsschutz.de/atemschutz/feinstaubmasken/ffp2-feinstaubmaske/286

https://ats-arbeitsschutz.de/125-ffp2

Bild 1: FFP1 Atemschutzmaske (Beispiel)



Bild 2: FFP2 Atemschutzmaske (Beispiel)



B-EPD ENVIRONMENTAL PRODUCT DECLARATION

ETEX
CEDRAL fibre cement sheets

The production and installation of 1 m^2 (thickness 10 mm overlap, 12mm non-overlap) of a “Cedral” panel and its related impacts over cradle-to-grave life cycle stages, over a reference service life of 60 years.

Issued 07.10.2021
Valid until 07.10.2026

Third party verified
Conform to EN 15804+A2, NBN/DTD B08-001 and ISO14025

Modules declared Cradle-to-grave					
A123	A4	A5	B	C	D
•	•	•	•	•	•

[B-EPD n° 21-0135-02-00-00-EN]

OWNER OF THIS ENVIRONMENTAL PRODUCT DECLARATION
Etex services

EPD PROGRAM OPERATOR
Federal Public Service of Health, Food Chain Safety and Environment
www.b-epd.be

The intended use of this EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings. This EPD is only valid when registered on www.b-epd.be. The FPS Public Health cannot be held responsible for the information provided by the owner of the EPD.

PRODUCT DESCRIPTION

PRODUCT NAME
Cedral

PRODUCT DESCRIPTION
Cedral sidings are steam-hardened cellulose-reinforced fibre cement planks produced at Kapelle-op-den-Bos production plant, Belgium. They exist in two finishes: smooth or structured (wood relief). Planks are coated and available in various colours.

INTENDED USE
Cedral sidings are used as board-like façade cladding for back-ventilated façades. For both smooth and structured panels two installation methods are provided. The “click” application has a tongue and groove system, while the “lap” application foresees an overlap of the panels. The results of the LCA are valid for both Click and Lap application, and are based on a weighted average of the market shares of both products. In both cases the weight of 1m² installed CEDRAL is 19,5 kg or 0,0195 ton. The overlap of the “lap” application is exactly compensated by the board being 2 mm thinner than the “click” application.

REFERENCE FLOW / DECLARED UNIT
The functional unit is defined as: the production and installation of 1 m^2 (thickness 10 mm overlap, 12mm non-overlap) of a “CEDRAL” sheets and its related impacts over cradle-to-grave life cycle stages, where the product’s expected average reference service life is of 60 years.

Packaging is included.

The weight per reference flow is 19,5 kg.
The minimum (dry) density of the product is 1300 kg / m^3.
Dimensions of the panel per FU: 1 m² of thickness 10 mm overlap, 12mm non-overlap

INSTALLATION
The product is installed according to the following scenario(s): fixation of the panel to a framework in wood or metal. This EPD declares the screws and energy consumption to fixate the panels, but does not include the framework. This may lead to the need of additional products and materials for which the impact is not included in this EPD and which shall be taken into account at building level. The different frameworks are described in the chapter “Additional technical information for scenario development at building”.

IMAGES OF THE PRODUCT AND ITS INSTALLATION







COMPOSITION AND CONTENT

Components	Composition / content / ingredients	Quantity
Product	*- Sand* *- Cement* *- Cellulose* *- Internal production waste* *- Wollastonite* *- Aluminium hydroxide* *- Primer* *- Water* *- Others*	*30 -40%* *20 - 30%* *<10%* *<5%* *<5%* *<5%* *<5%* *15-20%* *<1%*
Fixation materials	*-Cedral click: inox clips* *Or* *-Cedral lap: inox screws*	*10 p* *12,5 p*
Jointing materials	*NA*	*/*
Treatments	*NA*	*/*
Packaging	*- Pallet* *- PE cover foil* *- PE plastic foam layers* *- PE band on a carton roll*	*0,6787 kg* *0,0041 kg* *0,1545 kg* *0,1620 kg*

The product does not contain materials listed in the “Candidate list of Substances of Very High Concern for authorization”.

REFERENCE SERVICE LIFE

The reference service life is estimated at 60 years.

CEDRAL is a rather new product on the market (°2007), and there is not yet extensive evidence regarding its reference service life. However there are some studies that suggest that it is feasible to assume that this product lasts for the average lifetime of a building[1].

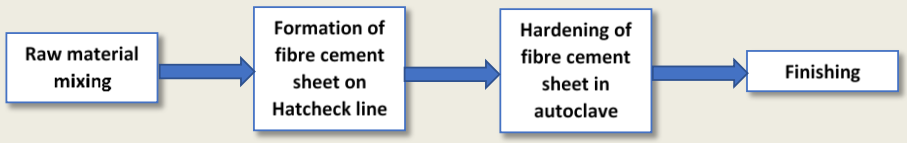
The RSL is valid under normal conditions of use.

DESCRIPTION OF GEOGRAPHICAL REPRESENTATIVITY

The EPD is representative for the Belgian market.

DESCRIPTION OF THE PRODUCTION PROCESS AND TECHNOLOGY

Cedral Click and Lap Cedral are manufactured largely in accordance with an automated winding process: the raw materials are mixed with water to prepare a homogenous mixture. Rotating screen cylinders are immersed in this fibre cement pulp which drain internally. The screen surface is covered in a thin film of fibre cement which is transferred onto an infinite conveyor belt from where it is conveyed to a format roller which is gradually covered in an increasingly thicker layer of fibre cement. Once the requisite material thickness is achieved, the still moist and malleable fibre cement layer (fibre cement fleece) is separated and removed from the format roller. The fibres cement fleece is cut to size. Leftovers are returned to the production process preventing any waste from being incurred. The panels are then set aside for curing before stacking on pallets and steam-hardened in an autoclave for approx. two hours. The setting time lasts approx. three days. Waste from damaged or broken panels is recycled by an external company as raw material for cement production. For the Click application a tongue and groove closure is milled out from the panels. Finally the façade panels are coated in acrylic paint.



[1] ‘Durability of Autoclaved Cellulose Fiber Cement Composites’, A.M.Cooke, Managing Director, Building Materials and Technology Pty Ltd, Sydney, NSW, Australia

TECHNICAL DATA / PHYSICAL CHARACTERISTICS

Technical property	Standard	Value	Unit	Comment
Gross density dry (min)	EN12467	1300	kg/m^3	
Standard panel thickness (“lap” system)		10	mm	
Standard panel thickness (“click” system)		12	mm	
Thermal conductivity		0.212	W/(mK)	
Flexural strength parallel	EN12467	23	N/mm^2	
Flexural strength perpendicular	EN12467	11	N/mm^2	
Modulus of elasticity parallel	EN12467	7500	N/mm^2	
Modulus of elasticity perpendicular	EN12467	5500	N/mm^2	
Coefficient of thermal expansion		<0.01	10-6K-1	

LCA STUDY

DATE OF LCA STUDY
September 2021

SOFTWARE
For the calculation of the LCA results, the software program SimaPro 9.1.1.1 (PRé Consultants, 2021) has been used in combination with a specific LCA software program for ETEX.

INFORMATION ON ALLOCATION
At Etex, different types of cement fiber products are produced. However CEDRAL products are produced only on certain production lines, with no co-products being produced as part of the process. Only facility level data were available for electricity use, the use of natural gas, etc. The facility level data have been allocated to the analyzed product using their respective annual production volume (physical relationship), therefore volume allocation is applied. Material inputs and outputs which were not available at the product level, such as waste, were allocated similarly, by mass allocation.

INFORMATION ON CUT OFF
Following processes were considered below the cut-off:
- Transport of packaging of raw materials
- The metal templates in which the boards are produced need to be greased periodically. The template oil is considered below cut-off
- Packaging and transport of ancillary materials used during installation
- Waste treatment of ancillary materials used during installation
- Wearable sieves and cutting knives

INFORMATION ON EXCLUDED PROCESSES
Following processes were excluded for the inventory:
- Infrastructure and land use of the factory
-
- Environmental impacts caused by the personnel of the production plants are not included in the LCA, e.g. waste from the cafeteria and sanitary installations, accidental pollution caused by human mistakes, or environmental effects caused by commuter traffic

INFORMATION ON BIOGENIC CARBON MODELLING
The fibre cement panels contain cellulose, which is a biobased material. Uptake of biogenic CO_2 within cellulose is reported in module A1, release of biogenic CO_2 related to this flow is reported in C4.
The fibre cement panels are transported using wooden pallets and a carton coverage. Uptake of biogenic CO_2 within these pallets and carton is reported in module A3, release in module A5.

	Biogenic carbon content (kg C / FU)
Biogenic carbon content in product (at the gate)	4,71E-01
Biogenic carbon content in accompanying packaging (at the gate)	3,03E-01

INFORMATION ON CARBON OFFSETTING
Carbon offsetting is not allowed in the EN 15804 and hence not taken into account in the calculations.

ADDITIONAL OR DEVIATING CHARACTERISATION FACTORS
The characterization factors from EC-JRC were applied. No additional or deviating characterization factors were used.

DATA

SPECIFICITY

The data used for the LCA are specific for this product which is manufactured by a single manufacturer in a single production site.

PERIOD OF DATA COLLECTION

Manufacturer specific data have been collected for the year 2016.

INFORMATION ON DATA COLLECTION

Company specific data for the product stage have been collected by Eternit and were provided to VITO through an excel file. The LCI data has been checked by the EPD verifier (Evert Vermaut, Vinçotte). VITO uses publicly available generic data for all background processes such as the production of electricity, transportation by means of a specific truck, etc. Primary data is used for modules A1, A2, A3, and A5. The rest of the study is based on scenarios (module A4, modules B1-B7, modules C1-C4, and module D).

DATABASE USED FOR BACKGROUND DATA

The main LCI source used in this study is the Ecoinvent 3.6 database (Wernet et al., 2019).

ENERGY MIX

The Belgian electricity mix (consumption mix + import) has been used to model electricity use in life cycle stages A3, A5, C1, C3, C4 and D. The used record is the ecoinvent record 'Electricity, low voltage {BE}| market for | Cut-off, U' (Wernet et al., 2016).

PRODUCTION SITES

The production site is located at Kuiermansstraat 1, 1880 Kapelle-op-den-Bos, Belgium.

SYSTEM BOUNDARIES

Product stage			Construction installation stage		Use stage							End of life stage					Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction 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 = included in the EPD
MND = module not declared

CEDRAL uses production waste from other production lines in the ETEX factory, so does contain recycled content.

In the default end-of-life scenario as described by the B-PCR 100% is landfilled, so the end-of-waste state is not reached.

The production waste is partly externally recycled. However, it has been assumed that the recycled waste has no economic value, so 100% of the impacts of the production are allocated to the product and 0% to recycled production waste.

POTENTIAL ENVIRONMENTAL IMPACTS PER REFERENCE FLOW

	Production			Construction process stage		Use stage							End-of-life stage					
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
GWP total (kg CO2 equiv/FU)	4,87E+00	4,74E-01	1,82E+00	3,44E-01	2,77E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,46E-03	2,61E-01	7,18E-05	1,83E+00	-5,39E-01	1,24E+01
GWP fossil (kg CO2 equiv/FU)	6,74E+00	4,74E-01	2,76E+00	3,44E-01	1,65E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,42E-03	2,61E-01	7,14E-05	1,08E-01	-5,41E-01	1,23E+01
GWP biogenic (kg CO2 equiv/FU)	-1,88E+00	1,86E-04	-9,39E-01	1,45E-04	1,12E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,15E-05	1,06E-04	2,74E-07	1,73E+00	2,71E-03	2,79E-02
GWP luluc (kg CO2 equiv/FU)	1,04E-02	3,41E-04	2,76E-03	1,21E-04	1,10E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,29E-05	9,11E-05	1,64E-07	5,94E-05	-5,46E-04	1,49E-02
ODP (kg CFC 11 equiv/FU)	3,56E-07	9,86E-08	3,63E-07	7,86E-08	8,86E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,13E-09	5,92E-08	1,46E-11	4,58E-08	-5,45E-08	1,09E-06
AP (mol H^+ eq)	2,19E-02	9,20E-03	6,12E-03	1,41E-03	5,44E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,35E-05	1,06E-03	1,92E-07	9,28E-04	-1,53E-03	4,60E-02
EP - freshwater (kg P-equiv/FU)	1,92E-04	3,13E-06	7,27E-05	2,79E-06	3,69E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,44E-07	2,05E-06	1,93E-09	1,15E-06	-9,03E-06	3,11E-04
EP - marine (kg N-equiv/FU)	5,20E-03	2,46E-03	1,80E-03	4,17E-04	1,17E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,77E-06	3,16E-04	4,14E-08	3,44E-04	-3,39E-04	1,17E-02
EP - terrestrial (mol N-equiv/FU)	5,92E-02	2,73E-02	1,68E-02	4,62E-03	1,29E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,40E-05	3,49E-03	5,01E-07	3,81E-03	-3,81E-03	1,28E-01
POCP (kg NMVOC equiv/FU)	1,54E-02	7,18E-03	6,04E-03	1,44E-03	3,77E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,70E-06	1,07E-03	1,35E-07	1,08E-03	-1,57E-03	3,60E-02

ADP Elements (kg Sb equiv/FU)	3,88E-06	5,57E-07	1,20E-06	6,42E-07	1,23E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,42E-08	5,07E-07	1,94E-10	1,10E-07	-7,07E-07	1,92E-05
ADP fossil fuels (MJ/FU)	5,17E+01	6,47E+00	7,51E+01	5,23E+00	1,39E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,16E-01	3,93E+00	2,76E-03	3,49E+00	-1,43E+01	1,60E+02
WDP (m^3 water eq deprived /FU)	3,03E+00	1,48E-02	6,41E-01	1,58E-02	2,78E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,06E-03	1,09E-02	2,63E-05	1,52E-02	-1,99E-01	4,00E+00

GWP total = total Global Warming Potential (Climate Change); GWP-luluc = Global Warming Potential (Climate Change) land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential for Soil and Water; EP = Eutrophication Potential; POCP = Photochemical Ozone Creation; ADPE = Abiotic Depletion Potential – Elements; ADPF = Abiotic Depletion Potential – Fossil Fuels; WDP = water use (Water (user) deprivation potential, deprivation-weighted water consumption)

RESOURCE USE

	Production			Construction process		Use stage							End-of-life stage					
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
PERE (MJ/FU, net calorific value)	3,00E+01	7,67E-02	1,08E+01	7,33E-02	7,30E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,33E-02	5,43E-02	2,95E-04	1,18E-01	-9,47E+00	4,85E+01
PERM (MJ/FU, net calorific value)	1,64E+01	0,00E+00	9,50E+00	0,00E+00	-2,51E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,34E+01
PERT (MJ/FU, net calorific value)	4,64E+01	7,67E-02	2,03E+01	7,33E-02	4,80E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,33E-02	5,43E-02	2,95E-04	1,18E-01	-9,47E+00	7,18E+01
PENRE (MJ/FU, net calorific value)	5,81E+01	6,50E+00	6,61E+01	5,27E+00	2,36E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,28E-01	3,95E+00	2,91E-03	3,51E+00	-1,52E+01	1,67E+02
PENRM (MJ/FU, net calorific value)	3,95E-02	0,00E+00	1,36E+01	0,00E+00	-7,50E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,15E+00
PENRT (MJ/FU, net calorific value)	5,81E+01	6,50E+00	7,97E+01	5,27E+00	1,61E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,28E-01	3,95E+00	2,91E-03	3,51E+00	-1,52E+01	1,73E+02
SM (kg/FU)	2,88E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,76E+00	2,88E-02
RSF (MJ/FU, net calorific value)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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/FU, net calorific value)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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 (m^3 water eq/FU)	1,58E-01	3,37E-04	5,97E-02	4,04E-04	1,38E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,18E-05	2,84E-04	7,87E-07	3,37E-03	-3,19E-03	2,36E-01

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

WASTE CATEGORIES & OUTPUT FLOWS

	Production			Construction process stage		Use stage							End-of-life stage					
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
Hazardous waste disposed (kg/FU)	4,08E-05	1,18E-05	5,51E-05	1,34E-05	1,89E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,66E-07	1,03E-05	2,27E-09	3,82E-06	-1,53E-05	1,54E-04
Non-hazardous waste disposed (kg/FU)	4,88E-01	1,37E-01	1,55E-01	3,10E-01	1,62E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,89E-04	1,88E-01	5,41E-06	1,95E+01	-3,09E-02	2,24E+01
Radioactive waste disposed (kg/FU)	2,25E-04	4,45E-05	3,09E-04	3,56E-05	5,68E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,08E-06	2,68E-05	2,64E-08	2,58E-05	-3,90E-05	7,26E-04
Components for re-use (kg/FU)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling (kg/FU)	0,00E+00	0,00E+00	1,13E+00	0,00E+00	5,80E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,51E-02	0,00E+00	-1,79E+00	1,79E+00
Materials for energy recovery (kg/FU)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy (MJ/FU)	0,00E+00	0,00E+00	7,11E-03	0,00E+00	3,59E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,60E+00	3,60E+00

IMPACT CATEGORIES ADDITIONAL TO EN 15804

		Production			Construction process		Use stage							End-of-life stage					
		A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
	*PM (disease incidence)*	2,22E-07	2,29E-08	6,70E-08	2,57E-08	6,13E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,64E-11	1,81E-08	1,27E-12	1,94E-08	-1,56E-08	4,36E-07
	*IRHH (kg U235 eq/FU)*	2,45E-01	2,82E-02	3,71E-01	2,29E-02	5,98E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,44E-03	1,72E-02	3,10E-05	2,01E-02	-4,29E-02	7,66E-01
	*ETF (CTUe/FU)*	1,50E+02	4,71E+00	2,66E+01	4,24E+00	2,74E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,45E-02	3,14E+00	1,29E-03	1,87E+00	-4,52E+00	2,18E+02
	*HTCE (CTUh/FU)*	3,10E-09	2,38E-10	1,09E-09	1,17E-10	7,78E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,22E-12	8,84E-11	4,58E-14	4,49E-11	-4,20E-10	1,25E-08
	*HTnCE (CTUh/FU)*	8,82E-08	4,52E-09	1,56E-08	4,66E-09	3,12E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,12E-11	3,43E-09	8,84E-13	1,08E-09	-4,64E-09	1,49E-07
	*Land Use Related impacts (dimensionless)*	2,76E+02	2,86E+00	1,36E+02	4,31E+00	2,49E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,71E-02	2,71E+00	1,85E-03	6,43E+00	-7,19E+01	4,53E+02

HTCE = Human Toxicity – cancer effects; HTnCE = Human Toxicity – non cancer effects; ETF = Ecotoxicity – freshwater; (potential comparative toxic unit)
PM = Particulate Matter (Potential incidence of disease due to PM emissions);
IRHH = Ionizing Radiation – human health effects (Potential Human exposure efficiency relative to U235);

	*Global Warming Potential*	*The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.* *It is split up in 4:* - *Global Warming Potential total (GWP-total) which is the sum of GWP-fossil, GWP-biogenic and GWP-luluc* - *Global Warming Potential fossil fuels (GWP-fossil) : The global warming potential related to greenhouse gas (GHG) emissions to any media originating from the oxidation and/or reduction of fossil fuels by means of their transformation or degradation (e.g. combustion, digestion, landfilling, etc).* - *Global Warming Potential biogenic (GWP-biogenic) : The global warming potential related to carbon emissions to air (CO2, CO and CH4) originating from the oxidation and/or reduction of aboveground biomass by means of its transformation or degradation (e.g. combustion, digestion, composting, landfilling) and CO2 uptake from the atmosphere through photosynthesis during biomass growth – i.e. corresponding to the carbon content of products, biofuels or above ground plant residues such as litter and dead wood.[2]* - *Global Warming Potential land use and land use change (GWP-luluc): The global warming potential related to carbon uptakes and emissions (CO2, CO and CH4) originating from carbon stock changes caused by land use change and land use. This sub-category includes biogenic carbon exchanges from deforestation, road construction or other soil activities (including soil carbon emissions).*
	*Ozone Depletion*	*Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons), Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.*
	*Acidification potential*	*Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.*
	*Eutrophication potential*	*The potential to cause over-fertilization of water and soil, which can result in increased growth of biomass and following adverse effects.* *It is split up in 3:* - *Eutrophication potential – freshwater: The potential to cause over-fertilization of freshwater, which can result in increased growth of biomass and following adverse effects.* - *Eutrophication potential – marine: The potential to cause over-fertilization of marine water, which can result in increased growth of biomass and following adverse effects.* - *Eutrophication potential – terrestrial: The potential to cause over-fertilization of soil, which can result in increased growth of biomass and following adverse effects.*
	*Photochemical ozone creation*	*Chemical reactions brought about by the light energy of the sun creating photochemical smog. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.*
	*Abiotic depletion potential for non-fossil ressources*	*Consumption of non-renewable resources, thereby lowering their availability for future generations. Expressed in comparison to Antimonium (Sb).* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Abiotic depletion potential for fossil ressources*	*Measure for the depletion of fossil fuels such as oil, natural gas, and coal. The stock of the fossil fuels is formed by the total amount of fossil fuels, expressed in Megajoules (MJ).* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Ecotoxicity for aquatic fresh water*	*The impacts of chemical substances on ecosystems (freshwater).* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Human toxicity (carcinogenic effects)*	*The impacts of chemical substances on human health via three parts of the environment: air, soil and water.*

[2] Carbon exchanges from native forests shall be modelled under GWP - luluc (including connected soil emissions, derived products or residues), while their CO_2 uptake is excluded.

		The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.
	*Human toxicity (non-carcinogenic effects)*	*The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Particulate matter*	*Accounts for the adverse health effects on human health caused by emissions of Particulate Matter (PM) and its precursors (NOx, SOx, NH3)*
	*Resource depletion (water)*	*Accounts for water use related to local scarcity of water as freshwater is a scarce resource in some regions, while in others it is not.* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Ionizing radiation - human health effects*	*This impact category deals mainly with the eventual impact on human health of low dose ionizing radiation of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.*
	*Land use related impacts*	*The indicator is the "soil quality index" which is the result of an aggregation of following four aspects:* - *Biotic production* - *Erosion resistance* - *Mechanical filtration* - *Groundwater* *The aggregation is done based on a JRC model. The four aspects are quantified through the LANCA model for land use.* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

DETAILS OF THE UNDERLYING SCENARIOS USED TO CALCULATE THE IMPACTS

A1 – RAW MATERIAL SUPPLY

This module takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process.

A2 – TRANSPORT TO THE MANUFACTURER

The raw materials are transported to the manufacturing site.

A3 – MANUFACTURING

This module takes into account the production process.

A4 – TRANSPORT TO THE BUILDING SITE

Fuel type and consumption of vehicle or vehicle type used for transport	Truck 16-32 ton EURO 5 (0,260 l/km)	Truck >32 ton EURO 5 (0,366 l/km)	Truck 7.5-16 ton EURO 5 (0,186 l/km)
Distance	100 (40% from factory to construction site) 35 (60%*85% from supplier to construction site)	100 (60% from factory to supplier)	35 (60%*15% from supplier to construction site)
Capacity utilisation (including empty returns)	50%	50%	50%
Bulk density of transported products	Ecoinvent	Ecoinvent	Ecoinvent
Volume capacity utilisation factor	Ecoinvent	Ecoinvent	Ecoinvent

The B-PCR provides default transport scenarios for the transport to the building site for cases where specific data on transport are missing. The B-PCR provides scenario's for this life cycle stage. Fibre cement panels are categorized as 'loose products' in table 5 of the B-PCR. The following transport steps apply:

- 40% directly to the construction site over 100 km with a 16-32 ton lorry (ecoinvent record: 'Transport, freight, lorry 16-32 metric ton, EURO5 {RER}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U')
- 60% to a supplier over 100 km with a >32 ton lorry (ecoinvent record: 'Transport, freight, lorry >32 metric ton, EURO5 {RER}| transport, freight, lorry >32 metric ton, EURO5 | Cut-off, U')
- 85% of these 60% is transported over 35 km from supplier to construction site with a 16-32 ton lorry (ecoinvent record: 'Transport, freight, lorry 16-32 metric ton, EURO5 {RER}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U')
- 15% of these 60% is transported over 35 km from supplier to construction site with a 7.5-16 ton lorry (ecoinvent record: 'Transport, freight, lorry 7.5-16 metric ton, EURO5 {RER}| transport, freight, lorry 7.5-16 metric ton, EURO5 | Cut-off, U')

A5 – INSTALLATION IN THE BUILDING

12,5 inox screws are necessary per functional unit for Cedral lap and 10 inox clips are necessary for Cedral clip. In this EPD an average has been considered by including 50% of the screws (6,25 screws or 0,019 kg) and 50% of the clips (5 clips or 0,060 kg). For the installation of 1m² CEDRAL product, 0.022 kWh of electricity is declared. The dataset used to model the impacts is 'Electricity, low voltage {BE}| market for | Cut-off, U'.

During the installation, depending on how the CEDRAL sheets are cut, there is a loss rate between 5-30%, depending on the building shape. For this EPD an average loss rate of 10% is used.

All packaging material for the CEDRAL product is transported to End of Life (EoL) and disposed of in line with the B-PCR default EoL scenarios for Belgium.

Parts of the installation	quantity	Description
Processes necessary for the installation of the product	*0,022 kWh*	*energy needed to fix the screws*
Fixation materials	*6,25* *5*	*Screws* *Clips*
Material losses	*10%*	*Average material losses*
Packaging	*- Pallet* *- PE cover foil* *- PE plastic foam layers* *- PE band on a carton roll*	*0,6787 kg* *0,0041 kg* *0,1545 kg* *0,1620 kg*

Ancillary materials for installation (specified by material);	12,5 Screws 10 clips	
Water use	None	
Other resource use	10% losses	
Quantitative description of energy type (regional mix) and consumption during the installation process	0,022 kWh electricity, low voltage	
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	packaging waste: *0,6787* kg wood	packaging waste: 0,321 kg plastic
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	60% recycling 20% incinerated	35% recycling 60% incinerated 5% landfill
Direct emissions to ambient air, soil and water	None	None
Distance	Not applicable	Not applicable

B – USE STAGE (EXCLUDING POTENTIAL SAVINGS)

B1: No emissions during the use phase.
B2: The product does not require maintenance.
B3: The product does not require repair.
B4: No replacement required.
B5: No refurbishment
B6: The product does not require operational energy use.
B7: No operational water use.

C: End of life

The default scenario for Cement fibre boards from NBN/DTD B08-001 is used to model the End-of-life of the boards. The default scenario for metals from NBN/DTD B08-001 is used to model the End-of-life of the screws and the clips.

C1: The dismantling of EQUITONE [tectiva] involves the same amount of energy as for the installation, which is 0,022 kWh.
C2: The default scenario for fibre cement boards from NBN/DTD B08-001 describes that the end-of-life waste is transported to a sorting facility over a distance of 30 km. Afterwards, 100% of the fibre cement boards and 5% of the metal screws and clips are transported to a landfill over a distance of 50 km.
C3: No recycling/reuse of fibre cement boards, 95% recycling of metal screws
C4: 100% landfill of fibre cement boards, 5% landfill of metal screws

Module C2 – Transport to waste processing					
Type of vehicle (truck/boat/etc.)	Fuel consumption (litres/km)	Distance (km)	Capacity utilisation (%)	Density of products (kg/m^3)	Assumptions
Truck 16-32 ton	0,260 l diesel/km	80	50%	Ecoinvent scenario	Ecoinvent scenario

End-of-life modules – C3 and C4		
Parameter	Unit	Value
Wastes collected separately	kg	0,079
Wastes collected as mixed construction waste	kg	19,5
Waste for re-use	kg	0
Waste for recycling	kg	0,075
Waste for energy recovery	kg	0
Waste for final disposal	kg	19,5

D – Benefits and loads beyond the system boundaries

In module D, the benefits and loads beyond the system boundaries are quantified. Following waste streams are considered after their end-of-waste: wooden pallets in A3 and A5 (of which 60% is recycled), plastic packaging in A3 and A5 (of which 35% is recycled), paper and cardboard in A3 (of which 95% is recycled), steel cables in A3 (of which 95% is recycled) and metal screws and clips (of which 95% is recycled.

Quantitative description of the loads beyond the system boundaries	Treatment of 0,078 kg of scrap steel to prepare it for to prepare it for recycling at the remelter
	Sorting of 0,408 kg of waste wood to prepare it for recycling
	Treatment of 0,113 kg plastic to prepare it for recycling
Quantitative description of the benefits beyond the system boundaries	Avoided production of 2,40 MJ of heat using natural gas
	Avoided production of 1,20 MJ of Belgian electricity mix
	Avoided production of 0,078 kg primary steel
	Avoided production of 0,408 kg primary softwood
	Avoided production of 0,113 kg primary polypropylene/ polypropylene granulates

ADDITIONAL INFORMATION ON RELEASE OF DANGEROUS SUBSTANCES TO INDOOR AIR, SOIL AND WATER DURING THE USE STAGE

INDOOR AIR

Under normal conditions of use, CEDRAL products do not cause any adverse health effects or release of volatile organic compounds (VOCs) to indoor air.

SOIL AND WATER

No environmental impact to water, air or soil is expected due to the extremely low metal release from the low maintenance requirements.

DEMONSTRATION OF VERIFICATION

EN 15804+A2 serves as the core PCR
Independent verification of the environmental declaration and data according to standard EN ISO 14025:2010 Internal ☐ External ☒
Third party verifier: Evert Vermaut (Vincotte) Jan Olieslagerslaan 35 1800 Vilvoorde, Belgium evermaut@vincotte.be

ADDITIONAL TECHNICAL INFORMATION FOR SCENARIO DEVELOPMENT

This EPD does not include the framework on which the panels are installed. At building level the impact of the framework should be added. If specific information on quantities is missing, following weights can be used. The values are applicable for exterior wall cladding.

Wooden framework

Components	quantity	Description
Wooden frame	*2,4 kg*	
EPDM sealing tape	*0,018 kg*	

Steel framework

Components	quantity	Description
Steel frame	*2,48 kg*	
PVC foam	*0,02 kg*	

APPLICATION UNIT

This paragraph gives information on the applied product and how the reference flow and table with impacts relate to different applications. The table below gives an overview of the standard thicknesses, the thickness range and the ratio to the declared unit of 1 m^2 for each application. The environmental impact is proportional with the thickness.

Application	Standard thickness	Thickness range	Ratio to the declared unit of 1 m^2
Exterior wall covering ("lap" system)	*10 mm*	/	*1*
Exterior wall covering ("click" system)	*12 mm*	/	*1*

ADDITIONAL INFORMATION ON REVERSIBILITY

For the application and installation as described in this EPD a qualitative assessment of the reversibility is given. Following 4 indicators shall be used (based on BAMB – buildings as material banks). The assessment is applicable for exterior wall cladding and for all frameworks.

Reversibility	-	*Reversible with light repairable damage (fixation with screws, bolts and dowels)*
Simplicity of disassembly	-	*simple - no specific dismantling tools required*
Speed of disassembly	-	*speedy disassembly*
Ease of handling (size and weight)	-	*can be handled manually, but size and/or weight requires two or more workers*
Robustness of material (material resistance to disassembly)	-	*the material resists well during disassembly*

BIBLIOGRAPHY

- ISO 14040:2006: Environmental Management-Life Cycle Assessment-Principles and framework.
- ISO 14044:2006: Environmental Management-Life Cycle Assessment-Requirements and guidelines.
- ISO 14025:2006: Environmental labels and Declarations-Type III Environmental Declarations-Principles and procedures.
- NBN EN 15804+A2:2019
- NBN/DTD B 08-001 (BE-PCR)
- CEN/TR 16970:2016. Sustainability of construction works - Guidance for the implementation of EN 15804
- Durability of Autoclaved Cellulose Fiber Cement Composites, A.M.Cooke, Managing Director, Building Materials and Technology Pty Ltd, Sydney, NSW, Australia
- Information sheet http://noam.equitone.com/file.php?id=05baa7d0-7e8c-47af-bd2d-b00a6737a2d2
- EN 12467:2012 + A1:2018 Fibre-cement flat sheets - Product specifications and test methods
- EN 13501-1+A1:2007 Fire classification of construction products and building elements. Classification using test data from reaction to fire test
- Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <http://link.springer.com/10.1007/s11367-016-1087-8> .
- Landesanstalt für Umwelt, Messungen und Naturschutz Baden -Württemberg, Steckbrief „Asbestfreie Faserzementprodukte“
- Environment-related material performance of Building elements, project for the Flemish Waste Agency (2012), based on Debacker et. Al., 2012. Milieugerelateerde Materiaalprestatie van Gebouwelementen. In opdracht van OVAM.
- European Life Cycle Database (ELCD) v3.2, April 2018
- Industry 2.0 data: This library contains data as collected by industry associations, such as Plastics Europe, World Steel, ERASM and International Molybdenum Association (IMOA). Several datasets were updated and added in April 2015, September 2015, March 2016, December 2017, April 2018 and December 2019.

General information

Owner of the EPD, Responsible for the data, LCA and information	**Etex services** **Kuiermansstraat 1** **1880 Kapelle-op-den-Bos** **Belgium** Tel : +32 (0) 15 71 82 83; *For more information you can contact Peggy Van De velde, peggy.vandevelde@etexgroup.com*
EPD program Program operator Publisher of this EPD	**B-EPD** Federal Public Service of Health / DG Environment Galileelaan 5/2 1210 Brussels Belgium www.environmentalproductdeclarations.eu
Contact programma operator	epd@environment.belgium.be
Based on following PCR documents	EN 15804+A2:2019 NBN/DTD B 08-001 and its complement
PCR review conducted by	Federal Public Service of Health and Environment & PCR Review committee
Author(s) of the LCA and EPD	Arthur De Jaegher, arthur@enperas.com
Identification of the project report	Life cycle assessment of CEDRAL (VITO, 07-09-21)
Verification	External independent verification of the declaration and data according to EN ISO 14025 and relevant PCR documents
Name of the third party verifier Date of verification	Evert Vermaut (Vinçotte 08.09.2021
www.b-epd.be	**www.environmentalproductdeclarations.eu**

Comparing EPDs is not possible unless they are conform to the same PCR and taking into account the building context.
The program operator cannot be held responsible for the information supplied by the owner of the EPD nor LCA practitioner.

LCA practitioner

www.vito.be
www.enperas.be

Building calculator of the regional authorities

www.totem-building.be

Federal Public Service of Health, Food Chain Safety and Environment

www.b-epd.be

ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Etex
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ETE-20220190-ICA1-EN
Issue date	24/10/2022
Valid to	23/10/2027

Cedral sidings
ETEX

Institut Bauen und Umwelt e.V.

www.ibu-epd.com | https://epd-online.com

ECO PLATFORM EPD VERIFIED





1. General Information

Etex Lithuania	Cedral sidings
Programme holder IBU – Institut Bauen und Umwelt e.V. Hegelplatz 1 10117 Berlin Germany	**Owner of the declaration** Etex Lithuania J. Dalinkevičiaus str. 2H Naujoji Akmenė, 85118
Declaration number EPD-ETE-20220190-ICA1-EN	**Declared product / declared unit** Covering 1 m^2 of wall with Cedral sidings, over a reference service life of 60 years.
This declaration is based on the product category rules: Fibre cement / Fibre concrete, 01.2019 (PCR checked and approved by the SVR)	**Scope:** This EPD presents the Cedral fibre cement sidings. This product is an autoclaved fibre cement panel produced by ETEX at Akmene factory in Lithuania and sold in Europe.
Issue date 24/10/2022	The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences. The EPD was created according to the specifications of *EN 15804+A2*. In the following, the standard will be simplified as *EN 15804*.
Valid to 23/10/2027	**Verification** The standard *EN 15804* serves as the core PCR Independent verification of the declaration and data according to *ISO 14025:2011* ☐ internally ☒ externally
Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)	Vito D'Incognito (Independent verifier)
Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))	

2. Product

2.1 Product description/Product definition

Cedral sidings are steam-hardened cellulose-reinforced fibre cement panels. They exist in two finishes: smooth or structured (wood relief). Panels are coated and available in various colours.

The manufacturer can - within the framework of the *European Regulation N° 305/2011 (CPR)* - present the Declaration of Performance (DOP) of the product confirming that the product has a CE marking

2.2 Application

Cedral sidings are used as board-like façade cladding for back-ventilated façades. Cedral sidings come as Cedral Click or Cedral Lap. This EPD only considers Cedral Lap, as Cedral Click is not produced in Akmene. The “lap” application foresees an overlap of the panels. Once installed correctly according to the manufacturer’s guidelines Cedral needs no further maintenance, repair, replacement or refurbishment during the full life span of the product.

2.3 Technical Data

The following tables include technical data specific to the Cedral sidings.

Constructional data

Name	Value	Unit
Gross density	1300	kg/m^3
Standard panel thickness	10	mm
Thermal conductivity	0.212	W/(mK)
Flexural strength parallel	23	N/mm^2
Flexural strength perpendicular	11	N/mm^2
Modulus of elasticity parallel	4000	N/mm^2
Modulus of elasticity perpendicular	5500	N/mm^2
Coefficient of thermal expansion	<0.01	$10^{-6}K^{-1}$
Swelling (air-dry to water-saturated) Hygric movement	1.75	mm/m
Durability classification EN12467	Category A	-
Strength classification EN12467	Class 2	

For the use and application of the product the respective (national) provisions at the place of use apply: European standard *EN 12467:2012 + A1:2016 + A2:2006* ‘Fibre-cement flat sheets’.

2.4 Delivery status

The products are packed: pallet, PE cover foil, Coverage carton, PE plastic foam layers and PE band.

The sheets have the following dimensions:

- Thickness: 10 mm
- Cedral classic (length x width): 190 mm x 3600 mm

- Cedral smooth (length x width): 190 mm x 3600 mm

2.5 Base materials/Ancillary materials

Base materials included in the composition of Cedral sidings are:

- Sand: 45-55 %
- Cement: 25-35 %
- Cellulose: <10 %
- Additives: <3 %
- Coating: <3 %
- Water: 10-20 %

This product/article/at least one partial article contains substances listed in the candidate list (date: 10.10.2022) exceeding 0.1 percentage by mass: no.

This product/article/at least one partial article contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: no

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no

2.6 Manufacture

Cedral sidings are manufactured largely in accordance with an automated winding process: the raw materials are mixed with water to prepare a homogenous mixture. Rotating screen cylinders are immersed in this fibre cement pulp which drain internally. The screen surface is covered in a thin film of fibre cement which is transferred onto an infinite conveyor belt from where it is conveyed to a format roller which is gradually covered in an increasingly thicker layer of fibre cement. Once the requisite material thickness is achieved, the still moist and malleable fibre cement layer (fibre cement fleece) is separated and removed from the format roller. The fibres cement fleece is cut to size. Leftovers are returned to the production process preventing any waste from being incurred. The panels are then set aside for curing before stacking on pallets and steam-hardened in an autoclave for approx. two hours. The setting time lasts approx. three days. Waste from damaged or broken panels is recycled by an external company as raw material for cement production. Finally the façade panels are coated in acrylic paint.

2.7 Environment and health during manufacturing

Environmental, occupational health, safety and quality management at the Akmene plant are in accordance with the following standards:

- *ISO 14001;2015*
- *ISO 9001;2015*
- *ISO 45001:2018*

2.8 Product processing/Installation

Description of the type of processing, machinery and tools used, dust extraction etc., auxiliary materials needed for installation as well as measures for noise reduction.
Information on the rules of technology as well as on workers safety and environmental protection is possible.

2.9 Packaging

A wooden pallet, PE cover foil, coverage carton, PE plastic foam layers and PE band are used to pack and transport the Cedral sidings to the installation site.

2.10 Condition of use

Maintenance requirement will depend on the specific design and application. Usually, Cedral sidings won't change the composition of the materials and thus no maintenance is needed.

2.11 Environment and health during use

Under normal conditions of use, Cedral sidings do not cause any adverse health effects or release of volatile organic compounds (VOCs) into indoor air.
No environmental impact on water, air or soil is expected due to the extremely low metal release from the low maintenance requirements.

2.12 Reference service life

The RSL of the Cedral sidings are estimated at 60 years.
Justification for this assumption: Cedral sidings are a rather new product on the market (°2007), and there is not yet extensive evidence regarding its reference service life. However, there are some studies that suggest that it is feasible to assume that this product lasts for the average lifetime of a building.[1]
The RSL is valid under normal conditions of use.

[1] Durability of Autoclaved Cellulose Fiber Cement Composites", A.M.Cooke, Managing Director, Building Materials and Technology Pty Ltd, Sydney, NSW, Australia
https://www.nachhaltigesbauen.de/fileadmin/pdf/baustoff_gebauededaten/BNB_Nutzungsdauern_von_Bauteilen__2011-11-03.pdf

2.13 Extraordinary effects

Fire

Fire protection

Name	Value
Building material class	A2
Burning droplets	d0
Smoke gas development	s1

Water

Tests on the product performance including possible impacts on the environment following the unforeseeable influence of water, e.g. flooding showed that no risks are expected to occur in terms of environment and human health.

Mechanical destruction

In case of mechanical destruction, no risks are expected to occur in terms of environment and human health.

2.14 Re-use phase
Cedral sidings will be disassembled at the end of its reference life service (RLS), which is 60 years.
The boards are only held in the walls with screws. The disassembly only requires the removal of the screws. The same energy as at the installation is necessary for this process.

2.15 Disposal
Two end-of-life scenario have been calculated.
Scenario A: 100 % landfill

Scenario B: While studies (LUBW, 2017) showed that Cedral sidings can be re-used and recycled, the current EPD includes a second end-of-life scenario in which 100 % of the fibre cement boards are recycled (7 % is recycled in cement clinker and 93 % as backfill in screed). Sidings are designed for recyclability and are already being recycled in the plant at Kapelle-op-den-Bos (Belgium).

2.16 Further information
Additional information on Cedral sidings can be found at: https://www.cedral.world/en/

3. LCA: Calculation rules

3.1 Declared Unit
Covering 1 m^2 of wall with Cedral sidings, over a reference service life of 60 years.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Area density	19.5	kg/m^2

3.2 System boundary

This is a cradle-to-grave EPD for the Cedral sidings with the following life cycle stages included: A1, A2, A3, A4, A5, B1-7, C1, C2, C3, C4 and D.
For A1, A2 and A3 specific quantities and distances were collected by ETEX NV and processed by *Enperas*. For transportation the default capacity utilisation factor of the transportation datasets was used, as all transportations were mass-based.

3.3 Estimates and assumptions
All assumptions made and the limitations of the LCA study are commented in the report. The results of the LCA are interpreted in agreement with the goal and scope and therefore with the *ISO 14040* and *ISO 14044* guidelines.

3.4 Cut-off criteria
The following processes are considered below cut-off:

- Wearable sieves and cutting knives
- Transport of packaging of raw material
- Infrastructure and land use of the factory
- Packaging and transport of ancillary materials used during installation
- Waste treatment of ancillary materials used during installation
- Environmental impacts caused by the personnel of the production plants are not included in the LCA, e.g. waste from the cafeteria and sanitary installations, accidental pollution caused by human mistakes, or environmental effects caused by commuter traffic. Heating or cooling of the plants in order to ensure a comfortable indoor climate for the personnel for example is also neglected.

3.5 Background data
The life cycle assesment was done using the LCA software package "*SimaPro 9.3.0.3" (PRé Consultants, 2021)*" in combination with a specific LCA software for ETEX. The main LCA database used in the study is the *Ecoinvent v3.6* database (September 2019). For some materials the *ELCD* or *Industry 2.0 database* has been used as no data was available in *Ecoinvent* or because these databases better describe the respective material.

3.6 Data quality
An estimate should be made as regards data quality (addressing both foreground and background data), whereby the age of background data used must be indicated.

For average EPDs, an estimate of the robustness of the LCA values must be made, e.g. concerning variability of the production process, geographical representatively and the influence of background data and preliminary products compared to the environmental impacts caused by the actual production.

3.7 Period under review
Data were collected for 2020 for the production process of Cedral sidings in Akmene, Lithuania.

3.8 Allocation
At ETEX, different types of fibre cement boards are produced. Only facility level data were available for the use of electricity, natural gas, propane and water. The facility-level data have been allocated to the individual product using the annual production volume of the products materials (physical relationship). Material inputs and outputs which were not available at the product level, such as waste, were allocated similarly.

EN15804+A2 also describes the rules for joint co-production, where the processes cannot be divided. The production waste is partly externally recycled. However, it has been assumed that the recycled waste has no economic value, so 100 % of the impacts of the production are allocated to the product and 0 % to recycled production waste.

3.9 Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

The main LCA database used in the study is the *Ecoinvent v3.6 database* (September 2019). For some materials, the *European Reference Life Cycle Database (ELCD)* or *Industry 2.0 database* has been used as no data was available in *Ecoinvent* or because these databases better describe the respective material.

4. LCA: Scenarios and additional technical information

Characteristic product properties
Information on biogenic Carbon
The product contains biogenic carbon in the form of cellulose. Its accompanying packaging contains biogenic carbon in the form of wooden pallets and carton. Note: 1 kg biogenic Carbon is equivalent to 44/12 kg of CO_2.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic Carbon Content in product	0.47	kg C
Biogenic Carbon Content in accompanying packaging	0.469	kg C

Transport to the building site (A4)
The following transport scenario has been used to model the transport from the manufacturing plant in Akmene (Lithuania) to the installation site in Europe.

- 29 % directly to the construction site over 709 km with a 16-32 ton lorry (ecoinvent record: 'Transport, freight, lorry 16-32 metric ton, EURO5 {RER}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U'

- 71 % to a supplier over 1274 km with a >32 ton lorry (ecoinvent record: 'Transport, freight, lorry >32 metric ton, EURO5 {RER}| transport, freight, lorry >32 metric ton, EURO5 | Cut-off, U') and from the supplier to the installation site over 35 km with a 16-32 ton lorry (ecoinvent record: 'Transport, freight, lorry 16-32 metric ton, EURO5 {RER}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U')

Losses during transport are considered during the installation phase, as it is difficult to separately quantify the specific transport and installation losses.

Name	Value	Unit
Litres of fuel	25.6	l/100km
Transport distance (3 % directly to construction site)	1693	km
Transport distance (97 % to a supplier)	1600	km
Transport distance (97 % from supplier to construction site)	35	km
Capacity utilisation (including empty runs)	50	%
Gross density of products transported	Scenario Ecoinvent	kg/m^3
Capacity utilisation volume factor	Scenario Ecoinvent	-

Installation into the building (A5)
12.5 inox screws (or 0.038 kg) are necessary per functional unit for Cedral sidings. The installation involves an amount of 0.00176 kWh per screw used to fix the Cedral sidings. So in total 0,022 kWh of electricity is declared.
During the installation, depending on how the Cedral sheets are cut, there is a loss rate between 5-30 %, depending on the building shape. For this EPD an average loss rate of 10 % is used.

All packaging material for the Cedral sidings is transported to End of Life (EoL) and disposed of in line with the default EoL scenarios for Germany described in Annexe C of the Product Environmental Footprint Pilots (PEFCR) 6.3 guidance.

The packaging of the ancillary materials used during installation are considered below cut-off.

Name	Value	Unit
Auxiliary Inox screws	0.038	kg
Electricity consumption To fix the screws	0.022	kWh
Material loss	10	%
Output substances following waste treatment on site	Packaging final product: wooden pallet, PE-band, PE cover foil, PE plastic foam layers, coverage carton	

Use phase B1-7
Over the 60 years of reference service life (RSL), if correctly installed, there are no impacts for the use phase (B1-7)

Name	Value	Unit

End of life (C1-C4)
The dismantling of Cedral sidings involves the same amount of energy as for the installation, which is 0,022 kWh.

In module C2, the impacts due to the transport of waste from the final product to waste processing are calculated.
- to recycling - 200 km
- to incineration - 150 km
- to landfill - 50 km

Two end-of-life scenarios have been calculated.
Scenario A: 100 % of the fibre cement board and 5 % of the steel screws are landfilled, The end-of-waste state is not reached. 95 % of the steel screws are recycled at their end of life. The end-of-waste state is reached after the sorting.

Scenario B: While studies showed that Cedral sidings can be re-used and recycled, the current EPD includes a second end-of-life scenario in which 100 % of the fibre cement boards are recycled (7 % is recycled in cement clinker and 93 % as backfill in screed) and 95 % of the steel screws are recycled. The end end-of-waste state is reached after sorting. 5 % of the steel screws are landfilled. The end-of-waste state is not reached.

Name	Value	Unit
Collected separately waste type	19.538	kg
Collected as mixed construction waste	0	kg
Reuse	0	kg
Reuse (Scenario B)	0	kg
Recycling	0.036	kg
Recycling (Scenario B)	19.536	kg
Energy recovery	0	kg
Energy recovery (Scenario B)	0	kg
Landfilling	19.502	kg
Landfill (Scenario B)	0.002	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Following waste streams are considered after their end-of-waste point in this study: steel screws in C3 (of which 95 % are recycled), wooden pallets in A3 and A5 (of which 30 % are recycled and respectively 7 % and 32 % are incinerated with efficiency <60 %), plastic packaging in A3 and A5 (of which respectively 27 % and 29 % are recycled and respectively 27 % and 32 % are incinerated with efficiency <60 %), paper and cardboard in A3 and A5 (of which 75 % are recycled and respectively 3 % and 11 % are incinerated), and steel cables in A3 (of which respectively 95 % are recycled).

For the additional end-of-life scenario (Scenario B), 100 % of the fiber cement boards are recycled and reaches the end-of-waste state. This is taken into account in module D of Scenario B.

Name	Value	Unit
Quantitative description of the loads beyond the system boundaries Treatment of scrap steel to prepare it for to prepare it for recycling at the remelter	0.039	kg
Quantitative description of the benefits beyond the system boundaries Sorting of waste wood to prepare it for recycling	0.313	kg
Quantitative description of the benefits beyond the system boundaries Treatment kg plastic to prepare it for recycling	0.061	kg
Quantitative description of the benefits beyond the system boundaries Avoided production of heat using natural gas	1.51	MJ
Quantitative description of the benefits beyond the system boundaries Avoided production of European electricity mix	0.75	MJ
Quantitative description of the benefits beyond the system boundaries Avoided production of primary steel	0.039	kg
Quantitative description of the benefits beyond the system boundaries Avoided production of primary softwood	0.313	kg
Quantitative description of the benefits beyond the system boundaries Avoided production of primary polypropylene/polypropylene granulates	0.061	kg
Quantitative description of the benefits beyond the system boundaries (only EoL scenario B) Avoided production of primary limestone	1.635	kg
Quantitative description of the benefits beyond the system boundaries (only EoL scenario B) Avoided production of primary sand	18.135	kg

5. LCA: Results

While studies [2] showed that Cedral sidings can be reused and recycled, the current EPD assumes 100 % landfilling of the product at its end of life.

Sidings are designed for recyclability and are already being recycled in the plant at Kapelle-op-den-Bos (Belgium). The waste of the fibre cement and calcium silicate boards (both pre- and post-consumer waste), will no longer go to landfill: 7 % in cement clinker and 93 % as backfill in screed. Therefore, also a 100 % recycling scenario has been calculated and included in the results (see columns C2/1, C3/1, C4/1 and D/1 in the results tables).

[2] Landesanstalt für Umwelt, Messungen und Naturschutz Baden -Württemberg, Steckbrief „Asbestfreie Faserzementprodukte“

Note that the effect of carbonation has been included in module B1. Using the formula below a CO_2 uptake of 1.93 kgCO_2 eq due to carbonation during the use phase is calculated
Carbonation = Dc x Qcem x %Ccem x 0.65 x m.m CO_2/m.m CaO

- m.mCO_2 = molecular mass of CO_2
- m.m CaO = molecular mass of CaO
- 0.65 = % of CaO in cement clinker
- Qcem= amount of cement used for producing 1m² of Cedral sidings
- %Ccem = percentage of clinker in cement which is at least 90 % in Portland cement (used in Cedral siding) according to *EN16757*
- Dc = degree of carbonation according to *EN16757* whereas Dc will depend on the exposure conditions. 75 % has been assumed.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

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 the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction 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	X	X	X	X	X	X	X	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m^2 wall covered with Cedral sidings

Core Indicator	Unit	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C2/1	C3	C3/1	C4	C4/1	D	D/1
GWP-total	[kg CO_2-Eq.]	4.01E+0	1.01E+0	4.20E-1	2.55E+0	2.89E+0	-1.93E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.53E-3	1.73E-1	8.23E-1	1.66E-4	1.77E+0	1.85E+0	4.33E-5	-5.23E-1	-2.29E+0
GWP-fossil	[kg CO_2-Eq.]	5.77E+0	1.01E+0	2.04E+0	2.55E+0	1.17E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.44E-3	1.73E-1	8.22E-1	1.63E-4	4.85E-2	1.32E-1	4.29E-5	-5.23E-1	-5.67E-1
GWP-biogenic	[kg CO_2-Eq.]	-1.77E+0	3.93E-4	-1.62E+0	1.05E-3	1.72E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.61E-5	7.04E-5	3.35E-4	2.70E-6	1.72E+0	1.72E+0	4.17E-7	6.67E-4	-1.72E+0
GWP-luluc	[kg CO_2-Eq.]	2.19E-3	4.03E-4	2.36E-3	7.93E-4	5.90E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.20E-5	6.03E-5	2.87E-4	1.94E-7	5.12E-5	6.74E-5	2.20E-8	-6.99E-4	-7.28E-4
ODP	[kg CFC11-Eq.]	2.53E-7	2.26E-7	2.69E-7	5.93E-7	9.73E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.95E-10	3.92E-8	1.87E-7	6.59E-12	3.03E-9	4.37E-8	9.31E-12	-4.65E-8	-5.46E-8
AP	[mol H^+-Eq.]	1.74E-2	8.24E-3	8.55E-3	1.06E-2	4.25E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.51E-5	7.05E-4	3.36E-3	4.86E-7	1.90E-4	1.01E-3	2.61E-7	-1.98E-3	-2.43E-3
EP-freshwater	[kg P-Eq.]	9.74E-5	7.43E-6	5.19E-5	1.96E-5	2.11E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.01E-6	1.36E-6	6.46E-6	2.43E-8	6.37E-6	6.97E-6	1.91E-9	-2.20E-5	-2.31E-5
EP-marine	[kg N-Eq.]	4.19E-3	2.20E-3	2.71E-3	3.18E-3	1.06E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.99E-6	2.09E-4	9.97E-4	7.83E-8	4.84E-5	3.54E-4	8.00E-8	-3.88E-4	-5.43E-4
EP-terrestrial	[mol N-Eq.]	4.87E-2	2.44E-2	2.98E-2	3.52E-2	1.18E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.62E-5	2.31E-3	1.10E-2	1.21E-6	6.22E-4	3.99E-3	9.01E-7	-4.41E-3	-6.29E-3
POCP	[kg NMVOC-Eq.]	1.29E-2	6.88E-3	1.03E-2	1.11E-2	3.50E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.19E-5	7.09E-4	3.38E-3	2.40E-7	1.47E-4	1.11E-3	2.75E-7	-1.67E-3	-2.15E-3
ADPE	[kg Sb-Eq.]	3.35E-6	1.80E-6	2.83E-6	3.73E-6	6.42E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.29E-8	3.36E-7	1.60E-6	2.73E-10	7.28E-8	1.31E-7	7.04E-11	-5.13E-7	-6.87E-7
ADPF	[MJ]	3.84E+1	1.49E+1	4.32E+1	3.93E+1	1.08E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.94E-1	2.60E+0	1.24E+1	2.21E-3	6.59E-1	3.35E+0	7.99E-4	-1.05E+1	-1.13E+1
WDP	[m^3 world-Eq deprived]	2.20E+0	3.92E-2	1.32E+0	1.22E-1	2.32E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.18E-3	7.24E-3	3.45E-2	8.65E-6	2.37E-3	1.05E-2	2.22E-5	-1.32E-1	-1.71E-1

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m^2 wall covered with Cedral sidings

Indicator	Unit	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C2/1	C3	C3/1	C4	C4/1	D	D/1
PERE	[MJ]	2.27E+1	1.92E-1	2.91E+1	5.04E-1	8.06E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.63E-2	3.60E-2	1.71E-1	3.94E-4	1.03E-1	1.43E-1	3.16E-5	0.00E+0	0.00E+0
PERM	[MJ]	1.54E+1	0.00E+0	1.43E+1	0.00E+0	-7.70E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.52E+1	0.00E+0	0.00E+0	4.60E+0	1.98E+1
PERT	[MJ]	3.81E+1	1.92E-1	4.35E+1	5.04E-1	3.60E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.63E-2	3.60E-2	1.71E-1	3.94E-4	-1.51E+1	1.43E-1	3.16E-5	4.60E+0	1.98E+1
PENRE	[MJ]	4.30E+1	1.50E+1	3.72E+1	3.95E+1	1.44E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.33E-1	2.62E+0	1.25E+1	2.97E-3	8.58E-1	3.53E+0	8.68E-4	0.00E+0	0.00E+0
PENRM	[MJ]	5.55E-2	0.00E+0	8.92E+0	0.00E+0	-2.41E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.48E-2	1.48E-2
PENRT	[MJ]	4.31E+1	1.50E+1	4.61E+1	3.95E+1	1.20E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.33E-1	2.62E+0	1.25E+1	2.97E-3	8.58E-1	3.53E+0	8.68E-4	1.48E-2	1.48E-2
SM	[kg]	1.13E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.48E-1	2.14E+1
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m^3]	1.40E-1	1.00E-3	3.17E-2	3.06E-3	1.06E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.43E-4	1.88E-4	8.96E-4	6.53E-7	1.73E-4	3.34E-3	5.09E-7	-3.41E-3	-2.91E-2

Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m^2 wall covered with Cedral sidings

Indicator	Unit	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C2/1	C3	C3/1	C4	C4/1	D	D/1
HWD	[kg]	3.29E-5	3.59E-5	6.23E-5	9.77E-5	1.90E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.30E-7	6.82E-6	3.25E-5	2.90E-9	9.83E-7	3.98E-6	1.53E-9	-1.78E-5	-1.97E-5
NHWD	[kg]	3.62E-1	6.29E-1	2.01E-1	2.92E+0	1.79E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.87E-4	1.25E-1	5.93E-1	9.86E-6	2.67E-3	1.95E+1	2.84E-3	-4.00E-2	-4.54E-2
RWD	[kg]	1.31E-4	1.02E-4	7.67E-5	2.68E-4	4.51E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.38E-6	1.78E-5	8.45E-5	8.91E-9	2.90E-6	2.12E-5	4.47E-9	-2.61E-5	-3.19E-5
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	5.38E-1	0.00E+0	4.11E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.95E+1	0.00E+0	0.00E+0	-9.49E-1	-2.14E+1
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	2.59E-3	0.00E+0	7.52E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-7.55E-1	-7.55E-1
EET	[MJ]	0.00E+0	0.00E+0	5.19E-3	0.00E+0	1.50E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.51E+0	-1.51E+0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m^2 wall covered with Cedral sidings

Indicator	Unit	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C2/1	C3	C3/1	C4	C4/1	D	D/1
PM	[Disease Incidence]	1.55E-7	6.47E-8	1.81E-7	2.13E-7	5.64E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.44E-10	1.20E-8	5.72E-8	2.23E-12	2.26E-9	1.96E-8	7.99E-12	-1.83E-8	-2.73E-8
IRP	[kBq U235-Eq.]	1.46E-1	6.49E-2	7.45E-2	1.72E-1	3.85E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.68E-3	1.14E-2	5.42E-2	6.94E-6	2.17E-3	1.39E-2	2.95E-6	-2.84E-2	-3.49E-2
ETP-fw	[CTUe]	5.94E+1	1.17E+1	3.06E+1	3.13E+1	1.60E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.33E-1	2.08E+0	9.93E+0	1.90E-3	5.47E-1	2.03E+0	1.52E-3	-6.01E+0	-9.81E+0
HTP-c	[CTUh]	2.47E-9	3.76E-10	1.54E-9	8.07E-10	4.01E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.44E-12	5.86E-11	2.79E-10	5.93E-14	1.72E-11	4.85E-11	8.70E-14	-6.02E-10	-6.52E-10
HTP-nc	[CTUh]	6.32E-8	1.24E-8	2.49E-8	3.52E-8	1.99E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.17E-10	2.27E-9	1.08E-8	1.75E-12	5.00E-10	1.31E-9	1.06E-12	-6.15E-9	-7.09E-9
SQP	[-]	1.44E+2	9.25E+0	2.36E+2	3.92E+1	2.40E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.75E-2	1.79E+0	8.55E+0	1.65E-3	4.40E-1	6.38E+0	1.18E-3	-8.25E+1	-8.37E+1

Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

6. LCA: Interpretation

To facilitate comprehension of the life cycle assessment, both the relevant indicators of the life cycle inventory and the indicators of the impact assessment declared in section 5 “LCA results” have to be interpreted in a dominance analysis.
An illustration of the results with figures is recommended, e.g. for the dominance analysis, the distribution of impacts across the modules, the CO_2-balance, etc. as appropriate for a reader to understand the environmental profile of the declared product.
The interpretation shall also include a description of the time frame and/or variability of the LCIA results (in qualitative or quantitative terms) if the EPD is valid for several products or producers.

7. Requisite evidence

7.1 Radioactivity

Not measured

7.2 Leaching

No leaching test was done since 2020 at Akmene due to the changed Lithuanian legal acts

7.3 VOC emissions

Not applicable as Cedral sidings are designed for external applications

8. References

Standards
EN15804
EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

PCR Part A
Calculation rules for the Life Cycle Assessment and Requirements on the Background Report, Institut Bauen und Umwelt e.V., www.bauumwelt.com.

PCR Part B
Institut Bauen und Umwelt e.V, Berlin (pub.): PCR Guidance-Texts for Building-Related Products and Services From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU) : Requirements on the EPD for Fibre cement / Fibre concrete

EN12467
EN 12467:2012 + A1:2016 + A2:2006 'Fibre-cement flat sheets'

EN16757
EN 16757:2017, Sustainability of construction works– Environmental product declarations – Product Category Rules for concrete and concrete elements

ISO 14025
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 14040
ISO 14040:2006: Environmental management – Life cycle assessment – Principles and framework.

ISO 14044
ISO 14044:2006: Environmental management – Life cycle assessment – Requirements and guidelines.

ISO 14001
ISO 14001:2015: Environmental management systems — Requirements with guidance for use

ISO 9001
ISO 9001:2015: Quality management systems — Requirements

ISO 45001
ISO 45001:2018: Occupational health and safety management systems Requirements with guidance for use

Further references

Pré Consultants (2021) SimaPro 9.2.0.1 [Computer Software]. Amersfoort, The Netherlands.

CPR
European Regulation N° 305/2011 (CPR)

Ecoinvent
Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <http://link.springer.com/10.1007/s11367-016-1087-8> .

ELCD
European commission (2018). European reference Life Cycle Database v3.2. 2018. https://eplca.jrc.ec.europa.eu/ELCD3/

Industry 2.0
Industry 2.0 (from PlasticsEurope, worldsteel and ERASM) LCA database as integrated in SimaPro 9.3.0.3.

PEFCR
European commission (2018). Product Environmental Footprint Category Rules PEFCR Guidance, version 6.3.

Reuse and recycling
LUBW. Landesanstalt für Umwelt, Messungen und Naturschutz Baden -Württemberg, Steckbrief „Asbestfreie Faserzementprodukte". 2017. https://www.lubw.baden-wuerttemberg.de/documents/10184/151537/Steckbrief+25-7_Asbestfreie+Faserzementprodukte_17-10-10.pdf/f713de93-88f8-4356-b45d-b4804085b9e3

Durability
Durability of Autoclaved Cellulose Fiber Cement Composites", A.M.Cooke, Managing Director, Building Materials and Technology Pty Ltd, Sydney, NSW, Australia http://www.fibrecementconsulting.com/publications/990925.durabilitypaper.pdf

IBU
IBU 2021. Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021 www.ibu-epd.com

Publisher
Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Programme holder
Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Author of the Life Cycle Assessment
Enperas
Thorpark 8300
3600 Genk
Belgium

Tel +32 3 376 00 19
Fax -
Mail info@enperas.com
Web **https://www.enperas.com/en/**

Owner of the Declaration
Etex Building Performance International
Rue Marcel Demonque 500
84915 Avignon Cedex 9
France

Tel +32 2 778 12 11
Fax +32 2 778 12 12
Mail info@etexgroup.com
Web **http://www.etexgroup.com**