ANNEX 1
Build-up option 1

for the:

ENVIRONMENTAL PRODUCT DECLARATION
as per /ISO 14025/ and /EN 15804/

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EQUITONE TECTIVA fibre cement sheets

ETEX

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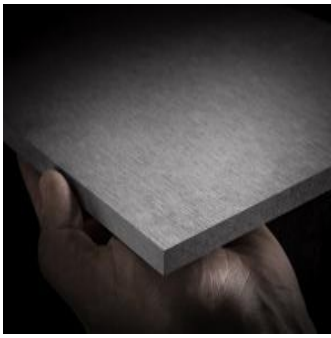

General Information

The EPD document is applicable at building level coupled with specific, recommended build-ups. Annex 1 and Annex 2 to the EPD provide all necessary details for the 2 build-up options in view of using them in combination with the EPD for EQUITONE TECTIVA at building level, as a complete system.

Product

Product description / Product definition
EQUITONE TECTIVA is an autoclaved calcium silicate Eternit fibre cement sheet produced at Kapelle-op-den-Bos production plant, Belgium.

Product processing/installation
The product use and installation instructions shall be followed for the specific applications where EQUITONE TECTIVA is used.
Build-up alternatives are presented in this annex include the environmental profiles of build-up option 1 for use at building level.

Build scenario 1: Fastening of EQUITONE panels to facades using EQUITONE UNI-screw (EN 14567) or A2 (304) Stainless Steel ISR T20 Torx TTAP® screw fixed to a sub-construction of wooden framing. These recommendations apply to the most common areas of application.Consumption per m²: 2,389 kg wood, 0,033kg stainless steel screws and 0,018kg EPDM sealing tape.

LCA: Calculation rules

Declared Unit
The functional unit of the EPD is defined as: the production of 1 m^2 (thickness 8 mm)of a "EQUITONE TECTIVA" sheets and it's related impacts over cradle-to-grave life cycle stages, where the product's expected average reference service life is of 50 years.

Build-up option 1 is designed for the installation of 1m^2 of EQUITONE TECTIVA.

System boundary
The EPD for EQUITONE TECTIVA is a cradle to grave EPD with the following life cycle stages included: A1, A2, A3, A4, A5, B1-7, C1, C2, C3, C4 and D.

For the build-up scenarios the following life cycle stages are included: A1, A2, A3, A4, C2, C3, C4 and D. The impacts related to the life cycle stages A5, B1-7 and C1 are fully allocated to the EQUITONE TECTIVA product.

LCA: Scenarios and additional technical information

Transport to the building site (A4)
For this EPD the EQUITONE TECTIVA product is installed in Germany. The transport to the building site of the additional build-up components is done by truck in 2 steps: (1) from the plant to the merchant, with big truck (16-32 t), (2) from the merchant to the building site (85% with big truck (16-32 t) and 15% with small truck (3,5 - 7,5 t)).

Name	Value	Unit
Plant to the merchant - distance	100	km
Merchant to the building site - distance	35	km

For the build-up, some of the components are first delivered to the Etex factory, after which they are shipped to the merchant. Thus, for the screws an additional distance of 300 km is added to Build 1, and for EPDM 190 km is added to both build options.

Installation into the building (A5)

The installation involves an amount of 0,0216 kWh per screw used to fix the EQUITONE TECTIVA product, where 15 screws are necessary for the functional unit. However these inputs are fully allocated to EQUITONE TECTIVA product, with no impacts for A5 allocated to the build-up.

Use phase B1-7

Name	Value	Unit

For Equitone Tectiva over the 50 years of RLS, if correctly installed, there are no impacts for the use phase. No impacts during the use phase are associated with the build-up either.

End of life
Dismantling (C1)
The dismantling of Tectiva involves the same amount of energy as for the installation, which is 0,0216 kWh per screw, where 15 screws are used. However they are fully allocated to the EQUITONE TECTIVA product, therefore no impacts are alocated tot he build-up.

Transport to EOL (C2)
The scenarios for the transport to EoL of the build-up compoments is presented below, where the transport mode in truck, 16-32 t.
- to recycling - 800 km
- to incineration - 150 km
- to landfill - 50 km

Waste processing (C3) and disposal (C4)
At the end of life of the building the build-up components are disposed of according to the EoL scenarios**.** The EoL scenario in Germany for the build-up are based on EuroStat 2011 and are presented below.

Materials	***Recycling/***	***Incineration***	***Landfill***

	Reuse		
Wood	38%	60,17%	1,83%
EPDM	0%	97,05%	2,95%
Steel	95%	4,97%	0,03%

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

Name	Value	Unit

1) energy recovery (or avoided production of energy) due to the incineration process[1] from waste disposal processes declared in module C4, as well as from the packaging materials disposed during the production stage and installation stage.

- For the Electricity part the following datasets were used accordingly:
  - Electricity, low voltage {BE}| market for | Cut-off, U
  - Electricity, low voltage {DE}| market for | Cut-off, U
- For the Thermal energy the following dataset was used:
  - Heat, district or industrial, natural gas {Europe without Switzerland}| heat production, natural gas, at industrial furnace >100kW | Cut-off, U
- Net energy efficiency of 20% for thermal energy and 10% for electric energy (using the Lower Heating Value of waste (LHV)

2) **the benefits and loads related to the recycling processes**

[1] The BE-PCR describes how benefits from exported energy should be quantified in module D for incineration processes which take place in Belgium.

LCA: Results

Build-up 1 for 1 m^2 EQUITONE TECTIVA product

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

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 Phase	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1-7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	X	X	x	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: declared unit and product

Parameter	Unit	A1	A2	A3	A4	A5	B1-7	C1	C2	C3	C4	D
GWP	[kg CO_2-Eq.]	3.24E-01	2.78E-01	9.97E-02	6.01E-02	0.00E+00	0.00E+00	0.00E+00	2.90E-01	5.59E-03	6.07E-02	-4.89E-01
ODP	[kg CFC11-Eq.]	4.58E-08	5.16E-08	5.08E-09	1.11E-08	0.00E+00	0.00E+00	0.00E+00	5.39E-08	5.93E-10	5.36E-10	-6.31E-08
AP	[kg SO_2-Eq.]	1.98E-03	8.86E-04	4.95E-04	1.92E-04	0.00E+00	0.00E+00	0.00E+00	9.26E-04	2.86E-05	6.21E-05	-2.13E-03
EP	[kg $(PO_4)^{3}$-Eq.]	3.61E-04	1.48E-04	5.60E-05	3.18E-05	0.00E+00	0.00E+00	0.00E+00	1.55E-04	6.90E-06	1.63E-05	-3.44E-04
POCP	[kg ethene-Eq.]	4.43E-04	4.53E-05	2.73E-05	9.87E-06	0.00E+00	0.00E+00	0.00E+00	4.73E-05	8.38E-07	3.09E-06	-1.83E-04
ADPE	[kg Sb-Eq.]	5.22E-06	8.49E-07	1.06E-06	2.00E-07	0.00E+00	0.00E+00	0.00E+00	8.87E-07	6.02E-09	8.87E-09	-9.94E-07
ADPF	[MJ]	4.83E+00	4.45E+00	1.08E+00	9.59E-01	0.00E+00	0.00E+00	0.00E+00	4.65E+00	7.29E-02	5.17E-02	-7.06E+00

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

RESULTS OF THE LCA - RESOURCE USE: declared unit and product

Parameter	Unit	A1	A2	A3	A4	A5	B1-7	C1	C2	C3	C4	D
PERE	[MJ]	0	0	0	0	0	0	0	0	0	0	0
PERM	[MJ]	0	0	0	0	0	0	0	0	0	0	0
PERT	[MJ]	5.43E+01	6.09E-02	1.94E-01	1.33E-02	0	0	0	6.37E-02	6.55E-03	2.29E-03	-6.99E+01
PENRE	[MJ]	0	0	0	0	0	0	0	0	0	0	0
PENRM	[MJ]	0	0	0	0	0	0	0	0	0	0	0
PENRT	[MJ]	6.61E+00	4.31E+00	1.50E+00	9.30E-01	0	0	0	4.50E+00	9.61E-02	5.84E-02	-8.46E+00
SM	[kg]	0	0	0	0	0	0	0	0	0	0	0
RSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[m³]	3.66E-03	7.88E-04	9.18E-04	1.71E-04	0,00E+00	0	0,00E+00	8.23E-04	2.45E-05	1.92E-04	-2.27E-03

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 – OUTPUT FLOWS AND WASTE CATEGORIES: declared unit and product

Parameter	Unit	A1	A2	A3	A4	A5	B1-7	C1	C2	C3	C4	D
HWD	[kg]	6.89E-06	2.50E-06	2.00E-06	5.60E-07	0	0.00E+00	0	2.62E-06	1.90E-07	1.43E-07	-2.42E-05
NHWD	[kg]	2.29E-01	2.03E-01	5.00E-02	4.22E-02	0	0.00E+00	0	2.13E-01	2.29E-04	4.92E-02	-1.29E-01
RWD	[kg]	3.78E-05	2.94E-05	3.38E-06	6.31E-06	0	0.00E+00	0	3.07E-05	4.44E-07	2.15E-07	-3.89E-05
CRU	[kg]	0	0	0	0	0	0.00E+00	0	0	0	0	0
MFR	[kg]	0	0	0	0	0	0.00E+00	0	0	0	0	9.39E-01
MER	[kg]	0	0	0	0	0	0.00E+00	0	0	0	0	1.45E+00
EEE	[MJ]	0	0	0	0	0	0.00E+00	0	0	0	0	0
EET	[MJ]	0	0	0	0	0	0.00E+00	0	0	0	0	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; EEE = Exported thermal energy