MEDITE®

DEFINING THE STANDARD OF MDF

MEDITE CLEAR MDF

ENVIRONMENTAL PRODUCT DECLARATION
as per ISO 14025 and EN 15804 + A1
Owner of the Declaration – MEDITE Europe DAC

Declaration number: EPDIE-21-30
Issue date 12th March 2021
Valid to 12th March 2026

1. General information

PROGRAMME OPERATOR	OWNER OF DECLARATION
Irish Green Building Council, 19 Mountjoy Square, Dublin D01 E8P5	MEDITE Europe DAC
DECLARATION NUMBER	**PRODUCTION SITE**
EPDIE-21-30	Clonmel, Co. Tipperary, Ireland
ECO PLATFORM EPD	**DECLARED UNIT**
Yes	1 tonne of MDF panel
APPLICABLE PRODUCT CATEGORY RULES	**DECLARED PRODUCT**
EN 15804:2012+A1:2013; EPD Ireland PCR Part A.	MEDITE CLEAR MDF
DATE OF ISSUE	**SCOPE OF EPD**
12.03.2021	Cradle to Gate, with options
DATE OF EXPIRY	**LCA CONSULTANT OR PERSON RESPONSIBLE FOR LCA**
12.03.2026	EcoReview, Kilkenny, Co. Kilkenny, Ireland, +353 87 258 9783 / +31 646 264 9327 info@ecoreview.ie / www.ecoreview.eu
TYPE OF EPD: SINGLE OR MULTI PRODUCT	**LCA SOFTWARE AND DEVELOPER IF APPLICABLE**
Single product	Ecochain
PRODUCT CLASSIFICATION OR NACE CODE	**NAME AND VERSION OF INVENTORY USED**
1621, Manufacture of medium density fibre panel	Ecoinvent version 3.5
COMPARABILITY	
Environmental Product Declarations from different programmes may not be directly comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See clause 5.3 of EN 15804:2012+2012+A1:2013	
The CEN Norm /EN 15804 serves as the core PCR	
Independent verification of the declaration according to ISO 14025	

Internally ☐   Externally ✗

SIGNATURE OF PROGRAMME OPERATOR	SIGNATURE VERIFIER
Pat Barry - CEO - Irish Green Building Council	Kim Allbury - Intertek Deutschland GmbH

MEDITE®
DEFINING THE STANDARD OF MDF

2. Scope and Type of EPD

This is a Cradle to Gate, with options, EPD. The Modules that are declared are shown in the table below.

PRODUCT STAGE			CONSTRUCTION ON 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	MND

X - Module declared.

MND - Module not declared.

3. Detailed product description

This EPD is carried out for the MEDITE CLEAR MDF PANEL. Medite MDF panels are manufactured in accordance with I.S. EN 622-5, Fibreboards – Specifications, Part 5: Requirements for dry processed boards (MDF).

The constituent raw materials of the MDF panels comprise: wood logs, wood chips and additives such as resin, urea fire retardant and wax. By weight, wood comprises 91%, additions 7% and water 2%.

The intended use of the MDF panels is in the construction industry in structural and non-structural applications, such as flooring, roofing, walling, timber-frame sheathing, temporary works and external hoarding.
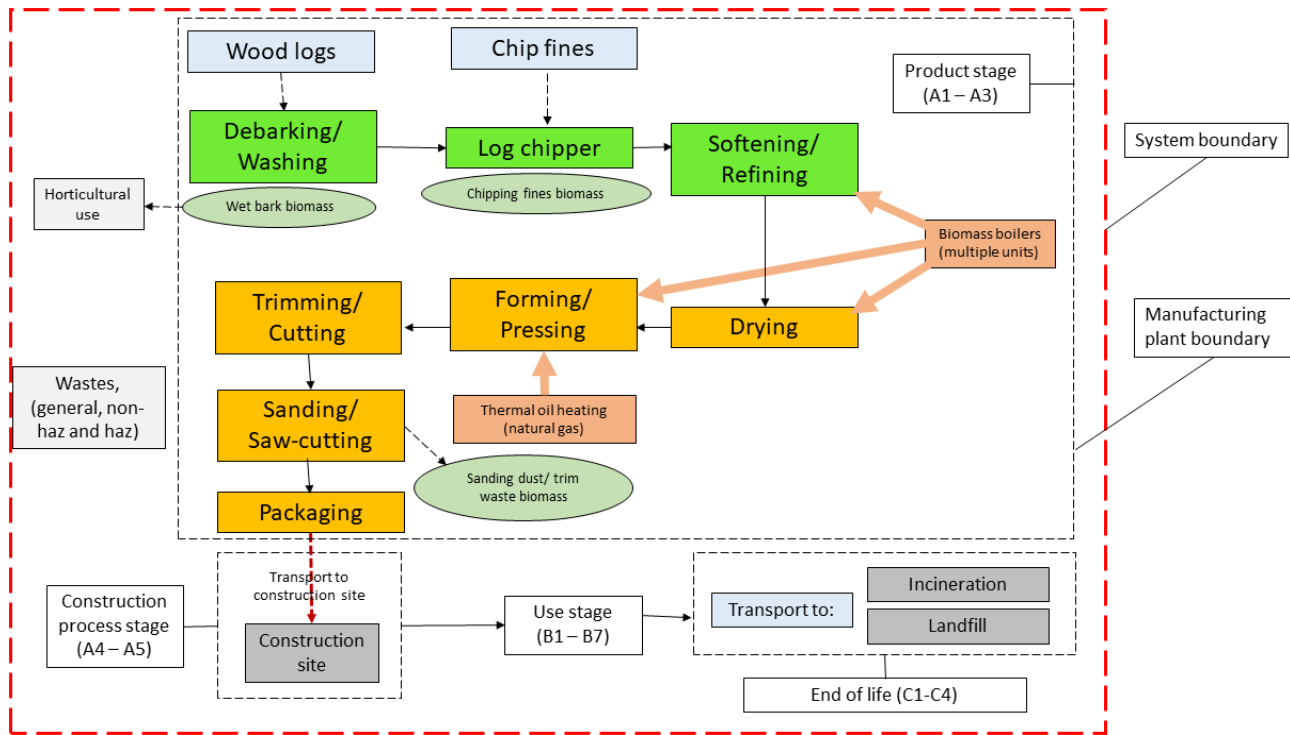
3.1 Manufacturing Process Description

MEDITE CLEAR is manufactured by refining softwood chips into wood fibres and combining them with resin glue and other additives. The wood fibre is then conveyed and dried by hot air through tube driers. The dried fibre passes over a continuous weigh belt and is conveyed to fibre storage bins, ready for the next production stage. The wood fibre mat is then formed by even controlled spreading of the dried resinated wood fibre onto a continuously moving wire mesh belt. The depth and width of wood fibre mat is pre-set according to thickness, width and density required.

The mat is then compressed to a more compact form, excess fibre is trimmed off the edges and recycled back into the wood fibre forming system. The fibre mat then moves through a continuous hot press which consists of an upper and lower continuously moving heated steel belt, the pressed panel is then cross-cut to the required size, then cooled, stacked and moved for either storage or sanding.

This EPD also covers the transport to site and end-of-life stages. This covers: transport to site, and end-of-life transport from site, waste processing and waste disposal. In the end-of-life it is assumed 50% of the MDF is incinerated (C3 phase) and 50% of the MDF ends up in landfill (C4 phase).

The LCA phases are shown below:

Wood logs → Debarking/ Washing → Log chipper → Softening/ Refining

Chip fines → Log chipper

Debarking/ Washing → Wet bark biomass → Horticultural use

Log chipper → Chipping fines biomass

Product stage (A1 – A3)

System boundary

Biomass boilers (multiple units)

Softening/ Refining → Drying

Trimming/ Cutting ← Forming/ Pressing ← Drying

Manufacturing plant boundary

Thermal oil heating (natural gas) → Forming/ Pressing

Trimming/ Cutting → Sanding/ Saw-cutting → Packaging

Sanding/ Saw-cutting → Sanding dust/ trim waste biomass

Wastes, (general, non-haz and haz)

Construction process stage (A4 – A5)

Transport to construction site → Construction site → Use stage (B1 – B7) → Transport to: Incineration / Landfill

End of life (C1-C4)

PROPERTY	STANDARD	UNIT	PANEL 6 - 19mm
Thickness Swelling (24hrs)	EN 317	%	10 - 30
Internal Bond	EN 319	N/mm²	0.55 - 0.65
Modulus of Rupture	EN 310	N/mm²	18 - 23
Modulus of Elasticity	EN 310	N/mm²	2100 - 2700
Moisture Content	EN 322	%	4 - 8
Formaldehyde	EN 120	mg/100g	<8
Thermal Conductivity (λ) Value	EN 13986	w/(m.K)	0.1 - 0.14

4. LCA results - MEDITE CLEAR MDF

Environmental impact per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWPf	[kg CO_2-Eq.]	3.83E+02	8.39E+00	2.58E+02	6.50E+02	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	INA	INA	INA	MND
GWPb	[kg CO_2-Eq.]	-1.65E+03	0.00E+00	0.00E+00	-1.65E+03	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	INA	INA	INA	MND
GWPt	[kg CO_2-Eq.]	-1.27E+03	8.39E+00	2.58E+02	-1.00E+03	8.20E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.62E+01	7.18E+00	3.78E+01	MND
ODP	[kg CFC11-Eq.]	7.22E-05	1.68E-06	1.50E-05	8.89E-05	1.51E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.98E-06	5.49E-07	1.44E-06	MND
AP	[kg SO_2-Eq.]	2.18E+00	2.31E-02	1.51E+00	3.71E+00	2.19E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	3.91E-02	5.81E-02	3.64E-02	MND
EP	[kg (PO4)-Eq.]	5.16E-01	3.76E-03	3.61E-01	8.81E-01	3.33E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	6.23E-03	2.64E-02	1.46E-02	MND
POCP	[kg ethene-Eq.]	5.75E-01	5.34E-03	6.21E-01	1.20E+00	4.10E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	7.97E-03	3.88E-03	1.20E-02	MND
ADPE	[kg Sb-Eq.]	3.37E-02	1.63E-05	3.12E-04	3.40E-02	2.47E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	4.93E-05	9.38E-06	6.99E-06	MND
ADPF	[MJ]	7.79E+03	1.39E+02	4.06E+03	1.20E+04	1.25E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.48E+02	7.65E+01	1.36E+02	MND

GWPf = Global warming potential (fossil fuel); GWPb = Global warming potential (biogenic); GWPt = Global warming potential (total); 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.

Note - MND - Module not declared INA - Indicator not assessed

MEDITE®
DEFINING THE STANDARD OF MDF

4. LCA results - MEDITE CLEAR MDF

Resource use per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	3.62E+03	7.26E-01	6.08E+03	9.70E+03	1.37E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.49E+00	1.41E+00	2.24E+00	MND
PERM	[MJ]	1.28E+04	0.00E+00	0.00E+00	1.28E+04	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND
PERT	[MJ]	1.64E+04	1.49E+00	6.08E+03	2.25E+04	1.37E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.49E+00	1.41E+00	2.24E+00	MND
PENRE	[MJ]	6.76E+03	7.22E+01	4.09E+03	1.09E+04	1.34E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.65E+02	7.37E+01	1.45E+02	MND
PENRM	[MJ]	1.41E+03	0.00E+00	0.00E+00	1.41E+03	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND
PENRT	[MJ]	8.17E+03	1.49E+02	4.09E+03	1.24E+04	1.34E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.65E+02	7.37E+01	1.45E+02	MND
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND
FW	[m³]	7.15E+00	2.58E-02	5.02E-01	7.68E+00	2.07E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	3.99E-02	-1.08E-01	1.36E-01	MND

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. INA = Indicator not assessed. MND = Module not declared.

SM, RSF and NRSF are not calculated by the EcoChain software.

MEDITE®
DEFINING THE STANDARD OF MDF

4. LCA results - MEDITE CLEAR MDF

Output flows and waste categories per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	6.89E-03	8.11E-05	1.95E-01	2.02E-01	8.03E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.59E-04	1.51E-04	1.08E-04	MND
NHWD	[kg]	4.37E+01	1.18E+01	1.54E+02	2.09E+02	5.95E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.19E+01	5.62E+00	5.01E+02	MND
RWD	[kg]	2.35E-02	9.51E-04	4.00E-03	2.84E-02	8.52E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.67E-03	1.58E-04	8.21E-04	MND
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	MND

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.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

5. LCA results - Additional Impact Indicators - MEDITE CLEAR MDF

Environmental impact per tonne

| PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	2.31E+02	4.02E+00	7.22E+01	3.07E+02	3.15E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	6.22E+00	4.27E+00	3.20E+00	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	7.85E+00	1.08E-01	2.79E+00	1.07E+01	8.56E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.70E-01	1.40E-01	5.15E-02	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	1.53E+04	4.25E+02	6.01E+03	2.18E+04	3.29E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	6.51E+02	4.42E+02	2.12E+02	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	1.28E+00	1.24E-02	1.63E+00	2.92E+00	1.10E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.17E-02	1.40E-01	1.01E-02	MND

Note - MND - Module not declared INA - Indicator not assessed.

6. LCA Results - Additional LCI Indicators

The primary component of MEDITE MDF products is wood, which as it grows sequesters atmospheric CO_2.

For clarity in the EPD, the biogenic CO_2 is reported separately so that the biogenic CO_2 component can be incorporated into any end-of-life scenarios, where these are considered.

Biogenic CO_2 is calculated according to EN 16485:2014 Round and sawn timber – Environmental Product Declarations - Product category rules for wood and wood-based products for use in construction and EN 16449:2014 Wood and wood-based products – Calculation of the biogenic carbon content of wood and conversion to carbon dioxide.
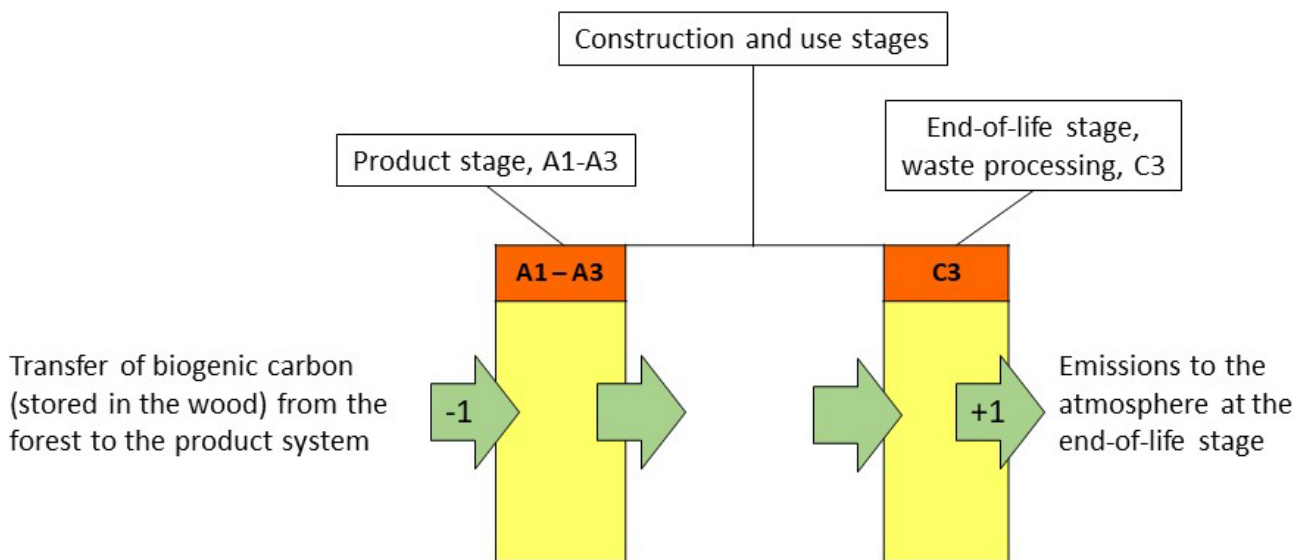
Biogenic carbon fluxes in the product system where carbon neutrality is assumed

The figure shows that if we assess the product system as a whole, (represented graphically by each full rectangle above, which includes the "+1" arrow, representing release at end-of-life), eventually this CO_2 will be released back into the atmosphere.

The formula used to calculate the biogenic CO_2 is given as:
$$P_{CO_2} = \frac{44}{12} \times cf \times \frac{\rho_\omega \times V_\omega}{1 + \frac{\omega}{100}}$$

Where:

P_{CO_2} is the biogenic carbon oxidized as as carbon dioxide emission from the product system into the atmoshphere (e.g. energy use at the end-of-life) (kg);

cf is the carbon fraction of woody biomass (oven dry mass), 0,5 as the default value;

ω is the moisture content of the product (e.g. 12 (%));

ρ_ω is the density of woody biomass of the product at that moisture content (kg/m³);

V_ω is the volume of the solid wood product at that moisture content (m³).

For wood-based products, wood volume content V_ω = VP x percentage of wood. VP is the gross volume of the wood-based product.

6. LCA Results - Additional LCI Indicators

At the end of life (module C) the biogenic CO_2 will be released back into the atmosphere. The biogenic CO_2, that is released at the end of life is presented below.

The input values used to calculate biogenic CO_2 per m^3 wood are:

PARAMETER	VALUE	NOTES
cf, carbon fraction of woody biomass	0.5	As per EN 16449
ω, moisture content of wood	0%	
V_ω, volume of solid wood at above ω	1.0 m^3	Calculation is done per m^3
ρ_ω, density of wood	410 kg/m^3	Density of wood @ m.c. of 0% (figures supplied by MEDITE)

The wood types used in the MDF panels comprises 25% spruce and 75% pine and an average density of 410 kg/m^3 is used in the biogenic calculation (data supplied by MEDITE).

The biogenic CO_2 per m^3 of wood P_{CO_2} = (44 / 12) x 0.5 x (410 x 1.0) / (1 + (0 / 100))
= 751.67 kg per cubic metre (m^3)

The wood density is 410 kg/m^3, thus biogenic CO_2 per kg wood = 751.67/410 = 1.83 kg CO_2 per kg. The biogenic CO_2 values for the MEDITE products are presented in the table below.

Biogenic CO_2 for MEDITE CLEAR (kg per tonne of product)

kg of dry wood per tonne of MDF panel	kg biogenic CO_2 per tonne of MDF panel
903.3	1653.04

Taking into account the biogenic CO_2, the resultant net CO_2 for the MEDITE products "at the factory gate", i.e. as they leave the production plant is given in the table below.

Net CO_2-eq for MEDITE CLEAR at factory gate (kg per tonne of product)

A1-A3 CO_2 per tonne (kg)	Biogenic CO_2 per tonne (kg)	Net CO_2 per tonne (kg)
649.71	1653.04	-1003.33

MEDITE®
DEFINING THE STANDARD OF MDF

7. Calculation rules

Methodology and reproducibility

The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented in the LCA report. In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated which can be accessed via the Ecochain tool. This data portfolio contains a summary of all the data used in this LCA, and correspondingly, in the MEDITE MDF Ecochain account.

Data quality

Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

Data collection period

The dataset is representative for the production processes used in 2019.

8. Scenarios and additional technical information

A1. Raw materials supply

This module considers the extraction and processing of all raw materials and energy which occur upstream to the MEDITE MDF manufacturing process, as well as waste processing up to the end-of waste state.

A2. Transport of raw materials to manufacturer

This includes the transport distance of the raw materials to the manufacturing facility via road and ship (sea) transport.

A3. Manufacturing

This module covers the manufacturing of MEDITE MDF panels and includes all processes linked to production such as wood preparation and processing, drying, mixing, forming, compressing, cutting and internal transport. Use of electricity, fuels (biomass and fossil fuels) and auxiliary materials in production is taken into account.

A4. Transport

This module covers road + sea transport of the MDF panels from Ireland to construction sites/distrubutors in mainland UK.

References transport:
Road transport: transport, freight, lorry 16-32 metric ton, EURO6
Sea transport: transport, freight, sea, transoceanic ship
Distance by road: 574 km
Distance by sea: 106km
Capacity utilisation: 64%

C2, C3, and C4. End of Life

Deconstruction (C1) is assumed to be manual, and no energy is consumed. Transport (C2) of the deconstruction/demolition materials to their destination is taken to be 100km for disposal or reuse.

It is assumed that 50% of the MDF is incinerated (C3 phase - processing) and 50% ends up in landfill (C4 phase - disposal). This estimate is taken after discussions with experts in the MDF and wood waste industry in the UK.

The background reference datasets used in these modules are:

ITEM	REFERENCE	MODULE
Transport	transport, freight, lorry 16-32 metric ton, EURO6 | transport, freight, lorry 16-32 metric ton, EURO6	C2
Incineration	treatment of waste wood, untreated, municipal incineration | waste wood, untreated | Rest-of-World Ecoinvent v3.5 Cut-off	C3
Landfill	treatment of waste wood, untreated, sanitary landfill | waste wood, untreated | Rest-of-World Ecoinvent v3.5 Cut-off	C4

9. Mandatory additional information on release of dangerous substances to indoor air, soil and water

None of the substances contained in the product are listed in the "Candidate List of Substances of Very High Concern for authorisation", or they do not exceed the threshold with the European Chemicals Agency.

10. Other optional additional environmental information

N/A.

11. References

1. ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006.

2. ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.

3. ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures', International Organization for Standardization, ISO14025:2006.

4. I.S. EN 15804:2012+A1:2013,: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', EN 15804:2012+A1:2013.

5. Ecochain, 2019, web: http://app.ecochain.com.

6. Product Category Rules : Part A Implementation and use of I.S. EN 15804:2012 and CEN TR 16970:2016 in Ireland. https://www.igbc.ie/wp-content/uploads/2018/06/Final-reviewed-PCR-29.06.18.pdf

7. CML - Department of Industrial Ecology, CML-IA Characterisation Factors, Dated August 2016, Leiden University, Leiden, Netherlands Available at: https://www.universiteitleiden.nl/en/research/research-output/science/cml-ia-characterisation-factors

8. Ministerie van Verkeer en Waterstaat, 8 maart 2004, Toxiciteit heeft z'n prijs, Schaduwprijzen voor (eco-) toxiciteit en uitputting van abiotische grondstoffen binnen DuboCalc.

9. I.S. EN 16485:2014 Round and sawn timber - Environmental Product Declarations - Product category rules for wood and wood-based products for use in construction.