

# Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

## Roof Truss

from

**Crendon Timber Engineering Limited**



<b>Programme</b>	The International EPD System, <a href="http://www.environdec.com">www.environdec.com</a>
<b>Programme Operator</b>	EPD International AB
<b>EPD Registration</b>	S-P-12793
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<b>Valid Until</b>	2029-03-06

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)



## General Information

<b>Programme</b>	The International EPD System
<b>Address</b>	EPD International AB
	Box 210 60
	SE-100 31 Stockholm
	Sweden
<b>Website</b>	<a href="http://www.environdec.com">www.environdec.com</a>
<b>Email</b>	info@environdec.com

### Accountabilities for PCR LCA, and independent, third party verification

#### Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR): EN 15804+A2, PCR 2019: 14 Construction Products and Services. Version 1.8. 2023-12-08

PCR review was conducted by Claudia A. Peña

#### Life Cycle Assessment (LCA)

Produced by: Enistic Limited, Oxford U.K.

Lifecycle Accountability: Rebecca Eccles, Enistic Limited

#### Third Party Verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third Party Verifier: Hudai Kara, PhD, Metsims Sustainability Consulting, Oxford, U.K.



Approved by: The International EPD System

Procedure for follow-up of data during EPD validity involves third party verifier: No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

## Company Information

<b>Owner of the EPD</b>	Crendon Timber Engineering Limited
<b>Contact</b>	Ed Kirk
<b>Description of Organisation</b>	Manufacturer of timber construction products.
<b>Product/Management System-Related Certifications</b>	EN 15804+A2, ISO 14025, ISO 21930
<b>Name and location of production site(s):</b>	Bridgend (CF32 9LW)
	Castleford (WF10 4PS)
	East Harling (NR16 2QW)
	Glastonbury (BA6 9LX)
	Kirkby (NG17 9LE)
	Long Crendon (HP18 9BA)
	Piddlehinton (DT2 7UA)
	Wem (SY4 5SD)

## Product Information

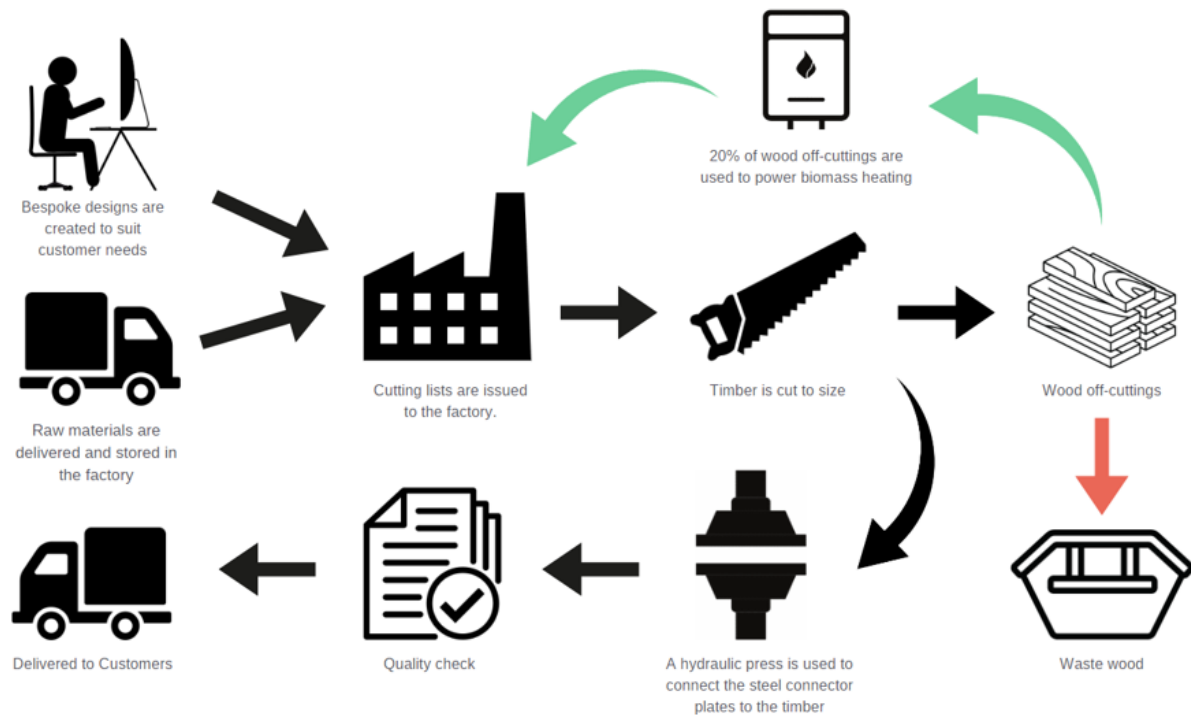
<b>Product Name</b>	Roof Truss
<b>Production Identification</b>	Roof Truss
<b>Product Description</b>	A roof truss is a structural framework designed to support the roof of a building. It consists of a series of interconnected triangular-shaped units made from timber beams, known as trusses, which are arranged in a specific pattern to distribute the weight of the roof evenly. The trusses are manufactured bespoke to each customer and so they all vary in size. A roof trusses lifetime is generally as long as the buildings it is installed onto.
<b>UN CPC Code</b>	311
<b>Geographical Scope</b>	Timber suppliers are located in Sweden, Finland, and Germany meanwhile all manufacturing sites and customers are located in the UK. The products use phase consists of the product being still and attached to a roof frame and so there is no energy used during this phase. It is assumed the roof truss will be disposed of in the UK.

## LCA Information

<b>Functional/Declared Unit</b>	1m3 Roof Truss (with average weight of 467 kg)
<b>Reference Service Life</b>	N/A
<b>Time Representativeness</b>	January 2022 - December 2022
<b>Databases and Software Used</b>	Ecoinvent Version 3.10, OneClick LCA Version 1.13.0
<b>Description of System Boundaries</b>	Cradle to gate with options, modules C1–C4, module D and with optional modules (A1–A3 + C + D and additional modules). The additional modules include A4–A5, C1–C4, and D.
<b>Averaging in EPD</b>	To produce an average EPD, the input data was weighted based on energy use. As such, this EPD is averaged across all Crendon Timber Engineering Limited sites for the products Roof Truss.
<b>Averages and Variability</b>	-11% to 4%
<b>Type of EPD</b>	This is an average EPD cradle to grave covering A1–A3, A4–A5, C and D modules

## Manufacturing Diagram

### System Diagram:



### **About the Manufacturer:**

Crendon Timber Engineering Limited is part of a wider group called Wyckham Blackwell Group (WBG). WBG is a high quality, innovative and customer-focused group that is committed to sustainability. All companies within WBG specialise in manufacturing a variety of timber products for the construction industry. Crendon Timber Engineering Limited most commonly manufactures roof trusses for the construction of homes.

Further information can be found at <https://crendon.co.uk/>

### **Manufacturing and Packaging (A1-A3):**

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

### **Transport and Installation (A4-A5):**

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

### **Product Use and Maintenance (B1-B7):**

This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied.

### **Product End of Life (C1-C4, D):**

At the end-of-life, in the demolition phase 100% of the waste is assumed to be collected as separate construction waste. The demolition process consumes energy in the form of diesel fuel used by building machines (C1). The dismantled wooden element is delivered to the nearest construction waste treatment plant (C2). At the waste treatment plant, waste that can be reused, recycled, or recovered for energy is separated and diverted for further use. (C3). Unusable materials are disposed of in a landfill (C4). Due to the recycling potential of the steel and wood, they can be used as secondary raw material and as energy, respectively. This study assumes that 85% of steel is recycled and 15% goes directly to landfill. Meanwhile, it is assumed that 80% of waste wood is incinerated and 20% goes directly to landfill. Recycling of steel avoids the use of virgin raw material, and the heat recovered from the combustion of wood replaces the use of fossil fuels in energy production (D).

### Cut Off Criteria:

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

### Allocation, Estimates, and Assumptions:

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, any assumptions have been done in the following ways:

Module	Assumptions
<b>A1 Packaging Materials</b>	It was assumed that 50% of all strapping delivered to all Crendon Timber Engineering Limited sites were used for roof trusses.
<b>A1 Ancillary Materials</b>	It was estimated that 150 litres of lubricating oil was used across all Crendon Timber Engineering Limited sites for roof trusses.
<b>A2 Transport</b>	A “default route” from each supplier to each Crendon Timber Engineering Limited site was assumed to be used for every delivery throughout the study period (January 2022 – December 2022).
<b>A3 Manufacturing Energy</b>	Energy usage was allocated to roof trusses by using the ratio of kg of manufactured roof trusses vs all manufactured products.
<b>A3 Manufacturing Waste</b>	Where waste was not weighed, disposal cost was used to estimate weight of waste produced.
<b>A4 Transport</b>	It was assumed that 70% of all customer deliveries were for Roof Trusses.

## Scope

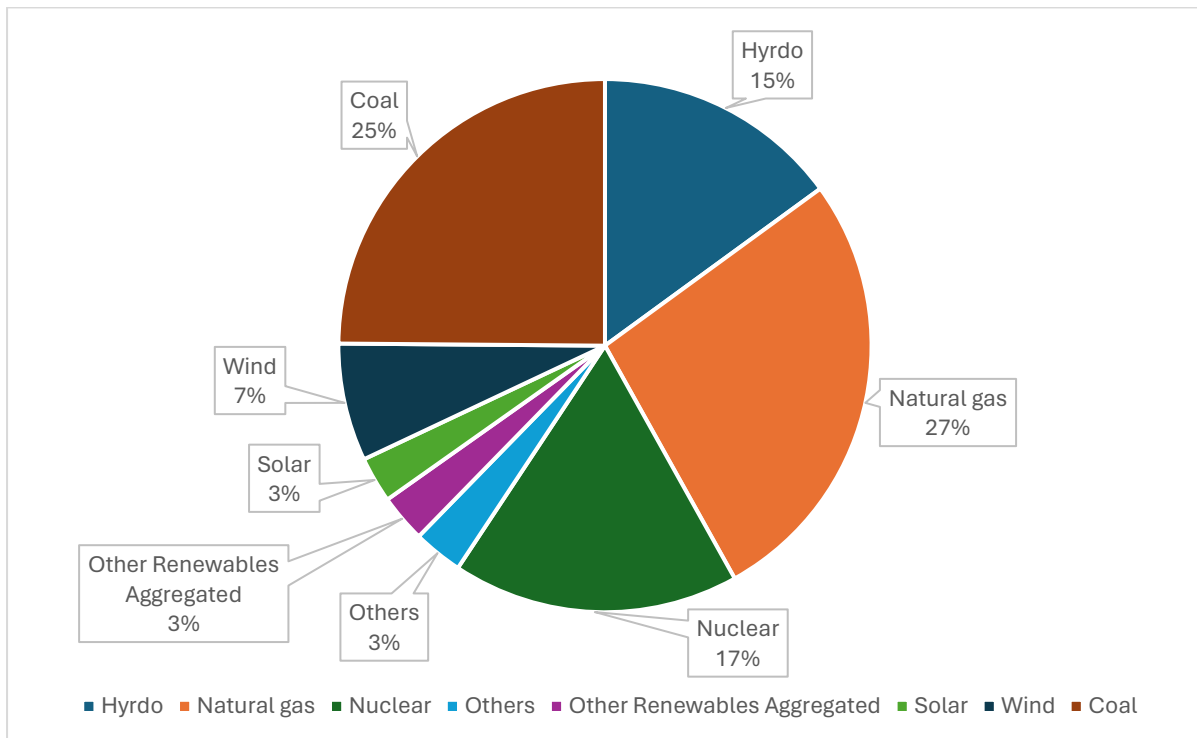
	Product stage			Assembly Stage		Use stage							End of life stage				Beyond the System Boundaries		
	Raw Materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstr./demol.	Transport	Waste Processing	Disposal	Reuse	Recovery	Recycling
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
Modules Declared	x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x		
Geography	SE, FR, UK, DEU	SE, FR, UK, DEU	UK	UK	UK								UK	UK	UK	UK	UK		
Specific Data Used	>90%					-	-	-	-	-	-	-	-	-	-	-	-		
Variation - Products	0%					-	-	-	-	-	-	-	-	-	-	-	-		
Variation - Sites	-11% to 4%					-	-	-	-	-	-	-	-	-	-	-	-		

## Content Information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% of product	Biogenic material, kg C/product or declared unit
Timber	452	0%	100%	50
Steel	15.3	50%	0%	0
TOTAL	467	1.64%	100%	50
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg	
Plastic Strapping	0.07	0.01%	0	0
TOTAL	0.07	0.01%	0	0

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
N/A			

The electricity datapoint was attained from ecoinvent and is representative of several countries', including the UK's, electricity consumption. The carbon impact of 1 kWh of electricity consumption is 0.31 kg CO<sub>2</sub>e. The chart below represents the different sources of the electricity





## Results of the Environmental Indicators

Results are presented per 1m<sup>3</sup> Roof Truss.

### Mandatory Impact Category Indicators According to EN 15804+A2

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO2e	-504	12.8	0.0375	0	2.18	435	108	-113
GWP – fossil	kg CO2e	35	12.8	0.037	0	2.18	3.43	0.414	-112
GWP – biogenic	kg CO2e	-540	0	0	0	0	432	108	0
GWP – LULUC	kg CO2e	1.23	0.00536	0.0000203	0	0.000803	0.00123	0.0000426	-0.0608
Ozone depletion pot.	kg CFC-11e	0.00000587	0.00000276	1.09E-09	0	0.000000501	0.000000396	0.0000000887	-0.00000336
Acidification potential	mol H+e	0.248	0.0378	0.000121	0	0.00921	0.114	0.00433	-0.379
EP-freshwater	kg Pe	0.00815	0.000109	0.00000304	0	0.0000178	0.0000615	0.00000991	-0.00941
EP-marine	kg Ne	0.0974	0.00761	0.0000338	0	0.00274	0.0537	0.00297	-0.102
EP-terrestrial	mol Ne	1	0.0846	0.00038	0	0.0302	0.615	0.0208	-1.18
POCP (“smog”)	kg NMVOCe	0.574	0.0316	0.000096	0	0.00967	0.161	0.0098	-0.303
ADP-minerals & metals	kg Sbe	0.000259	0.0000453	0.0000000479	0	0.0000051	0.0000163	0.000000213	-0.000196
ADP-fossil resources	MJ	546	186	0.563	0	32.7	34.8	5.59	-1750
Water use	m3e depr.	40.2	0.82	0.00702	0	0.146	7.47	0.0151	-21
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins, and/or risks.

## Additional Voluntary Impact Category Indicators (EN15804+A1)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP - GHG	kg CO <sub>2</sub> e	42.5	12.7	0.037	0	2.15	3.38	11.7	-111
Ozone depletion Pot.	kg CFC-11e	0.000000756	0.00000219	0.000000000891	0	0.000000397	0.000000356	0.000000702	-0.00000277
Acidification	kg SO <sub>2</sub> e	0.29	0.031	0.0000943	0	0.00716	0.0772	0.00309	-0.295
Eutrophication	kg PO <sub>4</sub> 3e	0.2	0.00684	0.00024	0	0.00163	0.109	0.92	-0.293
POCP ("smog")	kg C <sub>2</sub> H <sub>4</sub> e	0.0252	0.00154	0.00000325	0	0.000279	0.00313	0.00248	-0.0105
ADP-elements	kg Sbe	0.000796	0.0000443	0.000000048	0	0.00000494	0.0000132	0.00000021	-0.000197
ADP-fossil	MJ	591	186	0.563	0	32.7	34.8	5.59	-1750

## Resource Use Indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	5760	2.2	0.0126	0	0.368	1.6	0.0322	-40.7
PERM	MJ	4970	0	0	0	0	-3980	-994	0
PERT	MJ	10700	2.2	0.0126	0	0.368	-3970	-994	-40.7
PENRE	MJ	547	186	0.563	0	32.7	34.8	5.59	-1750
PENRM	MJ	0.935	0	0	0	0	-0.577	-0.358	0
PENRT	MJ	548	186	0.563	0	32.7	34.2	5.23	-1750
SM	kg	0.974	0.062	0.0000253	0	0.00908	0.116	0.00219	1.02
RSF	MJ	51.1	0.000803	0.000000225	0	0.0000916	0.000189	0.00000734	-0.000904
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m <sup>3</sup>	0.856	0.0221	0.000171	0	0.00423	0.18	0.000386	-0.572
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

## Waste Indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	2.68	0.268	0.00416	0	0.0433	0.00294	0	-13.8
Non-hazardous waste	kg	27.9	4.28	0.132	0	0.712	369	92.7	-3590
Radioactive waste	kg	0.00845	0.00123	0.00000267	0	0.000219	0.00000163	0	-0.00823

## Output Flow Indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0	0	0
Materials for recycling	kg	0.0567	0	0	0	0	1.75	0	0
Materials for energy rec	kg	0.00491	0	0	0	0	4,142	0	0
Exported energy	MJ	0.000202	0	0	0	0	3770	0	0

## Other Environmental Performance Indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate matter	Incidence	0.0000106	0.00000102	0.000000000417	0	0.000000251	0.000000923	0.000000115	-0.00000129
Ionizing radiation 6)	kBq U235e	7.31	0.868	0.00995	0	0.156	0.137	0.0257	-30.7
Ecotoxicity (freshwater)	CTUe	1110	170	0.536	0	29.4	83.2	7.72	-1680
Human toxicity, cancer	CTUh	0.0000000861	0.0000000048	0.000000000106	0	0.00000000072	0.00000011	0.000000000148	-0.0000000163
Human tox. non-cancer	CTUh	0.0000015	0.0000001540	0.000000000317	0	0.0000000291	0.000000322	0.0000000233	-0.0000008780
SQP 7)	-	24100	130	0.0819	0	37.7	11.9	23.5	-249
Acronyms	6) EN 15804+A2 disclaimer for ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health 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; 7) SQP = Land use related impacts/soil quality.								

## References

General Programme Instructions of the International EPD® System. Version 4.0.

OneClick LCA, Version 1.13.0

Ecoinvent Data Base Version 3.10

PCR 2019 :14 Construction Products and Services. Version 1.8

IEA 50 2024: Monthly Electricity Statistics, <https://www.iea.org/data-and-statistics/data-tools/monthly-electricity-statistics>