Environmental Product Declaration

An average EPD in accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Posi Joist

from

Crendon Timber Engineering Limited

Programme	The International EPD System, www.environdec.com
Programme Operator	EPD International AB
EPD Registration	EIS-EPD-0008075 (S-P-08075)
Publication Date	2024-07-19
Valid Until	2029-07-18
	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

General Information

Programme	The International EPD System
Address	EPD International AB
	Box 210 60
	SE-100 31 Stockholm
	Sweden
Website	www.environdec.com
Email	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 1.3.3, 2024-03-01, c-PCR-006 Wood and wood-based products for use in construction (EN 16485)
PCR review was conducted by Claudia A. Peña
Life Cycle Assessment (LCA)
Produced by: Enistic Limited, Oxford U.K. using One Click LCA EPD Generator for construction products, Ver. 1.13.0.
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

Owner of the EPD	Crendon Timber Engineering Limited
Contact	Ed Kirk
Description of Organisation	Manufacturer of timber construction products.
Product/Management System-Related Certifications	EN 15804+A2, ISO 14025
Name and location of production site(s):	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

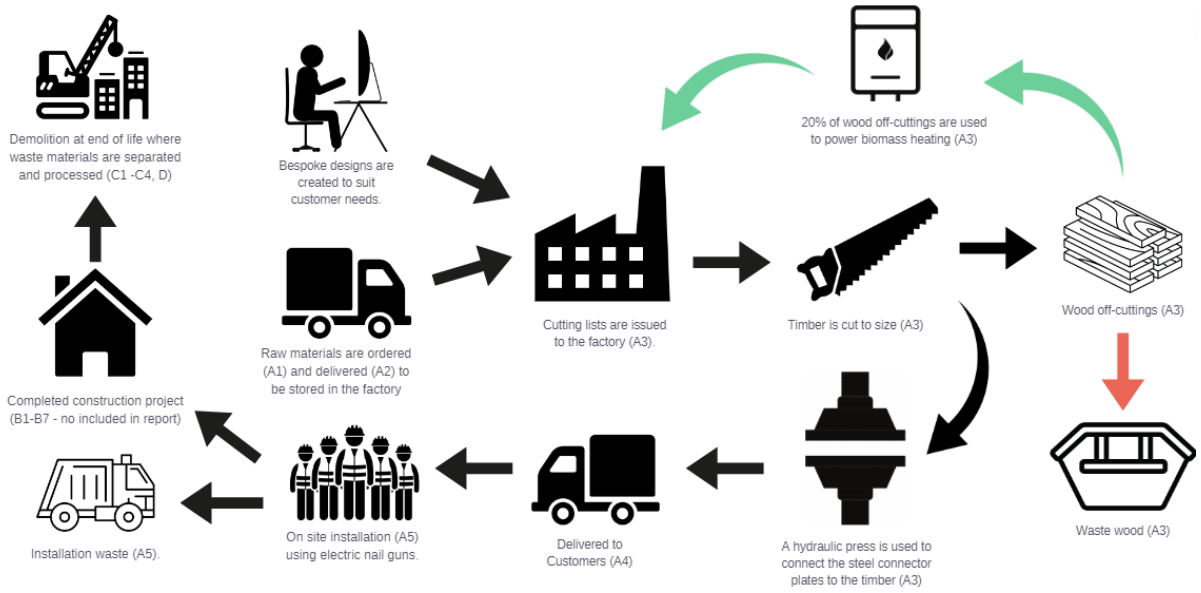
Product Name	Posi Joist
Production Identification	Posi Joist
Product Description	A posi-joist is a type of engineered timber joist system widely used in construction for its strength, versatility, and efficiency. It consists of a lightweight, open web design, typically made from high-grade timber. Also known as Eco Joists, Metal-web and Easi Joists, they combine the lightness of timber with the strength of steel, are easy to install and span greater distances than timber alternatives to allow unequalled design freedom.
UN CPC Code	311 - Wood, sawn or chipped lengthwise, sliced or peeled, of a thickness exceeding 6 mm
Geographical Scope	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 the frame of a building and so there is no energy used during this phase. It is assumed the posi-joist will be disposed of in the UK.

LCA Information

Functional/Declared Unit	$1m^3$ Posi Joist
Reference Service Life	N/A
Time Representativeness	January 2022 - December 2022
Databases and Software Used	Ecoinvent Version 3.10, OneClick LCA Version 1.13.0
Description of System Boundaries	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.
Averaging in EPD	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 Posi Joist.
Averages and Variability	-38% to 8% variation between manufacturing sites.
Type of EPD	This is an average EPD cradle to grave covering A1-A3, A4-A5, C and D modules

Manufacturer Information

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.

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.

Once the wood (A1) is delivered to the manufacturing site (A2), it is cut to size and the piece are attached together by using a hydraulic press which is powered by electricity (A3). Any manufacturing waste is either disposed of or used to fuel the biomass boiler (A3). The final product is packaged using shrink wrap and metal banding clips.

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. The final product is deliverd by HGV to customers across the UK.

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):

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 landfil.

Beyond System Boundary (D):

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
A1 Packaging Materials	It was assumed that 10% of all strapping delivered to all Crendon Timber Engineering Limited sites were used for posi joists.
A1 Ancillary Materials	It was estimated that 150 litres of lubricating oil was used across all Crendon Timber Engineering Limited sites for posi joists.
A2 Transport	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 2023).
A3 Manufacturing Energy	Energy usage was allocated to posi joists by using the ratio of kg of manufactured posi joists vs all manufactured products.
A3 Manufacturing Waste	Where waste was not weighed, disposal cost was used to estimate weight of waste produced.
A4 Transport	It was assumed that 20% of customer deliveries were for posi joists. It was also assumed that on average, 30 posi joists were delivered on each individual delivery.

Scope

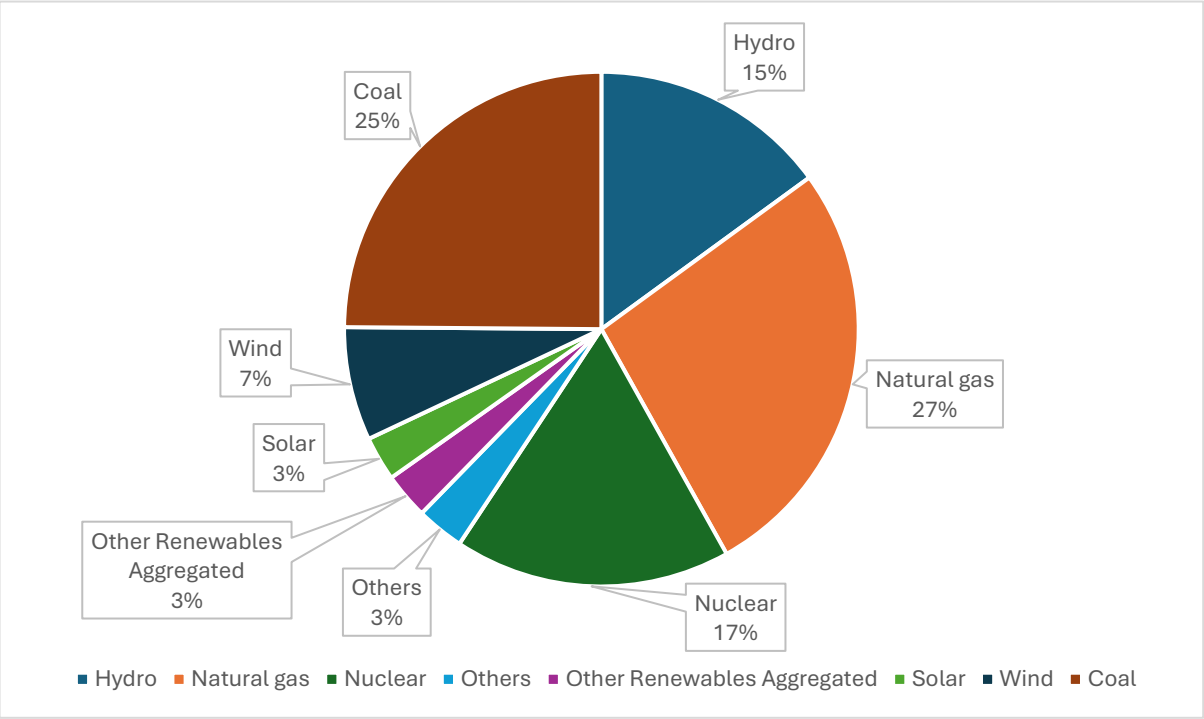
	Product stage			Assembly Stage		Use stage							End of life stage				Beyond the System Boundaries		
	Raw Materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstr./demol.	Transport	Waste Processing	Disposal	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	<10%					-	-	-	-	-	-	-	-	-	-	-	-		
Variation - Sites	-38% to 8%					-	-	-	-	-	-	-	-	-	-	-	-		

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%	226
Steel	153	50%	0%	0
TOTAL	605	12.6%	74.7%	226
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**	
Plastic Strapping	0.18	0.03%	0	
TOTAL	0.18	0.03%	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 representive of several countries', including the UK's, electricity consumption. The carbon impact of 1 kWh of electricity consumption is 0.31 kg CO2e. The chart below represents the different sources of the electricity.



Results of the Environmental Performance Indicators

Results are presented per $1\mathrm{m}^3$ Posi Joist.

Mandatory Impact Category Indicators According to EN 15804+A2

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO2e	-234	3.13	0.132	0	2.93	562	140	-228
GWP – fossil	kg CO2e	460	3.13	0.132	0	2.93	6	0.542	-228
GWP – biogenic	kg CO2e	-696	0	0	0	0	557	139	0.0741
GWP – LULUC	kg CO2e	1.83	0.00129	0.0000621	0	0.00108	0	0.000158	0.0645
Ozone depletion pot.	kg CFC-11e	0.0000355	0.000000684	0.00000000355	0	0.000000674	0	0.000000139	-0.00000647
Acidification potential	mol H+e	2.12	0.0112	0.000378	0	0.0124	0	0.00554	-0.807
EP-freshwater	kg Pe	0.0249	0.0000265	0.00000929	0	0.000024	0	0.0000113	-0.0104
EP-marine	kg Ne	0.542	0.00288	0.000112	0	0.00369	0	0.00341	-0.103
EP-terrestrial	mol Ne	5.8	0.0318	0.00119	0	0.0407	1	0.0255	-2.37
POCP (“smog”)	kg NMVOCe	2.61	0.0104	0.000307	0	0.013	0	0.0112	-0.962
ADP-minerals & metals	kg Sbe	0.00269	0.000011	0.000000148	0	0.00000687	0	0.0000005	-0.00382
ADP-fossil resources	MJ	5250	45	1.73	0	44	56	9	-2720
Water use	m3e depr.	234	0.199	0.0215	0	0.197	8	0.0259	26.9
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 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	kg CO2e	426	3.1	0.126	0	2.9	6.39	12	-218
Ozone depletion Pot.	kg CFC-11e	0.0000299	0.000000542	0.00000000289	0	0.000000534	0.000000461	0.00000011	-0.00000738
Acidification	kg SO2e	4.47	0.00892	0.000293	0	0.00964	0.0884	0.004	-0.633
Eutrophication	kg PO43e	1.76	0.00202	0.00247	0	0.00219	0.122	0.936	-0.477
POCP (“smog”)	kg C2H4e	0.39	0.000394	0.0000127	0	0.000376	0.00392	0.00256	-0.0971
ADP-elements	kg Sbe	0.0505	0.0000107	0.000000148	0	0.00000665	0.000103	0.000000488	-0.00382
ADP-fossil	MJ	5810	45.4	1.73	0	44	55.8	9	-2720

Resource Use Indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	8120	0.535	0.0385	0	0.496	5.09	0.0615	-180
PERM	MJ	6710	0	0	0	0	-5370	-1340	0
PERT	MJ	14800	0.535	0.0385	0	0.496	-5360	-1340	-180
PENRE	MJ	5250	45.4	1.73	0	44	55.8	9	-2720
PENRM	MJ	3.5	0	0	0	0	-2.8	-0.7	0
PENRT	MJ	5260	45.4	1.73	0	44	53	8.3	-2720
SM	kg	50.3	0.015	0.000082	0	0.0122	0.156	0.00293	81.9
RSF	MJ	55.2	0.000195	0.000000717	0	0.000123	0.00333	0.0000257	-0.0169
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m3	4.71	0.00538	0.000524	0	0.0057	0.199	0.00403	-3.8
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 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								

Waste Indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	101	0.0655	0.0127	0	0.0583	0.22	0	-85.8
Non-hazardous waste	kg	694	1.05	0.511	0	0.958	382	117	-3880
Radioactive waste	kg	0.0288	0.000301	0.00000819	0	0.000294	0.00012	0	-0.00814

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	0.152	0	0	0	0	131	0	0
Materials for energy rec	kg	0.0132	0	0	0	0	376	0	0
Exported energy	MJ	0.000541	0	0	0	0	3840	0	0

Other Environmental Performance Indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate matter	Incidence	0.000045	0.000000259	0.00000000147	0	0.000000338	0.00000112	0.00000014	-0.00000504
Ionizing radiation 6)	kBq U235e	28.9	0.211	0.0304	0	0.21	0.48	0.0411	-29.6
Ecotoxicity (freshwater)	CTUe	12500	41.7	1.67	0	39.6	303	10	-4360
Human toxicity, cancer	CTUh	0.0000024	0.00000000117	0.0000000000326	0	0.000000000972	0.000000116	0.000000000205	0.00000118
Human tox. non-cancer	CTUh	0.0000112	0.0000000384	0.00000000098	0	0.0000000392	0.000000408	0.0000000251	0.0000063
SQP 7)	-	39900	31.6	0.286	0	50.7	121	31	-660
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 1.3.3

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