Statement of Verification

BREG EN EPD No: 000760 Issue: 01

This is to verify that the Environmental Product Declaration provided by:

Teknion Furniture Systems (M) Sdn Bhd

are in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:
District Panel workstation for two persons with the dimensions of D1200mm x W2800mm and a weight of 199 kg. Service year of 10 years.

Company Address

Teknion Furniture Systems (M) Sdn Bhd
Lot 761, Jalan Haji Sirat,
Off Jalan Meru,
42100 Klang,
Selangor

teknion

Signed for BRE Global Limited — Hayley Thomson, Operator

Date of this Issue	Date of First Issue	Expiry Date
27 January 2026	27 January 2026	26 January 2031

BRE Global Ltd., Garston, Watford WD25 9XX
T: +44 (0)333 321 8811 F: +44 (0)1923 664603 E: Enquiries@breglobal.com

Environmental Product Declaration

EPD Number: 000760

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2025 Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.2
Commissioner of LCA study	**LCA consultant/Tool**
Teknion Furniture Systems (M) Sdn Bhd, Lot 761, Jalan Haji Sirat, Off Jalan Meru, 42100 Klang, Selangor	Grace Ong / LINA A2
Declared/Functional Unit	**Applicability/Coverage**
District Panel workstation for two persons with the dimensions of D1200mm x W2800mm and a weight of 199 kg. Service year of 10 years.	Other (please specify). Product specific
EPD Type	**Background database**
Cradle to Grave	Ecoinvent 3.8

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☒Internal ☐ External
(Where appropriate [b]) Third party verifier: Flavie Lowers
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. 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+A2:2019 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Teknion Furniture Systems (M) Sdn Bhd
Lot 761, Jalan Haji Sirat, Off Jalan Meru,
42100 Klang,
Selangor

Construction Product:

Product Description

The District® system provides a customizable workspace solution that innovatively reinterprets systems furniture. By merging the attributes of classic furniture with modern system functionality, it efficiently maximizes smaller spaces through multi-functional products, including panels, desks, credenzas, storage units, windows, and walls. District uses and reinterprets these elements for the modern office.

The workspace solution studied can contain panels, worksurfaces, storage solutions, and power cables, depending on the final configuration. The specific configuration modelled is a typical unit of District Panel workstation with high pressured laminated worksurfaces for two persons which utilizing the product codes detailed below:

Product code	Height (cm)	Width (cm)	Depth (cm)	Description
MUNPFR	135	120		Flush Panel Wall
MUNPFR	135	140		Flush Panel Wall
MUNELF	57	120		Tackable Fabric Fascia
MUNELF	60	120		Tackable Fabric Fascia
MUNELMB	15	120		Metal Base Feed Fascia
MUNELMB	15	140		Metal Base Feed Fascia
MUNTT	-	120		Top Trim
MUNTT	-	140		Top Trim
MUNTE	-	135		End Trim
MUNPCR2	135			Two-Way 95˚ connector
MUNGE			60	End Gable
MUNBP				Worksurface Panel Wall Bracket – Pair
MUWDG	60	120		90° Corner Worksurface

*** Part code can be found in the District Metric product Map and the specific dimensions are restricted to the end user; however, any technical inquiries or requests for further details should be directed to the Teknion technical team****

The worktop is available in two finish options—source laminate (low pressure laminate LPL) and foundation laminate (high pressure laminate HPL)—which will be applied by the worktop manufacturer. The worktop is made of a medium-density fibreboard (MDF). The dataset used for the LCA analysis does not include the finishing layer; however, the laminate manufacturer has provided GWP impacts for high-pressure laminate. For 1 m² of finished panel with a 0.8 mm thickness and a mass of 1.208 kg/m², the total GWP impact is 2.98 kg CO_2e/m². The Teknion receives completed product and no additional processing at the Teknion factory. The dimensions of D1200mm x W2800mm and a weight of 199 kg. The impact of the finishes (HPL) for this table would be an additional 4.29 kgCO_2eq.

This product is determined to be a representative product based on sales of the variations. While the exact configuration purchased may be slightly different. Details about the District® system, please refer to: District

Technical Information

Environmental Certifications:

Applicable Standard	Description
Indoor Advantage™ Gold	Registration # SCS-IAQ-05339

Note: The modelled configuration is District panel workstation for two persons with trackable fabric fascia, metal base feed fascia and 90° corner worksurfaces. The chairs are not included in the analysis.

Main Product Contents

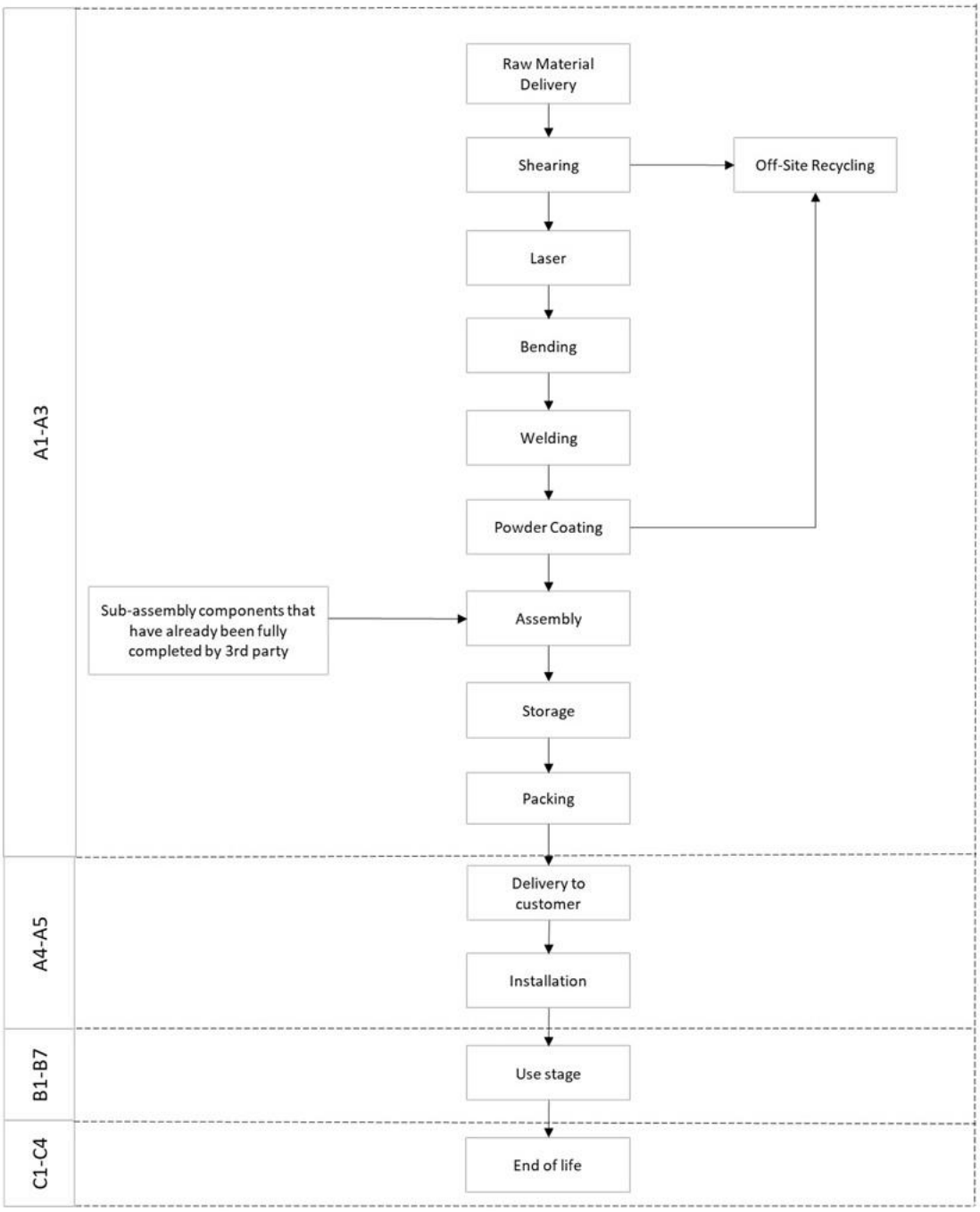
Like many commercial furniture products, District panel workstation is available in wide range of configurations. For this particular study, a representative configuration was used. The composition of the configuration is provided in the table below.

Material/Chemical Input	%
Steel	45.84%
Polypropylene (PP)	24.25%
MDF	17.50%
Aluminium	7.84%
Fabric	3.15%
Zamak 3	0.10%
Polyoxymethylene (POM)	0.25%
ABS	0.03%
Other	1.05%

Manufacturing Process

The manufacturing process begins with the delivery of raw materials, followed by cutting (for aluminium) or shearing (for steel), during which scrap materials are sent for off-site recycling. The processed materials then undergo punching, deburring, and foaming (bending), after which they are welded. Post-welding, the items are subjected to grinding and buffing to ensure surface smoothness.
Powder coating is then applied for finishing, and at this stage, partially completed sub-assembly parts from third parties—such as steel brackets and plates—are also integrated. The next phase is assembly, which may also involve incorporating fully completed sub-assembly components from third parties, such as levellers, laminated worksurfaces.

Process flow diagram



Use Information

No specific maintenance is required and District panel wall are expected to outlast their intended lifespan, provided they are maintained according to the recommended care procedures

End of Life

At the end of the product's life, District panel wall will undergo manual dismantling, with a material separation process involved. Energy consumption is minimal due to manual dismantling with no involvement of machinery or power.

Life Cycle Assessment Calculation Rules

Functional unit description

District Panel workstation for two persons with the dimensions of D1200 x W2800 and a weight of 199 kg. Service year of 10 years.

System boundary

This is a Cradle-to-Grave EPD, reporting the upstream processing stages A1 to A3, Construction and Installation (A4-A5), Use stages (B1 to B7), end-of-life stages (C1 to C4) and Module D in accordance with EN15804:2012+A2:2019 and BRE 2025 Product Category Rules (PN 514 Rev 3.2). The LCA study period used for the analysis is 10years

Data sources, quality and allocation

For the Life Cycle Assessment (LCA) and Environmental Product Declaration (EPD), Teknion utilised specific primary data extracted from its production operations at Teknion Malaysia's factory, modelled using the LINA A2 LCA and the Ecoinvent 3.8 database. In accordance with the requirements of EN15804:2012 + A2:2019, the most current available data has been used. Manufacturer-specific data has been used for the LCA analysis.
The data represents one unit of the District panel workstation for two persons, based on production period between 01/12/2023 and 30/11/2024 from Teknion Malaysia's factory. A production quantity of one unit was used, as the data was sourced directly from the ERP system.

The primary production figures are taken from the manufacturers ERP system, and the secondary datasets are derived from Ecoinvent v3.8, and the LCA tool used was BRE LINA A2. The LCA analysis is conducted for the District Panel workstation for two persons with the dimensions of D1200 x W2800 and the weight of 199kg.
For the production process, the facility uses the national grid consumption mix for the production.

In addition to the District panel workstation, other products are manufactured in the factory. Therefore, the allocation of electricity, fuel, water consumption, and discharge are required. There are multiple configurations and combinations of products produced on the production line (in terms of size, accessories, etc.)

Therefore, allocating energy consumption, water, other waste, and wastewater based on mass would assign higher values to certain products. Instead, using the sales revenue of the product line relative to the total revenue is more accurate. Therefore, energy, water, other waste, and wastewater leaving the factory has been allocated based on the % revenue of the product line over the total revenue. Actual usage figures were employed for raw materials, packaging, and production waste are taken from ERP system. Upon data review, it was noted that the mass balance is within the acceptable range, and no data uplift has been performed. In addition, no proxy dataset was used for the LCA modelling.

Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e. raw material production) from the Ecoinvent 3.8 database. All Ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN 15804:2012+A2:2019.

ISO14044 guidance. Quality Level	Geographical representativeness	Technical representativeness	Time representativeness
Very Good	Data from area under study.	Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e., identical technology).	There is approximately 1-2 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

Manufacturer country specific datasets have been selected from the Ecoinvent LCI for this LCA. Teknion Malaysia uses national grid electricity and natural gas for production, so therefore for the LCA modelling the location-based electricity dataset has been used for the LCA modelling (Ecoinvent 3.8).
The GWP carbon footprint for using 1 kWh of Electricity, medium voltage {Ma}| market for electricity, medium voltage | EN15804, U', 2014, with an emission factor of 0.840 kgCO2e/kWh.
The GWP carbon footprint for using 1 kWh of Natural gas at industrial furnace (RoW) is 0.256 kgCO2e/kWh.

The quality level of time representativeness is also Very Good as the background LCI datasets are based on Ecoinvent v3.8 which was compiled in 2021. Therefore, there is less than 5 years between the Ecoinvent LCI reference year and the time period for which the LCA was undertaken.

Cut-off criteria

In the manufacturing site, all raw materials and energy inputs to the manufacturing process have been included, except the consumables and direct emissions to air, water, and soil, which are not measured at either manufacturing facility. In Teknion Malaysia LCA inventory process, all data related to raw materials, packaging materials, and consumables are included in the modelling

LCA Results (finishes not included)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Note: For 1 m² of finished panel with a 0.8 mm thickness and a mass of 1.208 kg/m², the total GWP impact is 2.98 kg CO_2e/m². The Teknion receives completed product and no additional processing at the Teknion factory. The dimensions of D1200mm x W2800mm and a weight of 199 kg. The impact of the finishes (HPL) for this table would be an additional 4.29 kgCO_2eq

Parameters describing environmental impacts

			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	4.37E+02	5.45E+02	-1.08E+02	6.28E-01	1.21E-04	3.38E+00	1.92E-01
	Transport	A2	3.64E+00	3.64E+00	9.11E-04	2.41E-03	7.32E-07	5.72E-02	2.65E-04
	Manufacturing	A3	1.53E+01	1.65E+01	-1.24E+00	6.30E-02	1.08E-06	6.59E-02	5.03E-03
	Total (Consumption grid)	A1-3	4.56E+02	5.65E+02	-1.09E+02	6.93E-01	1.23E-04	3.50E+00	1.97E-01
Construction process stage	Transport	A4	3.02E+01	3.02E+01	1.46E-02	1.74E-02	6.46E-06	4.74E-01	1.74E-03
	Construction	A5	8.94E-01	8.94E-01	1.37E-04	2.93E-05	3.35E-08	1.02E-03	6.72E-06
Use stage	Use	B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Maintenance	B2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Repair	B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Replacement	B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Refurbishment	B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational energy use	B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational water use	B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.17E+01	2.16E+01	1.07E-02	1.33E-02	4.40E-06	8.67E-02	2.18E-03
	Waste processing	C3	1.96E+02	1.40E+02	5.59E+01	9.68E-03	2.44E-06	1.25E-01	2.57E-03
	Disposal	C4	6.13E-02	6.09E-02	3.29E-04	6.33E-05	1.48E-08	4.81E-04	1.24E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4.29E+02	-4.50E+02	2.14E+01	-4.76E-01	-1.80E-05	-2.56E+00	-1.62E-01

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
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; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts

			EP-marine	EP-terrestrial	POCP	ADP-mineral& metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	5.48E-01	8.10E+00	2.12E+00	8.07E-03	8.79E+03	2.40E+02	5.50E-05
	Transport	A2	1.43E-02	1.58E-01	4.22E-02	1.49E-05	4.97E+01	2.17E-01	1.84E-07
	Manufacturing	A3	2.00E-02	1.53E-01	4.26E-02	4.41E-05	2.20E+02	5.79E+00	6.46E-07
	Total (Consumption grid)	A1-3	5.82E-01	8.41E+00	2.20E+00	8.13E-03	9.06E+03	2.46E+02	5.58E-05
Construction process stage	Transport	A4	1.20E-01	1.33E+00	3.55E-01	9.81E-05	4.24E+02	1.73E+00	1.71E-06
	Construction	A5	4.31E-04	4.53E-03	1.51E-03	2.37E-07	1.93E+00	1.84E-02	1.98E-08
Use stage	Use	B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Maintenance	B2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Repair	B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Replacement	B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Refurbishment	B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational energy use	B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational water use	B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.32E-02	2.52E-01	7.81E-02	1.28E-04	3.09E+02	1.74E+00	1.38E-06
	Waste processing	C3	5.27E-02	5.42E-01	1.46E-01	2.25E-04	1.46E+02	4.56E+00	2.23E-06
	Disposal	C4	1.45E-04	1.58E-03	4.62E-04	1.37E-07	1.24E+00	5.03E-02	8.54E-09
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4.59E-01	-4.84E+00	-1.64E+00	-7.37E-04	-4.72E+03	-8.62E+01	-3.37E-05

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	2.98E+01	1.39E+04	2.58E-06	1.29E-05	2.45E+03
	Transport	A2	2.26E-01	4.25E+01	2.06E-09	3.50E-08	1.74E+01
	Manufacturing	A3	5.90E-01	2.05E+02	5.89E-09	1.31E-07	1.78E+02
	Total (Consumption grid)	A1-3	3.06E+01	1.41E+04	2.59E-06	1.31E-05	2.64E+03
Construction process stage	Transport	A4	2.13E+00	3.14E+02	1.54E-08	2.82E-07	1.78E+02
	Construction	A5	9.17E-03	3.06E+00	1.70E-10	2.10E-09	3.54E-01
Use stage	Use	B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Maintenance	B2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Repair	B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Replacement	B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Refurbishment	B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational energy use	B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational water use	B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.41E+00	3.11E+02	1.15E-08	2.76E-07	1.50E+02
	Waste processing	C3	1.00E+00	5.07E+02	4.22E-08	4.41E-07	5.23E+01
	Disposal	C4	6.19E-03	5.30E+02	4.33E-11	1.14E-09	2.22E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.20E+01	-1.15E+04	-1.01E-06	-8.89E-06	-2.44E+03

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, primary energy

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	2.16E+03	4.31E+02	2.59E+03	6.90E+03	1.79E+03	8.69E+03
	Transport	A2	1.36E-01	0.00E+00	1.36E-01	1.90E+01	0.00E+00	1.90E+01
	Manufacturing	A3	-8.21E+00	4.95E+01	4.13E+01	1.53E+02	2.98E+01	1.83E+02
	Total (Consumption grid)	A1-3	2.15E+03	4.81E+02	2.63E+03	7.08E+03	1.82E+03	8.89E+03
Construction process stage	Transport	A4	1.07E+00	0.00E+00	1.07E+00	1.56E+02	0.00E+00	1.56E+02
	Construction	A5	-5.45E+01	5.46E+01	8.99E-02	2.40E+00	0.00E+00	2.40E+00
Use stage	Use	B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Maintenance	B2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Repair	B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Replacement	B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Refurbishment	B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational energy use	B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational water use	B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	-4.83E+02	4.87E+02	3.59E+00	1.02E+02	0.00E+00	1.02E+02
	Disposal	C4	3.72E-02	0.00E+00	3.72E-02	1.23E+00	0.00E+00	1.23E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.78E+02	-2.88E+02	-5.66E+02	-4.65E+03	-3.81E+01	-4.69E+03

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	3.97E+01	0.00E+00	0.00E+00	5.89E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	5.36E-03
	Manufacturing	A3	3.82E+00	0.00E+00	0.00E+00	1.38E-01
	Total (Consumption grid)	A1-3	4.35E+01	0.00E+00	0.00E+00	6.04E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	4.28E-02
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	4.39E-04
Use stage	Use	B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Maintenance	B2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Repair	B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Replacement	B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Refurbishment	B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational energy use	B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational water use	B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	4.28E-02
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	1.09E-01
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	1.19E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-2.18E+00

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	7.54E+02	1.51E+04	5.72E-01
	Transport	A2	2.62E-02	2.20E-01	1.76E+00
	Manufacturing	A3	1.00E+00	2.08E+01	2.62E-04
	Total (Consumption grid)	A1-3	7.55E+02	1.51E+04	2.33E+00
Construction process stage	Transport	A4	2.12E-01	1.73E+00	1.10E-03
	Construction	A5	1.05E-02	2.16E-01	1.56E-05
Use stage	Use	B1	0.00E+00	0.00E+00	0.00E+00
	Maintenance	B2	0.00E+00	0.00E+00	0.00E+00
	Repair	B3	0.00E+00	0.00E+00	0.00E+00
	Replacement	B4	0.00E+00	0.00E+00	0.00E+00
	Refurbishment	B5	0.00E+00	0.00E+00	0.00E+00
	Operational energy use	B6	0.00E+00	0.00E+00	0.00E+00
	Operational water use	B7	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	6.31E-01	4.37E+01	6.34E-04
	Disposal	C4	1.38E-02	9.52E-01	6.93E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6.81E+01	-7.60E+02	-9.13E-03

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	1.03E-02	3.80E-02	0.00E+00	-1.74E+00	0.00E+00
	Total (Consumption grid)	A1-3	0.00E+00	1.03E-02	3.80E-02	0.00E+00	-1.74E+00	0.00E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	7.56E+00	1.29E-07	0.00E+00	0.00E+00	1.74E+00
Use stage	Use	B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Maintenance	B2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Repair	B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Replacement	B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Refurbishment	B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational energy use	B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Operational water use	B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.61E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	Products manufactured in Malaysia are distributed both domestically within Malaysia and internationally across the Asia region, Australia, and the Middle East. In the context of the Life Cycle Assessment (LCA), the longest road distance (417km) and longest sea distance (6625km) based on delivery order are considered in the transportation modelling (Malaysia to Australia) to ensure a conservative and comprehensive evaluation of the transportation-related environmental impacts.		
Transport 1	Road transport –16-32 metric ton lorry	km	417
	Fuel consumption	l/km	0.227
	Capacity utilisation (incl. empty returns)	%	26
Transport 2	Water transport – for transoceanic freight ship	km	6,625
	Fuel consumption	g/tkm	2.50
	Capacity utilisation (incl. empty returns)	%	61
A5 – Installation in the building	The product is installed manually using basic hand tools, requiring minimal energy input. Therefore, no product waste is generated during installation, and only packaging waste is produced		
	Installation wastage rate	%	0
	Packaging waste – Cardboard waste to recycling	kg	3.87
	Packaging waste – Plastic waste to incineration	kg	0.33
B1 – Use stage	Once installed, no emission to air, water, and soil throughout the service life of the product.		
B2 – Maintenance	Once installed, the product is ready for use. Throughout its 10-years reference service life, this product requires no maintenance, repair, replacement, refurbishment. This product does not contain components that consume energy during use, therefore, no operational energy and operational water are required		
B3 – Repair			
B4 – Replacement			
B5 – Refurbishment			
B6 - Operational energy use			
B7 - Operational water use			
Reference service life	10 years		
Study period of the LCA	10 years		
Design Application Parameters	Use as indicated in product brochure, user instruction and warranty		

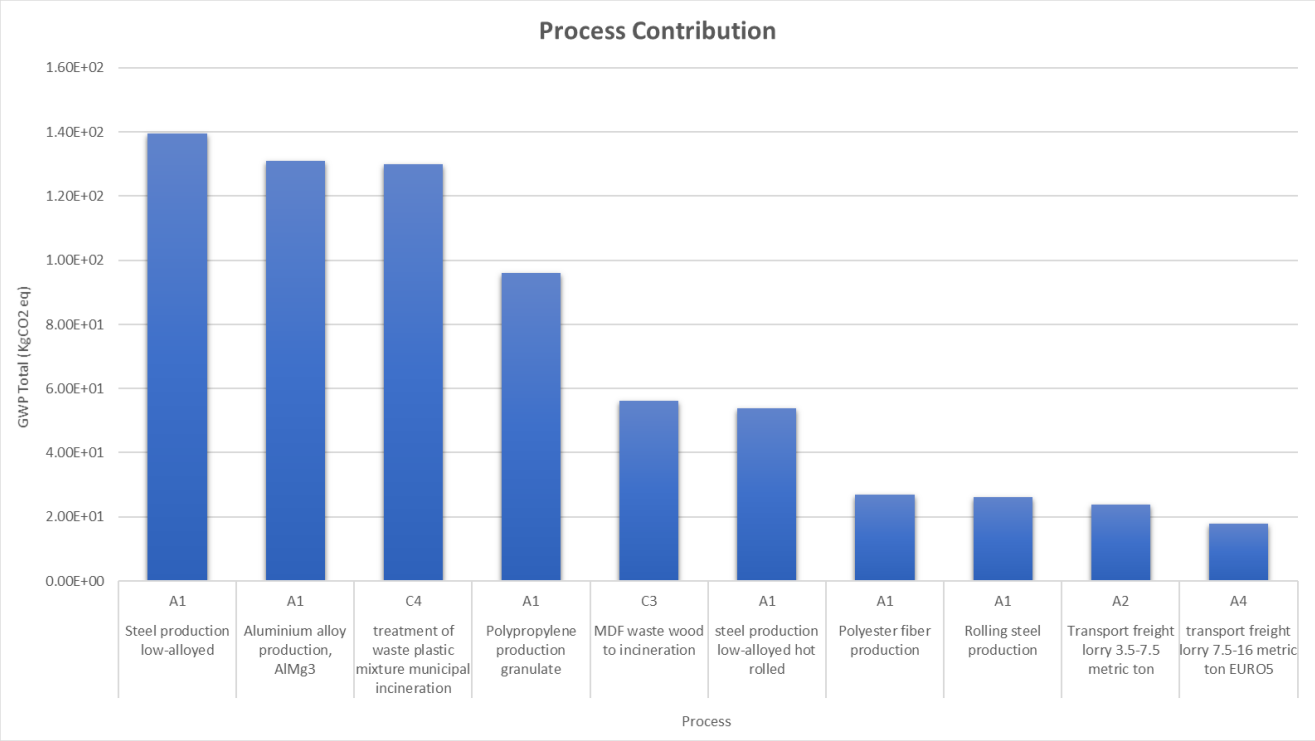
Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C1 – Deconstruction	At the end of the product's life, District is dismantled, and materials are separated. Energy consumption is minimal due to manual dismantling with no involvement of machinery or power. It is assumed that 100% of the waste product is recovered at the demolition site and send to waste processing facility.		
C2 - Transportation	Distance from the dismantling site to a disposal site will be no more than 200km. The transport mode is a 3.5-7.5-ton truck.		
	Road transport by Lorry 3.5 -7.5 metric ton	km	200
C3 – waste processing	This District panel workstation is made up of 45.84% steel, 17.50% MDF, 7.8% aluminium, 24.25% polypropylene, 3.15% polyester fabric and the remaining percentage made up of ABS, POM, Zamak 3, and powder coating. According to the BRE PCR EN15804+A2, the following end of life scenarios will be applied to the materials: • Metal components such as powder coated steel and aluminium, zinc, will be 95% recycled and reused while 5% may end up in landfill. Steel and aluminium recycling will involve a process of collecting and separating from other wastes. The powder coating cannot be separated from the final waste; therefore, it will be recycled along with the product sent to recycling, while the powder coating associated with the 5% of steel and aluminium will be sent to landfill. • 45% of the MDF boards will be incinerated for the energy recovery and 55% will be recycled • Mixed plastic components will be incinerated for energy recovery (e.g. heat, electricity.)		
	Steel waste to recycle (with powder coating) - 95%	kg	99.20
	Aluminium waste to recycling(with powder coating) – 95%	kg	16.23
	Zinc waste to recycling – 95%	kg	0.19
	Plastic waste to incineration – 100%	kg	55.03
	Wood waste to recycling – 55%	kg	19.13
	Wood waste to Incineration - 45%	kg	15.65
C4 – Disposal	Some materials cannot be recovered during waste processing process (C3) and may end up in landfill.		
	Steel waste to landfill (with powder coating) – 5%	kg	5.22
	Aluminium waste to landfill ((with powder coating) – 5%	kg	0.85
	Zinc waste to landfill – 5%	kg	0.01

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
Module D	The District system is made up of post-consumer and virgin materials. When calculating the benefits of recycling steel and aluminium, the pre-existing recycled content has been removed, and the benefits have been calculated only for virgin steel and aluminium. Powder coating quantities are assumed as negligible with the module D calculation The pre-existing recycled content in the Ecoinvent 3.8 Steel dataset is 36.4%; therefore, the benefits have been calculated by excluding the recycled content. That is, the benefits are calculated based solely on the virgin steel content. Benefits due to recycling of virgin steel = 63.08 kg The pre-existing recycled content in the Ecoinvent 3.8 aluminium alloy dataset is 25.9%; therefore, the benefits have been calculated by excluding the recycled content. That is, the benefits are calculated based solely on the virgin aluminium content. Benefits due to recycling of virgin aluminium = 12.02 kg Benefits due to recycling of virgin zinc = 0.13 kg Benefits due to recycling of MDF = 19.13 kg Yield is assumed to be 100% during the recycling process. The incineration benefits have been calculated for waste wood and plastic mixture waste. The incinerated energy and heat will replace the European average mix. Benefits due to incineration of plastic mixture = 55.02 kg Benefits due to incineration of MDF = 15.65 kg		

Interpretation:

The bulk of the environmental impacts and primary energy demand are attributed to the manufacturing phase, covered by information modules A1-A3 of EN15804:2012+A2:2019. The process contribution analysis reveals that the highest carbon emissions are associated with steel, low-alloyed production, treatment of plastic waste, polypropylene production contributes around 64% of the overall emission.

Then followed by treatment of waste wood at the waste processing facility and steel production at A1 contributes 14% and other processes contributes far less to overall emissions. This indicates that the majority impact is coming from raw material processing stage, especially steel and aluminium these are the most critical areas for carbon reduction efforts.



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