Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Architectural Wall Panel

from

Kingspan Insulated Panels

Programme:	EPD Australasia, www.epd-australasia.com
Programme operator:	EPD Australasia
EPD registration number:	S-P-00847
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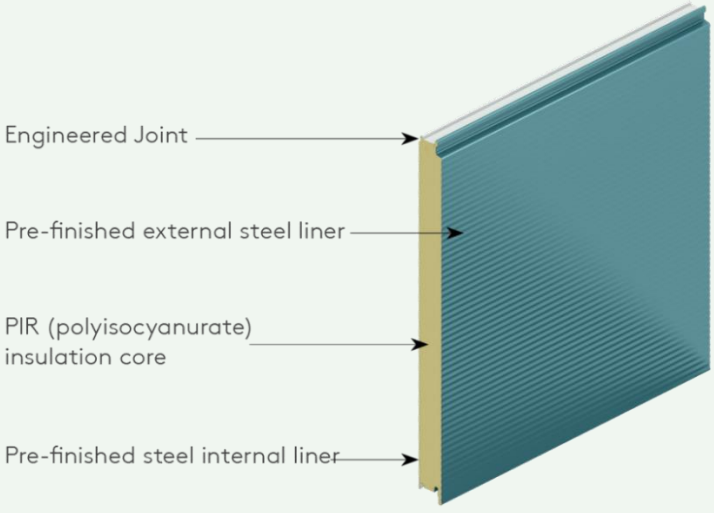
Geographic Scope	Australia, New Zealand and South East Asia

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.epd-australasia.com



General information

Programme information

Programme:	EPD Australasia
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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products (EN 15804:A2) (1.11); UN CPC Code: Structural Metal Products and Parts Thereof (CPC 421, Version 2.1, dated 2015)
PCR review was conducted by: The Technical Committee of the International EPD® System. Moderator: Stefano Rossi, rossi@studiolce.it
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Andrew Moore, Life Cycle Logic *+61 0424 320 057* *andrew@lifecyclelogic.com.au* *PO Box 571 Fremantle WA 6959* *www.lifecyclelogic.com.au* *In case of recognised individual verifiers:* Approved by: EPD Australasia
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

This is a specific EPD.

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

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Table 1 Company Information

	Company Data
Owner of the EPD	Kingspan Insulated Panels Pty Ltd
Production Facility	Kingspan Insulated Panels Pty Ltd 38-52 Dunheved Circuit, St Marys, NSW 2760, Australia
Contact Person	Andrew McCreanor, Technical Manager
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Product information

Table 2 Product Information

Product Characteristics			
Products	**Panel Nominal Thickness (mm)**	**Product R-Value (m^2K/W) at 23°C[1]** (National Construction Code, Australia)	**Product R-Value (m^2K/W) at 15°C** (New Zealand Building Code)
	50mm	2.24	2.34
	80mm	3.68	3.84
	100mm	4.61	4.82
	140mm	6.47	6.76
Application Area	Insulated wall panel systems		
Principal Geographical Sale Areas	Australia, New Zealand and South East Asia		
Thickness of each component	Metallic coated steel liners with 50, 80, 100 or 140mm insulation foam		
Weight percentage of each single component [%]	See *Table 5 Material Content* for the technical specifications		
Compressive Strength	Varies depending on finish		
Reaction to Fire	Varies depending on finish		

Product description[2]:

This secret-fix wall panel system offers unprecedented freedom of design and performance. The four distinct profiles (Mini-Micro, Micro-Rib, Plank and Wave) allow you to look beyond traditional insulated panels to create buildings with more inspiring façades.

Advantages of the Kingspan Architectural Wall Panelinclude:

- High performance PIR insulated panel system
- CodeMark™-approved
- Ecospecifier global green tag certified to GreenRate Level A
- Available in four distinct profiles (Mini-Micro, Micro-Rib, Plank and Wave) and 1000mm, 900mm and 600mm cover width

UN CPC code:

CPC 421

ANZSIC Code:

2090

[1] Product R-Value are calculated in accordance with AS/NZS 4859.1:2018 as required for compliance to the National Construction Code and the NZBC

[2] The KS1000RW Trapezoidal Wall Panel has been removed from the previous version as is now covered in its own EPD – SP05482

LCA information

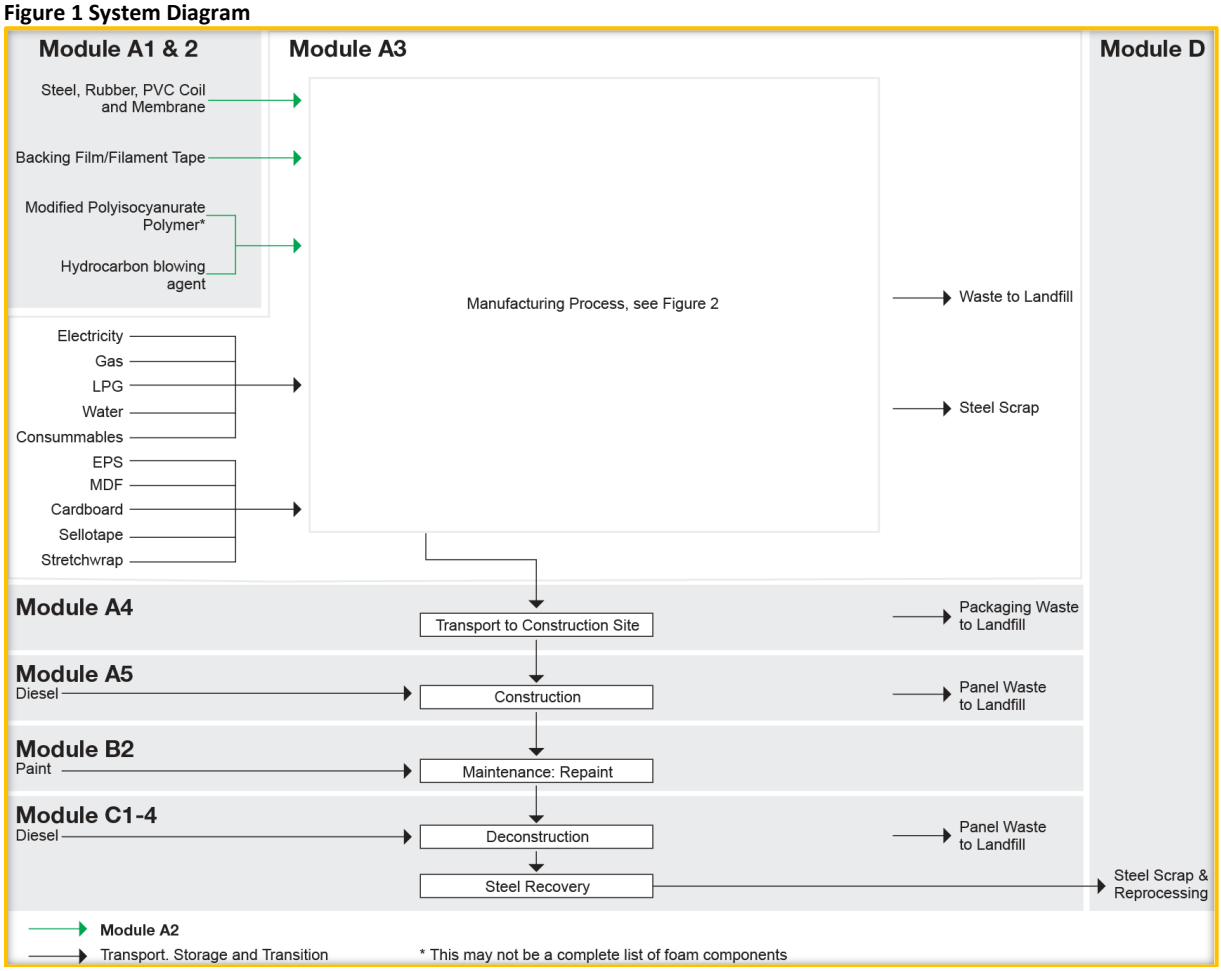
Kingspan's LCA calculates the environmental footprint at each stage of the supply chain, manufacturing processes, product use and end of life. All the significant environmental impacts associated with the product, including the impact on water, air, land and climate change are reported based on international ISO LCA standards.

This product declaration is based on the report "Kingspan Insulated Panels Cradle to Grave LCA January 2022" by Edge Environment Pty Ltd and verified by Andrew Moore with Life Cycle Logic.

Table 3 Product Characteristics

Product Characteristics	
Declared Unit	1m^2 of panel
System Boundary	The scope of this LCA is cradle to gate with options, modules C1-C4, and module D (A1-A3+A4+A5+B2+C+D).
Reference Service Life (RSL)	40 years assuming use in climatic conditions typical for Australia, New Zealand and South East Asia. This figure is for modelling purposes, and in general the product is expected to last the life of the building it is installed on.
Geographical Coverage	Australia, New Zealand and South East Asia
Time Period	Foreground was provided first-hand by Kingspan for CY20 (2020-01-01 to 2020-12-31)
Databases used	Australian Life Cycle Inventory (AusLCI) v1.31, Ecoinvent v3.6 (all background data is less than 10 years old)
Software	SimaPro (v9.1.1.1)

Figure 1 System Diagram



More information:

Kingspan Insulated Panels have a number of quality and environmental management systems in place, including:

- Kingspan's insulated panel systems manufactured in St Mary's, NSW are quality approved to
  - **ISO 9001: 2015** (Quality Management System)
  - **ISO 14001:2015** (Effective Environmental Management System)
  - **ISO 45001:2018** (Occupational Health & Safety Management System)
- Regular sustainability reporting to the building market and all stakeholders. The 2017 Sustainability Report complies with the Global Reporting Index (GRI) reporting framework to level C, and covers the Kingspan Insulated Panels Division Head Office and manufacturing site at Holywell in the UK, as well as its insulated panel manufacturing sites at Sherburn in the UK, Kingscourt in Ireland, and Sydney, Australia.

Modules declared, share of specific data (in GWP-GHG indicator) and data variation:

The life cycle of a building product is divided into three process modules according to the General Program Instructions (GPI) and four information modules according to ISO 21930 and EN 15804 and supplemented by an optional information module on potential loads and benefits beyond the building life cycle, as given in Table 4. The geographical scope of the data is Australia and New Zealand.

Table 4: The life cycle of a building product

GPI Module	**Asset life cycle stage**		**Reported** (X = included in the EPD, "not relevant", shall not be regarded as an indicator result of zero),	**Geography**	**Specific Data**	**Variation - Products**	**Variation - sites**
Upstream	A1	Raw material supply	X	AU		<10%	Not applicable
Core	A2	Transport	X	AU	>90%	-	
	A3	Manufacturing	X	AU		-	
Downstream	A4	Transport	X	AU/NZ	>90%	-	
	A5	Construction, installation process	X	AU/NZ	-	-	
	B1	Material emissions from usage	ND		-	-	
	B2	Maintenance	X	AU/NZ	-	-	
	B3	Repair	ND		-	-	
	B4	Replacement	ND		-	-	
	B5	Refurbishment	ND		-	-	
	C1	Deconstruction and demolition	X	AU/NZ	-	-	
	C2	Transport	X	AU/NZ	-	-	
	C3	Waste processing	X	AU/NZ	-	-	
	C4	Disposal	X	AU/NZ	-	-	
Other environmental information	D	Reuse, recycle or recovery	X	AU/NZ	-	-	

ND = not declared

The scenarios included are currently in use and are representative for one of the most likely scenario alternatives. The following life cycle stages are deemed not applicable for Kingspan panels: Material emissions from usage (B1); Repair (B3); Replacement (B4); and Refurbishment (B5) over the stated RSL.

Content information

Table 5 Material Content

Material	Units	Percentage Content				CAS No.
		50mm	80mm	100mm	140mm	
Steel Sheets						
Steel Coil	kg	73%	66%	62%	56%	12597-69-2
Zinc/Aluminium/Magnesium coating	M^2	-	-	-	-	7429-90-5, 7440-21-3, 7440-66-6
Polyester Paint 25um (incl. primer)	M^2	-	-	-	-	Varies
Backing Film / Filament tape	kg	10%	9%	8%	8%	-
Insulation Foam						
PIR Insulation foam (total)	kg	17%	25%	29%	36%	
- Modified Polyisocyanurate Polymer		*12-17%*	*20-25%*	*24-29%*	*31-36%*	-
- Hydrocarbon blowing agent		*0-2%*	*0-2%*	*0-2%*	*0-2%*	
- (This may not be a complete list of foam components)		-	-	-	-	
Packaging						
Polystyrene	kg	0.33%	0.30%	0.28%	0.25%	9003-53-6
MDF (Medium-density fibreboard)	m^3	-	-	-	-	-
Cardboard	kg	0.08%	0.07%	0.07%	0.06%	-
Stretchwrap (Ethylene / Polybutene)	kg	0.08%	0.07%	0.07%	0.06%	26211-73-8, 9003-29-6

None of the products contain one or more substances that are listed in the “Candidate List of Substances of Very High Concern for authorisation”. According to the PCR 2019:14, if one or more substances of the “Candidate List of Substances of Very High Concern (SVHC) for authorisation” are present in a product and their total content exceeds 0.1% of the weight of the product, they need to be reported.

Raw Materials, Packaging, and Transportation from Supplier (Module A1 and A2)

The panels are produced using the following materials for which generic background data was used:

- backing film/filament tape made of HDPE attached to the steel sheet;
- insulation foam formed from MDI, polyol, catalysts and pentane; and
- typical packaging made up from EPS, MDF, cardboard, stretch wrap and small amounts of sellotape (assumed negligible).

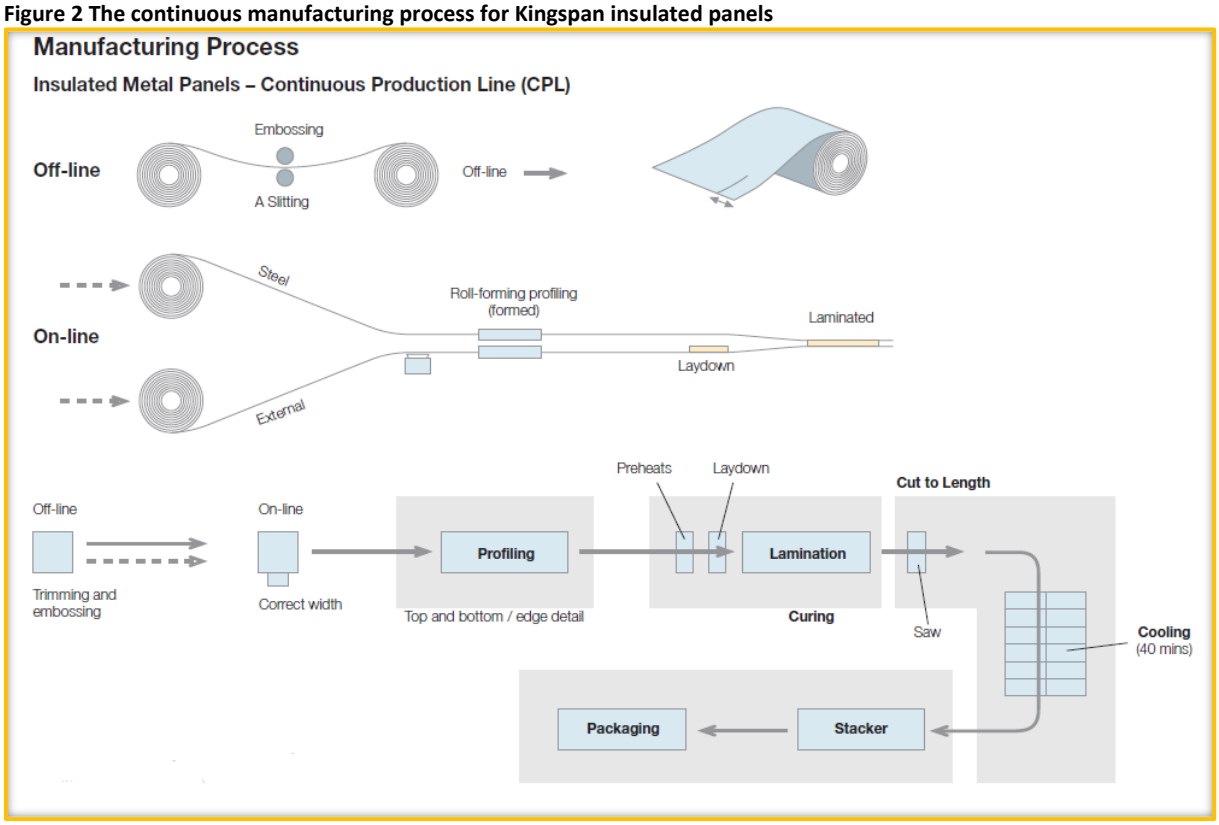
Data for the steel coil was provided by supplier, Bluescope.

The electricity generation mix for NSW used, from the AusLCI database, includes: 84% black coal, 4.4% hydro-electric, 3.7% PV, 3.4% natural gas, 2.7% wind power, 0.6% bagass (sugarcane), and 0.5% biogas.

Panel Manufacturing (Module A3)

Kingspan's panel manufacturing facility is illustrated in Figure 2 below. The main inputs, besides raw materials and packaging, are electricity (1.51kWh/m^2) and natural gas (0.72MJ/m^2)). The electricity mix used during product manufacturing was assumed to be the average for NSW. Manufacturing energy and water consumption is, according to Kingspan, proportional to the area of panels produced, rather than the individual thickness of the panels. Therefore, the calculated energy and water consumption is the same for all panels per m^2 produced.

Figure 2 The continuous manufacturing process for Kingspan insulated panels



Transport (Module A4)

Within the Australian market, panel distribution by truck, rail and sea freight from Kingspan's gate is calculated based on national annual sales volumes by state and conservative average transport distance assumptions.

For New Zealand and South East Asia distribution the assessment includes inbound sea freight and regional road distribution.

Installation (Module A5) and Deconstruction (Module C1)

Diesel fuel consumption for machinery used during construction and deconstruction has been included in the assessment. Construction waste from damaged panels is accounted for by assuming 1% wastage i.e. the production of 1.01m^2 of panels produced and delivered to site for each square metre of panel installed in the building. This is likely a conservative estimate for the average Kingspan panel construction project.

Maintenance (Module B2)

The exterior facing (top) panel side is assumed to be re-painted once over the 40-year life of the panel.

Disposal / Reuse / Recycling (Module C2-C4)

Kingspan has limited empirical evidence of what the end-of-life fate is for their panels. Based on anecdotal evidence, the panels are either deconstructed and transported for reuse in a second building or diverted for material recovery and disposal. With the large degree of uncertainty of the panels' end of life fate, the cradle to grave environmental profile is calculated based on the most conservative scenarios where the majority of used panels are deconstructed and transported to material recovery facilities, where the steel is recovered and returned into the recycling stream, and the insulation foam is diverted to landfill. Approximately 6% of the panels are assumed to be disposed in landfill with no immediate material recovery.

Reuse is always the preferred option for panels, and features of the panel system such as the ability to be removed off the building at end of life facilitate this aspect. Where this is not possible or practical, the steel is stripped from the panels and fully recycled. Economics for specific buildings will depend on transport distances and the prevailing price of scrap steel.

Steel is a major component of Kingspan's insulated panels. Kingspan's ongoing work with environmental consultants on environmental profiles means that it continues to identify environmental impacts in its supply chain. It is using this to identify priorities for engagement with key suppliers to find ways to reduce these impacts.

Other Environmental Information

Benefits and loads beyond the system boundary (Module D)

Product Category Rules for construction products state that the information in module D may contain technical information as well as LCA results from post-consumer recycling, i.e. environmental benefits or loads resulting from reusable products, recyclable materials and/or useful energy carriers leaving a product system (e.g., as secondary materials or fuels). The net flow of post-consumer recycled materials is limited to panel steel scrap after use. The net benefit has been calculated in accordance with the specific guidance by Leroy et al (2014).

Cut-off rules

It is common practice in LCA/LCI protocols to propose exclusion limits for inputs and outputs that fall below a threshold % of the total, but with the exception that where the input/output has a "significant" impact it should be included. According to the PCR 2019:14, the Life Cycle Inventory data for a minimum of 95% of total inflows (mass and energy) per module to the upstream and core module shall be included, accounted as global warming potential (GWP) or energy consumption. Inflows not included in the LCA shall be documented in the EPD. Data gaps in included stages in the down stream module shall be reported in the EPD, including an evaluation of their significance.

In accordance with the PCR 2019:14, the following system boundaries on manufacturing equipment and employees are excluded:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI. Capital equipment and buildings typically account for less than a few percent of nearly all LCIs and this is usually smaller than the error in the inventory data itself. For this project, it is assumed that capital equipment makes a negligible contribution to the impacts as per Frischknecht et al with no further investigation.
- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. For this project, the impacts of employees are excluded.

Allocation

According to EN 15804 A2:2019, in a process step where more than one type of product is generated, it is necessary to allocate the environmental stressors (inputs and outputs) from the process to the different products (functional outputs) in order to get product-based inventory data instead of process-based data. An allocation problem also occurs for multi-input processes.

In an allocation procedure, the sum of the allocated inputs and outputs to the products shall be equal to the unallocated inputs and outputs of the unit process.

The following stepwise allocation principles has been applied for multi-input/output allocations:

- The initial allocation step includes dividing up the system sub-processes and collecting the input and output data related to these sub-processes.
- The first (preferably) allocation procedure step for each sub-process is to partition the inputs and outputs of the system into their different products in a way that reflects the underlying physical relationships between them.
- The second (worst case) allocation procedure step is needed when physical relationship alone cannot be established or used as the basis for allocation. In this case, the remaining environmental inputs and outputs from a sub-process must be allocated between the products in a way that reflects other relationships between them, such as the economic value of the products.

Manufacturing energy and water consumption is, according to Kingspan, proportional to the area of panels produced, rather than the individual thickness of the panels. Therefore, the calculated energy and water consumption is the same for all panels per m2 produced.

Data Quality and Validation

The primary data used for the study (core module) is based on direct utility bills or feedstock quantities from Kingspan's procurement records. Edge used contribution analysis to focus on the key pieces of data contributing to the environmental impact categories. The data was benchmarked against relevant benchmark data in Ecoinvent. Edge considers the data to be of high quality for the core module.

Compliance with Standards

The methodology and report format has been modified to comply with:

- ISO 14040:2006 and ISO14044:2006+A1:2018 which describe the principles, framework, requirements and provides guidelines for life cycle assessment (LCA) (ISO, 2006; ISO, 2018).
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations -- Principles and procedures, which establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations (ISO, 2006).
- EN 15804+A2:2019: Sustainability of construction works – Environmental product declarations - Core rules for the product category of construction products (here after referred to as EN15804+A2).
- Product Category Rules (PCR) 2019:14, v1.1 – Construction products – Hereafter referred to as PCR 2019:14.
- General Programme Instructions (GPI) for the International EPD System V3.01 – containing instructions regarding methodology and the content that must be included in EPDs registered under the International EPD System.
- Instructions of EPD Australasia V3.0 – a regional annex to the general programme instructions of the International EPD System.

Key Assumptions and Considerations

Assumption or limitation	Impact on LCA results	Discussion
Insulation foam ingredient composition.	Minor (<10%)	The insulation composition has been used in the LCA background report but has been removed from this EPD for confidentiality.
Panel distribution	Minor (<12%)	Transportation assumptions are based on the average transportation distance from the port of each country. Transport distances are taken from Google Maps[3] and Sea Distances[4]
Construction energy	Minor	Direct construction energy use is based on conservative estimates, still not significant to the overall results.
Exclusion of employees, capital good and infrastructure	Low	Personnel-related impacts, such as transportation to and from work, are not accounted for in the LCI
Recycling of panels, esp. steel, after use.	Medium/high	Few panels are believed to be discarded or disposed into landfill after use. The assumption of 6% of panels being disposed of in landfill is based on assumptions developed with Kingspan's industry expertise and experience in their European market, as direct data for Australia was not available at the time of reporting. The recycling rate has impact on Module D avoided production calculations.
Maintenance during use	Low	The panels are assumed to be repainted once over 40 years of use. This is considered a conservative estimate.

[3] https://www.google.com/maps

[4] https://sea-distances.org/

Environmental Performance

The potential environmental impacts, use of resources and waste categories included in this EPD were calculated using the SimaPro v9.1.1.1 tool and are listed in Table 5. All tables from this point will contain the abbreviation only. The LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds and safety margins or risks.

Table 6: Life Cycle Impact, Resource and Waste Assessment Categories, Measurements and Methods

Impact Category	Abbreviation	Measurement Unit	Assessment Method and Implementation
Potential Environmental Impacts			
Global warming potential (fossil)	GWPF	kg CO2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Global warming potential (biogenic)	GWPB	kg CO2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Land use/ land transformation	GWPL	kg CO2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Total global warming potential	GWPT	kg CO2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Acidification potential	AP	mol H+ eq.	Accumulated Exceedance, Seppälä et al. 2006, Posch et al., 2008
Eutrophication – aquatic freshwater	EP - freshwater	kg PO43- equivalents	CML (v4.1)
Eutrophication – aquatic freshwater	EP - freshwater	kg P equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe[5]
Eutrophication – aquatic marine	EP - marine	kg N equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication – terrestrial	EP – terrestrial	mol N equivalent	Accumulated Exceedance, Seppälä et al. 2006, Posch et al.
Photochemical ozone creation potential	POCP	kg NMVOC equivalents	LOTOS-EUROS, Van Zelm et al., 2008, as applied in ReCiPe
Abiotic depletion potential (elements)*	ADPE	kg Sb equivalents	CML (v4.1)
Abiotic depletion potential (fossil fuels)*	ADPF	MJ net calorific value	CML (v4.1)
Ozone depletion potential	ODP	kg CFC 11 equivalents	Steady-state ODPs, WMO 2014
Water Depletion Potential*	WDP	m3 equivalent deprived	Available WAter REmaining (AWARE) Boulay et al., 2016
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	kg CO2 equivalents (GWP100)	CML (v4.1)
Resource use			
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value	ecoinvent version 3.6 and expanded by PRé Consultants[6]
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value	Manual for direct inputs[7]

[5] EN 15804:2012+A2:2019 specifies that the unit for the indicator for Eutrophication aquatic freshwater shall be kg PO4 eq, although the reference given ("EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe") uses the unit kg P eq. This is likely a typographical error in EN 15804, which is expected to be corrected in a future revision. Until this has been corrected, results for Eutrophication aquatic freshwater shall be given in both kg PO4 eq and kg P eq. in the EPD.

[6] Method to calculate Cumulative Energy Demand (CED), based on the method published by Ecoinvent version 2.0 and expanded by PRé Consultants for raw materials available in the SimaPro database.

[7] Calculated based on the lower heating value of renewable raw materials.

Impact Category	Abbreviation	Measurement Unit	Assessment Method and Implementation
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value	ecoinvent version 3.6 and expanded by PRé Consultants
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ, net calorific value	Manual for direct inputs[8]
Use of non- renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value	ecoinvent version 3.6 and expanded by PRé Consultants
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value	ecoinvent version 3.6 and expanded by PRé Consultants [9]
Use of secondary material	SM	kg	Manual for direct inputs
Use of renewable secondary fuels	RSF	MJ, net calorific value	Manual for direct inputs
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value	Manual for direct inputs
Use of net fresh water	FW	m3	ReCiPe 2016
Waste categories			
Hazardous waste disposed	HWD	kg	EDIP 2003 (v1.05)
Non-hazardous waste disposed	NHWD	kg	EDIP 2003 (v1.05) [10]
Radioactive waste disposed/stored	RWD	kg	EDIP 2003 (v1.05)
Additional environmental impact indicators			
Particulate matter	Potential incidence of disease due to PM emissions (PM)	Disease incidence	SETAC-UNEP, Fantke et al. 2016
Ionising radiation - human health**	Potential Human exposure efficiency relative to U235 (IRP)	kBq U-235 eq	Human Health Effect model
Eco-toxicity (freshwater)*	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	CTUe	USEtox
Human toxicity potential - cancer effects*	Potential Comparative Toxic Unit for humans (HTP-c)	CTUh	USEtox
Human toxicity potential - non cancer effects*	Potential Comparative Toxic Unit for humans (HTP-nc)	CTUh	USEtox
Soil quality*	Potential soil quality index (SQP)	dimensionless	Soil quality index (LANCA®)

**Disclaimer – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.*

***Disclaimer – 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*

[8] Calculated based on the lower heating value of non-renewable raw materials.

[9] Calculated as sum of *Non-renewable, fossil*, *Non-renewable, nuclear* and *Non-renewable, biomass*.

[10] Calculated as sum of *Bulk waste* and *Slags/ash*.

Environmental information for Architectural Wall Panel, 50mm thick

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	4.02E+01	3.10E+00	7.14E-04	2.89E+00	7.14E-04	9.42E-01	0.00E+00	1.01E-01	-9.10E+00
GWP-biogenic	kg CO_2 eq.	-2.55E-01	2.85E-04	1.99E-07	4.25E-03	1.99E-07	2.23E-05	0.00E+00	1.88E-02	5.52E-02
GWP-luluc	kg CO_2 eq.	1.37E-02	1.80E-05	5.63E-08	6.62E-06	5.63E-08	6.88E-06	0.00E+00	7.36E-07	2.71E-03
GWP-total	kg CO_2 eq.	3.99E+01	3.10E+00	7.15E-04	2.90E+00	7.15E-04	9.42E-01	0.00E+00	1.20E-01	-9.04E+00
ODP	kg CFC 11 eq.	2.03E-06	1.16E-07	1.54E-10	6.74E-08	1.54E-10	3.83E-08	0.00E+00	1.04E-08	-3.42E-07
AP	mol H^+ eq.	1.86E-01	2.26E-02	7.47E-06	1.80E-02	7.47E-06	6.43E-03	0.00E+00	8.17E-04	-3.35E-02
EP-freshwater	kg PO_4^{3-} eq.	3.69E-02	2.63E-03	1.24E-06	2.11E-03	1.24E-06	7.51E-04	0.00E+00	1.00E-04	-1.76E-02
EP-freshwater	kg P eq.	5.08E-03	1.01E-04	2.57E-08	1.30E-04	2.57E-08	3.54E-05	0.00E+00	3.39E-06	-4.42E-03
EP-marine	kg N eq.	4.55E-02	6.24E-03	3.30E-06	4.61E-03	3.30E-06	1.81E-03	0.00E+00	2.48E-04	-8.10E-03
EP-terrestrial	mol N eq.	4.26E-01	6.81E-02	3.62E-05	5.01E-02	3.62E-05	1.98E-02	0.00E+00	2.71E-03	-8.09E-02
POCP	kg NMVOC eq.	1.35E-01	2.07E-02	9.95E-06	1.37E-02	9.95E-06	6.22E-03	0.00E+00	8.01E-04	-5.29E-02
ADP-minerals&metals*	kg Sb eq.	5.40E-04	1.19E-05	1.10E-09	7.98E-07	1.10E-09	4.55E-06	0.00E+00	4.13E-07	-2.63E-05
ADP-fossil*	MJ	5.20E+02	1.44E+01	9.83E-03	3.68E+01	9.83E-03	4.60E+00	0.00E+00	1.01E+00	-7.00E+01
WDP*	m^3	3.56E+01	3.30E+01	1.32E-05	3.20E+01	1.32E-05	9.99E+00	0.00E+00	1.01E+00	-4.29E-01
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									

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[11]	kg CO_2 eq.	3.86E+01	3.04E+00	7.06E-04	2.52E+00	7.06E-04	9.23E-01	0.00E+00	9.89E-02	-8.37E+00

[11] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of resources

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.74E+01	4.85E-01	4.00E-05	3.08E-01	4.00E-05	0.00E+00	0.00E+00	1.26E-02	4.42E-01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.74E+01	4.85E-01	0.00E+00	3.08E-01	4.00E-05	0.00E+00	0.00E+00	1.26E-02	4.42E-01
PENRE	MJ	5.36E+02	1.49E+01	1.04E-02	3.79E+01	1.04E-02	0.00E+00	0.00E+00	1.07E+00	-7.28E+01
PENRM	MJ.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.36E+02	1.49E+01	1.04E-02	3.79E+01	1.04E-02	0.00E+00	0.00E+00	1.07E+00	0.00E+00
SM	kg	8.74E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	2.94E-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	3.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.30E-01	4.87E-03	2.11E-07	3.04E-03	2.11E-07	0.00E+00	0.00E+00	1.79E-04	-1.87E-02
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 production and output flows

Waste production

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.68E-04	4.85E-05	2.68E-08	1.77E-05	2.68E-08	0.00E+00	0.00E+00	2.58E-06	-1.11E-03
Non-hazardous waste disposed	kg	2.09E+00	2.62E-01	1.19E-05	3.78E-02	1.19E-05	0.00E+00	0.00E+00	4.82E+00	-1.18E+00
Radioactive waste disposed	kg	1.81E-03	2.12E-07	6.83E-08	1.01E-05	6.83E-08	0.00E+00	0.00E+00	6.20E-09	-3.95E-05

Additional Environmental Impact Indicators

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
Particulate matter	disease incidence	3.81E-03	1.60E-07	1.98E-10	-4.19E-07	1.98E-10	4.87E-08	0.00E+00	5.05E-09	5.25E-08
Ionising radiation - human health**	kBq U-235 eq	1.17E+00	1.48E-03	4.47E-05	1.80E-01	4.47E-05	4.54E-04	0.00E+00	4.40E-05	4.87E-04
Eco-toxicity (freshwater)*	CTUe	9.23E+02	5.36E+01	5.93E-03	-3.26E+02	5.93E-03	1.61E+01	0.00E+00	1.36E+00	1.72E+01
Human toxicity potential - cancer effects*	CTUh	1.40E-07	1.15E-09	2.07E-13	-2.04E-09	2.07E-13	3.69E-10	0.00E+00	3.05E-11	3.92E-10
Human toxicity potential - non cancer effects*	CTUh	1.39E-06	4.95E-08	5.11E-12	1.76E-06	5.11E-12	1.58E-08	0.00E+00	1.17E-09	1.66E-08
Soil quality*	dimensionless	1.47E+02	1.44E+01	1.25E-03	-2.34E+01	1.25E-03	4.02E+00	1.00E+01	4.51E-01	4.36E+00

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

***Disclaimer – 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*

Environmental information for Architectural Wall Panel, 80mm thick

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	4.66E+01	3.10E+00	7.14E-04	2.89E+00	7.14E-04	9.42E-01	0.00E+00	1.01E-01	-9.10E+00
GWP-biogenic	kg CO_2 eq.	-2.16E-01	2.85E-04	1.99E-07	4.25E-03	1.99E-07	2.23E-05	0.00E+00	1.88E-02	5.52E-02
GWP-luluc	kg CO_2 eq.	2.03E-02	1.80E-05	5.63E-08	6.62E-06	5.63E-08	6.88E-06	0.00E+00	7.36E-07	2.71E-03
GWP-total	kg CO_2 eq.	4.64E+01	3.10E+00	7.15E-04	2.90E+00	7.15E-04	9.42E-01	0.00E+00	1.20E-01	-9.04E+00
ODP	kg CFC 11 eq.	3.27E-06	1.16E-07	1.54E-10	6.74E-08	1.54E-10	3.83E-08	0.00E+00	1.04E-08	-3.42E-07
AP	mol H^+ eq.	2.29E-01	2.26E-02	7.47E-06	1.80E-02	7.47E-06	6.43E-03	0.00E+00	8.17E-04	-3.35E-02
EP-freshwater	kg PO_4^{3-} eq.	5.45E-02	2.63E-03	1.24E-06	2.11E-03	1.24E-06	7.51E-04	0.00E+00	1.00E-04	-1.76E-02
EP-freshwater	kg P eq.	8.16E-03	1.01E-04	2.57E-08	1.30E-04	2.57E-08	3.54E-05	0.00E+00	3.39E-06	-4.42E-03
EP-marine	kg N eq.	5.74E-02	6.24E-03	3.30E-06	4.61E-03	3.30E-06	1.81E-03	0.00E+00	2.48E-04	-8.10E-03
EP-terrestrial	mol N eq.	5.08E-01	6.81E-02	3.62E-05	5.01E-02	3.62E-05	1.98E-02	0.00E+00	2.71E-03	-8.09E-02
POCP	kg NMVOC eq.	1.63E-01	2.07E-02	9.95E-06	1.37E-02	9.95E-06	6.22E-03	0.00E+00	8.01E-04	-5.29E-02
ADP-minerals&metals*	kg Sb eq.	8.29E-04	1.19E-05	1.10E-09	7.98E-07	1.10E-09	4.55E-06	0.00E+00	4.13E-07	-2.63E-05
ADP-fossil*	MJ	6.35E+02	1.44E+01	9.83E-03	3.68E+01	9.83E-03	4.60E+00	0.00E+00	1.01E+00	-7.00E+01
WDP*	m^3	4.19E+01	3.30E+01	1.32E-05	3.20E+01	1.32E-05	9.99E+00	0.00E+00	1.01E+00	-4.29E-01
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									

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[12]	kg CO_2 eq.	4.47E+01	3.04E+00	7.06E-04	2.52E+00	7.06E-04	9.23E-01	0.00E+00	9.89E-02	-8.37E+00

[12] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of resources

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3.37E+01	4.85E-01	4.00E-05	3.08E-01	4.00E-05	0.00E+00	0.00E+00	1.26E-02	4.42E-01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.37E+01	4.85E-01	0.00E+00	3.08E-01	4.00E-05	0.00E+00	0.00E+00	1.26E-02	4.42E-01
PENRE	MJ	6.61E+02	1.49E+01	1.04E-02	3.79E+01	1.04E-02	0.00E+00	0.00E+00	1.07E+00	-7.28E+01
PENRM	MJ.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	6.61E+02	1.49E+01	1.04E-02	3.79E+01	1.04E-02	0.00E+00	0.00E+00	1.07E+00	0.00E+00
SM	kg	8.14E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	2.94E-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	3.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.17E-01	4.87E-03	2.11E-07	3.04E-03	2.11E-07	0.00E+00	0.00E+00	1.79E-04	-1.87E-02
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 production and output flows

Waste production

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2.66E-04	4.85E-05	2.68E-08	1.77E-05	2.68E-08	0.00E+00	0.00E+00	2.58E-06	-1.11E-03
Non-hazardous waste disposed	kg	2.77E+00	2.62E-01	1.19E-05	3.78E-02	1.19E-05	0.00E+00	0.00E+00	4.82E+00	-1.18E+00
Radioactive waste disposed	kg	2.02E-03	2.12E-07	6.83E-08	1.01E-05	6.83E-08	0.00E+00	0.00E+00	6.20E-09	-3.95E-05

Additional Environmental Impact Indicators

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
Particulate matter	disease incidence	2.87E-06	1.60E-07	1.98E-10	-4.19E-07	1.98E-10	4.87E-08	0.00E+00	5.05E-09	5.25E-08
Ionising radiation - human health**	kBq U-235 eq	1.71E+00	1.48E-03	4.47E-05	1.80E-01	4.47E-05	4.54E-04	0.00E+00	4.40E-05	4.87E-04
Eco-toxicity (freshwater)*	CTUe	1.46E+03	5.36E+01	5.93E-03	-3.26E+02	5.93E-03	1.61E+01	0.00E+00	1.36E+00	1.72E+01
Human toxicity potential - cancer effects*	CTUh	2.25E-07	1.15E-09	2.07E-13	-2.04E-09	2.07E-13	3.69E-10	0.00E+00	3.05E-11	3.92E-10
Human toxicity potential - non cancer effects*	CTUh	2.24E-06	4.95E-08	5.11E-12	1.76E-06	5.11E-12	1.58E-08	0.00E+00	1.17E-09	1.66E-08
Soil quality*	dimensionless	2.31E+02	1.44E+01	1.25E-03	-2.34E+01	1.25E-03	4.02E+00	1.00E+01	4.51E-01	4.36E+00

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***Disclaimer – 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*

Environmental information for Architectural Wall Panel, 100mm thick

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	5.32E+01	3.10E+00	7.14E-04	2.89E+00	7.14E-04	9.42E-01	0.00E+00	1.01E-01	-9.10E+00
GWP-biogenic	kg CO_2 eq.	-1.93E-01	2.85E-04	1.99E-07	4.25E-03	1.99E-07	2.23E-05	0.00E+00	1.88E-02	5.52E-02
GWP-luluc	kg CO_2 eq.	2.47E-02	1.80E-05	5.63E-08	6.62E-06	5.63E-08	6.88E-06	0.00E+00	7.36E-07	2.71E-03
GWP-total	kg CO_2 eq.	5.31E+01	3.10E+00	7.15E-04	2.90E+00	7.15E-04	9.42E-01	0.00E+00	1.20E-01	-9.04E+00
ODP	kg CFC 11 eq.	4.05E-06	1.16E-07	1.54E-10	6.74E-08	1.54E-10	3.83E-08	0.00E+00	1.04E-08	-3.42E-07
AP	mol H^+ eq.	2.65E-01	2.26E-02	7.47E-06	1.80E-02	7.47E-06	6.43E-03	0.00E+00	8.17E-04	-3.35E-02
EP-freshwater	kg PO_4^{3-} eq.	6.42E-02	2.63E-03	1.24E-06	2.11E-03	1.24E-06	7.51E-04	0.00E+00	1.00E-04	-1.76E-02
EP-freshwater	kg P eq.	1.01E-02	1.01E-04	2.57E-08	1.30E-04	2.57E-08	3.54E-05	0.00E+00	3.39E-06	-4.42E-03
EP-marine	kg N eq.	6.70E-02	6.24E-03	3.30E-06	4.61E-03	3.30E-06	1.81E-03	0.00E+00	2.48E-04	-8.10E-03
EP-terrestrial	mol N eq.	5.85E-01	6.81E-02	3.62E-05	5.01E-02	3.62E-05	1.98E-02	0.00E+00	2.71E-03	-8.09E-02
POCP	kg NMVOC eq.	1.89E-01	2.07E-02	9.95E-06	1.37E-02	9.95E-06	6.22E-03	0.00E+00	8.01E-04	-5.29E-02
ADP-minerals&metals*	kg Sb eq.	1.02E-03	1.19E-05	1.10E-09	7.98E-07	1.10E-09	4.55E-06	0.00E+00	4.13E-07	-2.63E-05
ADP-fossil*	MJ	7.36E+02	1.44E+01	9.83E-03	3.68E+01	9.83E-03	4.60E+00	0.00E+00	1.01E+00	-7.00E+01
WDP*	m^3	4.61E+01	3.30E+01	1.32E-05	3.20E+01	1.32E-05	9.99E+00	0.00E+00	1.01E+00	-4.29E-01
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									

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[13]	kg CO_2 eq.	5.11E+01	3.04E+00	7.06E-04	2.52E+00	7.06E-04	9.23E-01	0.00E+00	9.89E-02	-8.37E+00

[13] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of resources

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3.86E+01	4.85E-01	4.00E-05	3.08E-01	4.00E-05	0.00E+00	0.00E+00	1.26E-02	4.42E-01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.86E+01	4.85E-01	0.00E+00	3.08E-01	4.00E-05	0.00E+00	0.00E+00	1.26E-02	4.42E-01
PENRE	MJ	7.68E+02	1.49E+01	1.04E-02	3.79E+01	1.04E-02	0.00E+00	0.00E+00	1.07E+00	-7.28E+01
PENRM	MJ.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	7.68E+02	1.49E+01	1.04E-02	3.79E+01	1.04E-02	0.00E+00	0.00E+00	1.07E+00	0.00E+00
SM	kg	8.74E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	2.94E-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	3.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.43E-01	4.87E-03	2.11E-07	3.04E-03	2.11E-07	0.00E+00	0.00E+00	1.79E-04	-1.87E-02
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 production and output flows

Waste production

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	3.27E-04	4.85E-05	2.68E-08	1.77E-05	2.68E-08	0.00E+00	0.00E+00	2.58E-06	-1.11E-03
Non-hazardous waste disposed	kg	3.22E+00	2.62E-01	1.19E-05	3.78E-02	1.19E-05	0.00E+00	0.00E+00	4.82E+00	-1.18E+00
Radioactive waste disposed	kg	2.19E-03	2.12E-07	6.83E-08	1.01E-05	6.83E-08	0.00E+00	0.00E+00	6.20E-09	-3.95E-05

Additional Environmental Impact Indicators

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
Particulate matter	disease incidence	3.81E-03	1.60E-07	1.98E-10	-4.19E-07	1.98E-10	4.87E-08	0.00E+00	5.05E-09	5.25E-08
Ionising radiation - human health**	kBq U-235 eq	2.06E+00	1.48E-03	4.47E-05	1.80E-01	4.47E-05	4.54E-04	0.00E+00	4.40E-05	4.87E-04
Eco-toxicity (freshwater)*	CTUe	1.79E+03	5.36E+01	5.93E-03	-3.26E+02	5.93E-03	1.61E+01	0.00E+00	1.36E+00	1.72E+01
Human toxicity potential - cancer effects*	CTUh	2.79E-07	1.15E-09	2.07E-13	-2.04E-09	2.07E-13	3.69E-10	0.00E+00	3.05E-11	3.92E-10
Human toxicity potential - non cancer effects*	CTUh	2.77E-06	4.95E-08	5.11E-12	1.76E-06	5.11E-12	1.58E-08	0.00E+00	1.17E-09	1.66E-08
Soil quality*	dimensionless	2.83E+02	1.44E+01	1.25E-03	-2.34E+01	1.25E-03	4.02E+00	1.00E+01	4.51E-01	4.36E+00

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

***Disclaimer – 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*

Environmental information for Architectural Wall Panell, 140mm thick

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	6.37E+01	3.10E+00	7.14E-04	2.89E+00	7.14E-04	9.42E-01	0.00E+00	1.01E-01	-9.10E+00
GWP-biogenic	kg CO_2 eq.	-1.43E-01	2.85E-04	1.99E-07	4.25E-03	1.99E-07	2.23E-05	0.00E+00	1.88E-02	5.52E-02
GWP-luluc	kg CO_2 eq.	3.35E-02	1.80E-05	5.63E-08	6.62E-06	5.63E-08	6.88E-06	0.00E+00	7.36E-07	2.71E-03
GWP-total	kg CO_2 eq.	6.36E+01	3.10E+00	7.15E-04	2.90E+00	7.15E-04	9.42E-01	0.00E+00	1.20E-01	-9.04E+00
ODP	kg CFC 11 eq.	5.66E-06	1.16E-07	1.54E-10	6.74E-08	1.54E-10	3.83E-08	0.00E+00	1.04E-08	-3.42E-07
AP	mol H^+ eq.	3.28E-01	2.26E-02	7.47E-06	1.80E-02	7.47E-06	6.43E-03	0.00E+00	8.17E-04	-3.35E-02
EP-freshwater	kg PO_4^{3-} eq.	8.61E-02	2.63E-03	1.24E-06	2.11E-03	1.24E-06	7.51E-04	0.00E+00	1.00E-04	-1.76E-02
EP-freshwater	kg P eq.	1.41E-02	1.01E-04	2.57E-08	1.30E-04	2.57E-08	3.54E-05	0.00E+00	3.39E-06	-4.42E-03
EP-marine	kg N eq.	8.42E-02	6.24E-03	3.30E-06	4.61E-03	3.30E-06	1.81E-03	0.00E+00	2.48E-04	-8.10E-03
EP-terrestrial	mol N eq.	7.12E-01	6.81E-02	3.62E-05	5.01E-02	3.62E-05	1.98E-02	0.00E+00	2.71E-03	-8.09E-02
POCP	kg NMVOC eq.	2.32E-01	2.07E-02	9.95E-06	1.37E-02	9.95E-06	6.22E-03	0.00E+00	8.01E-04	-5.29E-02
ADP-minerals&metals*	kg Sb eq.	1.40E-03	1.19E-05	1.10E-09	7.98E-07	1.10E-09	4.55E-06	0.00E+00	4.13E-07	-2.63E-05
ADP-fossil*	MJ	9.09E+02	1.44E+01	9.83E-03	3.68E+01	9.83E-03	4.60E+00	0.00E+00	1.01E+00	-7.00E+01
WDP*	m^3	5.46E+01	3.30E+01	1.32E-05	3.20E+01	1.32E-05	9.99E+00	0.00E+00	1.01E+00	-4.29E-01
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									

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[14]	kg CO_2 eq.	6.10E+01	3.04E+00	7.06E-04	2.52E+00	7.06E-04	9.23E-01	0.00E+00	9.89E-02	-8.37E+00

[14] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of resources

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	4.75E+01	4.85E-01	4.00E-05	3.08E-01	4.00E-05	0.00E+00	0.00E+00	1.26E-02	4.42E-01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	4.75E+01	4.85E-01	0.00E+00	3.08E-01	4.00E-05	0.00E+00	0.00E+00	1.26E-02	4.42E-01
PENRE	MJ	9.53E+02	1.49E+01	1.04E-02	3.79E+01	1.04E-02	0.00E+00	0.00E+00	1.07E+00	-7.28E+01
PENRM	MJ.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	9.53E+02	1.49E+01	1.04E-02	3.79E+01	1.04E-02	0.00E+00	0.00E+00	1.07E+00	0.00E+00
SM	kg	8.74E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	2.94E-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	3.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	3.34E-01	4.87E-03	2.11E-07	3.04E-03	2.11E-07	0.00E+00	0.00E+00	1.79E-04	-1.87E-02
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 production and output flows

Waste production

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	4.53E-04	4.85E-05	2.68E-08	1.77E-05	2.68E-08	0.00E+00	0.00E+00	2.58E-06	-1.11E-03
Non-hazardous waste disposed	kg	4.12E+00	2.62E-01	1.19E-05	3.78E-02	1.19E-05	0.00E+00	0.00E+00	4.82E+00	-1.18E+00
Radioactive waste disposed	kg	2.50E-03	2.12E-07	6.83E-08	1.01E-05	6.83E-08	0.00E+00	0.00E+00	6.20E-09	-3.95E-05

Additional Environmental Impact Indicators

Results per functional or declared unit										
Indicator	**Unit**	**Tot.A1-A3**	**A4**	**A5**	**B2**	**C1**	**C2**	**C3**	**C4**	**D**
Particulate matter	disease incidence	3.82E-03	1.60E-07	1.98E-10	-4.19E-07	1.98E-10	4.87E-08	0.00E+00	5.05E-09	5.25E-08
Ionising radiation - human health**	kBq U-235 eq	2.78E+00	1.48E-03	4.47E-05	1.80E-01	4.47E-05	4.54E-04	0.00E+00	4.40E-05	4.87E-04
Eco-toxicity (freshwater)*	CTUe	2.48E+03	5.36E+01	5.93E-03	-3.26E+02	5.93E-03	1.61E+01	0.00E+00	1.36E+00	1.72E+01
Human toxicity potential - cancer effects*	CTUh	3.90E-07	1.15E-09	2.07E-13	-2.04E-09	2.07E-13	3.69E-10	0.00E+00	3.05E-11	3.92E-10
Human toxicity potential - non cancer effects*	CTUh	3.87E-06	4.95E-08	5.11E-12	1.76E-06	5.11E-12	1.58E-08	0.00E+00	1.17E-09	1.66E-08
Soil quality*	dimensionless	3.92E+02	1.44E+01	1.25E-03	-2.34E+01	1.25E-03	4.02E+00	1.00E+01	4.51E-01	4.36E+00

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Additional information

See sections 5.4, 7.3 and 7.4 in EN 15804

Kingspan wall panel systems have Global GreenTag™ certification. They have been certified as GreenTag™ with a GreenRate® Level A. Global GreenTag is a Type 1 ecolabel in conformance with ISO 14024, and is recognised by both the Green Building Councils of Australia and New Zealand under the Green Star programs.

Sustainable Buildings

The buildings of the future need to deliver more than ever before. They must combat climate change by maximising energy efficiency through superior thermal performance while incorporating products that are lower in embodied carbon across their entire lifecycle. Using less energy is not enough; buildings should generate their own energy too.

Kingspan's 10 Drivers for Sustainable Buildings

In order to achieve truly future-proofed, sustainable built environments, all buildings must be designed, constructed and operated to deliver 10 key benefits for the wellbeing of people and our planet.

Kingspan is driving innovation in its products and business to deliver 10 key drivers for sustainable buildings, with the ultimate goal of meeting the IPCC 1.5º climate change scenario.

1. **Energy Efficiency:** Reducing energy demand in buildings with fabric and services.
2. **Embodied Carbon:** Minimising embodied carbon in materials and buildings.
3. **Circularity:** Enabling circularity in products through the full lifecycle.
4. **Fire Performance:** Protecting people and property from fires.
5. **Occupant Wellbeing:** Harnessing the health benefits of daylighting and clean air.
6. **Water Conservation:** Conserving and managing this precious natural resource.
7. **Healthy Materials:** Protecting the wellbeing of workers and building occupants.
8. **Digitalisation:** Empowering better building performance and construction efficiency.
9. **Property Value:** Maximising lettable space and lifetime property value.
10. **Construction Efficiency:** Maximising build-speed and quality with MMC solutions.

Planet Passionate – Kingspan's global sustainability programme

Planet Passionate is Kingspan's ambitious 10-year global sustainability programme that aims to impact three big global issues:

- Climate change
- Circularity
- Protection of our natural world

By setting challenging targets in the areas of energy, carbon, circularity and water, Kingspan aims to make significant advances in the sustainability of both our business operations and our products.

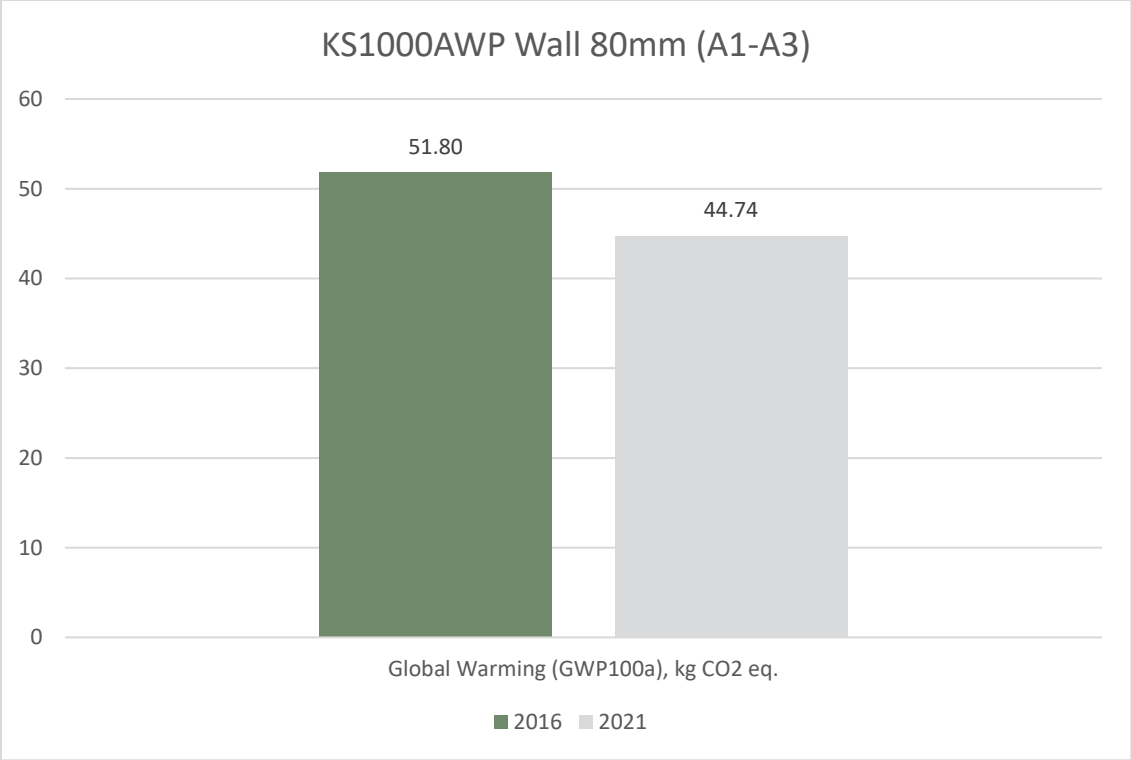
Kingspan's Global Planet Passionate Commitments

1. Energy
2. Carbon
3. Circularity
4. Water

Differences versus previous versions

- **The global warming potential (GWP) results decreased 14%** for the A1-A3 modules between 2016 and 2021. This is due to the data used for the steel components. The 2016 LCA used generic factors from SimaPro whereas 2021 has more specific factors provided by the supplier. The insulation results increased between 2016 and 2021, and manufacturing results decreased.
  - The panel production process (A3) for wall panels at Kingspan is **27% less carbon intensive** in the 2021 EPD compared to 2016.

Figure 3: Benchmarked environmental results for Architectural Wall Panel against 2016 results



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