Environmental Product Declaration

Zenith

In accordance with ISO 14025 for:

Kissen Table & Workstation Range

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

Environmental Product Declaration (EPD)
in accordance with ISO 14025
EPD Registration No. S-P-04644 | Version 1.0
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Company Information

Zenith Interiors designs, manufactures, and distributes leading-edge products for corporate and commercial environments that inspire people and organisations to excel (Zenith Interiors, 2019).

Product-related or management system-related certifications:

ISO 9001 – Quality management systems

ISO 14001 – Environmental Management Systems

AS 4801 Health and Safety

Name and location of production site: Zenith Interiors, Shanghai, China.

Kissen Table & Workstations

Designed for the physical and functional requirements of today's diverse work modes, Kissen fosters connection whether in a social or collaborative setting. The family of tables and workstations features a strong timber aesthetic with a distinct leg profile. The under-structure design makes economic use of the components and accessory options to provide ease of team expression and identity.
Kissen tables provide work surfaces in a broad range of sizes for both seated and standing heights of 720 mm, 750mm and 1050 mm respectively, with the option of mobility castors. Kissen legs are available linear or with a 45° corner leg for a softer domestic visual appeal.
Kissen Workstation is engineered to optimise team based working with numerous configuration options and customisation to enrich the work environment. Integrated with ZENITH Ctrl™, KISSEN Workstation has access to a range of accessories.

UN CPC code: 3812/3813/3814 (EPD International, 2019).

Geographical scope: Final product produced in Shanghai, China for the Asian market.

Functional unit / declared unit: One Kissen table with length 1.80 m, depth 1.65 m, height 0.72 m.

Scope: Cradle to grave life cycle of one Kissen table.

Reference service life: 15 years (EPD International, 2019).

Databases and LCA software used: AusLCI 2.2, ecoinvent 3.6, Industry Data 2.0 databases; SimaPro 9.1.0.11 software

Data collection period: July 2019 – February 2020

An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product that is based on a consistent set of rules known as Product Category Rules (PCR). EPDs within the same product category from different programs may not be comparable. This EPD is for a specific furniture product and follows the Product Category Rules 'Furniture, except seats and mattresses v2.01'.

Declaration Owner:

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PCR Information

PCR:
Product Category Rules 'Furniture, except seats and mattresses v2.01'.
PCR review conducted by:
Text
Independant verification of the declaration and data, according to ISO 14025:
☐ EPD process certification (Internal)
☐ EPD verification (External)

Third party verifier

Text
Text

Accredited or approved by: The Australasian EPD® Programme

Product Information

The Kissen table is 1.80 m long, 1.65 m deep and 0.72 m high. It consists of a particleboard top, a beam with steel and aluminium components and legs made of either aluminium or timber (displayed as two separate options in this Environmental Product Declaration).

The materials used are sourced from different suppliers in Australia as well as Shanghai, China and transferred to Zenith's Melbourne factory for the manufacturing of the final product.

The final manufacturing process includes powder coating of the metals where the surfaces are first cleaned, then go through a powder coating process after which they are cured with heat. The rest of the components are assembled in the factory.

Background Data

Australian inputs were primarily modelled with the AusLCI database; the ecoinvent v3 database was used where suppliers were from overseas. All background data used was less than ten years old.

System Boundaries and Life Cycle Stages

Life Cycle Stages

This Environmental Product Declaration analyses the production of a Kissen table, including the raw material extraction, the manufacture of components from suppliers, the assembly of the table as well as the end of its service life. The different Kissen table components are transported to Sandringham, Victoria where the table is assembled. The product is then packed in cardboard boxes and supplied to showrooms as well as clients in Australia.

Table 1: Life cycle stages of Kissen table

Process	Module	Description	Life cycle stages	Declared modules
Upstream process	A1	Raw materials supply	A1-A3: Manufacturing stage	X
	A2	Components/raw materials manufacture		X
Core process	A3	Components transport to Zenith factory		X
	A4	Manufacturing of final products		X
Downstream process	B1	Transport of final product	B1: Final product transport	X
	B2	Maintenance	B2-B4: Usage stage	X
	B3	Replacement		X
	B4	Operational energy use		X
	C1	Transport	C1-C3: End-of-life	X
	C2	Manual dismantling		X
	C3	Waste disposal		X
Other Environmental Stage	D	Recycling	Other Environmental Stage	X

System Diagram

An 'upstream – core – downstream' flow is adopted in this study. The upstream processes include the flows of raw materials. The core processes include all activities which the manufacturing organisation is in control of, i.e. transportation of the components to the manufacturing factory and the actual process of manufacturing. The downstream processes include the steps that are controlled by the user and the disposal or recycling options of the products.

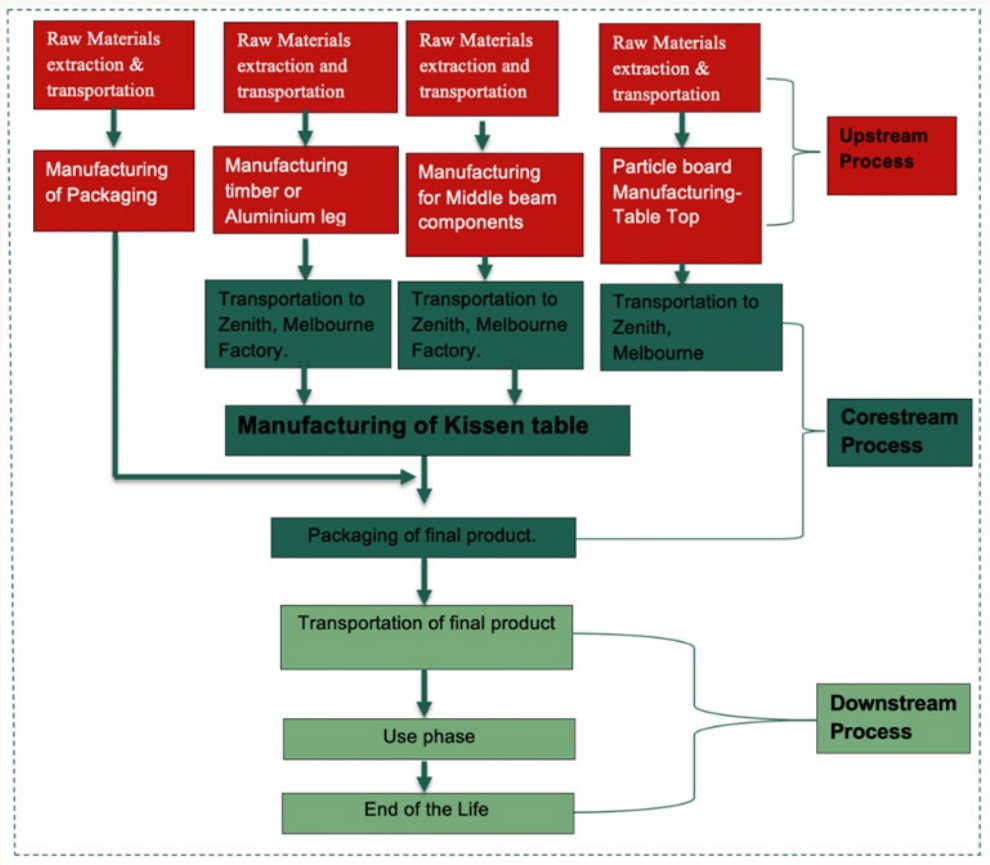

Figure 1: Process diagram Kissen table

End-of-life Scenarios

Zenith Interiors operates a take-back scheme for its furniture. Likewise, furniture owners resell or donate the furniture by themselves to extend its lifetime. In the end-of life for other environmental stages (represented as modules), all aluminium and steel parts of the product are recycled after being manually dismantled. This is noted separately due to Polluter pays principle (PPP).

Data Quality, Temporal Scope and Geographical Scope

The modelling of Zenith products is of high quality as detailed company specific data about the product components, component suppliers, the annual energy consumption and the annual production rate was provided for this study. Data for upstream and downstream processes are retrieved from suitable averages in the AusLCI and ecoinvent databases.

The temporal scope of the study is the period for which the data was collected. The data collection process started with the visit to Zenith's Melbourne factory in July 2019. The energy consumption data taken into consideration range from September 2018 to 2019. The production volume data is for 2019. For the background data, temporal scope for AUSLCI V1.33, a shadow database of modified ecoinvent 2.2 processes is July 2020. For ecoinvent 3.6 the temporal scope is September 2019.

***Table 2*: Data sources, geographical scope and data quality**

Materials/fuels		**Module**	**Data source**	**Geographical scope**	**Data quality**
Raw materials supply, components / raw materials manufacture, packaging	Materials and components for beam	A1, A2	Information provided by Zenith Interiors	Australia, China	High quality
	Materials for the legs (aluminium/timber)				
	Particle board for tabletop				
	Packaging of final product				
	Packaging from suppliers				
Components transport to Zenith factory, manufacturing of final products	Transportation of components from Shanghai, China	A3, A4	Information provided by Zenith Interiors	Australia, China	High quality
	Transportation of particle board (Victoria, Australia)				
	Electricity consumption				
	Natural gas consumption				
Transportation of final product	Zenith Melbourne factory to client	B1	Assumption of average distance of 1,000 km according to Product Category Rules	Australia	Medium quality
Usage stage	Maintenance	B2	Regular cleaning and dusting is recommended.	Australia	High quality
	Replacement	B3	Not required		High quality
	Operational energy use	B4	Not required		High quality
End of the life- Downstream	Transport	C1	Assumption of average distance of 1,000 km	Australia	Medium quality
	Manual dismantling	C2	No impacts observed for manual dismantling		Medium quality

	Waste disposal	C3	Complete product along with packaging ends up in landfill.		Medium quality
Other environmental impacts Recycling	Recycling	D3	Aluminium and steel parts are recycled.	Australia	Medium quality

Allocations

No allocation between co-products in the core module was necessary as there were no co-products created during manufacturing.

The methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP). This means that the generator of the waste shall carry the full environmental impact until the point in the product's life cycle at which the waste is transported to a scrapyard or the gate of a waste processing plant (collection site). The subsequent user of the waste shall carry the environmental impact from the processing and refinement of the waste, but not the environmental impact caused in the earlier life cycles. The cut-off system model from ecoinvent was used. Any allocations in the AusLCI unit system and Industry Data 2.0 were adopted.

Content Declaration

Table 3*: *Materials used for Kissen table

Materials	**Quantity**	**Unit**
Particle board tabletop	0.072	m3
Aluminium extruded	10.46	kg
Steel sheet	8.04	kg
Steel alloyed	1.968	kg
Aluminium die cast (including leg)	7.4	kg
American oak timber	6.3936	kg
Packaging materials from suppliers – plastic film	0.325	kg
Packaging materials from suppliers – folding box	0.081	kg
Packaging for final product – cardboard box	0.325	kg

Table 4*: *Energy consumption per product

Energy consumption	**Quantity**	**Unit**
Electricity	4.97	kWh
Gas usage	42.42	MJ

Environmental Performance

Environmental Impact Assessment Methods

Table 5: Overview of environmental impact assessment methods used in the study

Impact category		Unit	Assessment method
Global warming potential (GWP)	Fossil	kg CO_2 eq.	Greenhouse Gas Protocol V1.02
	Biogenic	kg CO_2 eq.	
	CO_2 eq. from land transformation	kg CO_2 eq.	
	Total	kg CO_2 eq.	
Abiotic depletion		kg Sb eq.	CML-IA baseline V3.6
Abiotic depletion (fossil fuels)		MJ	
Ozone layer depletion (ODP)		kg CFC-11 eq.	
Photochemical oxidation		kg C_2H_4 eq.	Recipe 2008 Midpoint
Acidification		kg SO_2 eq.	CML-IA baseline V3.6
Eutrophication		kg PO_4^{3-} eq.	
Water use		m^3	AWARE V1.01
Land use		species.yr	Recipe 2016 Endpoint V1.04
Human toxicity, cancer		CTUh	USEtox 2
Human toxicity, non-cancer		CTUh	
Freshwater ecotoxicity		CTUe	
Radioactive waste		kg	EDIP 2003 method
Hazardous waste		kg	EDIP 2003 method
Non-hazardous waste		kg	EDIP 2003 method (Sum of Bulk waste and Slag waste)
Primary energy resources Renewable	Use as energy carrier	MJ	Cumulative Energy Demand V1.11 method: calculated as sum of renewable – biomass, renewable – wind, solar, geothermal, and renewable – water.
	Use as raw materials	MJ	Manual calculation
Primary energy resources Non-renewable	Use as energy carrier	MJ	Cumulative Energy Demand V1.11 method: calculated as sum of non-renewable – fossil, non-renewable – nuclear, and non-renewable – biomass.
	Use as raw materials	MJ	Manual calculation
Secondary material resources		kg	Manual calculation
Renewable secondary fuels		MJ	0
Non-renewable secondary fuels		MJ	0
Net use of fresh water		m^3	Recipe 2016 Midpoint V1.04

The following tables show the environmental impacts of the Kissen table with respect to upstream, core and downstream processes, including all processes listed in Table 1. The downstream processes are divided into the two end-of-life scenarios described in chapter 7.

Environmental Impacts

The Kissen table is either manufactured with a timber leg or aluminium leg. The aluminium leg has an extra core process where it is powder coated in the Zenith factory itself.

Kissen Table with Aluminium Legs:

Table 6: Life cycle impacts – Kissen table with aluminium legs

Impact category		Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
			A1-A2	A3-A4	B1-C4		D
Global warming potential (GWP)	Fossil	kg CO_2 eq.	3.84E+02	2.13E+01	1.23E+02	5.25E+02	-3.58E+02
	Biogenic	kg CO_2 eq.	-8.54E+01	1.76E-02	9.26E+01	7.23E+00	-4.83E-01
	CO_2 eq. from land transformation	kg CO_2 eq.	1.36E+00	2.75E-05	4.13E-04	1.29E+00	-1.79E-03
	Total	kg CO_2 eq.	3.00E+02	2.14E+01	2.15E+02	5.34E+02	-3.58E+02
Abiotic depletion		kg Sb eq.	2.62E-03	2.30E-05	9.72E-05	2.74E-03	-1.39E-04
Abiotic depletion (fossil fuels)		MJ	3.05E+03	1.92E+02	1.65E+03	4.89E+03	-2.34E+03
Ozone layer depletion (ODP)		kg CFC-11 eq.	1.39E-05	9.52E-07	1.84E-05	3.32E-05	-9.54E-06
Photochemical oxidation		kg NMVOC	1.19E+00	1.05E-01	1.64E-01	1.46E+00	-8.72E-02
Acidification		kg SO_2 eq.	1.25E+00	5.87E-02	5.77E-01	1.88E+00	-9.26E-01
Eutrophication		kg PO_4^{3-} eq.	3.31E-01	1.54E-02	1.28E-01	4.75E-01	-1.89E-01
Water use		m^3	6.70E+03	2.79E+02	2.16E+02	7.20E+03	-8.45E+03

Table 7: Resource use – Kissen table with aluminium legs

Impact category		Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
			A1-A2	A3-A4	B1-C4		D
Primary energy resources Renewable	Use as energy carrier	MJ	1.61E+03	7.29E+00	3.14E+00	1.62E+03	-2.61E+02
	Use as raw materials	MJ	0	0	0	0	0
	Total	MJ	1.73E+03	7.29E+00	3.14E+00	1.74E+03	-2.61E+02
Primary energy resources Non-renewable	Use as energy carrier	MJ	3.46E+03	2.10E+02	1.76E+03	5.42E+03	-2.49E+03
	Use as raw materials	MJ	3.26E+00	0	0	3.26E+00	0
	Total	MJ	3.46E+03	2.10E+02	1.76E+03	5.42E+03	-2.49E+03
Secondary material resources		kg	0	0	0	0	0
Renewable secondary fuels		MJ	0	0	0	0	0
Non-renewable secondary fuels		MJ	0	0	0	0	0
Net use of fresh water		m^3	1.57E+02	6.49E+00	-1.87E+02	-2.29E+01	-4.94E+00

Table 8: Other impacts – Kissen table with aluminium legs

Impact category	Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
		A1-A2	A3-A4	B1-C4		D
Land use	species.yr	2.18E-07	5.29E-09	9.82E-09	2.33E-07	-1.15E-07
Human toxicity, cancer	CTUh	1.39E-07	4.29E-10	3.31E-09	1.43E-07	-2.02E-08
Human toxicity, non-cancer	CTUh	1.20E-08	1.10E-10	1.74E-09	1.39E-08	-1.25E-08
Freshwater ecotoxicity	CTUe	5.31E-01	3.78E-02	1.64E-01	7.33E-01	-2.58E-01

Table 9: Waste flow categories – Kissen table with aluminium legs

Impact category	Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
		A1-A2	A3-A4	B1-C4		D
Radioactive waste	kg	4.52E-03	1.27E-05	2.54E-06	4.54E-03	-2.10E-05
Hazardous waste	kg	4.99E-03	1.20E-03	7.16E-04	6.90E-03	1.22E-02
Non-hazardous waste	kg	5.78E+01	1.03E+00	5.32E+01	1.12E+02	-4.27E+01

Table 10: Output flow categories – Kissen table with aluminium legs

Impact category	Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
		A1-A2	A3-A4	B1-C4		D
Reuse	kg	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0
Energy recovered	MJ	0	0	0	0	0
Energy exported	MJ	0	0	0	0	0
Energy exported, thermal	MJ	0	0	0	0	0

Kissen table with timber legs

Table 11: Life cycle impacts – Kissen table with timber legs

Impact category		Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
			A1-A2	A3-A4	B1-C4		D
Global warming potential (GWP)	Fossil	kg CO_2 eq.	3.35E+02	1.77E+01	1.21E+02	4.73E+02	-2.73E+02
	Biogenic	kg CO_2 eq.	-1.01E+02	-5.64E-02	9.15E+01	-9.33E+00	-3.60E-01
	CO_2 eq. from land transformation	kg CO_2 eq.	5.65E-01	2.09E-05	4.06E-04	5.65E-01	-1.16E-03
	Total	kg CO_2 eq.	2.35E+02	1.76E+01	2.12E+02	4.64E+02	-2.74E+02
Abiotic depletion		kg Sb eq.	1.35E-03	2.08E-05	9.57E-05	1.47E-03	-8.95E-05
Abiotic depletion (fossil fuels)		MJ	2.51E+03	1.52E+02	1.62E+03	4.28E+03	-1.54E+03
Ozone layer depletion (ODP)		kg CFC-11 eq.	1.01E-05	6.70E-07	1.81E-05	2.88E-05	-6.22E-06
Photochemical oxidation		kg NMVOC	1.05E+00	2.18E-01	2.67E+00	3.94E+00	-5.96E-02
Acidification		kg SO_2 eq.	9.44E-01	3.64E-02	5.68E-01	1.55E+00	-6.13E-01
Eutrophication		kg PO_4^{3-} eq.	2.37E-01	1.07E-02	1.26E-01	3.74E-01	-1.24E-01
Water use		m^3	6.85E+03	2.08E+02	2.12E+02	7.27E+03	-6.39E+03

Table 12: Resource use – Kissen table with timber legs

Impact category		Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
			A1-A2	A3-A4	B1-C4		D
Primary energy resources Renewable	Use as energy carrier	MJ	1.89E+03	7.86E+00	3.07E+00	1.90E+03	-1.68E+02
	Use as raw materials	MJ	1.20E+02	0	0	1.20E+02	0
	Total	MJ	1.90E+03	7.86E+00	3.07E+00	2.00E+03	-1.68E+02
Primary energy resources Non-renewable	Use as energy carrier	MJ	2.77E+03	1.67E+02	1.73E+03	4.66E+03	-1.64E+03
	Use as raw materials	MJ	3.26E+00	0	0	3.26E+00	0
	Total	MJ	2.77E+03	1.67E+02	1.73E+03	4.66E+03	-1.64E+03
Secondary material resources		kg	0	0	0	0	0
Renewable secondary fuels		MJ	0	0	0	0	0
Non-renewable secondary fuels		MJ	0	0	0	0	0
Net use of fresh water		m^3	1.60E+02	4.83E+00	4.93E+00	1.70E+02	-1.49E+02

Table 13: Other impacts – Kissen table with timber legs

Impact category	Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
		A1-A2	A3-A4	B1-C4		D
Land use	species.yr	1.53E-06	5.83E-09	9.66E-09	1.55E-06	-7.44E-08
Human toxicity, cancer	CTUh	1.26E-07	3.03E-10	-1.50E-11	1.27E-07	-1.59E-08
Human toxicity, non-cancer	CTUh	1.08E-08	1.62E-10	2.28E-02	2.28E-02	-9.47E-09
Freshwater ecotoxicity	CTUe	5.03E-01	1.48E-01	0.00E+00	6.52E-01	-1.96E-01

Table 14: Waste flow categories – Kissen table with timber legs

Impact category	Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
		A1-A2	A3-A4	B1-C4		D
Radioactive waste	kg	2.10E-03	8.26E-06	2.50E-06	2.12E-03	-1.59E-05
Hazardous waste	kg	3.18E-03	7.86E-04	6.00E-04	4.56E-03	8.80E-03
Non-hazardous waste	kg	4.51E+01	8.38E-01	5.03E+01	9.62E+01	-3.24E+01

Table 15: Output flow categories – Kissen table with timber legs

Impact category	Unit	Upstream processes	Core processes	Downstream processes with landfill	Total	Other environmental stage-Recycling
		A1-A2	A3-A4	B1-C4		D
Reuse	kg	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0
Energy recovered	MJ	0	0	0	0	0
Energy exported	MJ	0	0	0	0	0
Energy exported, thermal	MJ	0	0	0	0	0