Environmental Product Declaration

In accordance with ISO 14025 for:

Precinct Screens

Zenith

Environmental Product Declaration (EPD)
in accordance with ISO 14025
EPD Registration No. S-P-04645 | Version 1.0
Issued 14/10/2021 | Valid until 14/10/2026

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, Melbourne, Victoria.

Precinct Screens

Precinct is a 9-30 mm soft and frameless screen solution that is highly functional and aesthetically pleasing, creating clean and defined workspaces. Available in many shapes sizes and fixings.

Product Names: Precinct Hold On, Precinct Flex, Precinct Divide, Precinct Fold Me.

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

Geographical scope: Final product produced in Melbourne, Victoria for the Australian market.

LCA Information

Functional unit / declared unit: One Precinct screen with length 1.8 m, depth 0.7 m, width 0.03 m.

Scope: Cradle to grave life cycle of one Precinct screen.

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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EPD produced by:

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PCR Information

PCR:
Product Category Rules 'Furniture, except seats and mattresses v2.01'.
PCR review conducted by:
GECA Australia; According to product category rules (PCR): Furniture, except seats and mattresses 2012:19 VERSION 2.01 UN CPC 3812/3813/3814
Independant verification of the declaration and data, according to ISO 14025:

- ☐ EPD process certification (Internal)
- ☐ EPD verification (External)

Third party verifier

Third Party Review (by Edge Environment)

Accredited or approved by: The Australasian EPD® Programme

Product Information

The Precinct screen is used in workspaces to achieve an aesthetically pleasing and clean environment. It can be easily fitted to workstations and tables and acts as a partition.

The analysed product consists of a screen with a length of 1.8 m, depth of 0.7 m and width of 0.03 m. The materials used are sourced from different suppliers in Australia 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.

1. System Boundaries and Life Cycle Stages

Life Cycle Stages

This Environmental Product Declaration analyses the production of a Precinct screen, including the raw material extraction, the manufacture of components from suppliers, the assembly of the screen as well as the end of its service life. The different Precinct screen components are transported to Sandringham, Victoria where the screen 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 Precinct screen

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.

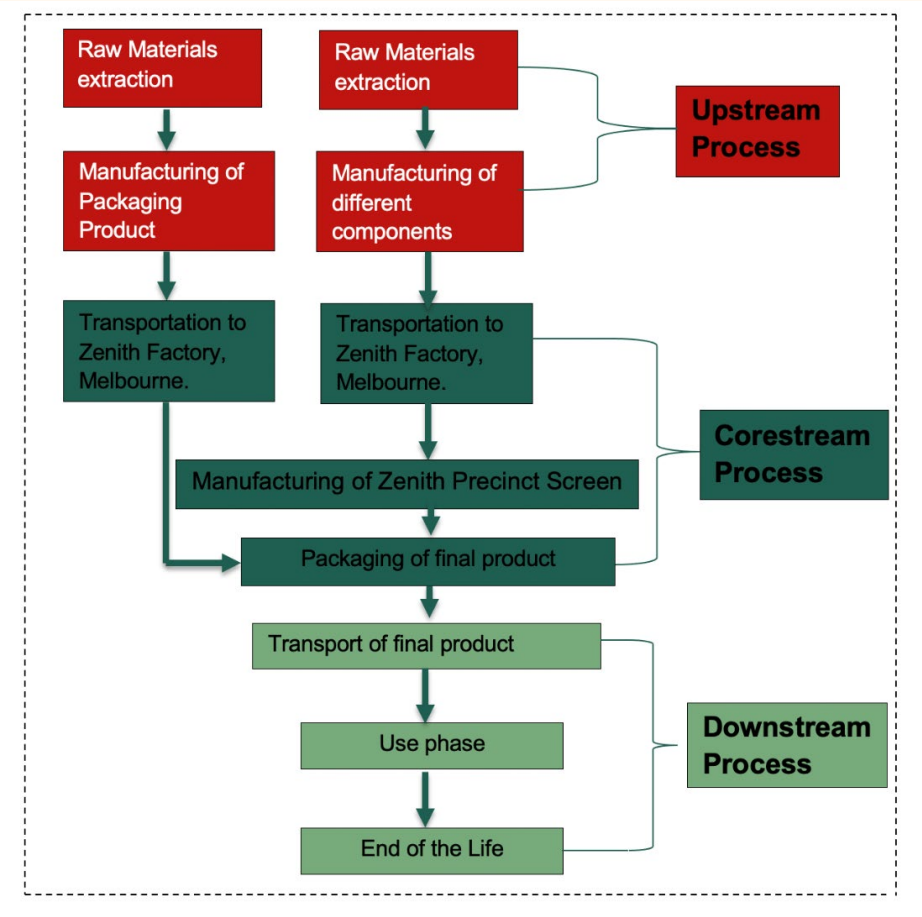

Figure 1: Process diagram Precinct screen

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 D), 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 (Upstream Process)	Fabric for logo and cover	A1, A2	Information provided by Zenith Interiors	New Zealand	High quality
	Steel for screws				
	MDF board				
	Foam				
	Aluminium for zipper				
	Packaging of final product				
	Packaging from suppliers				
Components transport to Zenith factory, manufacturing of final products (Corestream Process)	Transportation of MDF board	A3, A4	Information provided by Zenith Interiors	New Zealand	High quality
	Transportation of foam				
	Transportation of zipper				
	Transportation of metal screw				
	Transportation of fabric				
	Electricity consumption				
	Natural gas consumption				
Transportation of final product (Downstream Process	Zenith Auckland factory to client	B1	Assumption of average distance of 1,000 km according to Product Category Rules	New Zealand	Medium quality
Usage stage (Downstream process)	Maintenance	B2	Precinct screen does not require extra resources for maintenance apart from time-to-time manual dust cleaning.	New Zealand	High quality
	Replacement	B3	Not required		High quality
	Operational energy use	B4	Not required		High quality
End-of-life (Downstream Process)	Transport	C1	Assumption of average distance of 1,000 km	New Zealand	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
Benefits from recycling (Other life cycle stages)	Recycling	D	Aluminium and steel parts are recycled.		Medium quality
	Manual dismantling	D2	No impacts observed for manual dismantling		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

The major component of the Precinct screen is a medium density fibre (MDF) board. The screen is covered with a comfort foam and fabric and fixed with steel screws.

Table 3: Materials used for Precinct screen

Materials	**Quantity**	**Unit**
Fabric: polyester	0.237	kg
Steel	0.076	kg
Polyurethane foam	0.105	kg
Medium Density Fibreboard	0.129	m^3
Aluminium	0.053	kg

Table 4: Energy consumption per product

Energy consumption	**Quantity**	**Unit**
Electricity	0.56	kWh
Gas usage	0.247	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	
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	Indicator not assessed (INA)
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	Indicator not assessed (INA)
Secondary material resources		kg	Indicator not assessed (INA)
Renewable secondary fuels		MJ	Indicator not assessed (INA)
Non-renewable secondary fuels		MJ	Indicator not assessed (INA)
Net use of fresh water		m^3	Recipe 2016 Midpoint V1.04

Life Cycle Impacts

Table 6 shows the environmental impacts of the Precinct screen 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.

Table 6: Life cycle impacts – Precinct screen

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.	1.33E+01	7.78E-01	1.52E+01	2.92E+01	-1.10E+00
	Biogenic	kg CO_2 eq.	-1.94E+01	1.45E-03	1.20E+01	-7.40E+00	-1.33E-03
	CO_2 eq. from land transformation	kg CO_2 eq.	1.25E-03	5.27E-07	5.13E-05	1.30E-03	-4.51E-06
	Total	kg CO_2 eq.	-6.10E+00	7.80E-01	2.72E+01	2.17E+01	-1.10E+00
Abiotic depletion		kg Sb eq.	3.49E-05	6.62E-07	1.21E-05	4.76E-05	-3.46E-07
Abiotic depletion (fossil fuels)		MJ	1.61E+02	1.00E+00	2.05E+02	3.66E+02	-6.26E+00
Ozone layer depletion (ODP)		kg CFC-11 eq.	2.70E-07	7.06E-09	2.28E-06	2.56E-06	-2.47E-08
Photochemical oxidation		kg NMVOC	5.05E-02	1.74E-03	3.44E-01	3.96E-01	-3.29E-03
Acidification		kg SO_2 eq.	3.51E-02	7.77E-04	7.19E-02	1.08E-01	-2.53E-03
Eutrophication		kg PO_4^{3-} eq.	9.93E-03	2.59E-04	1.59E-02	2.61E-02	-4.91E-04
Water use		m^3	2.81E+02	3.21E+00	2.59E+01	3.09E+02	-2.48E+01

Table 7 below represents the resource use parameters of the Precinct screen.

Table 7: Resource use – Precinct screen

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	2.72E+02	3.80E-01	3.65E-01	2.72E+02	-6.49E-01
	Use as raw materials	MJ	0	0	0	0	0
	Total	MJ	2.72E+02	3.80E-01	3.65E-01	2.72E+02	-6.49E-01
Primary energy resources Non-renewable	Use as energy carrier	MJ	1.78E+02	1.08E+00	2.18E+02	3.96E+02	-6.66E+00
	Use as raw materials	MJ	6.14E+00	0	0	6.14E+00	0
	Total	MJ	1.78E+02	1.08E+00	2.18E+02	3.96E+02	-6.66E+00
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	6.52E+00	7.39E-02	6.03E-01	7.19E+00	-5.76E-01

The impacts on human toxicity cancerous, human toxicity non-cancerous, freshwater ecotoxicity and land use are given below in the Table 8.

Table 8: Other impacts – Precinct screen

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	4.44E+00	1.87E-02	1.38E-01	4.07E-08	-3.29E-02
Human toxicity, cancer	CTUh	1.85E-08	2.12E-12	4.10E-10	1.88E-08	-7.03E-11
Human toxicity, non-cancer	CTUh	4.37E-10	8.45E-13	2.16E-10	6.53E-10	-3.65E-11
Freshwater ecotoxicity	CTUe	1.01E-01	9.13E-05	2.04E-02	1.22E-01	-7.75E-04

Table 9 below represents waste flow categories of the Precinct screen.

Table 9: Waste flow categories – Precinct screen

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	3.89E-05	1.68E-08	3.16E-07	1.65E-03	-6.19E-08
Hazardous waste	kg	1.56E-03	1.75E-06	8.90E-05	8.02E+00	2.77E-05
Non-hazardous waste	kg	1.13E+00	2.24E-02	6.87E+00	3.92E-05	-1.26E-01

Table 10: Output flow categories – Precinct screen

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