ZENITH

# Environmental Product Declaration

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
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.

## 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, 750 mm 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 Melbourne, Victoria for the Australian 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

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

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

| **Declaration Owner:** |
| --- |
| **Zenith Interiors**<br>Web: zenithinteriors.com<br>Email: info@zenithinteriors.com<br>Phone: 1300 013 013 |
| **EPD produced by:** |
| **Good Environmental Choice Australia (GECA)**<br>Web: geca.eco<br>Email: enquiries@geca.org.au<br>Phone: 02 9699 2850 |
| **EPD program operator:** |
| **EPD Australasia Limited**<br>Web: www.epd-australasia.com<br>Email: info@epd-australasia.com<br>Post: 315a Hardy Street, Nelson, New Zealand 7010 |
| **PCR Information** |
| **PCR:**<br>Product Category Rules 'Furniture, except seats and mattressesv2.01'.<br>**PCR review conducted by:**<br>The International EPD System |
| **Independent third-party verification** |
| **Independant verification of the declaration and data, according to ISO 14025:**<br>☐EPD process certification (Internal)<br>☑ EPD verification (External) |
| **Third party verifier** |
| Jonas Bengtsson and Joana Almeida<br>**Edge Environment** |

## 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.

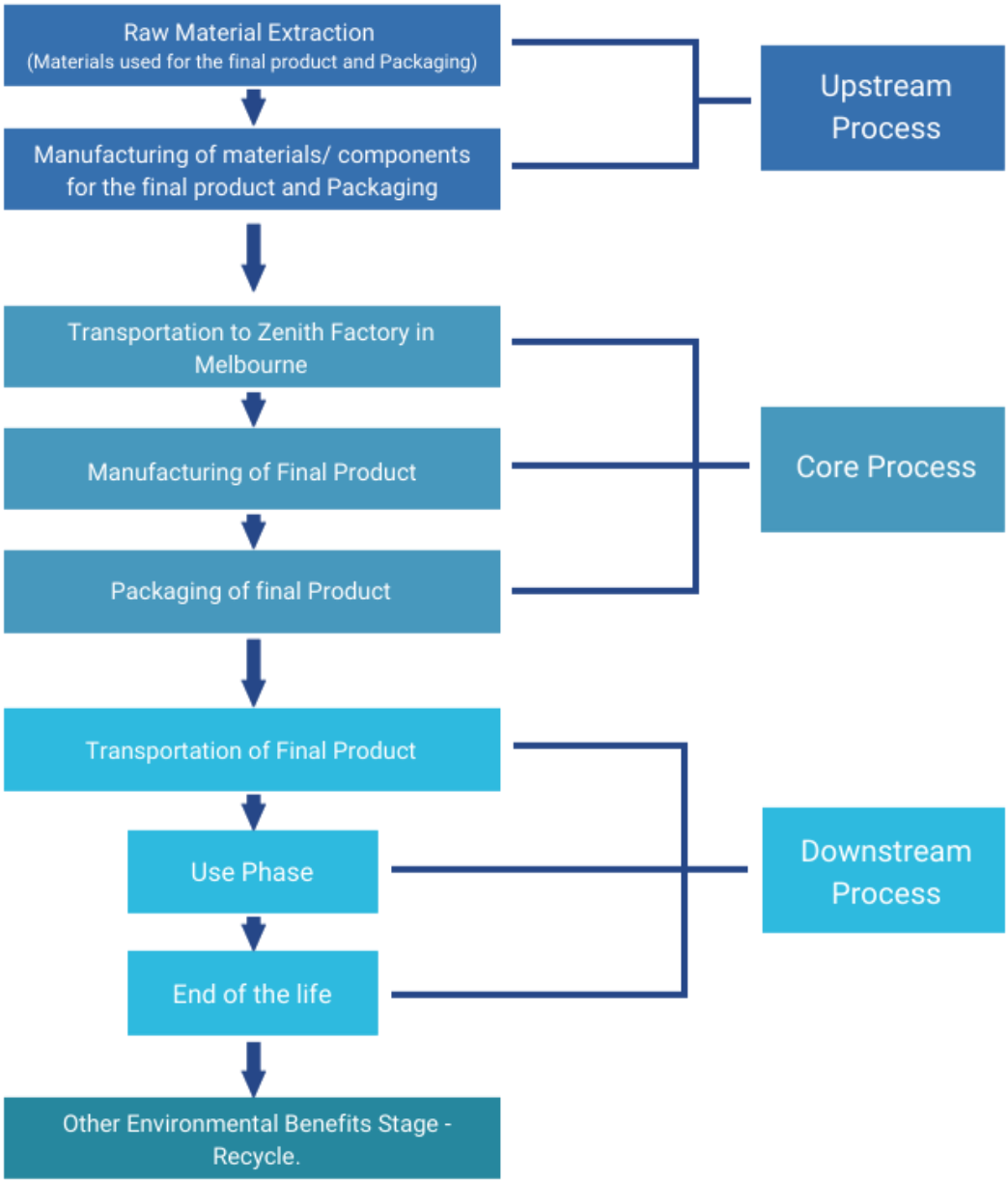


*Figure 1: Process diagram Kissen table*

## 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 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 | 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 |

## 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.

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.

### 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 |