Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Octo 4240

EPD of multiple products, based on average results for three variants of Octo 4240: birch; walnut; laminated (black/white) from

Secto Design Oy

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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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.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 - Construction products, Version 1.3.4, Valid until: 2025-06-20; This EPD follows additional requirements for construction products considered as Electronic or Electric Equipment (section 4.3.3 of PCR 1.3.4)
PCR review was conducted by: PCR 2019:14: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: Ylva Gilbert, BVersity Ab
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Viktor Hakkarainen, CHM Analytics AB    Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

The Life Cycle Assessment Report (Gilbert & Gilbert, 2024) and appendices are available to EPD-auditor on request and include all the detailed information as required by relevant standards.

Company information

Owner of the EPD

Secto Design Oy
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Finland

Contact

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Description of the organisation

Secto Design, founded in 1995, is a Finnish design lighting company specialising in timeless, handmade design lamps from high quality PEFC certified local birch, with a focus on ethical and sustainable production.

Product-related or management system-related certifications

The management system of Secto Design and its manufacturing company, Sectomo Oy, is based on the principles of ISO 9001, ISO 14001 and ISO 45000. All products are CE marked and comply with the Declaration of Conformity. North American products comply with the C/ETL mark.

Production site

Sectomo Oy
Suokannaksentie 2
18300 Heinolan kirkonkylä
Finland

Product information

Product name

Octo 4240

Product identification

Octo 4240

UN CPC code

46539

CN code

94051190

Product description

Octo 4240 is a pendant lamp, handmade from PEFC-certified form pressed birch slats, that is suitable in any interior. The shade is available in four variants: natural birch; walnut veneer; white laminated; and black laminated.

Shade dimensions:

- Height 68 cm
- Diameter 54 cm
- Weight 2,0 kg

Electrical component specifications

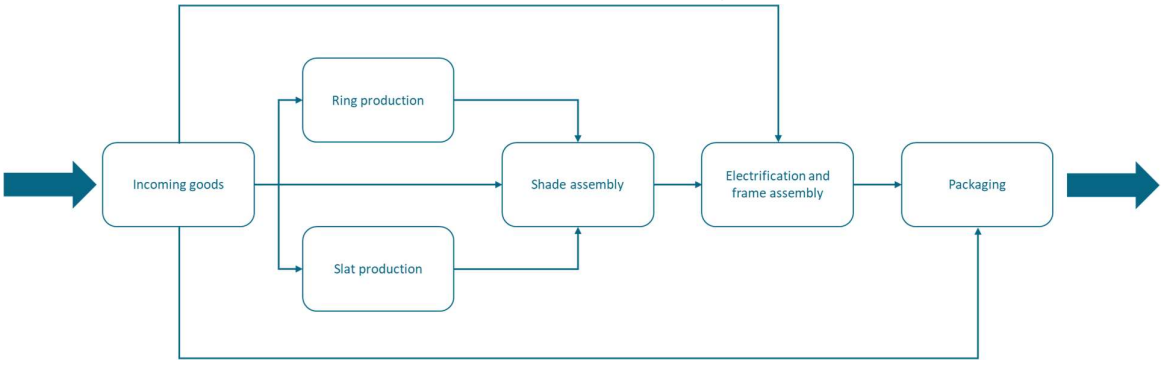
- Voltage: 220-240VAC 50Hz.
- Light source: E27 base, LED max 20 W.. The use of special bulbs such as halogen, mirror or 12 V bulbs in Secto Design lamps is prohibited, due to overheating. This product is supplied with an example bulb of energy efficiency class F (E27, 12 W, 1060 lumen, 3000 K, pure white, dimmable).
- Cable: 150 cm, textile cable, ceiling connector, ceiling cup.
- Classification: Ingress Protection IP20, IEC Protection Class II, CE marking.

Geographical scope

The data is applicable globally. The production is based in Finland (A3, and A1 veneers and form pressed blanks). EEE parts are sourced globally. The modelling of distribution (A4), installation (A5), use (B) and end-of-life (C) is based on location-specific scenarios, developed to represent different customers and different locations. The results presented in this EPD are based on a user scenario set in Germany, but further consideration of differences in impacts based on the end-customer's location was explored in the underlying LCA through scenario-based sensitivity analysis covering Finland, USA, Japan, UAE, and a global scenario (such as would be applicable for e.g. a cruise liner).

Module A3 manufacturing process

An overview of the A3 production process is shown in the figure below.



The manufacturing process involves two transforming processes (ring and slat production). The non-transformative processes include the shade assembly, electrification, testing, frame assembly and packaging. Each of the above steps consists of a multitude of actual work steps, or operations.
The electricity used at the A3 manufacturing site is 100% hydro.
The GWP-GHG is 0,013 kgCO2 eq./kWh.

LCA information

Declared unit

One Octo 4240, including single unit packaging, in use for 15 years.

Estimated lifetime

15 years. The product is designed for longevity and expected lifetime is much longer (50+ years) in normal use. This EPD is based on a user scenario of 12 h per day, 333 days a year, for 15 years. Three replacement bulbs are included. No replacement or refurbishment of the lamp itself is expected within this timeframe.

Time representativeness

Base case year for primary data is 2023.

Database(s) and LCA software

Ecoinvent 3.10 (EN 15804 + A2 adapted)
SimaPro 9.6.

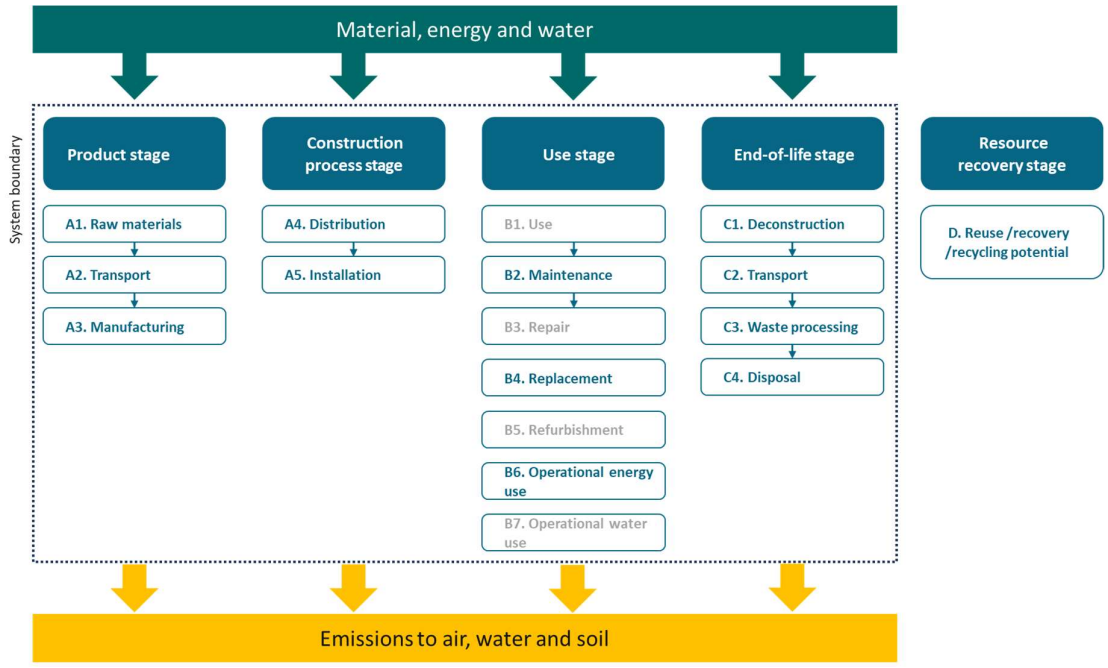
LCA Practitioner

Ylva Gilbert, BVersity Ab ylva.gilbert@bversity.fi

System boundaries

Type B, Cradle to gate with options, module C1-C4, Module D and optional modules A4, A5 and B1-B7. Modules where no environmental impacts have been identified are declared as zero. These are marked in grey in the system diagram below.

OCTO 4240 SYSTEM DIAGRAM



Product average calculation method

The average results is based on the average of the product variants in terms of top layer (Birch, walnut and a kraft-paper based laminated layer). The average has been calculated based on 1 lamp of each variant, i.e. an even 1:1:1 split. No weighting according to production volumes has been done as these vary from year to year. Furthermore, the differences between the variants are so small that weighting according to production volumes is not considered relevant. The underlying LCA explored different locational scenarios and included consideration of different electrical assemblies for different regional requirements. These audited results are not included in this EPD for multiple variants. Please contact us for further details.

Modules declared

MODULES DECLARED, GEOGRAPHICAL SCOPE, SHARE OF SPECIFIC DATA (IN GWP-GHG RESULTS) AND DATA VARIATION (IN GWP-GHG RESULTS)

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geography	GLO	GLO	FI	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	
Specific data used	23.3%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	4.2%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

A4 transport

Distribution (module A4) is based on scenarios developed as per EN 15804 requirements, in a format suitable for the purchased logistic services. The distribution scenarios (transport to the customers' sites) are based on distances and weight transported (kgkm) to a customer location in Berlin. Consideration of volume is excluded from this scope, as such data would not facilitate the use of background data from LCI references.

A5 installation

The installation scope is based on unpacking and installing the product by connecting it to the existing socket/outputs. The following has been excluded from the installation scope:

1. Wiring or other permanent installations, as these would need to be supplied on site of use regardless of what type of lamp is used.
2. Fixing the product to a wall or ceiling through screws, hooks, or similar. The scope of such a process is dependent on the installation site materials (e.g., wall material) and local regulations. These are best considered as part of the whole building or the building's electrification/design systems and therefore excluded.
3. In the scoping process, the requirement for indirect materials, water and energy use, waste, and other materials, as well as emissions were considered. Of these, waste was found to be relevant, and all the other parameters are excluded from the scope for module A5.

The waste materials are in effect equal to the products' packaging materials, as packed in module A3, with no losses assumed to occur during transport. The waste from installation consists of cardboard, straps, paper (instructions), anfd plastic (protective bags). Multi-unit packaging (pallets) was considered as a scenario for sensitivity analysis.

Waste processing and end-of-life fate has been modelled based on the approach recommended by Secto Design to its customers, i.e., that packaging waste is segregated and recycled as appropriate fractions in accordance with local waste regulations. The scope builds on using secondary data applicable to location-specific waste processing, transport, and end-of-life fate.

B2 Maintenance

Maintenance (B2) scope is based on Secto Design's recommended practices of "Wipe dust regularly. To remove fresh stains wipe with a slightly damp cloth".[1] No other maintenance requirements were identified or considered.

B4 Replacement

Replacement (B4) includes replacement of detachable light sources (LED bulbs). A total of 3 replacment bulbs are included, based on an estimated service life of 15 000 hours/bulb.

B6 Operational Energy

Operational energy use (B6) is assessed based on assumed hours of use (59940 hours during lifetime, based on 12 hours active use per day, and 333 days per year) multiplied by the light source energy consumption. Energy LCI database references are based on location.

C2 Waste transport

C2 waste transport is modelled based on an impact database reference for municipal waste collection service by 21 metric ton lorry. The whole lamp is assumed to be transported to a waste treatment facility 40 km from the customer's location.

[1] Dusting is assumed to be done weekly, and wiping monthly.

C3/C4 Waste processing

At the end of life, the lamp components are treated as municipal waste and separated into WEEE and the shade. 80% of LED bulbs and WEEE is assumed to be sent to recycling. The share of municipal waste incinerated is assumed to be 99%, with the reminder ending up in a sanitary landfill (with an additional 3 km transport required). All inputs and emissions from waste processing and final waste disposal are allocated to the DU in question.

Any further processing after the material has reached its end-of-waste state is not included in the scope of the system. For example, recycling activities at the refiner or the remelting facility are beyond the end-of-waste and not included in the LCA system, however, these are considered as part of module D.

D Resource recovery

Module D considers the impact of products or materials beyond the product system. For Octo 4240, the following were included in the assessment:

- The packaging (Cardboard, Polypropylene (straps), and Paper(instructions) and
- The lamp, WEEE (recycling and energy recovery) and the shade (energy recovery).

The loads generated from the recycling process and the benefits from replacing new material production are considered.

Cut-off criteria

The cut-off rules applied are in line with EN 15804, as follows:

- Where data was available, all inputs and outputs are included.
- In cases where there are data gaps, assumptions based on average or generic data are used and documented.
- The cut-off criteria in cases of insufficient data are 1% of renewable and non-renewable primary energy usage and 1% of the total mass input of that unit process. For each Module, the total of neglected input flows is maximum 5% of energy usage and mass.
- Particular care was taken to include material and energy flows known to have the potential to cause significant emissions into air and water or soil related to the environmental indicators of EN 15804.

In practice, the following approach has been adopted:

- **Mass:** all components are included in the scope and no cut-offs according to the cut-off criteria were identified.
- **Losses in upstream production** are included, either as part of the inventory database or considered separately (module A1).
- **Losses during production** are included and considered as co-products (module A3).
- **Energy:** all identified steps that use energy are included and the energy use allocated to the product.
- **Process steps**: all identified production activities (processes) at the production site (A3) and the main upstream production sites (A1) are included.
- **Environment:** no cut-off has been done based on environmental significance.

Cut-offs for incoming packaging were based on a combination of low weight and practical sorting of waste and included metal staples and packaging tape based on the 1% cut-off rule.

Cut-offs applied to the product

1. Veneer thickness is specified in the blank composition. Veneers of thicknesses 0.6 mm, 1 mm and 1.5 mm are used. Within these thicknesses, minor variations in individual veneers' thickness can occur to approximately 0.1 mm either above or below mean. This variation is not included in the assessment.
2. The black and white laminated variants are essentially exactly the same apart from being different colours. The colours stem from use of different pigments. The amount of pigments in the laminate are below the amounts required for notifications in accordance with the EU's REACH Regulation. Any differences between the two options originating from the different colouring is therefore deemed insignificant and has not been considered.
3. Colouring of powder coated metals are not considered separately, based on the powder coating reference being colour neutral and the low weight of the powder coating .

Allocation approach

Outputs from modules A1-A3 are allocated directly to the products as co-products. Generic electricity consumption in the building (e.g. lighting or heating) has not been included in the scope and are not allocated to the DUs. All material weights and process energies and consideration of any waste created are allocated to the product (part, component or material, depending on the production stage) and thereby also to the DU. Waste from modules A1 and A3 is considered as co-products from the production of the materials and components produced. Whether included in the LCI database reference or as a separate material, such as incoming packaging material, it is allocated in full the product in question.

The following principles have been applied for allocation:

- When two or more products arrive in the same packaging, the incoming packaging weight is allocated to each of the products based on mass (e.g. in proportion to the weight of each individual product vs. total product weight carried in that packaging).
- When a co-product with economic value is created from the same process as a product or a partially made product, the co-product is not allocated to the product. However, all the work steps, energy and potential additional materials are allocated to the said product in full.
- Co-allocation of waste to product is done through inclusion of the waste material and its processing to end-of-waste stage in the production step.
- No instances where substitution to convert multi-products to single product activities would be required have been identified and allocation per se is not applied.

To the extent possible allocation has been avoided through measuring all data inputs in the manufacturing process (module A3). The manufacturing can be thought of as including many different production processes, one for each product, all of which are in essence linear. The scope of allocating energy and indirect materials to each product was determined through a work study, wherein each work step in the flow of each product has been described and timed, and the energy use measured or calculated.

Exclusions from the module A3 scope

Exclusions from module A3 are based on that the scope is solely concerned with the production processes, not the site itself, and therefore excludes:

1. Capital goods, including:
    - the manufacturing, maintenance/repair, and decommissioning of buildings, grounds, and other infrastructure; and
    - the machinery itself (manufacturing, maintenance, and decommissioning of capital goods).
2. Heating and lighting or any maintenance or repair to heating or lighting equipment.
3. Wastewater other than specifically arising from production machinery.
4. Waste from other than production sources. Waste that stems from, e.g., broken tools, broken parts, or waste related to the office or personnel is not included.
5. Any personnel-related processes (such as travel and transportation).
6. Export of waste.

Content information

This EPD is representative of one Octo 4240, including single unit packaging, in use for 15 years. There are three variants of Octo 4240: birch; walnut; and laminated (black/white). Both the content information and the results of the environmental performance indicators declared in this EPD are averages of the abovementioned variants. This is in line with option 1 in section 2.2.2.1 of PCR 2019:14, Version 1.3.4. Note that the average results have been calculated 1:1:1. No weighting according to production volumes has been done as these vary from year to year. Note that the packaging is exactly the same for all three variants, hence there is no variation from the average.

OCTO 4240 CONTENT INFORMATION

Product components	Weight, average kg (+/-)	Post-consumer material, average weight-% (+/-)	Biogenic material, average weight-%	Biogenic material, average kg C/product (+/-)
Wood	**1.39 (+ 0.029/ -0.040)**	0 (+ 0/- 0)	100 (+ 0/- 0)	0.55 (+ 0.012/- -0.016)
Hazardous chemicals	**0.20 (+ 0.012/ -0.006)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Limestone	**0.00029 (+ 0/- 0)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Laminate	**0.023 (+ 0.046/ -0.023)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Non-hazardous chemicals	**0.042 (+ 0.00011/ -0.00022)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Plastic PET (1)	**0.042 (+ 0/ -0)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Zinc-plated steel (electro-galvanised)	**0.0029 (+ 0/- 0)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Acetate	**0.0057 (+ 0.011/ -0.0056)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Aluminium	**0.013 (+ 0.0043/ -0.0086)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Plastic PC (7)	**0.0047 (+ 0.0013/ -0.00062)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Electrical and electronic equipment	**0.012 (+ 0.012/ -0.006)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Copper	**0.016(+ 0.0080/ -0.016)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Plastic PVC (3)	**0.052 (+ 0/- 0)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Textile	**0.00555 (+ 0/- 0)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Brass	**0.000080 (+ 0/- 0)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Plastic PA6 (7)	**0.018 (+ 0/- 0)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
Plastic ABS (7)	**0.073 (+ 0/- 0)**	0 (+ 0/- 0)	0 (+ 0/- 0)	0 (+ 0/- 0)
TOTAL	**1.90 (+ 0/ 0)**	0 (+ 0/- 0)	73.05 (+ 1.52/ --2.1)	0.55 (+ 0.011/- -0.016)
Packaging materials	**Weight, average kg**	**Post-consumer material, average weight-%**	**Biogenic material, average weight-%**	**Biogenic material, average kg C/ product**
Cardboard	**2.74**	40.09	90	1.15
Carton	**0.023**	0	90	0.0097
Paper, printed	**0.0042**	0	90	0.0015
Plastic PE-LD (4)	**0.0050**	0	0	0
Zinc-plated steel (electro-galvanised)	**0.00020**	0	0	0
Objects with adhesive properties	**0.0073**	0	0	0
Plastic PP (5)	**0.010**	0	0	0
TOTAL	**2.79**	39.37%	89.26 %	1.16

No Substances of Very High Concern (SVHC) in concentrations exceeding the EU REACH Regulation allowances have been identified in any of the product variants.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. Use of the results of modules A1-A3 without considering the results of module C is discouraged.

OCTO 4240 VARIANTS (AVERAGE) MANDATORY IMPACT CATEGORY INDICATORS ACCORDING TO EN 15804, RESULTS PER DECLARED UNIT[2]

Results per declared unit, average																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	-2.43E+00	9.97E-01	4.47E+00	0	1.07E+00	0	3.90E+00	0	2.50E+02	0	0	1.04E-01	5.63E+00	5.77E-02	-4.60E+00
GWP-fossil	kg CO_2 eq.	7.17E+00	9.97E-01	2.06E-01	0	9.84E-01	0	3.88E+00	0	2.23E+02	0	0	1.04E-01	1.69E-01	6.62E-03	-5.63E+00
GWP-biogenic	kg CO_2 eq.	-9.72E+00	2.05E-04	4.26E+00	0	0.00	0	1.37E-02	0	2.61E+01	0	0	1.45E-05	5.46E+00	5.11E-02	1.00E+00
GWP-luluc	kg CO_2 eq.	1.28E-01	2.73E-05	1.74E-05	0	8.85E-02	0	6.93E-03	0	4.68E-01	0	0	3.11E-06	1.29E-05	4.50E-07	2.13E-02
ODP	kg CFC 11 eq.	9.57E-07	1.70E-08	2.64E-09	0	9.46E-09	0	6.44E-07	0	2.04E-06	0	0	1.61E-09	2.73E-10	1.11E-10	-4.90E-08
AP	mol H^+ eq.	5.01E-02	1.98E-02	9.89E-04	0	1.17E-02	0	2.79E-02	0	4.04E-01	0	0	5.45E-04	2.44E-04	2.36E-05	-2.54E-02
EP-freshwater	kg P eq.	6.74E-04	8.29E-07	1.11E-06	0	4.55E-04	0	2.81E-04	0	3.31E-02	0	0	7.73E-08	9.08E-07	1.15E-07	-8.31E-04
EP-marine	kg N eq.	1.19E-02	5.11E-03	6.18E-04	0	1.74E-02	0	4.02E-03	0	8.28E-02	0	0	2.41E-04	1.22E-04	5.01E-05	-4.91E-03
EP-terrestrial	mol N eq.	1.10E-01	5.67E-02	4.64E-03	0	4.52E-02	0	4.42E-02	0	9.59E-01	0	0	2.64E-03	1.29E-03	1.04E-04	-7.34E-02
POCP	kg NMVOC eq.	3.68E-02	1.59E-02	1.79E-03	0	4.00E-03	0	1.36E-02	0	3.08E-01	0	0	1.05E-03	3.17E-04	5.32E-05	-1.99E-02
ADP-minerals &metals*	kg Sb eq.	2.20E-04	2.08E-08	9.66E-09	0	7.25E-07	0	1.18E-04	0	1.31E-05	0	0	3.47E-09	7.41E-09	1.39E-09	-1.08E-04
ADP-fossil*	MJ	1.29E+02	1.27E+01	2.18E+00	0	1.09E+01	0	4.82E+01	0	3.57E+03	0	0	1.34E+00	2.29E-01	7.77E-02	-7.71E+01
WDP*	m^3	5.66E+00	1.10E-02	-1.68E-02	0	1.96E+01	0	1.21E+00	0	5.88E+01	0	0	1.56E-03	1.42E-02	-6.25E-02	-8.81E-01

** 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.*

[2] 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

OCTO 4240 VARIANTS (AVERAGE) ADDITIONAL MANDATORY AND VOLUNTARY IMPACT CATEGORY INDICATORS[3]

Results per declared unit, average																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[4]	kg CO_2 eq.	7.33E+00	9.97E-01	3.43E-01	0	1.10E+00	0	3.89E+00	0	2.25E+02	0	0	1.04E-01	1.69E-01	4.69E-02	-5.60E+00
PM	Disease incidence	1.07E-06	4.69E-08	2.13E-08	0	8.42E-08	0	2.23E-07	0	1.19E-06	0	0	1.35E-08	2.08E-09	5.32E-10	-2.45E-07
IRP*	kBq U235 eq.	4.11E-01	1.32E-03	7.98E-04	0	2.77E-02	0	1.38E-01	0	1.34E+01	0	0	1.07E-04	3.48E-04	5.32E-05	-1.97E-01
ETP-fw**	CTUe	5.71E+01	4.33E-01	1.36E+00	0	3.66E+01	0	2.41E+01	0	5.66E+02	0	0	4.59E-02	1.90E+00	2.58E-01	-9.25E+01
HTP-c**	CTUh	1.68E-08	3.41E-10	5.72E-11	0	1.22E-09	0	5.64E-09	0	4.17E-08	0	0	5.36E-12	9.26E-11	3.96E-12	-4.28E-09
HTP-nc**	CTUh	2.28E-07	3.15E-09	1.91E-09	0	1.53E-08	0	1.12E-07	0	1.27E-06	0	0	1.35E-10	6.81E-09	1.27E-10	-2.91E-08
SQP**	dimensionless	7.23E+02	2.48E-02	1.54E-01	0	3.35E+01	0	9.77E+00	0	4.30E+02	0	0	2.15E-03	2.25E-02	1.89E-01	-9.22E+01

** 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 facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.*

*** 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.*

[3] GWP-GHG = Global Warming Potential greenhouse gases; PM = Potential incidence of disease due to particulate matter emissions; IRP = Potential human exposure efficiency relative to U235; ETP-fw = Potential comparative toxic unit for ecosystems; HTP-c = Potential comparative toxic unit for humans (cancer effects); HTP-nc = Potential comparative toxic unit for humans (non-cancer effects); SQP = Potential soil quality index

[4] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

OCTO 4240 VARIANTS (AVERAGE) RESOURCE USE INDICATORS[5] [6]

Results per declared unit, average															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.50E+02	3.34E-02	3.96E+01	0	5.44E+00	0	5.63E+00	0	1.27E+03	0	0	2.58E-03	1.03E+01	2.49E-03	-3.21E+01
PERM	MJ	5.12E+01	0.00E+00	-3.96E+01	0	1.81E-01	0	6.91E-02	0	0.00E+00	0	0	0.00E+00	-1.02E+01	0.00E+00	-1.55E+00
PERT	MJ	2.01E+02	3.34E-02	2.63E-02	0	5.62E+00	0	5.70E+00	0	1.27E+03	0	0	2.58E-03	2.22E-02	2.49E-03	-3.37E+01
PENRE	MJ	1.18E+02	1.27E+01	2.66E+00	0	1.09E+01	0	4.97E+01	0	3.57E+03	0	0	1.34E+00	5.55E+00	7.77E-02	-7.68E+01
PENRM	MJ	1.28E+01	0.00E+00	-4.75E-01	0	0.00E+00	0	-1.46E+00	0	0.00E+00	0	0	0.00E+00	-5.32E+00	0.00E+00	-6.22E-02
PENRT	MJ	1.31E+02	1.27E+01	2.18E+00	0	1.09E+01	0	4.82E+01	0	3.57E+03	0	0	1.34E+00	2.29E-01	7.77E-02	-7.69E+01
SM	kg	1.59E+00	4.66E-06	3.27E-05	0	2.90E-04	0	3.39E-02	0	4.81E-03	0	0	5.33E-07	7.48E-06	6.33E-06	-1.52E-01
RSF	MJ	2.49E-01	3.86E-07	3.08E-06	0	1.47E-05	0	2.93E-03	0	2.27E-04	0	0	5.28E-08	8.68E-07	3.59E-07	1.00E-01
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00	0	0.00E+00	0	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.80E-01	2.70E-04	-3.76E-04	0	4.57E-01	0	3.09E-02	0	1.54E+00	0	0	3.75E-05	3.35E-04	-1.45E-03	-2.56E-02

[5] 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.

[6] The Primary Energy Indicators are calculated according to Option B (PCR 2019:14 v. 1.3.4)

OCTO 4240 VARIANTS (AVERAGE) WASTE INDICATORS

Results per declared unit, average															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	7.47E-01	1.01E-03	8.16E-03	0	6.50E-02	0	4.56E-01	0	7.18E+00	0	0	1.10E-04	1.07E-02	4.70E-05	-5.33E-01
Non-hazardous waste disposed	kg	2.26E+01	4.51E-02	2.03E+00	0	6.26E+01	0	1.11E+01	0	1.52E+03	0	0	4.15E-03	1.50E+00	1.90E+00	-2.22E+01
Radioactive waste disposed	kg	2.66E-04	8.35E-07	5.11E-07	0	1.84E-05	0	8.98E-05	0	1.67E-02	0	0	6.00E-08	4.11E-07	3.25E-08	-2.34E-04

OCTO 4240 VARIANTS (AVERAGE) OUTPUT FLOW INDICATORS

Results per declared unit, average																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	4.57E-02	0.00E+00	0.00E+00	0	0.00E+00	0	0	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	1.02E-01	2.46E-07	2.04E+00	0	3.72E-04	0	0	0.00E+00	2.64E-04	0	0	2.91E-08	1.75E-01	1.86E-06	1.26E+00
Materials for energy recovery	kg	1.76E-05	5.40E-09	1.03E-08	0	8.62E-04	0	0	0.00E+00	9.97E-06	0	0	7.67E-10	1.73E-08	7.50E-10	6.28E-07
Exported energy, electricity	MJ	1.23E-01	4.15E-04	2.68E-04	0	9.62E-03	0	0	0.00E+00	5.39E+01	0	0	2.14E-05	1.26E-03	2.23E-05	-7.11E-01
Exported energy, thermal	MJ	7.92E-02	5.09E-04	4.51E-04	0	1.32E-03	0	0	0.00E+00	5.80E-01	0	0	1.77E-06	7.14E-05	4.62E-04	-8.99E-03

Additional information

Secto Design is committed to continuously reducing our environmental impacts and ensuring a safe and healthy working environment. Read more about our sustainability work on our website: https://www.sectodesign.fi/about-us/sustainability

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