



MultiGeneration by Knoll® Americas

Environmental Product Declaration

Date of Issue: May 05, 2025

Date of Expiration: May 05, 2030

Product Category Rules

BIFMA PCR for Seating, UNCPC 3811, version 3

Product Sub-Category: Side Seat Chair (Single Occupant)

EN 15804+A2




ISO 14025/14040/14044

Functional Unit

1 seat for 1 individual maintained for a 10-year period (1 MultiGeneration by Knoll stacking base chair)

This EPD was not written to support comparative assertions. EPDs based on different PCRs or different calculation models may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results due to and not limited to the practitioner's assumptions, the source of the data used in the study, the specifics of the product modeled, and the software tool used to conduct the study.

MultiGeneration by Knoll

| | | |
|---|---|---|
| Program Operator | NSF Certification LLC 789 N. Dixboro, Ann Arbor, MI 48105 www.nsf.org |  |
| Manufacturer Name and Address | Knoll North America 1235 Water St East Greenville, PA 18041 | |
| Declaration Number | EPD11074 | |
| Declared Product and Functional Unit | MultiGeneration by Knoll Stacking Base (product code 2SASXHC3ONGENF09) Functional Unit: 1 seat for 1 individual maintained for 10 years | |
| Reference PCR and Version Number | BIFMA PCR for Seating, UNCPC 3811, version 3 EN 15804+A2 | |
| Product's intended Application and Use | Side Seat Chair (Single Occupant) | |
| Product RSL | 10 years | |
| Markets of Applicability | North/South America | |
| Date of Issue | May 05, 2025 | |
| Period of Validity | 5 years from date of issue | |
| EPD Type | Product Specific | |
| Intended Audience | Business-to-Business, Business-to-Consumer | |
| Range of Dataset Variability | N/A | |
| EPD Scope | Cradle to Grave | |
| Year of reported manufacturer primary data | 2021 | |
| LCA Software and Version Number | Sphera LCA for Experts (fka GaBi) 10.9 | |
| LCI Database and Version Number | Sphera Managed LCA Content (fka GaBi) Database, 2024.1 | |
| LCIA Methodology and Version Number | TRACI 2.1, IPCC AR6, EN 15804 EF 3.1 | |
| The PCR review was conducted by: | Review Panel Chaired by Dr. Thomas Gloria | |
| This declaration was independently verified in accordance with ISO 14025: 2006, the BIFMA PCR for Seating, and EN 15804+A2 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External | Jack Geibig - EcoForm jgeibig@ecoform.com |  |
| This reference life cycle assessment was conducted in accordance with ISO 14044 and the reference PCRs: | Lydia Schreiber - WAP Sustainability Consulting lydia@wapsustainability.com | |
| This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by: | Jack Geibig - EcoForm jgeibig@ecoform.com |  |
| References | BIFMA PCR for Seating: UNCPC 3811, Version 3 (2014) EN 15804+A2 (2019) ISO 14025/40/44 (2006) MillerKnoll Background Report for LCA/EPD Creation Tool v1.0 | |
| <p>Limitations:</p> <p>Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of Products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR. Full conformance with the PCR for Products allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.</p> | | |

MultiGeneration by Knoll

Product Description

Designed by Knoll in collaboration with Formway Design

MultiGeneration by Knoll encourages collaboration with a responsive, open design that supports multiple postures and a diversity of people in shared, team and large group environments. MultiGeneration facilitates natural movement, allowing us to focus, interact and communicate more effectively.

This document relates to MultiGeneration by Knoll. MultiGeneration by Knoll multipurpose stacking chair with fixed arms, upholstered seat pad, hard casters, and no book basket is covered in this document.



Company Description

MillerKnoll is a collective of dynamic brands that comes together to design the world we live in. The MillerKnoll brand portfolio includes Herman Miller, Knoll, Colebrook Bosson Saunders, DatesWeiser, Design Within Reach, Edelman, Geiger, HAY, HOLLY HUNT, Knoll Textiles, Maharam, Muuto, NaughtOne, and Spinneybeck|FilzFelt. MillerKnoll is an unparalleled platform that redefines modern for the 21st century by building a more sustainable, equitable, and beautiful future for all.

At the intersection of people and environments, there's Knoll. Founded in 1938, the company's creative collaborations with the most influential architects and designers of the day have yielded an unmatched portfolio of timeless products for the office, hospitality and home. Knoll was built on its belief that when furniture, interiors and architecture are designed harmoniously, we create spaces where people want to be. Knoll is part of MillerKnoll, a collective of the world's most dynamic design brands.

Our Mission

Driven by the mission to design and make the world's best products in the most sustainable way, MillerKnoll's sustainability strategy focuses on three key areas:

- **Carbon**
Design the lowest carbon footprint products and commit to achieving net-zero carbon emissions by 2050.¹
- **Materials**
Use sustainable, 100% bio-based or recycled materials by 2050.
- **Circularity**
Design timeless, durable products with zero waste by 2050.

Supplier Support

At MillerKnoll, we are committed to working closely with our suppliers to reduce our collective impact on the environment. We encourage our suppliers to minimize their operations'

environmental impacts and require they assist us in decreasing our facilities' environmental effects.

Manufacturing Locations

- East Greenville, PA, United States

Warranty

Backed by MillerKnoll's 12-year warranty.

Creating Transparency on Materials

We are transparent about our materials because we believe in informed decisions. Our Ecomedes platform provides environmental product information from across our brands, including details about materials used and third-party certifications. This resource helps customers buy or specify environmentally preferable products by supplying product-level data and automating product performance calculations that can help contribute to sustainability goals. Ecomedes is linked here.

Product Environmental Data

| | Value* |
|--------------------------|--------|
| Recycled Content % | 20% |
| Pre-Consumer | 16% |
| Post-Consumer | 4% |
| Recyclability (max %) ** | 86% |

*The recycled content information shown may vary from ecomedes due to periodic product updates.

**This recyclability rate is the maximum amount of the product that is recyclable, based on availability of recycling facilities and ability of the product to be disassembled. Note that, per the requirements of the PCR, the End-of-Life results presented in this EPD were calculated using the US EPA's recycling rates within the 2018 Municipal Solid Waste Report for parts that can be disassembled.

Additional information, including installation and recycling instructions, can be found at <https://www.knoll.com/design-plan/product/multigeneration-by-knoll-stacking-base>.

¹ MillerKnoll's net-zero commitment is subject to factors that are partly outside its control, including its value chain's ability to reduce their Scope 1 and 2 emissions (and therefore MillerKnoll's Scope 3 emissions) by 2050. In light of this, MillerKnoll is committed to achieving net-zero by 2050 and will continue to engage with stakeholders across its value chain to support them in their efforts to become net-zero by 2050.

MultiGeneration by Knoll

MATERIAL DECLARATION

Functional Unit

The functional unit is one seat for one individual, maintained over a 10-year period, including packaging materials used for the final assembled product. The product has met ANSI/BIFMA X5.1 requirements for a 10-year lifetime, so no replacements are required. To meet the functional unit, 1 unit of MultiGeneration by Knoll is required.

Reference Flow and Product Specifications

One MultiGeneration by Knoll multipurpose stacking chair (product number 2SASXHC3ONGENF09) with fixed arms, upholstered seat pad, hard casters, no book basket, metallic grey frame finish, onyx shell color, and onyx Generation fabric was modeled for this EPD. This chair is determined to be a representative product based on sales of the variations. The results in this EPD are only representative of this configuration. While the exact configuration purchased may be slightly different, it is expected to have impacts within 10% of this representative configuration. The results presented on the subsequent pages and the tables to the right consist of the impacts of MultiGeneration by Knoll made at East Greenville, PA.

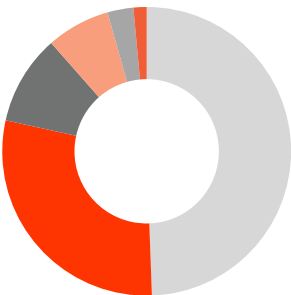
System Boundary

Cradle-to-Grave

Content Declaration

The table to the right details the materials included in a specific SKU for the product made in the United States, summarized in the chart below. In order to achieve the functional unit, 1 product is required.

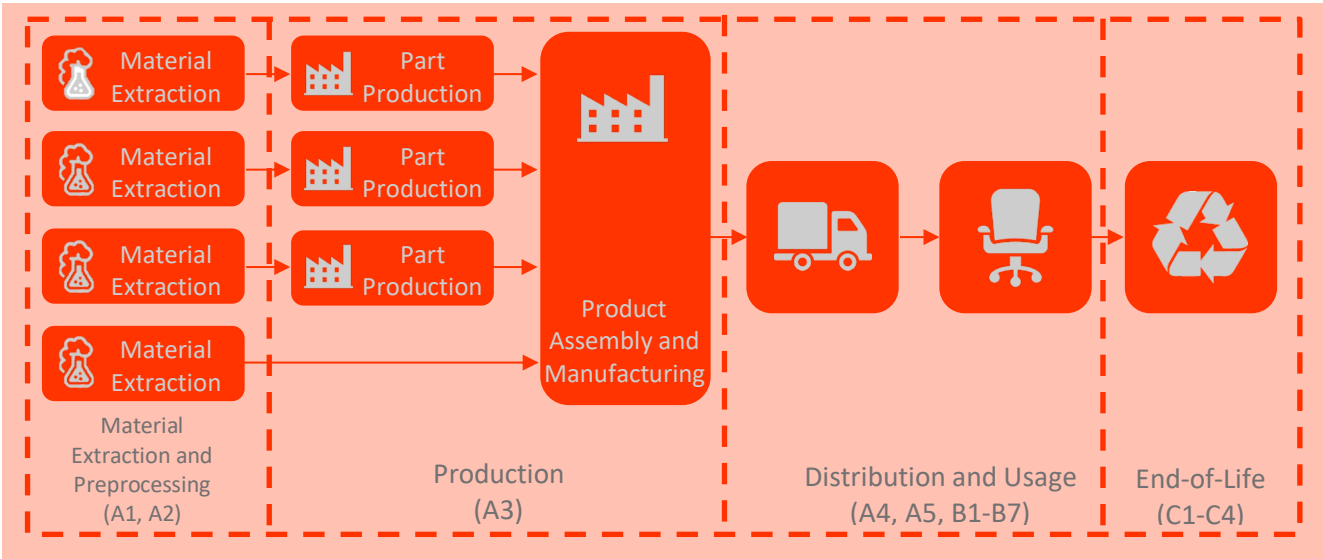
- Steel 49%
- Polyamide 6 (PA6) 29%
- Polyurethane Foam 10%
- Polypropylene (PP) 7%
- Thermoplastic Polyurethane (TPU) 3%
- Other 1%



| Material | Mass (kg) | Mass (%) | Resource |
|----------------------------------|-----------|----------|---|
| Steel | 4.48 | 49% | Virgin Non-renewable and Recycled Content |
| Polyamide 6 (PA6) | 2.63 | 29% | Virgin Non-renewable and Recycled Content |
| Polyurethane Foam | 0.91 | 10% | Virgin Non-renewable |
| Polypropylene (PP) | 0.65 | 7% | Virgin Non-renewable |
| Thermoplastic Polyurethane (TPU) | 0.26 | 3% | Virgin Non-renewable |
| Other | 0.13 | 1% | Virgin Non-renewable |
| Total | 9.07 | 100% | |

| Packaging | Mass (kg) | Mass (%) | Resource |
|------------|-----------|----------|----------------------|
| Corrugate | 4.94 | 98% | Recycled Content |
| PE Bag | 0.09 | 2% | Virgin Non-Renewable |
| PP Banding | <0.01 | <1% | Virgin Non-Renewable |
| Total | 5.03 | 100% | |

This product contains no substances prohibited by the regulations applicable at the time of EPD publication, and does not contain substances that require registration under REACH. It respects the restrictions on use of hazardous substances as defined in the REACH directive EC 1907/2006.



Overview of Life Cycle Stages

MultiGeneration by Knoll

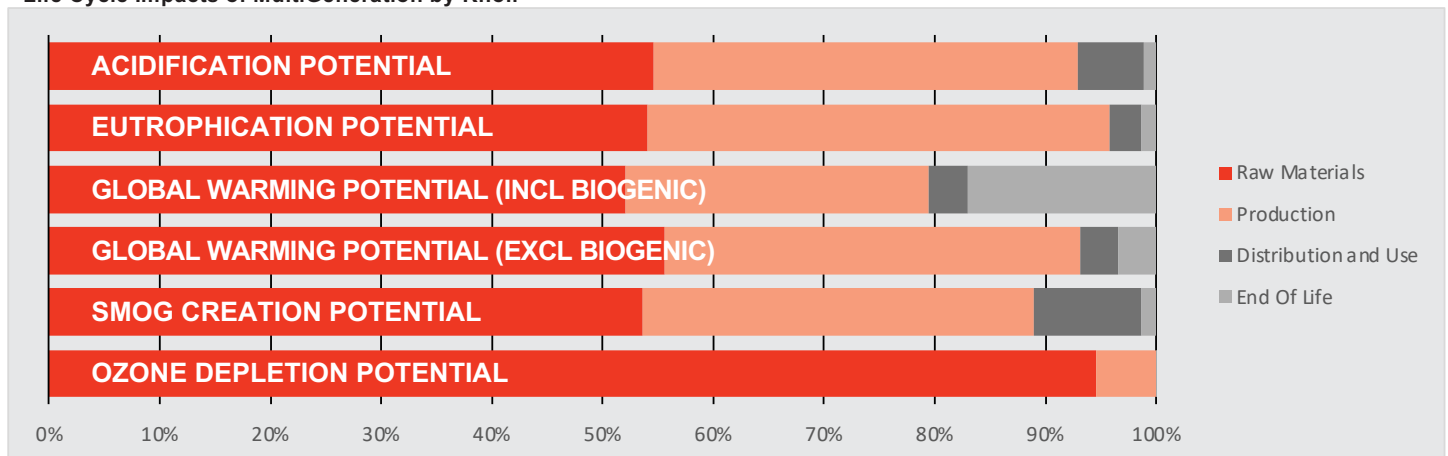
Life Cycle Impact Assessment – BIFMA PCR for Production in North America

Environmental Impacts were calculated using the GaBi software platform. Impact results according to the BIFMA PCR have been calculated using IPCC AR6 GWP₁₀₀ and TRACI 2.1 characterization factors. Additionally, LCI indicators have been calculated for primary energy, water usage, renewable and non-renewable resources used as energy carriers and materials, and recovered energy. Results presented in this report are for 1 seat for 1 individual maintained for 10 years.

The results presented here are for MultiGeneration by Knoll (2SASXHC3ONGENF09). Additionally, the results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

| LCA Impact Category | Unit | Total | Raw Material Production | Product Production | Distribution and Retail | End of Life |
|--|-----------------------|----------|-------------------------|--------------------|-------------------------|-------------|
| Acidification Potential | kg SO ₂ eq | 2.00E-01 | 1.09E-01 | 7.68E-02 | 1.18E-02 | 2.26E-03 |
| Eutrophication Potential | kg N eq | 3.76E-02 | 2.04E-02 | 1.57E-02 | 1.06E-03 | 5.16E-04 |
| Global Warming Potential Including Biogenic Carbon | kg CO ₂ eq | 7.39E+01 | 3.85E+01 | 2.02E+01 | 2.56E+00 | 1.26E+01 |
| Global Warming Potential Excluding Biogenic Carbon | kg CO ₂ eq | 7.39E+01 | 4.10E+01 | 2.77E+01 | 2.56E+00 | 2.54E+00 |
| Photochemical Ozone Creation Potential (Smog) | kg O ₃ eq | 2.80E+00 | 1.50E+00 | 9.89E-01 | 2.72E-01 | 3.68E-02 |
| Ozone Depletion Potential | kg CFC-11 eq | 9.76E-09 | 9.23E-09 | 5.27E-10 | 6.52E-15 | 1.31E-14 |
| LCI Impact Category | Unit | Total | Raw Material Production | Product Production | Distribution and Retail | End of Life |
| Primary Energy Demand (Renewable and Non-Renewable) | MJ (net cal value) | 1.13E+03 | 5.61E+02 | 5.27E+02 | 3.54E+01 | 6.40E+00 |
| Fresh Water Consumption | kg | 7.43E+02 | 5.94E+02 | 1.39E+02 | 4.95E+00 | 5.80E+00 |
| Renewable Primary Resources Used as Energy Carrier | MJ (net cal value) | 1.27E+02 | 2.42E+01 | 1.03E+02 | 0.00E+00 | 0.00E+00 |
| Renewable Primary Resources Used as Materials | MJ (net cal value) | 1.27E+02 | 2.58E+01 | 9.94E+01 | 1.47E+00 | 5.37E-01 |
| Non-renewable Primary Resources Used as Energy Carrier | MJ (net cal value) | 1.74E+02 | 1.69E+02 | 4.81E+00 | 0.00E+00 | 0.00E+00 |
| Non-renewable Primary Resources Used as Materials | MJ (net cal value) | 1.00E+03 | 5.35E+02 | 4.28E+02 | 3.39E+01 | 5.87E+00 |
| Recovered Energy | MJ (net cal value) | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Life Cycle Impacts of MultiGeneration by Knoll



MultiGeneration by Knoll

APPENDIX: EN 15804+A2

Additionally, results have been calculated using LCIA methodologies for core environmental impact categories specified in EN 15804+A2, as well as LCI indicators required by EN15804+A2 reference package EF 3.1. The results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks. Values in the scenario tables below are reported per functional unit, which is 1 seat for 1 individual maintained for 10 years. To fulfill this functional unit, 1 unit of product is required.

LCA Scenario Details

Functional Unit

| Parameter | Value |
|---------------------------------|-----------|
| Declared Unit | 1 seat |
| Reference Service Life Required | 10 years |
| Biogenic Carbon in Product | 0 kg C |
| Biogenic Carbon in Packaging | 2.72 kg C |

Reference Service Life

| Parameter | Value per functional unit |
|-------------------------------|---|
| Reference Service Life | 10 Years |
| Design Application Parameters | Use as indicated in product brochure and warranty |
| Declared Product Properties | Properties given in product description on page 4 |
| Indoor environment | Typical office and home environment |
| Use conditions | Typical office and home use |

A4: Transport to the Building Site

| Parameter | Value per functional unit |
|------------------------------------|---------------------------|
| Transportation Type | Diesel Truck |
| Fuel Consumption | 0.621 L/km |
| Distance | 2,253 km |
| Capacity Utilization | 61% |
| Capacity utilization volume factor | 1 |
| Weight of product (kg) | 9.07 |
| Volume (m ³) | 0.175 |

A5: Installation in the Building

| Parameter | Value per functional unit |
|--------------------------|--|
| Packaging Waste Produced | 5.03 kg |
| Installation Assumptions | No product waste, Installed with hand tools. |

B1: Use

| Parameter | Value per functional unit |
|---|---------------------------|
| There are no emissions related to the expected use of this product. | |

B2: Maintenance

| Parameter | Value per functional unit |
|---|---|
| Maintenance Process | No maintenance is expected for this product |
| Maintenance cycle | 0 |
| Ancillary Materials for maintenance (kg/cycle) | 0 |
| Waste materials resulting from maintenance (kg) | 0 |
| Net freshwater consumption during maintenance (m ³) | 0 |
| Energy input during maintenance (kWh) | 0 |

B3: Repair

| Parameter | Value per functional unit |
|--|--|
| Repair process | No repairs are expected for this product |
| Inspection process | No repairs are expected for this product |
| Repair cycle (#/RSL) | 0 |
| Ancillary materials (kg) | 0 |
| Waste materials from repair (kg) | 0 |
| Net freshwater consumption during repair (m ³) | 0 |
| Energy input during repair (kWh) | 0 |

B4: Replacements

| Parameter | Value per functional unit |
|--|---------------------------|
| Replacement cycle (#/RSL) | 0 |
| Energy input during replacement (kWh) | 0 |
| Exchange of worn parts during the products life cycle (kg) | 0 |

B5: Refurbishment

| Parameter | Value per functional unit |
|--|---|
| Refurbishment process | No refurbishment is expected for this product |
| Refurbishment cycle (#/RSL) | 0 |
| Energy input during refurbishment (kWh) | 0 |
| Material input for refurbishment (kg) | 0 |
| Waste material resulting from refurbishment (kg) | 0 |

B6 and B7: Use of energy and Use of Water

| Parameter | Value per functional unit |
|--|---------------------------|
| Ancillary materials (kg) | 0 |
| Net freshwater consumption (m ³) | 0 |
| Characteristic performance | n/a |

C1-C4: End-of-Life

| Parameter | Value per functional unit |
|----------------------------------|---------------------------|
| Weight of Product Collected (kg) | 9.07 |
| Weight to Recycling (kg) | 1.04 |
| Weight to Energy Recovery (kg) | 1.61 |
| Weight to Landfill (kg) | 6.42 |
| Distance to Recycling (km) | 50 |
| Distance to Energy Recovery (km) | 100 |
| Distance to Landfill (km) | 50 |

MultiGeneration by Knoll

Life Cycle Stages

The results are provided according to the following life cycle modules:

| Module | Description |
|--------|--|
| A1 | Product Stage: Raw Material Supply |
| A2 | Product Stage: Transport |
| A3 | Product Stage: Manufacturing |
| A4 | Construction Process Stage: Transport |
| A5 | Construction Process Stage: Installation |
| B1 | Use Stage: Use |
| B2 | Use Stage: Maintenance |
| B3 | Use Stage: Repair |
| B4 | Use Stage: Replacement |
| B5 | Use Stage: Refurbishment |
| B6 | Operational Energy Use |
| B7 | Operational Water Use |
| C1 | EOL: Deconstruction |
| C2 | EOL: Transport |
| C3 | EOL: Waste Processing |
| C4 | EOL: Disposal |
| D | Benefits beyond system |

MultiGeneration by Knoll

Life Cycle Impact Assessment – EN 15804+A2 (EF 3.1) for Production in North America

EN 15804+A2 Results – 1 seat for 1 individual maintained for 10 Years

| Impact Category | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|
| GWP _{Total} [kg CO ₂ eq] | 5.87E+01 | 2.56E+00 | 1.02E+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 | 4.68E-02 | 2.12E+00 | 2.26E-01 | -7.93E+00 |
| GWP _{Fossil} [kg CO ₂ eq] | 6.73E+01 | 2.56E+00 | 1.43E-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 | 4.67E-02 | 2.12E+00 | 1.63E-01 | -7.93E+00 |
| GWP _{Biogenic} [kg CO ₂ eq] | -8.60E+00 | 1.06E-03 | 1.01E+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 | 1.95E-05 | -9.75E-05 | 6.20E-02 | 0.00E+00 |
| GWP _{LULUC} [kg CO ₂ eq] | 1.37E-02 | 1.44E-03 | 4.11E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.64E-05 | 6.47E-05 | 6.12E-04 | -2.48E-03 |
| ODP [kg CFC 11 eq] | 9.20E-09 | 3.26E-13 | 1.99E-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 | 5.96E-15 | 1.27E-13 | 5.08E-13 | -1.78E-08 |
| AP [Mole H ⁺ eq] | 2.05E-01 | 1.27E-02 | 3.77E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.42E-04 | 5.78E-04 | 9.62E-04 | -3.13E-02 |
| EP, freshwater [kg PO ₄ eq] | 2.16E-03 | 1.31E-05 | 1.46E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.40E-07 | -1.28E-07 | 5.83E-05 | -4.56E-04 |
| EP, marine [kg N eq] | 5.42E-02 | 6.34E-03 | 1.68E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.86E-05 | 1.78E-04 | 2.59E-04 | -7.19E-03 |
| EP, terrestrial [Mole N eq] | 4.93E-01 | 6.99E-02 | 1.86E-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 | 7.57E-04 | 2.71E-03 | 2.41E-03 | -6.63E-02 |
| POCP [kg NMVOC eq] | 1.37E-01 | 1.30E-02 | 4.15E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.37E-04 | 4.76E-04 | 7.24E-04 | -1.94E-02 |
| Resource Use, mineral and metals* [kg Sb eq] | 2.90E-05 | 3.45E-07 | 8.67E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.31E-09 | -1.24E-08 | 1.05E-08 | -1.64E-06 |
| Resource Use, fossil* [MJ] | 1.14E+03 | 3.39E+01 | 1.36E+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 | 6.20E-01 | 1.22E+00 | 2.66E+00 | -1.10E+02 |
| Water use* [m ³ world eq] | 2.96E+01 | 1.52E-01 | 6.92E-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 | 2.78E-03 | 2.13E-01 | 1.99E-02 | -2.15E+00 |

GWP=Global Warming Potential; LULUC=Land Use and Land Use Change; ODP=Ozone Depletion Potential; EP=Eutrophication Potential; AP=Acidification Potential; POCP=Photochemical ozone creation potential

*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 experienced with the indicator

MultiGeneration by Knoll

Resource Use and Waste – 1 seat for 1 individual maintained for 10 Years

| Impact Category | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| PERE [MJ] | 2.52E+02 | 1.47E+00 | 5.68E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.69E-02 | 5.72E-02 | 3.96E-01 | -8.32E+01 |
| PERM [MJ] | 1.25E+02 | 1.47E+00 | 5.68E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.69E-02 | 5.72E-02 | 3.96E-01 | -8.19E+01 |
| PERT [MJ] | 3.77E+02 | 2.94E+00 | 1.14E-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 | 5.37E-02 | 1.14E-01 | 7.93E-01 | -1.65E+02 |
| PENRE [MJ] | 1.14E+03 | 3.39E+01 | 1.36E+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 | 6.20E-01 | 1.22E+00 | 2.66E+00 | -1.10E+02 |
| PENRM [MJ] | 1.74E+02 | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PENRT [MJ] | 1.31E+03 | 3.39E+01 | 1.36E+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 | 6.20E-01 | 1.22E+00 | 2.66E+00 | -1.10E+02 |
| SM [kg] | 2.35E+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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RSF [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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRSF [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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW [m ³] | 7.33E-01 | 4.95E-03 | 1.95E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.06E-05 | 4.92E-03 | 5.98E-04 | -5.50E-02 |
| HWD [kg] | 1.24E-06 | 4.59E-09 | 1.30E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.40E-11 | 1.28E-10 | 6.45E-10 | -6.13E-08 |
| NHWD [kg] | 9.73E+00 | 3.34E-03 | 7.31E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.12E-05 | 2.65E-01 | 6.05E+00 | -5.65E-01 |
| RWD [kg] | 4.38E-02 | 8.78E-05 | 3.25E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.61E-06 | 2.08E-05 | 3.69E-05 | -2.97E-03 |
| HLRW [kg] | 5.23E-05 | 1.04E-07 | 3.65E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.90E-09 | 2.43E-08 | 3.38E-08 | -3.62E-06 |
| ILLRW [kg] | 4.37E-02 | 8.77E-05 | 3.25E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.61E-06 | 2.08E-05 | 3.69E-05 | -2.97E-03 |
| CRU [kg] | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR [kg] | 1.63E+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 | 0.00E+00 | 6.55E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MER [kg] | 5.69E-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 | 0.00E+00 | 1.54E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE [MJ] | 3.01E+00 | 0.00E+00 | 1.33E-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 | 0.00E+00 | 0.00E+00 | 2.89E-02 | 0.00E+00 |
| PM [Disease Incidence] | 2.45E-06 | 1.29E-07 | 3.72E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.57E-09 | 6.98E-09 | 1.04E-08 | -3.67E-07 |
| IRP**[kBq U235 eq] | 3.64E+00 | 7.44E-03 | 3.08E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.36E-04 | 1.83E-03 | 5.07E-03 | -2.38E-01 |
| ETP-fw* [CTUe] | 7.05E+02 | 2.65E+01 | 1.12E+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 | 4.84E-01 | 1.19E+00 | 4.37E+00 | -5.98E+01 |
| HTP-c* [CTUh] | 3.30E-08 | 6.58E-10 | 2.00E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.43E-12 | 3.98E-11 | 6.77E-11 | -1.09E-08 |
| HTP-nc* [CTUh] | 3.09E-07 | 1.05E-08 | 4.82E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.89E-10 | 3.94E-09 | 1.70E-09 | -3.48E-08 |
| SQP* [no unit] | 3.93E+02 | 6.61E+00 | 1.50E-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 | 1.21E-01 | 1.26E-01 | 4.59E-01 | -1.42E+02 |

PERE=Renewable Primary Energy from Non-Materials; PERM=Renewable Primary Energy from Materials; PERT=Total Renewable Primary Energy; PENRE=Non-Renewable Primary Energy from Non-Materials; PENRM=Non-Renewable Primary Energy from Materials; PENRT=Total Non-Renewable Primary Energy; SM=Use of Secondary Materials; RSF=Use of Renewable Secondary Fuels; NRSF=Use of Non-Renewable Secondary Fuels; FW=Net Use of Fresh Water; HWD=Hazardous Waste Disposed; NHWD=Non-Hazardous Waste Disposed; RWD=Radioactive Waste Disposed; HLRW=High Level Radioactive Waste; ILLRW=Intermediate- and Low-Level Radioactive Waste; CRU=Components for Reuse; MFR=Materials for Recycling; MER=Materials for Energy Recovery; EE=Exported Energy; PM=Particulate Matter; IRP=Ionizing Human Radiation; ETP-fw=Eco-toxicity freshwater; HTP-c=Human toxicity - Cancer; HTP-nc=Human toxicity - Noncancer; SQP=Land use related impacts / soil quality

*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 experienced with the indicator.

**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.

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References

1. CEN. (2019). CSN EN 15804+A2. Retrieved from European Standards: <https://www.en-standard.eu/csn-en-15804-a2-sustainability-of-construction-works-environmental-product-declarations-core-rules-for-the-product-category-of-construction-products/>
2. ISO 14040: 2006/ Amd 1:2020: Environmental Management – Life cycle assessment – Requirements and Guidelines.
3. ISO 14044: 2006/ Amd 1:2017/ Amd 2:2020: Environmental Management – Life cycle assessment – Requirements and Guidelines – Amendment 1.
4. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
5. IPCC (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.
6. Joint Research Centre of the EU Commission. (2022, July). Environmental Footprint reference packages . Retrieved from European Platform on LCA: <https://eplca.jrc.ec.europa.eu/LCDN/developerEF.html>
7. NSF International (2014). BIFMA PCR for Seating: UNCPC 3811 version 3, valid through September 30, 2025
8. NSF International National Center for Sustainability Standards (2015). General Program Instructions.
9. US EPA (2012). TRACI: The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts. Version 2.1 – User Guide. Retrieved from <https://nepis.epa.gov/Adobe/PDF/P100HN53.pdf>.
10. US EPA (2022). Facts and Figures about Materials, Waste and Recycling. Retrieved from <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials>
11. US EPA. (2022, December 3). Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2018. Retrieved from <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials>
12. WAP Sustainability Consulting (2024, December). Life Cycle Assessment, MillerKnoll Background Report for LCA/EPD Creation Tool v1.0.