

# SMaRT<sup>®</sup> Environmental Product Declaration (EPD) & Health Product Declaration (HPD)

This Declaration discloses information over the product's life cycle from raw material extraction, transportation, manufacture, use, and reuse or end of life.

## Chadwick<sup>®</sup> chair



### Product Description

The model chosen for analysis is the Chadwick chair with adjustable arms and plastic base. This is the heaviest, fully optioned model and therefore the worst case scenario for LCA. This model has post-consumer recycle content of 12%, post-industrial recycle content of 22%.

Don Chadwick, an ergonomic design pioneer, created a chair that embodies the best of his thinking with the finest principles of Knoll design. From its streamlined form to its smart engineering, Chadwick is the office chair refined—and redefined.

Designed by Don Chadwick for Knoll

[knoll.com/product/chadwick](http://knoll.com/product/chadwick)

### Manufacturer

Chadwick is manufactured in the Knoll Lubin Manufacturing Facility, 1235 Water Street, East Greenville, Pennsylvania—a LEED<sup>®</sup> Gold and ISO 14001 certified and VPP Star site—using clean technologies.

Knoll is an industry leader in policies and practices designed to protect the biosphere, conserve natural resources and reduce waste.

Knoll is the recipient of the 2011 National Design Award for Corporate and Institutional Achievement from the Smithsonian's Cooper-Hewitt, National Design Museum. Since 1938, Knoll has been recognized internationally for creating workplace and residential furnishings that inspire, evolve and endure. Today, our commitment to modern design, our understanding of the workplace and our dedication to sustainable design has yielded a unique portfolio of products that respond and adapt to changing needs. Knoll is aligned with the U.S. Green Building Council and the Canadian Green Building Council and can help companies achieve Leadership in Energy and Environmental Design LEED<sup>®</sup> workplace certification. Knoll is the founding sponsor of the World Monuments Fund Modernism at Risk program.

For further information, visit [knoll.com](http://knoll.com).

### SMaRT Scorecard

#### SMaRT & SMaRT EPD & HPD Significance

All SMaRT Product EPDs & HPDs are Certified as Sustainable Products, Stockholm Treaty Toxic Chemicals/PVC and SF6 free, meet SMaRT's Carcinogen and Legal Operations Policies, use FSC Certified Wood for wood products, and are uniquely comparable accurately based on life cycle assessment (LCA).

The Chadwick chair is a SMaRT Sustainable Gold certified product achieving:

- 20 points for Safe for Public Health & Environment
- 23 points for Renewable Energy & Energy Reduction

- 8 points for Biobased or Recycled Materials
- 10 points for Facility or Company Requirements
- 4 points for Reclamation, Reuse & End of Life

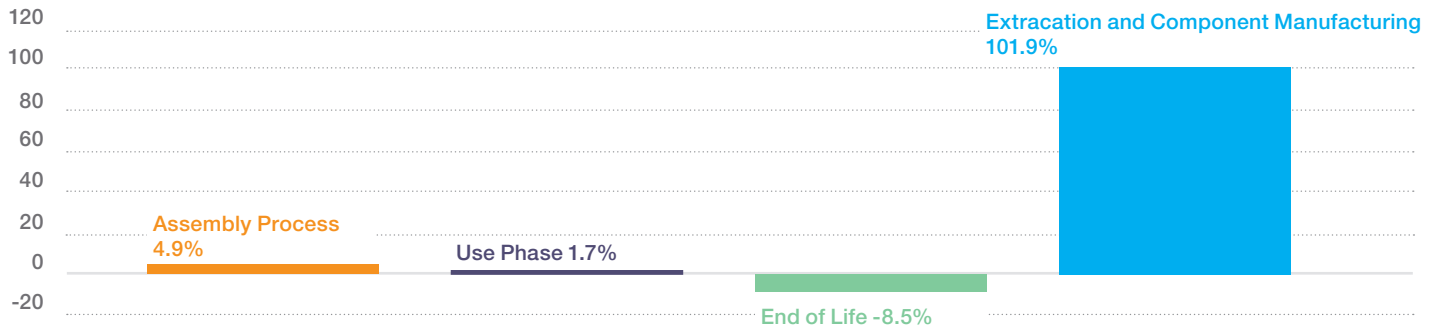
The Chadwick SMaRT Sustainable Product Certification Summary and Scorecard are at: <http://mts.sustainableproducts.com/SMaRT/Chadwick>

#### Background on SMaRT & ISO Environmental Labels

SMaRT is a type 1 consensus, performance based and quantified Ecolabel, an independently third-party verified, multi-criteria license to use the

SMaRT Label indicating the overall environmental and sustainable preferability of a product on a life cycle basis. Type 2 labels are manufacturer self-claims on the environment without third party verification. A type 3 label is an independent, qualified third-party verified environmental product declaration based on a quantified LCA with set parameters. To increase accuracy, SMaRT EPDs & HPDs combine the requirements of a type 1 Ecolabel and also a transparent type 3 label. LCAs are best used to obtain supplier environmental impact data and improve product design.

## Chadwick CO<sub>2</sub> Footprint by Life Cycle Stage



kg CO<sub>2</sub> equivalent

## Material Declaration

Chadwick consists of the materials listed below, comprising 1% or more by weight. The total chair weight is 37.38 pounds excluding packaging. Cardboard packaging weighs 8.0 pounds.

Metals	lbs	%
Aluminum	6.89	18.43
Steel	8.80	23.54

Plastics	lbs	%
PA 6	2.11	10.71
PA 66	16.64	34.54
ABS	0.309	1.56
PU	0.625	3.17

Other	lbs	%
Glass	1.22	3.26
Fabric	0.71	1.89

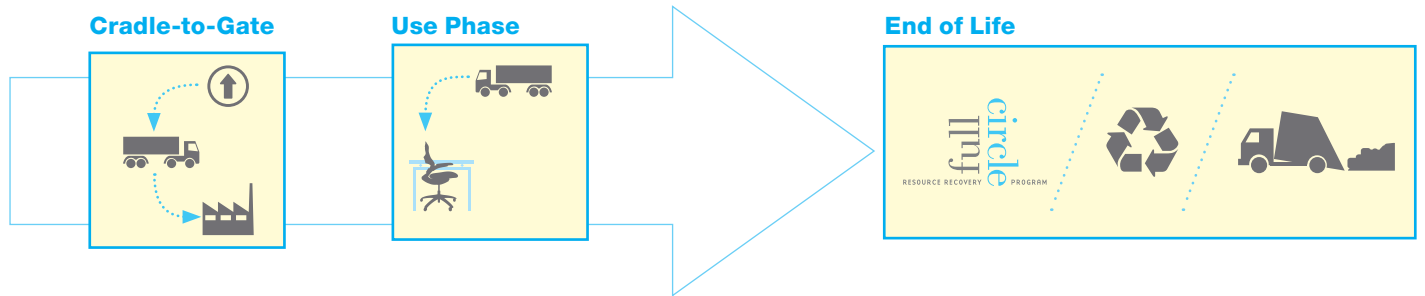
## Environmental Product Declaration & Health Product Declaration

The environmental impacts of Chadwick throughout its entire life cycle—including raw materials extraction, production, transport, use and end of life—were assessed using the Life Cycle Assessment (LCA) process, during the chair's development in 2005.

The functional unit used in the LCA is one chair with a ten year Life expectancy. The LCA was performed using Gabi software and the SMaRT<sup>®</sup> Product Criteria Rule (PCR) was applied. The SMaRT<sup>®</sup> EPD & HPD Policy and PCR documents meet the requirements of the ISO Standards for LCAs/EPD & HPDs.

## Life Cycle Inventory Analysis

The Life Cycle Inventory Analysis covers the entire life cycle stages as shown below.



### Cradle-to-gate

Includes raw materials extraction, transport of materials to Knoll suppliers, transformation of materials to parts and components, including the manufacturing processes for main parts, and the transport of parts to Knoll. The Cradle to Gate also includes receipt of parts to Knoll and all production and assembly processes through to the Knoll shipping dock.



### Use Phase

This phase includes transport to the customer and use of the product, where no relevant environmental impact occurs including for installation.



### End of life

Landfill, recycling and resource recovery are included in the LCA. It is assumed that the metals used to construct the chair are recovered. Knoll encourages customers to pursue the Knoll Full Circle program at the end of life, depending on condition of the product, options include resale, repurpose to non-profit organizations in their community, recycling, and/or converting materials not readily recyclable to clean Energy-from-Waste (EfW). Visit [www.knoll.com/fullcircle](http://www.knoll.com/fullcircle) for more details.

## Environmental Impact Potential

LCA Criteria	Cradle-to-gate	Use Phase	End of Life	Total
Global Warming <i>kg CO<sub>2</sub> equivalent</i>	107.88	1.66	-8.532	101
Stratospheric Ozone Depletion <i>kg CFC equivalent</i>	4.54 - 7	0	-0.455 - 6	0.948
Acidification <i>kg H<sup>+</sup> moles equivalent</i>	25.23	0.577	-1.50	24.3
Eutrophication <i>kg N equivalent</i>	0.078	0.0006	0.000482	0.0799
Photochemical Smog <i>kg O<sub>3</sub> equivalent</i>	4.88	0.235	-0.22	4.9
Ecological Toxicity <i>Air, Water, Soil PAF m3 day/kg</i>	10.87	-0.43	0.51	10.959
Human Health Toxicity <i>kg DCB equivalent</i>	9.94	0.0148	-3.974	5.98
Human Health Criteria <i>Air-kg of PM10 equivalent</i>	0.098	0	0.001	0.0987
Fossil Fuel Depletion <i>kg Oil equivalent</i>	38.75	0.356	-2.006	37.1
Solid /Hazardous Waste <i>kg disposed Gate to Gate</i>				0
Water Depletion <i>m3</i>	17.8	0.051	0.25	18.1

## Maintenance, Quality and Durability

Chadwick is designed for long and problem-free usage, with a 12-year, 24/7 warranty. See Knoll Selling Policy at [knoll.com](http://knoll.com) for further details, conditions and exclusions. It is easy to refurbish for continuous use in a second life. Minor environmental impacts have been identified during the use phase of this product.

Knoll recommends an annual maintenance checkup of your chair to achieve its maximum lifetime: tighten loose fasteners, lubricate moving parts, replace broken or missing parts, clean casters and fabrics, which are cleanable with low environmental impact fluids, including GS-37 certified products. See [KnollTextiles.com](http://KnollTextiles.com) for cleaning instructions.

## Recovery Declaration

Knoll has developed with its partners ANEW, InstallNet and Covanta Energy a program to avoid landfill when decommissioning furniture or surplus assets from a space. Options include reselling, repurposing, recycling, as well as converting unusable surplus to clean Energy-from-Waste.

This EPD & HPD is more robust than ISO minimums because it covers 11 environmental impacts regulated by EPA and the States, and includes required common assumptions for EPD & HPDs for multiple product categories.

## Additional environmental information

### Chadwick and SMaRT®

Rated Sustainable Gold by the SMaRT® Sustainable Product Standard. SMaRT® is a comprehensive, transparent, consensus sustainable product standard that measures a product's environmental, economic and social benefits over its life cycle and throughout its global supply chain, from raw materials extraction through reclamation or re-use. The SMaRT® Scorecard results of different products can be accurately compared and include LCA results. The Chadwick SMaRT® Scorecard and SMaRT® Certification Summary are available at this link: <http://mts.sustainableproducts.com/SMaRT/Chadwick>

### Chadwick and level®

Chadwick is BIFMA level® 3 certified. BIFMA has established level® as a common

framework against which to evaluate the environmental and social responsibility of a variety of products. Visit [levelcertified.org](http://levelcertified.org)

### Chadwick and GREENGUARD®

Chadwick is GREENGUARD and GREENGUARD Gold certified. The GREENGUARD Environmental Institute aims to protect human health and improve quality of life by enhancing indoor air quality and reducing people's exposure to chemicals and other pollutants. Visit [greenguard.org](http://greenguard.org)

### Chadwick and LEED®

Chadwick can contribute to achieving LEED® credits for Commercial Interiors, New Construction and Existing Buildings. Developed by the U.S. Green Building Council (USGBC) in 2000, The LEED® green building certification system is the preeminent program for rating the design, construction and operation of green buildings.

## References

SMaRT® EPD & HPD Policy & PCR: <http://mts.sustainableproducts.com/SMaRT/Chadwick>

ISO 14025 Environmental labels and declarations—Type III Environmental Declarations—Principals and Procedures

ISO 14040 Life Cycle Assessment—Principles and Framework

ISO 14044 Life Cycle Assessment—Requirements and Guidelines

ISO 21930 Sustainability in Building Construction—Environmental Declaration of Building Products

Federal Trade Commission (FTC) Environmental Guidelines

LCA Method and Characterization Factor

Knoll asserts that the SMaRT® EPD & HPD Policy and PCR were adhered to in preparation of this Declaration with accurate information that is not misleading, and qualified professionals were used consistent with the FTC Environmental Marketing Guides.

This SMaRT® EPD & HPD was certified by Market Transformation to Sustainability (MTS) November 2013, and expires June 2015. EPD & HPDs from different systems are not comparable unless the SMaRT® PCR is used.

SMaRT® PCR review consistent with ISO 21930 §§6.2 & 9.1 & ISO 14025 §8.1.2 was conducted by MTS. The Chairman of the SMaRT® Committee overseeing this EPD & HPD Policy and requirements is Doug Pierce, Perkins+Will who can be contacted through [MTS@sustainableproducts.com](mailto:MTS@sustainableproducts.com).

Independent verification of the declaration and data, according to ISO 14025:2006 performed by MTS (ISO 14025 §8.1.1)

SMaRT® EPD & HPD third party verification was conducted by MTS independent of first parties (suppliers/manufacturers) and second parties (purchasers) and is appropriate for business to business and business to consumer communications, and consumer and environmental representatives reviewed the SMaRT® EPD & HPD Policy consistent with ISO 14025 §9.3. MTS is not involved in the development of the ISO compliant LCA or the EPD, has no conflicts of interests, and is a nonprofit IRC §501(c)(3) (ISO 14025 §§8.1.1 & 9.4).

MTS is competent to conduct the third party SMaRT® EPD & HPD verification pursuant to ISO 14025 §8.2 as documented in section 12 of the SMaRT® EPD & HPD Policy.

MTS is the EPD & HPD Programme Operator, 1511 Wisconsin Avenue, NW, Washington, D.C. 20007

## Contact



For further information, please call Knoll at 877 615-6655.