Aloha Active Seating

Environmental Product Declaration

EPD-S-P-12454
Date of Issue: May 20, 2024
Date of Expiration: May 19, 2029

Product Category Rule

BIFMA PCR for Seating, UNCPC 3811
EN 15804+A2:2019/AC2021
Construction Products PCR:2019:14 version 1.3.4
In accordance with ISO 14025

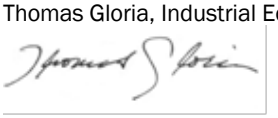
Program

Program: The International EPD System
www.environdec.com
Program Operator: EPD International AB

Functional Unit

1 Aloha Active seat with a plastic base, maintained for a period of 10 years produced in Europe.

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 and the software tool used to conduct the study.
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.

Program Operator	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
Manufacturer Name and Address	Haworth, Inc. One Haworth Center Holland, MI 49423 sustainability@haworth.com
Declaration Number	EPD-S-P-12454
Declared Product and Functional Unit	1 Aloha Active seat with a plastic base, maintained for a 10-year period produced in Europe
Reference PCR and Version Number	CEN standard EN 15804 serves as the core PCR PCR 2019:14 Construction products, version 1.3.4 BIFMA PCR for Seating: UNCPC 3811, Version 3
Product's intended Application and Use	Commercial Furniture
Product RSL	10 years
Markets of Applicability	Europe
Date of Issue	May 20, 2024
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	2022
LCA Software and Version Number	Sphera LCA FE (GaBi) 10.7
LCI Database and Version Number	Sphera MLC (GaBi) 2023.2
LCIA Methodology and Version Number	EN 15804+A2 (EF 3.1), IPCC AR6 + TRACI 2.1
Core PCR review was conducted by:	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.
The sub-category PCR review was conducted by:	Thomas Gloria, PhD (chair) Jack Geibig, P.E. Michael Overcash, PhD
Independent, third party verification of the declaration and data, according to ISO 14040 (2006), ISO 14025 (2006), 14025 (2006), EN 15804+A2, and BIFMA PCR for Seating: UNCPC 3811 V3, which serves as the core PCR. **☒EPD verification by individual verifier**	Thomas Gloria, Industrial Ecology Consultants  Approved by: The International EPD® System
This life cycle assessment was conducted in accordance with ISO 14044, EN 15804+A2, and the reference PCR by:	WAP Sustainability Consulting
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, or not compliant with EN 15804, 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.

This study utilizes the BIFMA Seating PCR as a cPCR. This BIFMA PCR was used to meet market expectations such as Building Transparency EC3 comparisons, LEED and existing vendor procurement requirements, and product scoring programs. The EPD should not be used outside of this context.

Company Description

Haworth strives to be a sustainable corporation. We believe operating a sustainable corporation will allow us to help people do great things for generations to come. We are on a journey—one that promotes longevity and delivers value to the people, communities, and planet that we serve. At our core, we are a family—and we weather challenges together. Haworth is built upon a culture that empowers members and all stakeholders to make positive changes. We strengthen existing partnerships and build new ones, while empowering our members and leveraging our global reach, as we continue our drive toward making positive changes for the people and communities, we serve all over the world.

Product Description

The Intuitive Seating Experience. Sleek looks and an amazing new performance that's wholly comfortable. The new affordable task-chair hero in the workplace. Haworth has leveraged its experience as leader in task-seating to combine the latest in comfort and technology. Aloha makes task-seating more instinctive and fit-for-purpose. Aloha Active provides well-considered design and a revolutionary weight-activated mechanism to maximize your seating experience without compromise of quality and comfort. Quality comes first. Haworth's design and innovation brings together decades of engineering excellence in task-seating. Smarter, smoother, and more comfortable, Aloha is the perfect balance of price and performance. A comfortable seat pan, height adjustable 4D arms, a back that locks in to three positions plus an optional adjustable lumbar support, means Aloha can be tailored to a wider range of body types and working styles. Aloha Active is manufactured in Queluz, Portugal– an ISO 14001 certified manufacturing facility. This product can be easily disassembled at the end of its useful life. Components are identified with ISO recycling symbols and material information to assist in the recycling effort, where practical. Haworth offers circular service solutions for product take back, refurbishment, or recycling after the product's useful life.

Results were calculated for multiple configurations of seating product. The first chair configuration reviewed (SECPT with 4D arm rests and plastic base) consists of a mesh back, lumbar support, 4D arms and a plastic base and was determined to have the highest potential impacts of Aloha Active model configurations with mesh backs produced in Europe, making the results in this EPD conservative and thus representative of all products listed with mesh backs. Product codes within the variation allowance include mesh-back chairs beginning with SECPT. The second chair configuration reviewed (SECPU with 4D arm rests and plastic base) consists of an upholstered back, lumbar support, 4D arms and a plastic base and was determined to have the highest potential impacts of Aloha Active model configurations with upholstered backs produced in Europe, making the results in this EPD conservative and thus representative of all products listed with upholstered backs. Product codes within the variation allowance include upholstered-back chairs beginning with SECPU.

This product falls under UN CPC 3811.

The compositions of the chairs reviewed are provided below. Material compositions are reported per unit of product. The mesh-back chair has a total product weight of 15.2 kg and total packaging weight of 2.27 kg.

Material	[kg]	[%]	Recycled Content [%]	Resource Type
Product				
Steel	6.65	43%	41%	Recycled, Virgin Non-renewable
Nylon PA6	5.70	38%	0%	Virgin Non-renewable
Polypropylene	1.79	12%	18%	Recycled, Virgin Non-renewable
Polyurethane	0.76	5%	0%	Virgin Non-renewable
Polyester Fabric	0.26	2%	1%	Recycled, Virgin Non-renewable
Other	0.03	<1%	0%	Virgin non-renewable
Packaging				
Paper	2.12	94%	47%*	Recycled, Virgin, Renewable
Polyethylene	0.14	6%	0%	Virgin, Non-renewable
Cardboard	0.01	<1%	0*%	Virgin, Renewable

*Recycled content of paper and cardboard packaging are average values associated with background LCI datasets

The upholstered-back chair has a total product weight of 17.9 kg and total packaging weight of 2.27 kg.

Material	[kg]	[%]	Recycled Content [%]	Resource Type
Product				
Steel	6.20	35%	31%	Recycled, Virgin Non-renewable
Nylon PA6	5.43	30%	0%	Virgin Non-renewable
Polypropylene	3.45	19%	0%	Virgin Non-renewable
Aluminum	1.07	6%	60%	Recycled, Virgin Non-renewable
Polyurethane	0.76	4%	18%	Recycled, Virgin Non-renewable
Thermoplastic Polyurethane	0.74	4%	25%	Recycled, Virgin Non-renewable
Polyester Fabric	0.25	1%	0%	Virgin Non-renewable
Other	0.02	<1%	0%	Virgin non-renewable
Packaging				
Paper	2.12	94%	47%*	Recycled, Virgin, Renewable
Polyethylene	0.14	6%	0%	Virgin, Non-renewable
Cardboard	0.01	<1%	0%*	Virgin, Renewable
*Recycled content of paper and cardboard packaging are average values associated with background LCI datasets				

Additional Environmental Information

The product under review is manufactured at a zero waste-to-landfill facility that is ISO 14001- and ISO 9001- certified. In addition, this product has the following certifications:

- GREENGUARD Gold Certified
- GS Safety Award

Functional Unit

The functional unit according to the PCR is one unit of seating to seat one individual, maintained for a 10-year period produced in Europe. The product under study has a 10-year service life under ANSI/BIFMA X5.5 and therefore does not require replacements to meet the functional unit.

LCA Stages

Materials Acquisition & Pre-Processing | Includes raw material extraction, pre-processing of materials, and transport to production.

Production | Includes component and final assembly manufacturing operations, both by Haworth and upstream suppliers, as well as intermediate transport and packaging requirements.

Distribution, Storage, and Use | Includes an average distribution to customers. No additional storage is required. There are no impacts associated with use of the product.

End-of-Life | Includes transport to and disposal of product and packaging based on average European EOL rates.

LCA Information

General principles of allocation were based on ISO 14040/44. Where possible, allocation was avoided. At the part supplier production facilities, manufacturing inputs and outputs are allocated to co-products by mass because of the use of secondary datasets and no primary data available for part suppliers. At Haworth assembly facilities, manufacturing inputs and outputs are allocated to co-products based on economic value. This choice was deemed the most appropriate at Haworth facilities due to the availability of data on economic value. As a default, Sphera Managed LCA Content datasets use a physical mass basis for allocation.

Throughout the study recycled materials were accounted for via the cut-off method. Under this method, impacts and benefits associated with the previous life of a raw material from recycled stock are excluded from the system boundary and includes the impacts associated with reprocessing and preparation of recycled materials. Additionally, impacts and benefits associated with secondary functions of materials at end of life are also excluded.

Production of capital goods, infrastructure, and personnel-related activities are excluded, as required by the BIFMA PCR for seating.

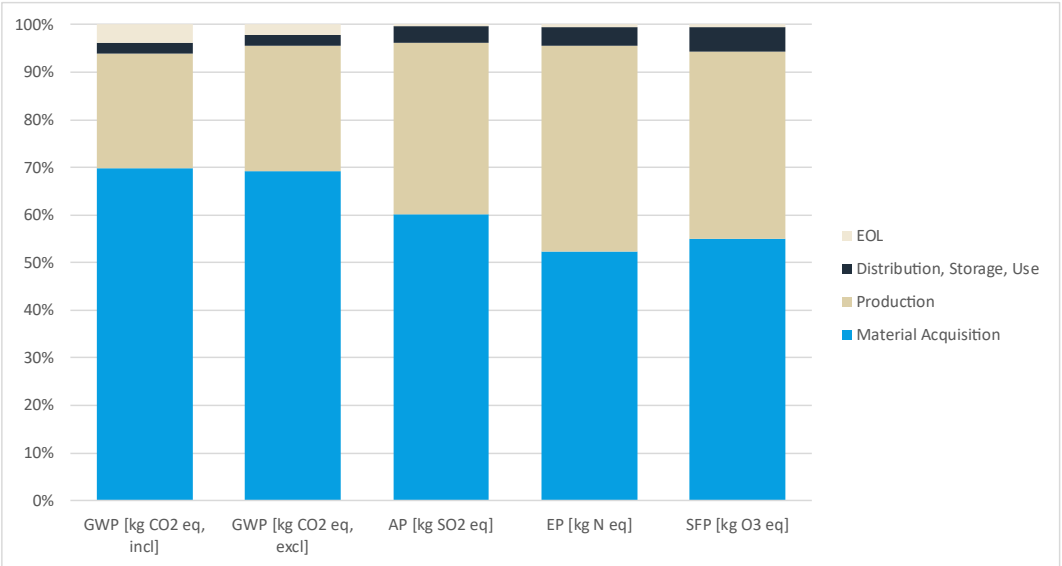
LCA Results – Mesh-Back Configuration

All results are given per functional unit, which is one unit of seating to seat one individual, maintained for a 10-year period. Results are reported separately by life cycle stage per the BIFMA PCR for seating. It is discouraged to use of results for Material Acquisition and Production without considering the results for End of Life.

Impact Category	Material Acquisition	Production w/ grid electricity*	Production w/ purchased renewables*	Distribution , Storage, Use	EOL	Total**
IPCC AR6 LCIA Impacts						
Global Warming Potential, incl biogenic [kg CO_2 eq]	6.48E+01	2.24E+01	1.90E+01	2.06E+00	3.53E+00	**9.28E+01**
Global Warming Potential, excl biogenic [kg CO_2 eq]	6.48E+01	2.48E+01	2.13E+01	2.06E+00	2.05E+00	**9.37E+01**
TRACI 2.1 LCIA Impacts						
Acidification Potential [kg SO_2 eq]	1.72E-01	1.03E-01	9.75E-02	9.50E-03	1.17E-03	**2.86E-01**
Eutrophication Potential [kg N eq]	1.12E-02	9.27E-03	8.65E-03	8.41E-04	1.18E-04	**2.14E-02**
Ozone Depletion Potential [kg CFC 11 eq]	1.60E-12	4.81E-10	4.87E-10	5.32E-15	1.37E-14	**4.83E-10**
Smog Formation Potential [kg O_3 eq]	2.34E+00	1.68E+00	1.56E+00	2.20E-01	1.87E-02	**4.26E+00**
Resource Use Indicators						
Renewable primary resources used as energy carrier [MJ]	6.47E+01	7.68E+01	1.52E+02	1.15E+00	4.16E-01	**1.43E+02**
Renewable primary resources with energy content used as material [MJ]	0.00E+00	2.97E+01	2.97E+01	0.00E+00	0.00E+00	**2.97E+01**
Renewable primary resources, total [MJ]	6.47E+01	1.07E+02	1.82E+02	1.15E+00	4.16E-01	**1.73E+02**
Non-renewable primary resources used as energy carrier [MJ]	7.20E+02	2.77E+02	2.20E+02	2.90E+01	2.76E+00	**1.03E+03**
Non-renewable primary resources with energy content used as a material [MJ]	2.66E+02	3.21E+01	3.21E+01	0.00E+00	0.00E+00	**2.98E+02**
Non-renewable primary resources, total [MJ]	9.87E+02	3.09E+02	2.52E+02	2.90E+01	2.76E+00	**1.33E+03**
Recovered energy [MJ]	0.00E+00	9.99E+00	9.99E+00	0.00E+00	1.60E+01	**2.60E+01**
Net fresh water usage [kg]***	8.45E-01	2.12E-01	2.46E-01	3.96E-03	8.74E-03	**1.07E+00**

*Impacts in the “production w/ grid electricity” stage includes electricity from the grid and on-site renewables whereas “production w/ purchased renewables” also includes electricity from the grid (if any) , on-site renewables (if any), and voluntary renewable electricity purchased by Haworth for production purposes.
**Includes material acquisition, production w/ grid, distribution, storage, use, and EOL.
***Water usage from electricity generation is included

The chart below presents the relative contribution of each life cycle stage to the TRACI 2.1 and IPCC environmental impact categories by life cycle stage per the BIFMA PCR for seating.



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. Results are reported per functional unit. For this product, 1 unit of product is required to meet the functional unit. The results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks. It is discouraged to use of results for A1-A3 without considering the results for C1-C4.

	Product Stage w/ grid electricity*	Product Stage w/ purchased renewables*	Construction Stage		Use Stage								End of Life			Benefits and Loads Beyond the System Boundary
	A1-A3	*A1-A3*	*A4*	*A5*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*B7*	*C1*	*C2*	*C3*	*C4*	*D*
GWP-GHG [kg CO2 eq.]	8.96E+01	8.62E+01	2.07E+00	1.23E-01	0	0	0	0	0	0	0	0	3.91E-02	1.85E+00	5.04E-02	-2.91E+01
Climate Change - total [kg CO2 eq.]	8.73E+01	8.38E+01	2.06E+00	2.20E+00	0	0	0	0	0	0	0	0	3.92E-02	1.85E+00	4.97E-02	-2.73E+01
Climate Change, fossil [kg CO2 eq.]	8.94E+01	8.59E+01	2.06E+00	8.17E-02	0	0	0	0	0	0	0	0	3.91E-02	1.85E+00	5.03E-02	-2.90E+01
Climate Change, biogenic [kg CO2 eq.]	-2.12E+00	-2.12E+00	1.33E-03	2.12E+00	0	0	0	0	0	0	0	0	2.52E-05	6.32E-05	-6.44E-04	1.74E+00
Climate Change, land use and land use change [kg CO2 eq.]	1.86E-02	1.82E-02	2.34E-03	1.87E-05	0	0	0	0	0	0	0	0	4.45E-05	3.06E-05	4.46E-05	-4.50E-03
Ozone depletion [kg CFC-11 eq.]	4.67E-10	7.64E-10	2.52E-13	1.99E-13	0	0	0	0	0	0	0	0	4.80E-15	3.61E-13	8.56E-14	-6.10E-11
Acidification [Mole of H+ eq.]	3.08E-01	3.02E-01	1.02E-02	4.54E-04	0	0	0	0	0	0	0	0	1.18E-04	2.30E-04	1.56E-04	-7.09E-02
Eutrophication, freshwater [kg P eq.]	4.86E-04	4.80E-04	1.01E-05	6.07E-07	0	0	0	0	0	0	0	0	1.92E-07	9.67E-08	8.91E-06	-4.18E-05
Eutrophication, marine [kg N eq.]	7.36E-02	7.18E-02	5.13E-03	1.70E-04	0	0	0	0	0	0	0	0	5.79E-05	6.24E-05	3.63E-05	-1.67E-02
Eutrophication, terrestrial [Mole of N eq.]	7.52E-01	7.32E-01	5.65E-02	2.06E-03	0	0	0	0	0	0	0	0	6.39E-04	1.05E-03	3.98E-04	-1.53E-01
Photochemical ozone formation, human health [kg NMVOC eq.]	2.21E-01	2.16E-01	1.04E-02	4.54E-04	0	0	0	0	0	0	0	0	1.15E-04	1.79E-04	1.15E-04	-5.23E-02
Resource use, mineral and metals [kg Sb eq.]**	1.52E-04	1.53E-04	1.35E-07	2.22E-09	0	0	0	0	0	0	0	0	2.57E-09	3.21E-09	1.36E-09	-4.62E-05
Resource use, fossils [MJ]**	1.57E+03	1.52E+03	2.70E+01	6.24E-01	0	0	0	0	0	0	0	0	5.13E-01	8.24E-01	7.51E-01	-5.76E+02
Water use [m^3 world equiv.]**	1.76E+01	1.93E+01	1.20E-01	1.90E-01	0	0	0	0	0	0	0	0	2.28E-03	1.75E-01	-5.76E-04	-1.60E+00

	Product Stage w/ grid electricity*	Product Stage w/ purchased renewables*	Construction Stage		Use Stage								End of Life			Benefits and Loads Beyond the System Boundary
	A1-A3	*A1-A3*	*A4*	*A5*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*B7*	*C1*	*C2*	*C3*	*C4*	*D*
Use of renewable primary energy (PERE) [MJ]	1.71E+02	2.46E+02	1.15E+00	1.27E-01	0	0	0	0	0	0	0	0	2.19E-02	1.98E-01	6.88E-02	-6.62E+01
Primary energy resources used as raw materials (PERM) [MJ]	2.97E+01	2.97E+01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	2.01E+02	2.76E+02	1.15E+00	1.27E-01	0	0	0	0	0	0	0	0	2.19E-02	1.98E-01	6.88E-02	-6.62E+01
Use of non-renewable primary energy (PENRE) [MJ]	1.30E+03	1.24E+03	2.90E+01	6.30E-01	0	0	0	0	0	0	0	0	5.51E-01	8.25E-01	7.52E-01	-5.76E+02
Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	2.98E+02	2.98E+02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	1.59E+03	1.54E+03	2.90E+01	6.30E-01	0	0	0	0	0	0	0	0	5.51E-01	8.25E-01	7.52E-01	-5.76E+02
Input of secondary material (SM) [kg]	6.26E+00	6.26E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW) [m3]	1.06E+00	1.09E+00	3.96E-03	4.49E-03	0	0	0	0	0	0	0	0	7.53E-05	4.17E-03	1.10E-05	-8.54E-01
Hazardous waste disposed (HWD) [kg]	9.48E-06	9.48E-06	8.33E-11	2.02E-11	0	0	0	0	0	0	0	0	1.58E-12	6.55E-12	6.23E-11	-1.17E-06
Non-hazardous waste disposed (NHWD) [kg]	4.89E+00	4.90E+00	2.52E-03	9.55E-02	0	0	0	0	0	0	0	0	4.79E-05	1.68E-01	8.09E-01	9.59E-01
Radioactive waste disposed (RWD) [kg]	2.47E-02	2.15E-02	8.31E-05	2.67E-05	0	0	0	0	0	0	0	0	1.58E-06	2.95E-05	8.88E-06	-8.44E-03
High-level radioactive waste, conditioned, to final repository (HLRW) [kg]	2.86E-05	2.48E-05	9.86E-08	2.20E-08	0	0	0	0	0	0	0	0	1.87E-09	2.70E-08	7.74E-09	-9.75E-06
Intermediate- and low-level radioactive waste, conditioned, to final repository (ILLRW) [kg]	2.46E-02	2.15E-02	8.30E-05	2.66E-05	0	0	0	0	0	0	0	0	1.58E-06	2.95E-05	8.88E-06	-8.43E-03
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	2.74E+00	2.74E+00	0	1.13E+00	0	0	0	0	0	0	0	0	0	0	0	0

	Product Stage w/ grid electricity*	Product Stage w/ purchased renewables*	Construction Stage		Use Stage								End of Life			Benefits and Loads Beyond the System Boundary
	A1-A3	*A1-A3*	*A4*	*A5*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*B7*	*C1*	*C2*	*C3*	*C4*	*D*
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total recovered energy exported from the product system (EEE and EET) [MJ]	9.99E+00	9.99E+00	0	6.61E+00	0	0	0	0	0	0	0	0	0	0	0	0
Particulate matter [Disease incidences]	5.04E-06	5.00E-06	1.02E-07	2.68E-09	0	0	0	0	0	0	0	0	1.27E-09	2.82E-09	1.55E-09	-5.28E-07
Ionizing radiation, human health [kBq U235 eq.]***	2.48E+00	2.28E+00	7.01E-03	4.19E-03	0	0	0	0	0	0	0	0	1.33E-04	4.06E-03	1.31E-03	-6.68E-01
Ecotoxicity, freshwater [CTUe]**	5.53E+02	5.47E+02	2.26E+01	3.16E-01	0	0	0	0	0	0	0	0	4.30E-01	5.40E-01	6.11E-01	-1.95E+02
Human toxicity, cancer [CTUh]**	8.50E-07	8.50E-07	5.26E-10	1.66E-11	0	0	0	0	0	0	0	0	7.82E-12	2.85E-11	3.31E-11	-2.02E-09
Human toxicity, non-cancer [CTUh]**	7.29E-07	7.22E-07	8.51E-09	6.42E-10	0	0	0	0	0	0	0	0	1.60E-10	2.36E-09	2.70E-09	-1.69E-07
Land Use [Pt]**	2.17E+02	1.76E+02	5.09E+00	1.61E-01	0	0	0	0	0	0	0	0	9.67E-02	1.96E-01	6.77E-02	-2.55E+02

The life cycle modules are defined by EN 15804 as follows: Product Stage – raw material supply, transport, and manufacturing; Construction Stage – distribution and installation; Use Stage – use of installed product, maintenance, repair, replacement, refurbishment, operational energy use, and operational water use; End of Life - deconstruction, transport of waste, waste processing, and disposal; Benefits and Loads Beyond the System Boundary - credits from energy and material capture.
*Impacts in the "product stage w/ grid electricity" stage includes electricity from the grid and on-site renewables whereas "product stage w/ purchased renewables" also includes electricity from the grid (if any), on-site renewables (if any), and voluntary renewable electricity purchased by Haworth for production purposes.
**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 experience 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.

As required by the construction products PCR, this EPD shall declare the energy source behind electricity used in the manufacturing process in A3 and its climate impact as kg CO2 eq./kWh (using the GWP-GHG indicator).

A3 Electricity Climate Impact

Site	Energy Source	GWP-GHG	Unit
Queluz, Portugal	National residual mix	3.50E-01	kg CO2 eq / kWh
Queluz, Portugal	Renewable sources from supplier: hydro, solar, wind	1.45E-02	kg CO2 eq / kWh

Functional Unit

Parameter	Value
Declared unit	1 seat for 1 individual maintained for a 10-year period
Number of occupants	1
Reference service life required	10 years
Biogenic carbon in product	0 kg C
Biogenic carbon in packaging	3.35 kg C

A4: Transport to the building site

Parameter	Value per functional unit	Value per functional unit
Transportation type	Truck	Ship
Fuel consumption (l/km)	0.42 diesel	130 heavy fuel oil
Distance	1474 km	3 km
Capacity utilization	67%	53%
Capacity utilization volume factor	=1	=1
Weight of product (kg)	15.189	
Volume (m^3)	0.504	

A5: Installation in the building

Parameter	Value per functional unit
Packaging waste produced	2.258 kg
Installation Assumptions	No product waste, Installed with hand tools.

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 fresh water consumption during maintenance (m^3)	0
Energy input during maintenance (kWh)	0

Reference service life (RSL)

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 3
Indoor environment	Typical office and home environment
Use conditions	Typical office and home use

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: Replacement

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
Power output of equipment (kW)	0
Characteristic performance	n/a

C1-C4: End-of-life

Parameter	Value per functional unit
Weight of product collected	15.189 kg
Weight to recycling	13.33 kg
Weight to energy recovery	0.939 kg
Weight to landfill	0.92 kg
Distance to recycling	32.2 km
Distance to energy recovery	32.2 km
Distance to landfill	32.2 km

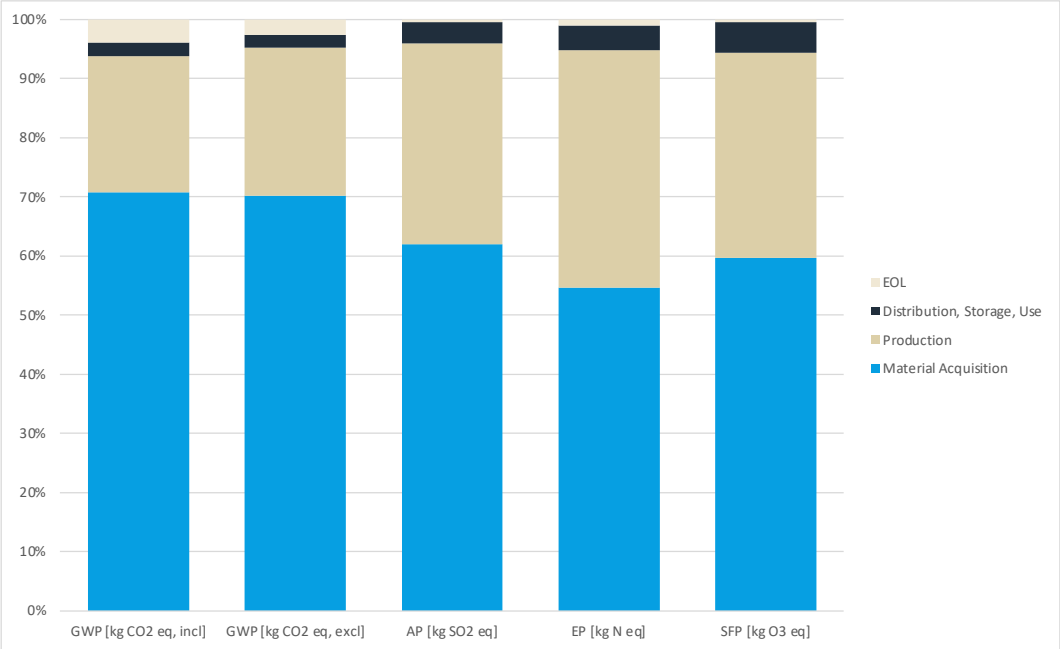
LCA Results – Upholstered-Back Configuration

All results are given per functional unit, which is one unit of seating to seat one individual, maintained for a 10-year period. Results are reported separately by life cycle stage per the BIFMA PCR for seating. It is discouraged to use of results for Material Acquisition and Production without considering the results for End of Life.

Impact Category	Material Acquisition	Production w/ grid electricity*	Production w/ purchased renewables**	Distribution , Storage, Use	EOL	Total***
IPCC AR6 LCIA Impacts						
Global Warming Potential, incl biogenic [kg CO2 eq]	7.68E+01	2.51E+01	2.17E+01	2.38E+00	4.17E+00	**1.08E+02**
Global Warming Potential, excl biogenic [kg CO2 eq]	7.67E+01	2.75E+01	2.40E+01	2.38E+00	2.69E+00	**1.09E+02**
TRACI 2.1 LCIA Impacts						
Acidification Potential [kg SO2 eq]	1.93E-01	1.05E-01	9.97E-02	1.10E-02	1.40E-03	**3.11E-01**
Eutrophication Potential [kg N eq]	1.29E-02	9.48E-03	8.86E-03	9.72E-04	1.44E-04	**2.35E-02**
Ozone Depletion Potential [kg CFC 11 eq]	2.13E-12	4.54E-10	4.60E-10	6.14E-15	1.68E-14	**4.56E-10**
Smog Formation Potential [kg O3 eq]	2.91E+00	1.69E+00	1.57E+00	2.54E-01	2.11E-02	**4.88E+00**
Resource Use Indicators						
Renewable primary resources used as energy carrier [MJ]	9.15E+01	9.27E+01	1.68E+02	1.33E+00	5.06E-01	**1.86E+02**
Renewable primary resources with energy content used as material [MJ]	0.00E+00	2.97E+01	2.97E+01	0.00E+00	0.00E+00	**2.97E+01**
Renewable primary resources, total [MJ]	9.15E+01	1.22E+02	1.98E+02	1.33E+00	5.06E-01	**2.16E+02**
Non-renewable primary resources used as energy carrier [MJ]	7.91E+02	2.51E+02	1.94E+02	3.35E+01	3.36E+00	**1.08E+03**
Non-renewable primary resources with energy content used as a material [MJ]	3.79E+02	5.89E+01	5.89E+01	0.00E+00	0.00E+00	**4.38E+02**
Non-renewable primary resources, total [MJ]	1.17E+03	3.10E+02	2.53E+02	3.35E+01	3.36E+00	**1.52E+03**
Recovered energy [MJ]	0.00E+00	1.05E+01	1.05E+01	0.00E+00	1.91E+01	**2.96E+01**
Net fresh water usage [kg]*	2.70E+00	2.36E-01	2.70E-01	4.57E-03	1.01E-02	**2.95E+00**

* Water usage from electricity generation is included
**Impacts in the “production w/ grid electricity” stage includes electricity from the grid and on-site renewables whereas “production w/ purchased renewables” also includes electricity from the grid (if any) , on-site renewables (if any), and voluntary renewable electricity purchased by Haworth for production purposes.
***Includes material acquisition, production w/ grid, distribution, storage, use, and EOL.

The chart below presents the relative contribution of each life cycle stage to the TRACI 2.1 and IPCC environmental impact categories by life cycle stage per the BIFMA PCR for seating.


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
GWP [kg CO2 eq, incl]
GWP [kg CO2 eq, excl]
AP [kg SO2 eq]
EP [kg N eq]
SFP [kg O3 eq]
EOL
Distribution, Storage, Use
Production
Material Acquisition

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. Results are reported per functional unit. For this product, 1 unit of product is required to meet the functional unit. The results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks. It is discouraged to use of results for A1-A3 without considering the results for C1-C4.

	Product Stage w/ grid*	Product Stage w/ renewables*	Construction Stage		Use Stage								End of Life			Benefits and Loads Beyond the System Boundary
	A1-A3	*A1-A3*	*A4*	*A5*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*B7*	*C1*	*C2*	*C3*	*C4*	*D*
GWP-GHG [kg CO2 eq.]	1.04E+02	1.01E+02	2.39E+00	1.23E-01	0	0	0	0	0	0	0	0	4.61E-02	2.46E+00	6.60E-02	-3.42E+01
Climate Change - total [kg CO2 eq.]	1.02E+02	9.85E+01	2.39E+00	1.60E+00	0	0	0	0	0	0	0	0	4.61E-02	2.46E+00	6.50E-02	-3.24E+01
Climate Change, fossil [kg CO2 eq.]	1.04E+02	1.00E+02	2.38E+00	8.17E-02	0	0	0	0	0	0	0	0	4.61E-02	2.46E+00	6.58E-02	-3.42E+01
Climate Change, biogenic [kg CO2 eq.]	-2.05E+00	-2.05E+00	1.53E-03	1.52E+00	0	0	0	0	0	0	0	0	2.97E-05	8.42E-05	-8.34E-04	1.76E+00
Climate Change, land use and land use change [kg CO2 eq.]	2.00E-02	1.96E-02	2.70E-03	1.87E-05	0	0	0	0	0	0	0	0	5.24E-05	4.08E-05	5.73E-05	-5.35E-03
Ozone depletion [kg CFC-11 eq.]	5.02E-10	7.98E-10	2.92E-13	1.99E-13	0	0	0	0	0	0	0	0	5.65E-15	4.82E-13	1.12E-13	-6.63E-11
Acidification [Mole of H+ eq.]	3.33E-01	3.27E-01	1.18E-02	4.54E-04	0	0	0	0	0	0	0	0	1.39E-04	3.06E-04	2.03E-04	-8.54E-02
Eutrophication, freshwater [kg P eq.]	5.03E-04	4.97E-04	1.17E-05	6.07E-07	0	0	0	0	0	0	0	0	2.27E-07	1.29E-07	1.19E-05	-4.23E-05
Eutrophication, marine [kg N eq.]	8.33E-02	8.14E-02	5.92E-03	1.70E-04	0	0	0	0	0	0	0	0	6.82E-05	8.32E-05	4.69E-05	-1.95E-02
Eutrophication, terrestrial [Mole of N eq.]	8.56E-01	8.36E-01	6.53E-02	2.06E-03	0	0	0	0	0	0	0	0	7.53E-04	1.41E-03	5.15E-04	-1.83E-01
Photochemical ozone formation, human health [kg NMVOC eq.]	2.46E-01	2.41E-01	1.20E-02	4.54E-04	0	0	0	0	0	0	0	0	1.35E-04	2.39E-04	1.49E-04	-6.19E-02
Resource use, mineral and metals [kg Sb eq.]**	1.15E-04	1.16E-04	1.56E-07	2.22E-09	0	0	0	0	0	0	0	0	3.03E-09	4.27E-09	1.77E-09	-4.93E-05
Resource use, fossils [MJ]**	1.89E+03	1.84E+03	3.12E+01	6.24E-01	0	0	0	0	0	0	0	0	6.05E-01	1.10E+00	9.84E-01	-6.99E+02
Water use [m³ world equiv.]**	2.39E+01	2.55E+01	1.39E-01	1.90E-01	0	0	0	0	0	0	0	0	2.69E-03	2.33E-01	-8.05E-04	-1.88E+00
Use of renewable primary energy (PERE) [MJ]	2.14E+02	2.89E+02	1.33E+00	1.27E-01	0	0	0	0	0	0	0	0	2.59E-02	2.64E-01	8.98E-02	-8.38E+01

	Product Stage w/ grid*	Product Stage w/ renewables*	Construction Stage		Use Stage								End of Life			Benefits and Loads Beyond the System Boundary
	A1-A3	*A1-A3*	*A4*	*A5*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*B7*	*C1*	*C2*	*C3*	*C4*	*D*
Primary energy resources used as raw materials (PERM) [MJ]	2.97E+01	2.97E+01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	2.44E+02	3.19E+02	1.33E+00	1.27E-01	0	0	0	0	0	0	0	0	2.59E-02	2.64E-01	8.98E-02	-8.38E+01
Use of non-renewable primary energy (PENRE) [MJ]	1.48E+03	1.42E+03	3.35E+01	6.30E-01	0	0	0	0	0	0	0	0	6.49E-01	1.10E+00	9.85E-01	-7.00E+02
Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	4.38E+02	4.38E+02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	1.92E+03	1.86E+03	3.35E+01	6.30E-01	0	0	0	0	0	0	0	0	6.49E-01	1.10E+00	9.85E-01	-7.00E+02
Input of secondary material (SM) [kg]	5.61E+00	5.61E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW) [m3]	2.94E+00	2.97E+00	4.57E-03	4.49E-03	0	0	0	0	0	0	0	0	8.87E-05	5.56E-03	1.30E-05	-9.50E-01
Hazardous waste disposed (HWD) [kg]	8.89E-06	8.89E-06	9.63E-11	2.02E-11	0	0	0	0	0	0	0	0	1.87E-12	8.73E-12	8.20E-11	-1.21E-06
Non-hazardous waste disposed (NHWD) [kg]	5.94E+00	5.96E+00	2.91E-03	9.55E-02	0	0	0	0	0	0	0	0	5.65E-05	2.23E-01	1.03E+00	3.42E-01
Radioactive waste disposed (RWD) [kg]	3.47E-02	3.15E-02	9.60E-05	2.67E-05	0	0	0	0	0	0	0	0	1.86E-06	3.93E-05	1.16E-05	-1.19E-02
High-level radioactive waste, conditioned, to final repository (HLRW) [kg]	3.57E-05	3.19E-05	1.14E-07	2.20E-08	0	0	0	0	0	0	0	0	2.21E-09	3.60E-08	1.01E-08	-1.15E-05
Intermediate- and low-level radioactive waste, conditioned, to final repository (ILLRW) [kg]	3.46E-02	3.15E-02	9.59E-05	2.66E-05	0	0	0	0	0	0	0	0	1.86E-06	3.93E-05	1.16E-05	-1.19E-02
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	2.83E+00	2.83E+00	0	1.13E+00	0	0	0	0	0	0	0	0	0	1.59E+01	0	0
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Product Stage w/ grid*	Product Stage w/ renewables*	Construction Stage		Use Stage								End of Life			Benefits and Loads Beyond the System Boundary
	A1-A3	*A1-A3*	*A4*	*A5*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*B7*	*C1*	*C2*	*C3*	*C4*	*D*
Total recovered energy exported from the product system (EEE and EET) [MJ]	1.05E+01	1.05E+01	0	6.61E+00	0	0	0	0	0	0	0	0	0	1.25E+01	0	0
Particulate matter [Disease incidences]	5.55E-06	5.50E-06	1.17E-07	2.68E-09	0	0	0	0	0	0	0	0	1.50E-09	3.75E-09	2.00E-09	-6.66E-07
Ionizing radiation, human health [kBq U235 eq.]***	4.22E+00	4.02E+00	8.10E-03	4.19E-03	0	0	0	0	0	0	0	0	1.57E-04	5.41E-03	1.72E-03	-1.46E+00
Ecotoxicity, freshwater [CTUe]**	6.44E+02	6.38E+02	2.61E+01	3.16E-01	0	0	0	0	0	0	0	0	5.06E-01	7.20E-01	8.08E-01	-2.44E+02
Human toxicity, cancer [CTUh]**	7.44E-07	7.44E-07	6.08E-10	1.66E-11	0	0	0	0	0	0	0	0	9.22E-12	3.79E-11	4.32E-11	-4.10E-09
Human toxicity, non-cancer [CTUh]**	8.07E-07	8.00E-07	9.84E-09	6.42E-10	0	0	0	0	0	0	0	0	1.88E-10	3.15E-09	3.51E-09	-2.28E-07
Land Use [Pt]**	2.32E+02	1.92E+02	5.88E+00	1.61E-01	0	0	0	0	0	0	0	0	1.14E-01	2.62E-01	8.77E-02	-2.62E+02

The life cycle modules are defined by EN 15804 as follows: Product Stage – raw material supply, transport, and manufacturing; Construction Stage – distribution and installation; Use Stage – use of installed product, maintenance, repair, replacement, refurbishment, operational energy use, and operational water use; End of Life - deconstruction, transport of waste, waste processing, and disposal; Benefits and Loads Beyond the System Boundary - credits from energy and material capture.
*Impacts in the "product stage w/ grid electricity" stage includes electricity from the grid and on-site renewables whereas "product stage w/ purchased renewables" also includes electricity from the grid (if any), on-site renewables (if any), and voluntary renewable electricity purchased by Haworth for production purposes.
**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 experience 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.

As required by the construction products PCR, this EPD shall declare the energy source behind electricity used in the manufacturing process in A3 and its climate impact as kg CO2 eq./kWh (using the GWP-GHG indicator).

A3 Electricity Climate Impact

Site	Energy Source	GWP-GHG	Unit
Queluz, Portugal	National residual mix	3.50E-01	kg CO2 eq / kWh
Queluz, Portugal	Renewable sources from supplier: hydro, solar, wind	1.45E-02	kg CO2 eq / kWh

Functional Unit

Parameter	Value
Declared unit	1 seat for 1 individual maintained for a 10-year period
Number of occupants	1
Reference service life required	10 years
Biogenic carbon in product	0 kg C
Biogenic carbon in packaging	3.35 kg C

A4: Transport to the building site

Parameter	Value per functional unit	Value per functional unit
Transportation type	Truck	Ship
Fuel consumption (l/km)	0.42 diesel	130 heavy fuel oil
Distance	1,474 km	3 km
Capacity utilization	67%	53%
Capacity utilization volume factor	=1	=1
Weight of product (kg)	17.906	
Volume (m^3)	0.564	

A5: Installation in the building

Parameter	Value per functional unit
Packaging waste produced	2.258 kg
Installation Assumptions	No product waste, Installed with hand tools.

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 fresh water consumption during maintenance (m^3)	0
Energy input during maintenance (kWh)	0

Reference service life (RSL)

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 3
Indoor environment	Typical office and home environment
Use conditions	Typical office and home use

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: Replacement

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
Power output of equipment (kW)	0
Characteristic performance	n/a

C1-C4: End-of-life

Parameter	Value per functional unit
Weight of product collected	17.906 kg
Weight to recycling	15.598 kg
Weight to energy recovery	1.171 kg
Weight to landfill	1.137 kg
Distance to recycling	32.2 km
Distance to energy recovery	32.2 km
Distance to landfill	32.2 km

Modules Declared and Data Variation

	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	GLO	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU
Specific data used – Mesh Back Configuration	4%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data used – Upholstered Back Configuration	3%																
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

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