* Bei dem abgebildeten Produkt handelt es sich nicht exakt um die untersuchte Produktreferenz.

Gesture

Gesture is the first chair designed to support our interactions with today's technologies. Inspired by the human body. Created for the way we work today.

- has a synchronized system moving with each user to provide continuous and persistent support
- offers unique arms which move like the human arm, allowing users to be supported in any position
- possesses a seat that brings comfort all the way to the edges
- features a wide variety of adjustments allowing it to fit an important palette of users and spaces

The model chosen for analysis is the most representative line (reference 442A30) from the Gesture range. Standard features on this model include:

- plastic base
- seat upholstery: "Connect"
- 360 arms
- back upholstery: "Connect"

This EPD – Environmental Product Declaration – is valid for the above reference.
Date of critical review: 09/2014

Published on 11/2016

Steelcase

EPD Overview

Final Assembly Location

Gesture is manufactured in Sarrebourg, France by Steelcase, for the EMEA (Europe, Middle East and Africa) market.

Goal and Scope

The potential environmental impacts of Gesture (incl. packaging) throughout its entire life cycle – including raw materials extraction, production, transport, use, and end of life – were assessed using Life Cycle Assessment (LCA – ISO 14040 / 14044) in July 2014.

Life Cycle Inventory

- list of materials
- inventory of resources
- inventory of emissions

Life Cycle Impact Assessment

- environmental impacts

Product Environmental Profile (PEP)

Verification Process and References

Contact

Goal and Scope

The measurements found during the life cycle assessment help to guide best practice decisions and are the starting point for continuous improvement.

Both method and product may be subject to modifications, and the figures are subject to change without notice.

At Steelcase, our goal is to continuously improve the environmental performance of our products, and to consider each phase of the life cycle. Our findings in one product life cycle assessment may also lead to better decisions or best practices for other product lines.

The potential environmental impacts of Gesture (incl. packaging) throughout its entire life cycle – including raw materials extraction, production, transport, use, and end of life – were assessed using Life Cycle Assessment (LCA – ISO 14040 / 14044) in July 2014.

Materials

This phase includes materials extraction and processing into useable materials. Benefits of recycled materials are considered here.

Production

This phase consists of all manufacturing and assembly taking place at Steelcase or their suppliers and sub-suppliers.

Transport

Upstream and downstream transports are considered, from materials extraction until handling for end-of life.

Use

The use phase is when the finished product is in its intended function – [no significant environmental impacts occur].

End of life

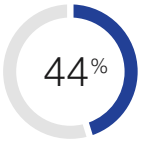
End-of-life product recyclability and local waste management infrastructure are considered. Benefits from recycling are not considered in this phase to avoid double counting.

The functional unit – i.e. the quantified performance of the product for use as a reference unit – used in the Life Cycle Assessment was chosen as “provision of comfortable seating - with the features stated in the product description – over varying periods of time, 5 days a week over 15 years.”

Environmental declarations may not be effectively comparable if evaluated against other products, or if the LCA methods were completed by different practitioners using different models.

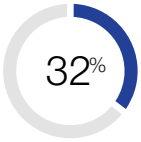
Life Cycle Inventory

Gesture materials composition is listed below*.



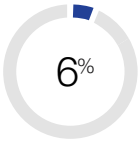
METALS

	kg	%
Steel	12.6	39.8
Aluminum (cast)	1.3	4.0
Stainless Steel	0.1	0.4
Zinc (Zamak)	0.1	0.2
Bronze	<0.1	<0.1



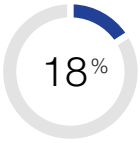
PLASTICS

	kg	%
Polypropylene (PP)	3.7	11.9
Recycled glass-filled nylon 6 (PA6-GF)	3.7	11.6
Glass-filled nylon 6 (PA6-GF)	1.2	3.9
Polyoxymethylene (POM)	0.8	1.6
Nylon (PA)	0.4	1.2
Thermoplastic elastomer (TPE)	0.3	0.9
Nylon 66 (PA66)	0.1	0.4
Polybutylene terephthalate/ polycarbonate (PBT/PC)	<0.1	0.1
Glass-filled nylon (PA-GF)	<0.1	0.1
Polyethylene terephthalate (PET)	<0.1	<0.1
Polybutylene terephthalate (PBT)	<0.1	<0.1
Polypropylene/ethylene propylene diene (PP/EPDM)	<0.1	<0.1
Synthetic rubber	<0.1	<0.1



OTHER MATERIALS

	kg	%
Polyurethane foam	0.8	3.6
Powder coating	0.3	1
Polyester fabric	0.2	0.7
Polyester wadding	<0.1	0.1
Fiberglass	<0.1	0.1
Natural rubber	<0.1	<0.1



PACKAGING

	kg	%
Cardboard	5.6	17.8
Low density polyethylene (LDPE)	0.1	0.4

TOTAL WEIGHT – incl. packaging	**31.3**

*The list of materials does not contain all materials used in the product (adhesives, coatings, residuals, etc.).

RESOURCES

This table inventories the most important energy and water consumption throughout the entire life cycle of Gesture.

RENEWABLE ENERGY

	MJ
Biomass	61
Hydropower	57
Wind	2.0

NON-RENEWABLE ENERGY

	MJ
Gas	1,000
Oil	810
Coal	620

WATER

	m^3
Water withdrawal	4.8

EMISSIONS

This table inventories the most important emissions to air, soil and water throughout the entire life cycle of Gesture.

EMISSIONS TO AIR

	kg
CO_2 – Carbon dioxide (fossil)	150
CO_2 – Carbon dioxide (biogenic)	8.9
CO – Carbon monoxide (fossil)	0.64
SO_2 – Sulfur dioxides	0.54
CH_4 – Methane (fossil)	0.49
NO_x – Nitrogen oxides	0.40

EMISSIONS TO SOIL

	kg
Oils	0.042
Cl^- – Chloride	0.040
Na – Sodium	0.011

EMISSIONS TO WATER

	kg
Cl^- – Chloride	3.5
SO_4^{2-} – Sulfate	3.5
Si – Silicon	2.2

Life Cycle Impact Assessment

Based on the Life Cycle Inventory, the environmental impacts of Gesture are assessed with the following impact categories:

Impact categories (selected by Steelcase)

- **Global warming** [kg CO_2-eq.]
  Is due to emissions of greenhouse gases, causing the rise of the global temperature.
- **Respiratory inorganics** [kg PM2.5*-eq.]
  Are due to small particles or dust that causes respiratory problems for humans with asthma or respiratory diseases.
  *Particulate matter smaller than 2.5 micrometers in diameter
- **Carcinogens** [kg C_2H_3Cl-eq.]
  Describe substances or agents which may contribute to cancer.
- **Terrestrial ecotoxicity** [kg TEG* soil]
  Measures the ecotoxicological factor for terrestrial ecosystems.
  *Triethylene glycol
- **Non-renewable energy** [MJ primary]
  Describes finite resources that will eventually dwindle, becoming too expensive or too environmentally damaging to extract.

Distribution of the environmental impacts for the respective life cycle stages:

The figures in this table are rounded up because the potential uncertainties don't justify the use of more than two significant digits.

Impact category	Unit	Total	Materials	Production	Transport	Use	End of life
Global warming	[kg CO_2-eq.]	170	77	64	15	No significant environmental impacts occur.	11
Respiratory inorganics	[kg PM2.5-eq.]	0.15	0.074	0.048	0.024		0.0015
Carcinogens	[kg C_2H_3Cl-eq.]	12	6.3	4.9	0.094		0.16
Terrestrial ecotoxicity	[kg TEG soil]	5200	2000	2700	470		19
Non-renewable energy	[MJ primary]	2800	1500	1100	240		12

Product Environmental Profile (PEP)

For more information

Our Product Environmental Profile (PEP) – an environmental declaration according to the objective of ISO 14021 – can be found on **Steelcase.com**

The PEP provides precise, accurate, verifiable and relevant information on the sustainability aspects of Gesture, including:

- Life cycle performance
- Materials
- Recycled materials and recyclability
- Certificates
- LEED contribution

Verification Process and References

The LCA study of Gesture (reference: 442A30) was carried out by Steelcase, according to ISO 14040 / 14044 and based on previous collaboration with the Technical University of Denmark (DTU) and Quantis. It was then critically reviewed by Michael Hauschild from the Department of Management Engineering of the DTU.

The independent verification of this EPD was carried out by the Department of Management Engineering of the DTU in accordance with ISO 14025.

Disclaimer: In the absence of a relevant Product Category Rule (PCR), Steelcase developed a set of specific rules, requirements and guidelines to perform life cycle assessments and Type III environmental declarations, according to the objectives of ISO 14025.

References

Related ISO standards:

- ISO 14025 Environmental labels and declarations – Type III environmental declarations
- ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines

LCIA method and LCI database:

- ILCD HANDBOOK, European Commission, Joint Research Centre, Institute for Environment and Sustainability. ILCD Handbook: General Guide for Life Cycle Assessment – Detailed Guidance. European Union, March 2010, 394p.
- IMPACT 2002+ V2.10 method: JOLLIET, O., MARGNI, M., CHARLES, R., HUMBERT, S., PAYET, J., REBITZER, G. et ROSENBAUM, R. (2003). IMPACT 2002+: A New Life Cycle Impact Assessment Methodology. International Journal of Life Cycle Assessment 8(6) p.324-330.
- Eco-Invent v2.2 LCI database: Swiss Centre for Life Cycle Inventories, Duebendorf, CH - **www.ecoinvent.ch**

End-of-life scenario:

- Mainly based on Eurostat data for the European market
  http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/data/wastemanagement/waste_treatment

Contact

For further questions, please contact: **epd@steelcase.com**

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