**Neutral Posture**

3904 North Texas Avenue Bryan, TX 77803
www.neutralposture.com | Sustainability@neutralposture.com

Neutral Posture is a recognized leader in providing ergonomic solutions, high quality products and accessories, and consulting and training. Its chair products are based on the concept of neutral body posture, developed to help users emulate the body's preferred position while they work. Neutral Posture ergonomic seating is available for the office, lab, and manufacturing areas, and are produced at its manufacturing facility in Bryan, Texas. Neutral Posture is committed to the health and safety of its employees and community, and protecting and respecting the natural environment through effective environmental management.

**Product**

AbChair® (ABC1533, ABC2533)

**EPD Number and Period of Validity**

SCS-EPD-03736

Beginning Date: 11/9/2015 – End Date: 11/8/2020

**Product Category Rule**

BIFMA PCR for Seating: UNCPC 3811, Version 3

**Program Operator:**

SCS Global Services

2000 Powell Street, Ste. 600, Emeryville, CA 94608

+1.510.452.8000 | www.SCSglobalServices.com

# Table of Contents

Product and Company Information . . . . . cover
Product Description . . . . . 3
Material Composition . . . . . 3
Key Environmental Parameters . . . . . 4
Life Cycle Assessment Overview . . . . . 5
Product Life Cycle Flow Diagram . . . . . 6
Life Cycle Inventory and Environmental Parameters . . . . . 7
Life Cycle Impact Assessment . . . . . 8
Additional Environmental Information . . . . . 9
Supporting Technical Information . . . . . 9
Data Quality . . . . . 11
References . . . . . 12

The PCR this EPD was based on 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 specifics of the product modeled.

***Disclaimers:*** *This Environmental Product Declaration (EPD) conforms to ISO 14025, 14040, and ISO 14044.*

***Scope of Results Reported:*** *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

***Accuracy of Results:*** *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

***Comparability:*** *The PCR this EPD was based on 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 specifics of the product modeled.*

| | |
|---|---|
| PCR review, was conducted by | Tom Gloria, PhD, Industrial Ecology Consultants (Review Chair) |
| Approved: 11/9/2015 Valid until: 11/8/2020 | |
| Independent verification of the declaration and data, according to ISO 14025:2006 | ☐ internal ☑ external |
| Third party verifier | Thomas Gloria<br>Tom Gloria, PhD, Industrial Ecology Consultants |

ABC1533

ABC2533

## PRODUCT DESCRIPTION:

The AbChair® chairs are produced at the Neutral Posture manufacturing facility in Bryan, Texas. These chairs offer ergonomic seating for the office, lab, or manufacturing areas. These chairs were developed to help users emulate the body's preferred position while they work.

The 1533 model includes a urethane AbRest™ back, a urethane seat, black arms, and a tilt with seat slider mechanism. The 2533 model includes an upholstered AbRest™ back, a urethane seat, black arms, and a tilt with seat slider mechanism.

The AbChair® chairs passed the ANSI/BIFMA X5.1 test, demonstrating a minimum expected lifetime of 10 years under normal use conditions.

## MATERIAL COMPOSITION:

**Table 1.** *Material composition summary, by material type, for ABC1533 by mass and as a percentage of total mass.*

| Material Type | Percent of Product | Weight (kg) | Resource |
|---|---|---|---|
| Glass fiber[1] | 2.6% | 0.51 | Virgin non-renewable |
| Neoprene | 0.090% | 0.018 | Virgin non-renewable |
| Nylatron | 0.068% | 0.014 | Virgin non-renewable |
| Nylon | 8.6% | 1.7 | Virgin non-renewable |
| Polyester | 0.68% | 0.14 | Virgin non-renewable |
| Polypropylene | 0.023% | $4.5x10^{-3}$ | Virgin non-renewable |
| PVC | 0.023% | $4.5x10^{-3}$ | Virgin non-renewable |
| Steel | 61% | 12 | Recycled content; virgin non-renewable |
| Tyvek | 0.023% | $4.5x10^{-3}$ | Virgin non-renewable |
| Urethane foam | 27% | 5.2 | Virgin non-renewable |

1 Used as a reinforcement in a plastic matrix for fiberglass.

**Table 2.** *Material composition summary, by material type, for ABC2533 by mass and as a percentage of total mass.*

| Material Type | Percent of Product | Weight (kg) | Resource |
|---|---|---|---|
| Glass fiber[1] | 2.6% | 0.51 | Virgin non-renewable |
| Neoprene | 0.090% | 0.018 | Virgin non-renewable |
| Nylatron | 0.068% | 0.014 | Virgin non-renewable |
| Nylon | 8.6% | 1.7 | Virgin non-renewable |
| Polyester | 0.68% | 0.14 | Virgin non-renewable |
| Polypropylene | 0.023% | $4.5x10^{-3}$ | Virgin non-renewable |
| PVC | 0.023% | $4.5x10^{-3}$ | Virgin non-renewable |
| Steel | 61% | 12 | Recycled content; virgin non-renewable |
| Tyvek | 0.023% | $4.5x10^{-3}$ | Virgin non-renewable |
| Urethane foam | 27% | 5.4 | Virgin non-renewable |

1 Used as a reinforcement in a plastic matrix for fiberglass.

## KEY ENVIRONMENTAL PARAMETERS

**Table 3.** *Summary of Key Environmental Parameters.*

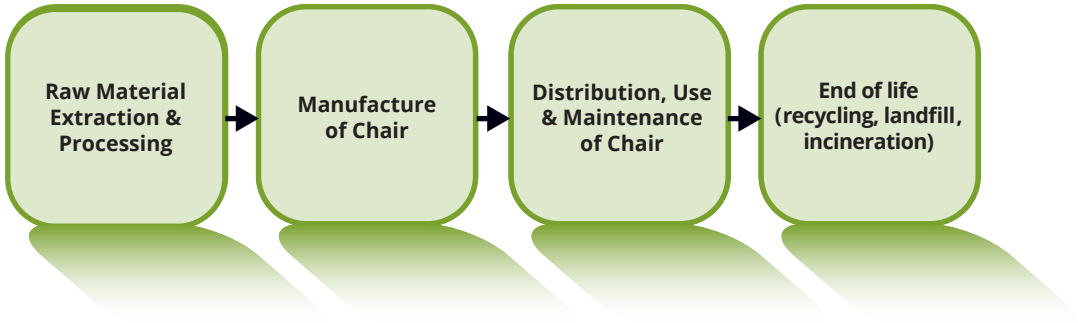
| Parameter | Units | ABC1533 and ABC2533 |
|---|---|---|
| Global Warming Potential, 100 year time horizon | kg $CO_2e$ | 180 |
| Primary Energy Demand | MJ | 3,900 |
| Recycled Content | % | 29 |

## LIFE CYCLE ASSESSMENT OVERVIEW

A Life Cycle Assessment (LCA) was conducted to evaluate the environmental performance of the AbChair® 1533 and 2533 chairs. LCA is an assessment of the environmental and human health impacts of a product over its entire life cycle, from raw material extraction through manufacturing, use, and end-of-life.

**Raw Material Extraction and Processing:** This stage includes the extraction of all raw virgin materials and reclamation of non-virgin feedstock. Resource use and emissions associated with both extraction and processing of the raw materials, and component manufacture are included. This stage also includes impacts associated with the transport of the chair components and product packaging materials to the manufacturing facility (upstream transport).

**Manufacture of Chair:** This includes all the relevant manufacturing processes and flows, including the impacts from energy use and emissions at the manufacturing facility. Production of capital goods, infrastructure, manufacturing equipment, and personnel-related activities are not included.

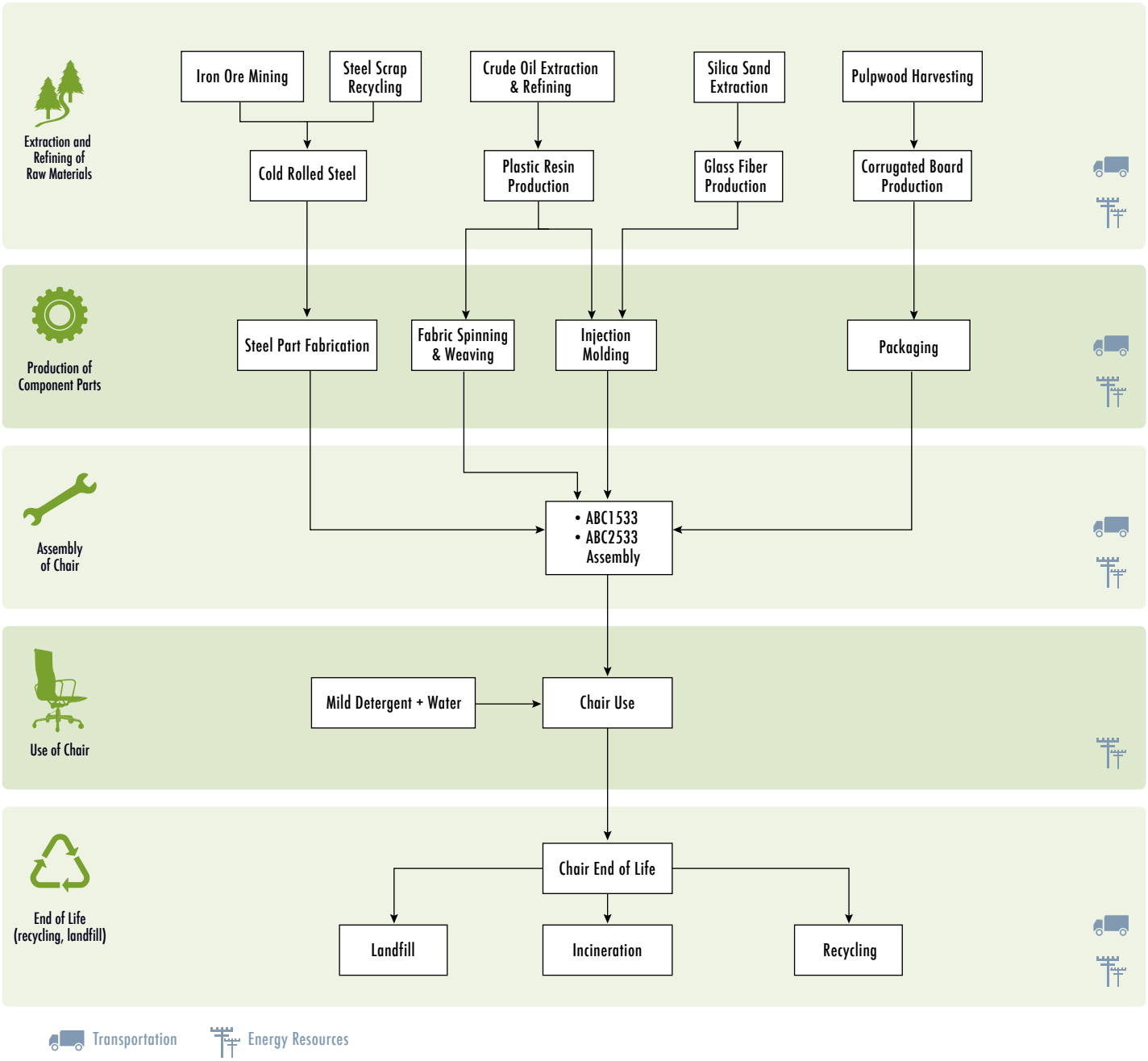



**Distribution, Use, and Maintenance of Chair:** This stage includes delivery of the chairs, including packaging, from the manufacturing facility to the point of use (downstream transportation). Disposal of packaging is included in this stage. This stage also includes the cleaning and maintenance of the chairs during its lifetime (10 years).

**End-of-Life:** The end-of-life stage includes transport of the chair components to recycling centers and waste treatment facilities. This stage includes the emissions associated with the degradation of material in a landfill or from burning in an incinerator.

## PRODUCT LIFE CYCLE FLOW DIAGRAM

The diagram below is a representation of the major material and energy flows to the life cycle of the AbChair® 1533 and 2533 chairs. This includes resource extraction, raw material processing, component manufacturing, transportation, assembly of chair, use and maintenance, and end-of-life. Mass flows below 1% not shown in the diagram.

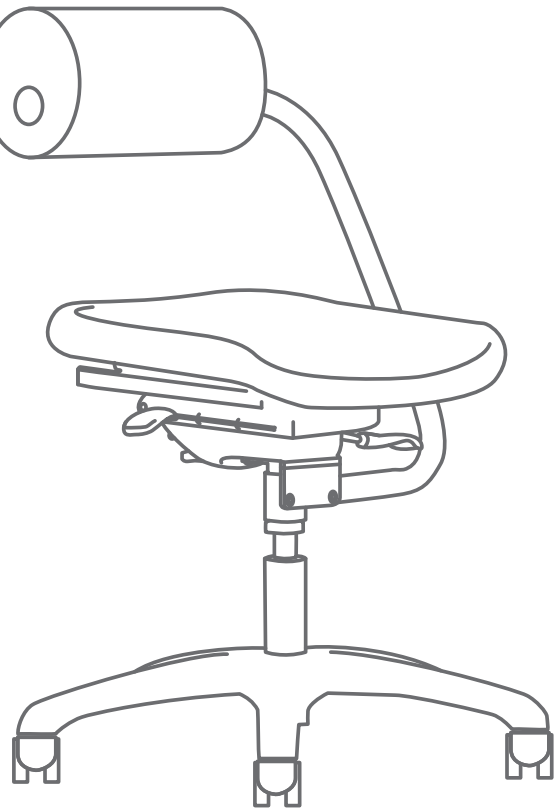


## LIFE CYCLE INVENTORY AND ENVIRONMENTAL PARAMETERS

The resource use and emissions from each step of the product life cycle are summed to obtain the life cycle inventory results. Table 4 shows inventory categories for energy and water consumption.

**Table 4.** *Inventory categories for energy and water consumption. Results are shown for one unit of seating to seat one individual over a 10 year time period.*

| Parameter | Units | ABC1533 | ABC2533 |
|---|---|---|---|
| Primary Energy Demand | MJ | 3,900 | 3,900 |
| Non-Renewable Energy, Fossil Fuels | MJ | 3,400 | 3,500 |
| Non-Renewable Energy, Nuclear | MJ | 270 | 270 |
| Renewable Energy | MJ | 160 | 160 |
| Freshwater Consumption | kg | 5,000 | 5,100 |
| Miscellaneous Fuels | MJ | 0.094 | 0.094 |



## LIFE CYCLE IMPACT ASSESSMENT

Life cycle impact assessment is the process of converting the life cycle inventory results into a representation of environmental and human health impacts. For example, emissions of carbon dioxide, methane, and nitrous oxide (inventory data) together contribute to climate change (impact assessment). The impact assessment for the EPD is conducted in accordance with the requirements of the Product Category Rule (PCR).

Impact category indicators were estimated using TRACI v2.1 characterization method, including Global Warming Potential (100 year time horizon), Acidification Potential, Eutrophication Potential, Smog Potential, and Ozone Depletion Potential.

**Table 5.** *TRACI 2.1 Life Cycle Impact Assessment results for ABC1533. Results are shown for one unit of seating to seat one individual over a 10 year period.*

| Impact Category | Units | Total | Raw Material Extraction and Processing | Manufacture of Chair | Distribution, Use, and Maintenance | End-of-life |
|---|---|---|---|---|---|---|
| Global Warming Potential | kg $CO_2$ eq | 180 | 110 | 40 | 12 | 16 |
| Acidification Potential | kg $SO_2$ eq | 1.4 | 1.0 | 0.31 | 0.085 | $1.9x10^{-2}$ |
| Eutrophication Potential | kg N eq | 0.62 | 0.31 | 0.021 | 0.018 | 0.27 |
| Ozone Depletion Potential | kg CFC-11 eq | $8.0x10^{-6}$ | $5.8x10^{-6}$ | $3.4x10^{-8}$ | $1.8x10^{-6}$ | $3.6x10^{-7}$ |
| Photochemical Ozone Creation Potential (Smog) | kg $O_3$ eq | 15 | 6.3 | 5.4 | 2.4 | 0.48 |

**Table 6.** *TRACI 2.1 Life Cycle Impact Assessment results for ABC2533. Results are shown for one unit of seating to seat one individual over a 10 year period.*

| Impact Category | Units | Total | Raw Material Extraction and Processing | Manufacture of Chair | Distribution, Use, and Maintenance | End-of-life |
|---|---|---|---|---|---|---|
| Global Warming Potential | kg $CO_2$ eq | 180 | 110 | 40 | 12 | 16 |
| Acidification Potential | kg $SO_2$ eq | 1.4 | 1.0 | 0.31 | 0.085 | $1.9x10^{-2}$ |
| Eutrophication Potential | kg N eq | 0.63 | 0.31 | 0.021 | 0.018 | 0.28 |
| Ozone Depletion Potential | kg CFC-11 eq | $8.0x10^{-6}$ | $5.8x10^{-6}$ | $3.4x10^{-8}$ | $1.8x10^{-6}$ | $3.7x10^{-7}$ |
| Photochemical Ozone Creation Potential (Smog) | kg $O_3$ eq | 15 | 6.3 | 5.4 | 2.4 | 0.49 |

## ADDITIONAL ENVIRONMENTAL INFORMATION

Neutral Posture is committed to the health and safety of its employees and community, and protecting and respecting the natural environment through effective environmental management.

Neutral Posture actively pursues standards and regulations that showcase its commitment to quality and continuity. The current certifications for ABC1533 and ABC2533 include ANSI/BIFMA X 5.1, GREENGUARD Gold, and ISO 9001:2008.

Furthermore, some of the Neutral Posture products include pre- and post-consumer recycled materials.
For more information, visit http://neutralposture.com/_site/about.php?id=4

For additional information regarding Neutral Posture's environmental efforts, visit
http://neutralposture.com/_imgs/lit/Sustainability/Policies/CorpEnvironment_Policies.pdf

## SUPPORTING TECHNICAL INFORMATION

### System Boundaries

The product systems under study include the extraction and processing of raw materials, the transportation of materials to the manufacturing facility, manufacture of the chairs, distribution, use, and end-of-life. The system boundaries include all unit processes contributing measurably to category indicator results and all known materials and processes were included in the life cycle inventory. The life cycle stages included within the scope of this LCA are consistent with the PCR. In accordance with the PCR, the full life cycle of the packaging materials are included in the model.

### Cut-off Criteria

No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No single flow that represents more than 1% of the total mass or energy flows was excluded.

### Data Sources

Unit processes were developed within the SimaPro 8.0 LCI model, drawing upon data from multiple sources. The principal sources of secondary LCI data are: 1) US-EI Database version 2.2 and 2) USLCI. Detailed descriptions of unit processes can be found in the accompanying documentation.

**Table 7.** *Data sources used for the LCA.*

| Material | Dataset | Data Source(s) | Publication Date |
|---|---|---|---|
| **Product Materials** | | | |
| Glass Fiber | Glass fibre, at plant/US- US-EI U | US-EI Database version 2.2 | 2013 |
| Neoprene | Synthetic rubber, at plant/US- US-EI U | US-EI Database version 2.2, proxy | 2013 |
| Nylatron | Nylon 6, at plant/US- US-EI U | US-EI Database version 2.2, proxy | 2013 |
| Nylon | Nylon 66, at plant/US- US-EI U | US-EI Database version 2.2 | 2013 |
| Polyester | Polyester fabric, Neutral Posture/US-US-EI U | Van der Velden et al., 2014., SCS | 2013; 2015 |
| Polypropylene | Polypropylene, granulate, at plant/US- US-EI U | US-EI Database version 2.2 | 2013 |
| Polyurethane | Polyurethane, rigid foam, at plant/US- US-EI U | US-EI Database version 2.2 | 2013 |
| PVC | Polyvinylchloride, at regional storage/US- US-EI U | US-EI Database version 2.2 | 2013 |
| Steel | Steel, low-alloyed, at plant/US- US-EI U; Steel, electric, un- and low-alloyed, at plant/US- US-EI U | US-EI Database version 2.2 | 2013 |
| Tyvek | Polyethylene, LDPE, granulate, at plant/US- US-EI U | US-EI Database version 2.2, proxy | 2013 |
| Urethane foam | Polyurethane, flexible foam, at plant/US- US-EI U | US-EI Database version 2.2 | 2013 |
| **Packaging** | | | |
| Nylon | Nylon 6, at plant/US- US-EI U | US-EI Database version 2.2 | 2013 |
| Corrugated board | Corrugated board, fresh fibre, single wall, at plant/US- US-EI U | US-EI Database version 2.2 | 2013 |
| Polyethylene | Polyethylene, LDPE, granulate, at plant/US- US-EI U | US-EI Database version 2.2 | 2013 |
| **Transportation** | | | |
| Truck | Transport, lorry, customizable truck / US U | US-EI Database version 2.2 | 2013; 2015 |

## Data Quality

**Table 8.** *Data Quality assessment of Life Cycle Inventory.*

| Data Quality Parameter | Data Quality Discussion |
|---|---|
| **Time-Related Coverage:** Age of data and the minimum length of time over which data should be collected | The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 10 years old (although 2003 or more recent data are included). All of the primary data used represented an average of one year's worth of data collection. Manufacturer-supplied data are based on a data record from December 1, 2013 to November 30, 2014. |
| **Geographical Coverage:** Geographical area from which data for unit processes should be collected to satisfy the goal of the study | The data used in the analysis provide the best possible representation available with current data. Actual processes for upstream operations are primarily North American. Surrogate data used in the assessment are representative of North American or European operations. Data representative of European operations are considered sufficiently similar to actual processes. Data representing product disposal are based on US statistics. |
| **Technology Coverage:** Specific technology or technology mix | For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes where primary data were not available. |
| **Precision:** Measure of the variability of the data values for each data expressed (e.g. variance) | Precision of results are not quantified due to a lack of data. Manufacturer data, and representative data used for upstream operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results. |
| **Completeness:** Percentage of flow that is measured or estimated | The LCA model included all known mass and energy flows for production of the chairs. In some instances, surrogate datasets used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded. In total, these missing data represent less than 5% of the mass or energy flows. |
| **Representativeness:** Qualitative assessment of the degree to which the data set reflects the true population of interest (i.e. geographical coverage, time period and technology coverage) | Data used in the assessment represent typical or average processes as currently reported from multiple data sources, and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction. |
| **Consistency:** Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis. | The consistency of the assessment is considered to be high. Secondary data sources of similar quality and age are used; with a bias towards Ecoinvent data for secondary data. Different portions of the product life cycle are equally considered; however, it must be noted that final disposal of the product is based on assumptions of current average practices in the United States. |
| **Reproducibility:** Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study. | Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented. |
| **Sources of the data:** Description of all primary and secondary data sources. | Data representing energy use at the Bryan, Texas facility represent an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. Primary data received from first tier suppliers were used in the model where possible. For secondary LCI datasets, both Ecoinvent and the USLCI data are used, with a bias towards Ecoinvent data. |
| **Uncertainty of the information:** Uncertainty related to data, models, and assumptions | Uncertainty related to materials in the chairs and packaging is low. Complete data for upstream operations were not available for every first tier supplier; as such, the study relied upon use of existing representative datasets for these cases. These representative datasets contained relatively recent data (~10 years, or more recent), but in some instances lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method includes impact potentials that lack characterization of providing and receiving environments or tipping points. |

## REFERENCES:


1. Bare, J., et al. TRACI – The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts. Journal of Industrial Ecology. Volume 6, no. 3-4 (2003). http://mitpress.mit.edu/jie
2. BIFMA x5.1. American National Standard for Office Furnishings – General Purpose Office Chairs – Tests
3. Earth Shift. (2009). US-EI SimaPro Database Update December 18, 2009. http://www.earthshift.com.
4. Ecoinvent Centre (2010) Ecoinvent data from v2.2. Swiss Center for Life Cycle Inventories, Dübendorf, 2010 http://www.Ecoinvent.org
5. Instructions for Recycling: Neutral Posture. http://neutralposture.com/_imgs/lit/Sustainability/recycling/recycleRegions_horz_v01.pdf
6. ISO 14025: 2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
7. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.
8. NSF International Product Category Rule for Environmental Product Declarations. BIFMA PCR for Seating: UNCPC 3811, Version 3. Valid through September 30, 2019.
9. SCS Global Services (2015). Life Cycle Assessment of Neutral Posture Ergonomic Chairs. Final Report. Prepared for Neutral Posture, Inc. November 3, 2015.
10. SCS Type III Environmental Declaration Program: Program Operator Manual v7. October, 2015. SCS Global Services
11. US EPA. Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Tables and Figures for 2010. Retrieved on 6/24/2015 from: http://www.epa.gov/solidwaste/nonhaz/municipal/pubs/msw_2010_rev_factsheet.pdf
12. US EPA (2013). Advancing sustainable materials management: 2013 fact sheet. Assessing trends in material generation, recycling, and disposal in the United States. http://www.epa.gov/solidwaste/nonhaz/municipal/pubs/2013_advncng_smm_fs.pdf
13. US Life-Cycle Inventory Database. National Renewable Energy Laboratory. http://www.nrel.gov/lci
14. Van der Velden N.M, Patel M.K, Vogtländer J.G (2014). LCA benchmarking study on textiles made of cotton, polyester, nylon, acryl or elastane. The International Journal of Life Cycle Assessment 19 (2). 331-356

NeutralPosture

For more information contact:

**Neutral Posture**
3904 North Texas Avenue Bryan, TX 77803
www.neutralposture.com | Sustainability@neutralposture.com

SCSglobal SERVICES

**SCS Global Services**
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA
main +1.510.452.8000 | fax +1.510.452.8001