



## Environmental Product Declaration

# Relate<sup>®</sup> Seating

### Models

Upholstered back work chair with adjustable arms and without arms.  
Mesh back work chair with adjustable arms.

### Product Description

Relate work chairs offer the perfect combination of versatility and enhanced comfort for longer sits at your desk or extended meetings in the conference room. Designed by Marcus Koepke, the Relate work chair features a contemporary, slim profile for any environment. Several innovative technologies, including a unique pivoting back and tension adjustment, provide active ergonomics and superior support.

### Functional Unit

One unit of seating to seat one individual, maintained for a 10 year period. The Allsteel Relate chair passes the ANSI/BIFMA X5.1 test, demonstrating a minimum expected lifetime of 10 years, and therefore one chair meets the functional unit.

### Manufacturer

At Allsteel, we demystify the office planning process by helping our customers align their workplace strategy with their business strategy. With an accessible team and an adaptable portfolio of systems, seating, casegoods, tables, collaborative furniture, and movable walls, we address our customers' needs for today and tomorrow.

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### EPD Program Operator

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### Product Category Rule

BIFMA PCR for Seating (v3): UNCPC 3811,  
September 30, 2014.

### EPD Number and Period of Validity

SCS-EPD-04232  
November 8, 2016 to November 7, 2021

#### Disclaimers

**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. This EPD is augmented with information from draft LEO-SCS-002 standard, which is intended to promote comparison between EPDs. 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.

# Allsteel<sup>®</sup>

## Product Specifications

With its contemporary design, active ergonomic features, and range of seating options, the Relate family of chairs is the single solution for the entire office. The streamlined, slim profile fits naturally in any environment. Several innovative technologies and easy-to-use adjustments allow you to quickly personalize your chair.

The Allsteel Relate work chair, assembled at the Geneva manufacturing facility in Iowa, is a general purpose office chair with unique pivoting back and tension adjustment for better comfort and support. It is constructed from a variety of materials including steel, aluminum, nylon and polyurethane foam with upholstery covering. Relate chairs are available with various options for color, base (stool or casters), and arm configurations. Relate seating passes the ANSI/BIFMA X5.1 tests, demonstrating a minimum expected lifetime of 10 years under specified conditions.

## Materials Composition

Table 1. Material composition of each Relate seating model. Results are shown in kg per functional unit, and as a percent of the total in parenthesis.

Material	Material Type	Material Resource	Uph. Task Chair w/ Fully-Adj. Arms	Uph. Task Chair w/o Arms	Mesh Task Chair w/ Fully-Adj. Arms
Cast aluminum	Aluminum	Recycled content	1.5 (8%)	1.5 (9%)	1.5 (9%)
Cast aluminum	Aluminum	Virgin non-renewable	2.3 (12%)	2.3 (14%)	2.3 (12%)
Fabric	Plastic	Recycled content	0.26 (1.4%)	0.26 (1.6%)	0.17 (0.96%)
Hytrel	Plastic	Virgin non-renewable	-	-	0.018 (0.10%)
Nylon 6 50% GF	Plastic	Virgin non-renewable	0.67 (4%)	0.67 (4%)	0.67 (3.8%)
Nylon 6,6	Plastic	Virgin non-renewable	2.0 (10%)	1.7 (10%)	2.0 (11%)
Nylon 6,6 30%-38% GF	Plastic	Virgin non-renewable	7.3 (38%)	6.27 (38%)	5.8 (33%)
Polypropylene	Plastic	Virgin non-renewable	0.88 (5%)	0.82 (4.9%)	1.0 (5.9%)
Polyurethane foam	Plastic	Virgin non-renewable	0.91 (5%)	0.68 (4.1%)	0.79 (4.5%)
POM (Acetal)	Plastic	Virgin non-renewable	0.032 (0%)	0.032 (0.19%)	0.032 (0.18%)
Steel	Steel	Recycled	1.0 (5.4%)	0.8 (5%)	1.0 (6%)
Steel	Steel	Virgin non-renewable	2.2 (11%)	1.7 (10%)	2.2 (12%)
<b>Total</b>			<b>19 (100%)</b>	<b>17 (100%)</b>	<b>18 (100%)</b>
Percentage of post-consumer recycled content			5.0%	4.5%	5.1%
Percentage of pre-consumer recycled content			9.8%	11%	10%

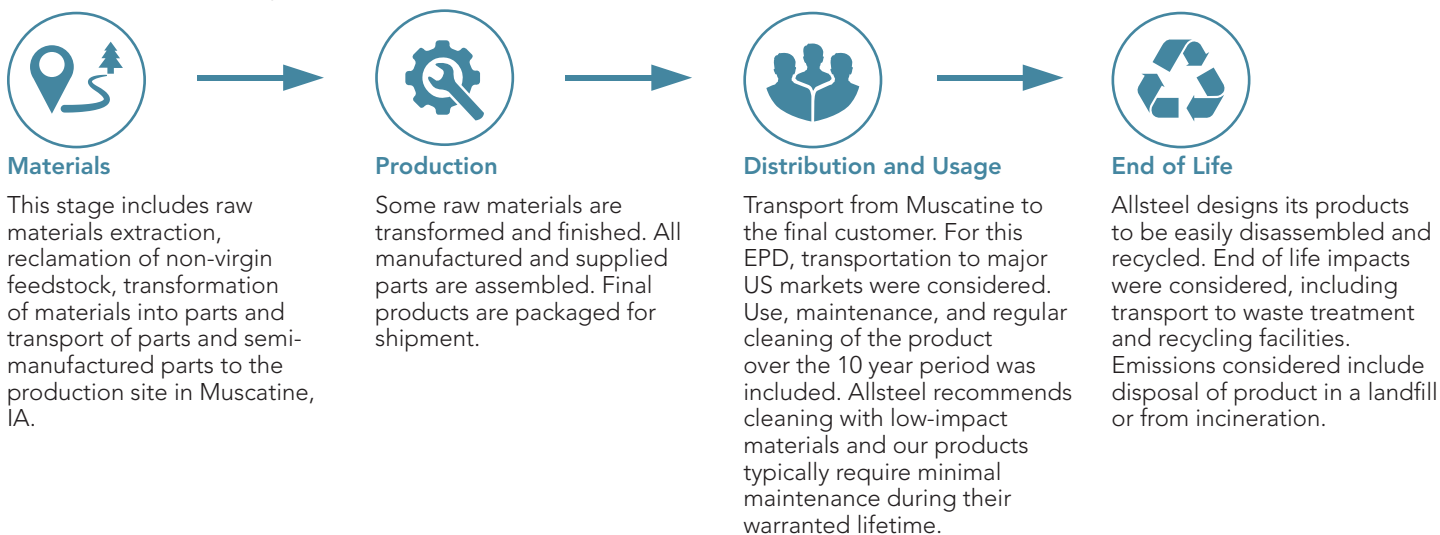
Table 2. Packaging materials used for each Relate seating model. Amounts shown in kg.

Material	Task Chair w/ Fully-Adj. Arms	Task Chair w/o Arms	Mesh Task Chair w/ Fully-Adj. Arms
Plastics (LDPE packaging film/EPS)	0.26	0.22	0.26
Cardboard	0.16	0.082	0.16

## Life Cycle Assessment Stages

Figure 1 below is a representation of the life cycle of Relate seating. The system boundary is cradle-to-grave and includes resource extraction and processing, product manufacture and assembly, distribution/transport, use and maintenance, and end-of-life.

Figure 1. Life cycle diagram for Relate seating. Excluded from this study are processes related to personnel activity and production of capital goods, infrastructure, manufacturing equipment, etc.



## Life Cycle Inventory

The resource use and emissions from each step of the product life cycle are summed to obtain the life cycle inventory results. The Life Cycle Inventory flows for Relate are shown in Table 3. Table 4 includes equivalency factors that were determined for the purpose of communicating critical environmental impacts in simplified terms for better understanding.

Table 3. Aggregated inventory flows for Relate seating. Results are shown per functional unit.

Parameters Prescribed by BIFMA PCR	Units	Total
Water Use	kg	6,400
Primary Energy Demand	MJ	2,200
Non-renewable, fossil fuels	MJ	1,800
Non-renewable, nuclear fuels	MJ	250
Renewable fuels	MJ	160
Miscellaneous fuels (surplus heat, incineration of waste)	MJ	0.015

Table 4. Equivalency Factors for select aggregated inventory results for Relate seating.

Category Indicator	Life Cycle Assessment results for 1 chair, maintained for 10 years	Basics of Calculation	1 chair, maintained for 10 years
Net Water Use	6,400 kg	Number of cycles run in a dishwasher <sup>1</sup>	140
Primary Energy Demand	2,200 MJ	Number of days operating a refrigerator <sup>2</sup>	120

<sup>1</sup>The net water use estimate is based on Energy Star-rated dishwashers and also considers the upstream water required to generate electricity to run the dishwasher. [https://www.energystar.gov/index.cfm?c=dishwash.pr\\_crit\\_dishwashers](https://www.energystar.gov/index.cfm?c=dishwash.pr_crit_dishwashers)

<sup>2</sup>The primary energy demand estimate is based on the energy consumption for Energy Star refrigerators, using a US average electricity supply mix, and also considers the upstream energy demand for electricity generation in US. <https://www.energystar.gov/index.cfm?fuseaction=refrig.calculator>

## Life Cycle Impact Assessment

Impact category indicators are calculated using the TRACI 2.1 characterization methods, including acidification potential, eutrophication potential, smog potential, ozone depletion potential, and global warming potential based on IPCC 2013, in accordance with the BIFMA PCR.

Table 5. Average life cycle impact assessment results for Relate seating. Results are shown per functional unit.






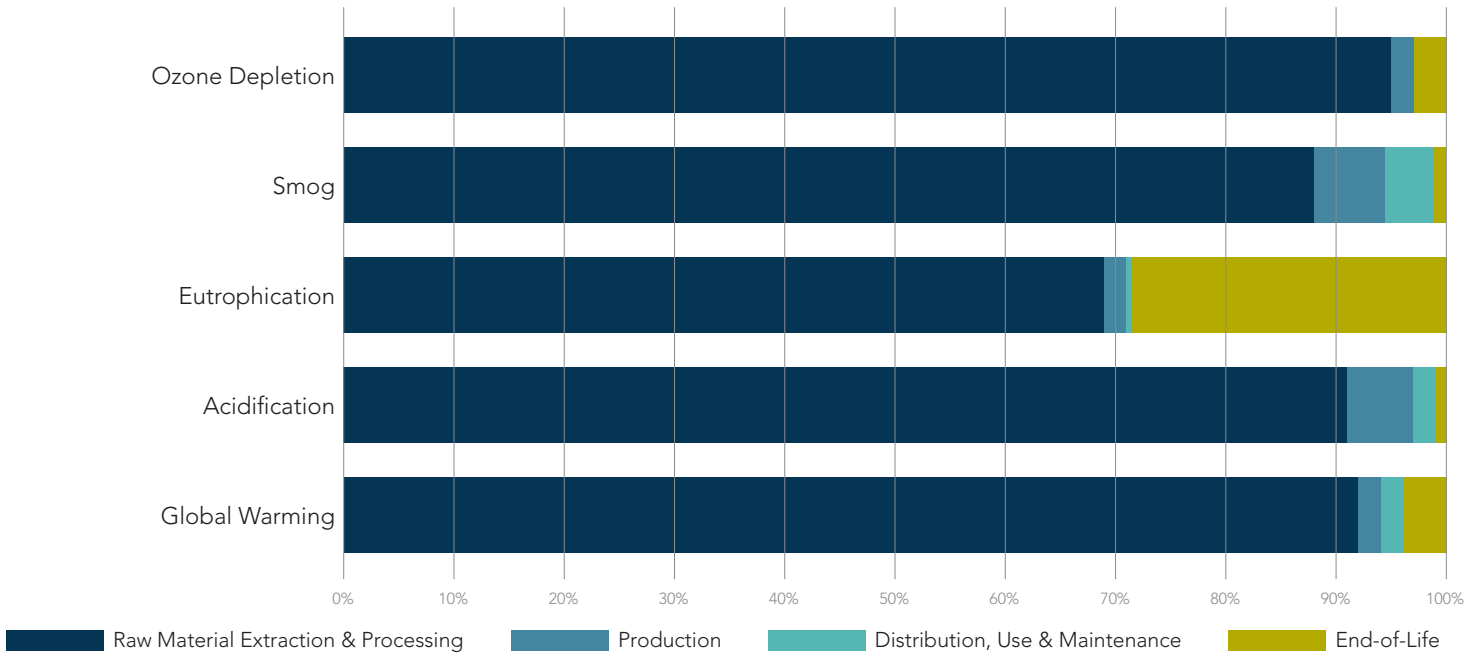
Impact Category	Units	Raw Material Extraction & Processing	Production (Manufacturing & Assembly)	Distribution, Use & Maintenance	End-of-Life	Total
 Global Warming Potential – 100 year	kg CO <sub>2</sub> eq	110	3.0	1.8	6.3	120
 Acidification Potential	kg CO <sub>2</sub> eq	0.48	0.031	0.011	3.5 x 10 <sup>-3</sup>	0.52
 Eutrophication Potential	kg N eq	0.30	0.010	9.1 x 10 <sup>-4</sup>	0.13	0.44
 Smog	kg O <sub>3</sub> eq	6.1	0.40	0.30	0.092	6.9
 Ozone Depletion Potential	kg CFC-11 eq	5.6 x 10 <sup>-6</sup>	9.2 x 10 <sup>-8</sup>	4.5 x 10 <sup>-9</sup>	1.9 x 10 <sup>-7</sup>	5.9 x 10 <sup>-6</sup>

Figure 2. Contribution analysis graph representing % contribution to each impact category indicator by life cycle phase.

### Life Cycle Impacts of Relate Seating



## Life Cycle Impact Assessment (continued)

Additional life cycle impact results are reported in Table 6 below as optional parameters of concern. These impacts are calculated using the LEO-SCS-002 framework, which augments the specified impact categories and method TRACI 2.1, identified by the NSF PCR.

Table 6. Average life cycle impact assessment results for Relate seating according to LEO-SCS-002 (June 2014) standard. Results are shown per functional unit.

Impact Category (LEO SCS-002 Parameters)	Unit	Total
Global Climate Change	kg CO <sub>2</sub> eq	100
Arctic Climate Change	kg CO <sub>2</sub> eq	140
Ocean Acidification	kg H <sub>2</sub> CO <sub>3</sub> eq	150
Energy Resource Depletion	MJ eq	1,000

Results for select impact category indicators are translated to the number of miles driven in a typical passenger vehicle or the days of operation for an Energy Star rated refrigerator, and are provided to help customers interpret the scale of potential environmental impact attributed to the product.

Table 7. Equivalency factors for select life cycle impact assessment results for Relate seating. Results are shown per functional unit.

Category Indicator	Life Cycle Impact Assessment results for 1 chair, maintained for 10 years	Basis of Equivalency Factor	Equivalency factor for Relate chair
Global Climate Change (LEO-SCS-002)	100 kg CO <sub>2</sub> eq	Number of miles driven in a typical passenger vehicle <sup>3</sup>	200 miles
Energy Resource Depletion (LEO-SCS-002)	1,000 MJ eq	Number of days operating a refrigerator <sup>4</sup>	40 days

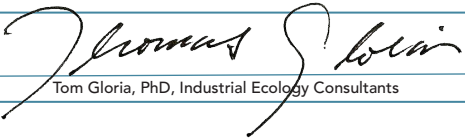
<sup>3</sup>Average vehicle miles traveled are estimated using average US fuel economies for passenger vehicles and light trucks and the amount of carbon dioxide emitted per gallon of motor gasoline burned. <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>

<sup>4</sup>The energy resource depletion estimate is based on the energy consumption for Energy Star refrigerators, using a US average electricity supply mix, and also considers the upstream energy demand for electricity generation in US. <https://www.energystar.gov/index.cfm?fuseaction=refrig.calculator>

## Additional Environmental Information

Allsteel makes it a priority to design product and implement processes that reduce our collective impact on the environment. Allsteel is proud to support sustainable initiatives in the building industry as a member of the U.S. Green Building Council (USGBC).

Relate is level<sup>®</sup> 2 certified to the ANSI/BIFMA e3 Furniture Sustainability Standard and SCS Indoor Advantage<sup>™</sup> Gold certified for indoor air quality. Relate has the ability to contribute to several credits in the LEED<sup>®</sup> green building program and the WELL Building Standard<sup>®</sup>.

Approved November 8, 2016   Valid until November 7, 2021	
PCR Review was conducted by	Thomas P. Gloria, PhD, Industrial Ecology Consultants t.gloria@industrial-ecology.com
Independent verification of the declaration and data, according to ISO 14025-2006	<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
Third party verifier	 Tom Gloria, PhD, Industrial Ecology Consultants

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Allsteel supports green initiatives in the contract furniture industry as a member of the U.S. Green Building Council. Relate is an SCS Indoor Advantage™ Gold and level® 2 certified product.

