Environmental Product Declaration
Schindler 5000 X - Rope

Program:	The International EPD® System EPD International AB www.environdec.com
EPD registration number:	S-P-02967
Published:	2021-12-20
Revision:	2022-05-16
Valid until:	2026-12-20
Product group classification:	UN CPC 4354

ECO PLATFORM EPD VERIFIED

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.

EPD®

Schindler

Program-related information and verification

Reference year for data:	2019
Geographical scope:	China
Product category rules (PCR):	EN15804:2012 + A2:2019 as Core PCR PCR 2019:14 Construction Products, version 1.1 C-PCR-008 Lifts (to PCR 2019:14), version 2020-10-30
PCR review was conducted by:	The Technical Committee of the International EPD© System. See www.environdec.com/about-us/the-international-epd-system-about-the-system for a list of members. Review chair: Gorka Benito Alonso. The review panel may be contacted via the Secretariat www.environdec.com/contact-us.
EPD owner:	Schindler Management Ltd Zugerstrasse 13 6030 Ebikon Switzerland The EPD Owner has sole ownership, liability and responsibility for the data contained within this EPD
LCA author:	Carbotech AG St. Alban-Vorstadt 19 4052 Basel Switzerland www.carbotech.ch
Program operator:	EPD International AB info@environdec.com
Procedure for follow-up during EPD validity involves third party verifier:	No

Verification:

CEN standard EN15804 serves as the core PCR
Independent verification of the declaration and data, according to EN ISO 14025:2010 **☐ Internal ☒ external**
Third party verifier: **Angela Schindler, Umweltberatung und Ingenieurdienstleistungen** **Approved by The International EPD(R) system**

Revision History:	Revision 2022-05-16: Post-consumer content added to material content declaration (pg. 12), moved information on recycled content considered for secondary material to pg. 14, material allocation corrected on preventive material table (pg. 16), correction of typing and editorial errors and product application range.

Comparability between EPDs based on this c-PCR-008 (to PCR 2019:14) and EPDs based on PCR 2015:05 is not conceivable and shall be avoided.
Any comparability of this kind shall be considered as false and misleading the EPD user.
EPDs of construction products may not be comparable if they do not comply with EN 15804+A2:2019.
EPDs within the same product category but from different programmes may not be comparable.

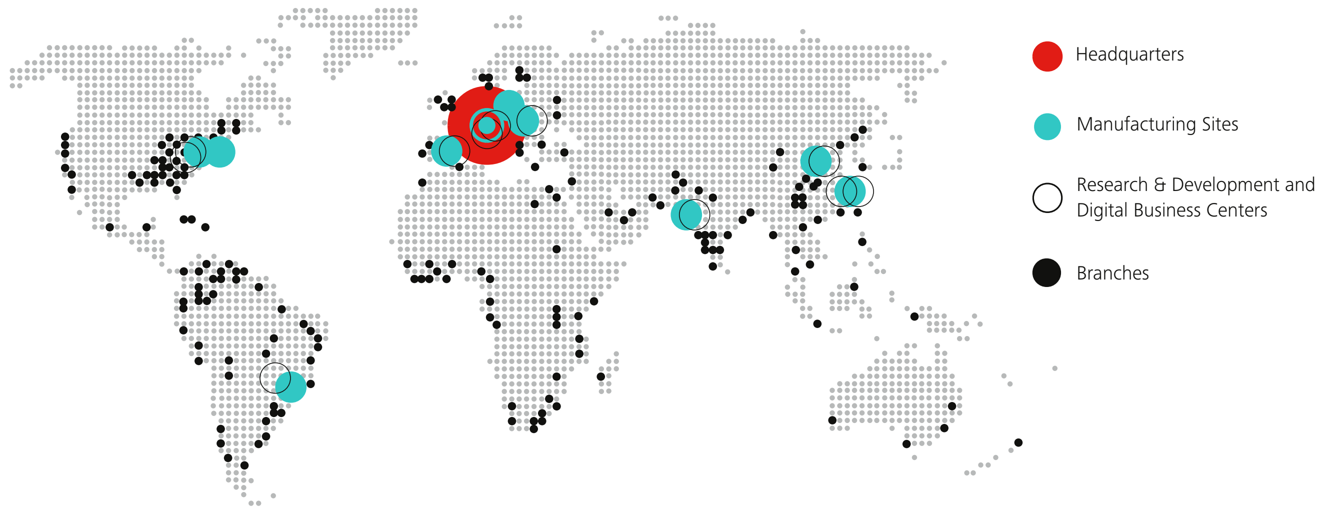
About Schindler

Founded in Switzerland in 1874, the Schindler Group is a leading global provider of elevators, escalators, and related services. Schindler mobility solutions move more than one billion people every day all over the world.

Behind the company's success are over 69,000 employees in more than 1,000 branches in over 100 countries throughout Europe, North & South America, Asia-Pacific, and Africa with manufacturing plants strategically located in Europe, Brazil, USA, China, and India.

Schindler manufactures, installs, services, and modernizes elevators, escalators, and moving walks for almost every type of building worldwide. Schindler's offerings range from cost-effective solutions for low-rise residential buildings to sophisticated access and transport management concepts for skyscrapers.

Schindler moves people and materials, and connects vertical and horizontal transport systems through intelligent mobility solutions driven by green and user-friendly technologies. Schindler products can be found in many well-known buildings across the globe, including residential and office buildings, airports, shopping centers / retail establishments, and buildings with special requirements.



A network of more than 1,000 branches in over 100 countries.

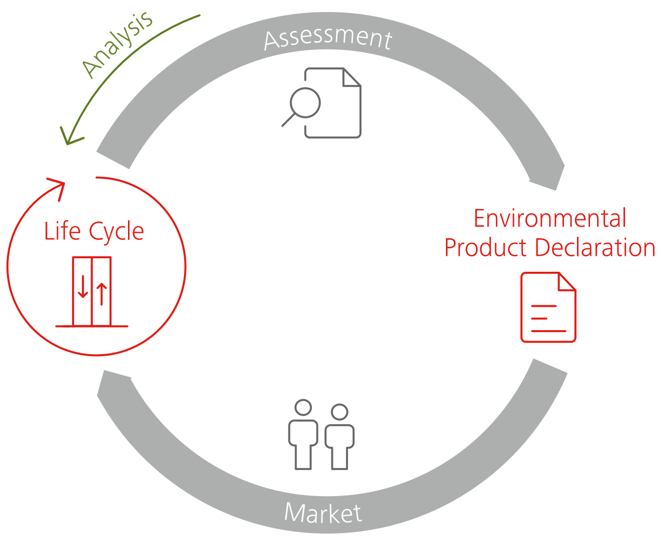
We Elevate... Sustainability

Schindler's commitment to sustainability is enshrined in our Corporate Sustainability Policy, which defines our approach to sustainability based on four pillars – People, Product, Planet, and Performance – and the journey we have embarked on regarding key sustainability challenges.

Sustainability is a dual commitment for Schindler: we want to fulfill our vision of leadership in urban mobility solutions and strive to optimize our environmental impact while investing in people and society. Schindler has demonstrated this commitment by achieving the ISO 9001/14001 certification in 2020.

Mobility is essential in the world we live and work. Every day, more than one billion people all over the world place their trust in Schindler. That is why we are committed to continuously improving the environmental impact of our products and services along the whole life cycle.

With over 145 years of history, Schindler has grown around the world and is recognized as a responsible corporate citizen. We firmly intend to continue evolving along this path with a global perspective on sustainability and a focus on the most relevant key performance indicators.



From design to recycling
From the first sketches in design, right through to disposal and recycling, environmental assessment considerations are an integral part of the Schindler product development process. The assessment rigidly follows the ISO 14040 standard and is embedded in the ISO 14001 Environmental Management System, which is applied at Corporate Research & Development and provides transparency in all phases.

Life Cycle Assessment (LCA)
Schindler conducts Life Cycle Assessments of its products. The objective is to continuously improve the environmental performance of the products. A holistic approach is applied all the way from initial product development through to the product improvement initiatives.

Environmental Product Declaration (EPD)
The EPD provides verified information on the environmental impact of a product. The declaration is based on a comprehensive LCA and follows the ISO 14025 guideline. A complex issue made understandable.

Product Category Rules (PCR)
Product Category Rules define the rules and requirements for EPDs of a certain product category. They are a key part of ISO 14025 as they enable transparency and comparability between EPDs.

Thinking globally. Acting locally.

Local production
With manufacturing plants strategically located in Europe, Brazil, USA, China, and India, Schindler focuses on local production for the local market. This reduces the environmental impact from shipping and transport around the world.

In China, Schindler has a manufacturing plant in Jiading, outside of Shanghai. With 96% of the components in the Schindler 5000 X produced or assembled in China, we can ensure the most effective and efficient transport methods are used to ship material to each jobsite and minimize our carbon footprint.

Modular products
Our modular approach to system development enables us to share components across products, including the Schindler 3000, Schindler 5000, and Schindler 5000 X. This enables better sourcing management with our suppliers and sub-suppliers and consolidation of shipments to reduce the environmental impact caused by the transport of material to Schindler manufacturing plants.

By optimizing our logistic activities and manufacturing supplier base, the supply chain in China has substantially reduced the logistic carbon dioxide footprint for the Schindler 5000 X.

Recyclable packaging
Packaging of the Schindler 5000 X is mainly comprised of environmentally friendly and recyclable material, such as cardboard, paper, PE plastic and wood. It is made with materials that are free from fumigation. This enhanced packaging features a robust and damage-resistant shell to protect our products in transit and on the construction site, while also reducing waste. It has been qualified in a test lab to ensure durability.

The packaging concept has been defined in combination with the installation process and has been designed to support the sequence of activities during the elevator installation. This ensures material remains un-damaged since it can remain packaged and protected until it is required for installation.

Digital processes
To improve our installation process and drive sustainability in the field, Schindler has digitized the installation and commissioning manuals for our fitters. By making these documents available on mobile devices, we have reduced our impact on natural resources, saving 250 metric tons of paper annually.

Key figures Schindler 5000 X

Schindler 5000 X
The Schindler 5000 X rope system is part of Schindler's new, modular-platform product range for residential and commercial buildings. From low- to high-rise, and from basic to sophisticated requirements, worldwide, Schindler has the product to fit your needs.

The Schindler 5000 X combines high-rise performance with maximum flexibility – for any rise up to 200m and speeds up to 4.0 m/s. This flexibility also extends to the design, dimensions, configurations, and application - even addressing the needs of demanding mixed-use and high-rise developments. This premium product meets the needs of the most high-end buildings around the world.

The Schindler 5000 X has been built on our new technical elevator systems (ES). The elevator systems are not linked directly to the branding, rather they provide the technical foundation for the elevator, while the market-related features and requirements drive the product brand selection. With this strategy, we can cover all customer requirements while also minimizing our product complexity.

Schindler 5000 X - Rope technical characteristics

Elevator System	ES2 and ES3
Capacity	630-1800kg
Travel height	Up to 200m
Door width	800 - 1400mm
Door height	Up to 2,900mm
Drive	Synchronous machine with regenerative drive with STO technology
Speed	1.0 - 4.0 m/s
Number of stops	Up to 65
Car groups	Up to 8 cars
Fixtures	Mechanical or touch-sensitive buttons dot matrix display or TFT LCD
Door types	T2L, T2R, C2

Perfectly suited to the environment

Overall system
– Robust and durable design that optimizes material usage
– Remote connectivity improves service efficiency and reduces unnecessary trips to the installation

Drive
– Lubrication-free, gearless machine for smooth ride quality
– Regenerative frequency converter, available as an option, to return energy to the grid for use in the building or elevator operation
– Stable start without high peak current, quickly reaching a low energy consumption level
– Permanent magnet machine for higher energy efficiency
– Disk brake provides a smooth stop for passengers

Car
– Ceiling lights, car indicator and landing indicators feature energy saving LED lights
– Door drive with stand-by mode for safety and energy conservation
– Lightweight interior materials improve operational efficiency and energy usage

Hoistway
– Updated elevator positioning system eliminates unnecessary trips to reset the system

Control
– System switches car lights and ventilation into stand-by mode when not in use
– Smart operation, down collective and selective collective controls for efficient passenger transportation

Representative unit
based on an average high-rise commercial building in China

Elevator System	ES3	**Car W/D/H (mm)**	2000×1700×3000
Rated Load	1600 kg	**Door W/H (mm)**	1100 / 2400
Speed	4.0 m/s	**Operation days per year**	365
Travel height	120 m (81 m express zone)	**Usage category**	4
Number of floors / entrances	15 / 1	**Reference service life**	25 years

In case of major deviations to the given configuration, please contact Schindler to anticipate the impact.

Elevator life cycle insights

System boundary

This EPD covers the full life cycle with a cradle to grave approach. The PCR focuses on four main stages. The Product stage (A1-A3) includes the raw material extraction and production, transport to the manufacturing site (primarily by truck), and manufacturing and assembly of components, considering the demand of energy, auxiliary and operational materials, and packaging. The Construction process stage (A4-A5) includes the transportation to the installation site by truck and the installation, considering the energy demand and auxiliary materials including related Volatile Organic Compound (VOC) emissions. The Use stage (B1-B7) includes the maintenance, considering the transportation of employees to the installation site and auxiliary materials, including related VOC emissions and preventive maintenance parts production and energy use during operation and standby. All other modules are not relevant and modernization is not foreseen. The End-of-life stage (C1-C4) includes the deconstruction, considering the energy demand and auxiliary materials, the transportation by truck to waste processing facilities, the waste processing, considering sorting, and the waste disposal, considering a scenario with recycling, incineration, and landfill. Finally, the benefits and loads beyond the system boundaries stage (D) include the potential for recycling by substitution of primary material and energy recovery.

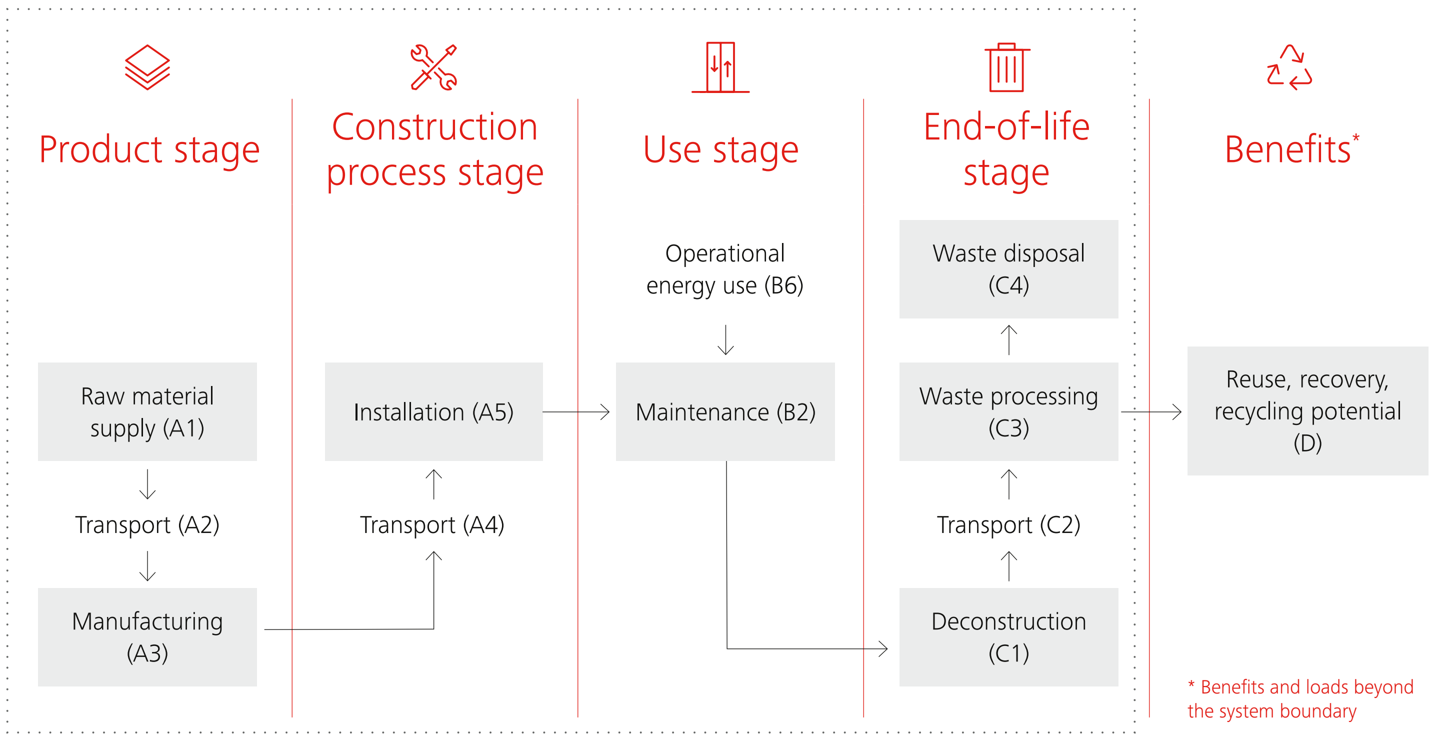
Cut-off criteria

General quality and cut-off criteria were considered, as defined for the evaluation in the PCR and EN 15804. The total mass of the elevator materials considered equals the total mass of the elevator. All inflows and outflows, for which data are mandatory, are included in the calculations. Special emphasis was given to material and energy flows that are known to have a large impact.

Product stage	Raw material supply	A1	✓
	Transport	A2	✓
	Manufacturing	A3	✓
Construction Process stage	Transport	A4	✓
	Installation	A5	✓
Use stage	Use	B1	ND
	Maintenance	B2	✓
	Repair	B3	ND
	Replacement	B4	ND
	Refurbishment	B5	ND
	Operational energy use	B6	✓
	Operational water use	B7	ND
End-of-life stage	Deconstruction	C1	✓
	Transport	C2	✓
	Waste processing	C3	✓
	Waste disposal	C4	✓
Benefits	Reuse, recovery, recycling, potential	D	✓

This declaration covers "cradle to grave". All mandatory modules covered in the EPD are marked with an ✓. For non-relevant fields, ND is marked in the table.

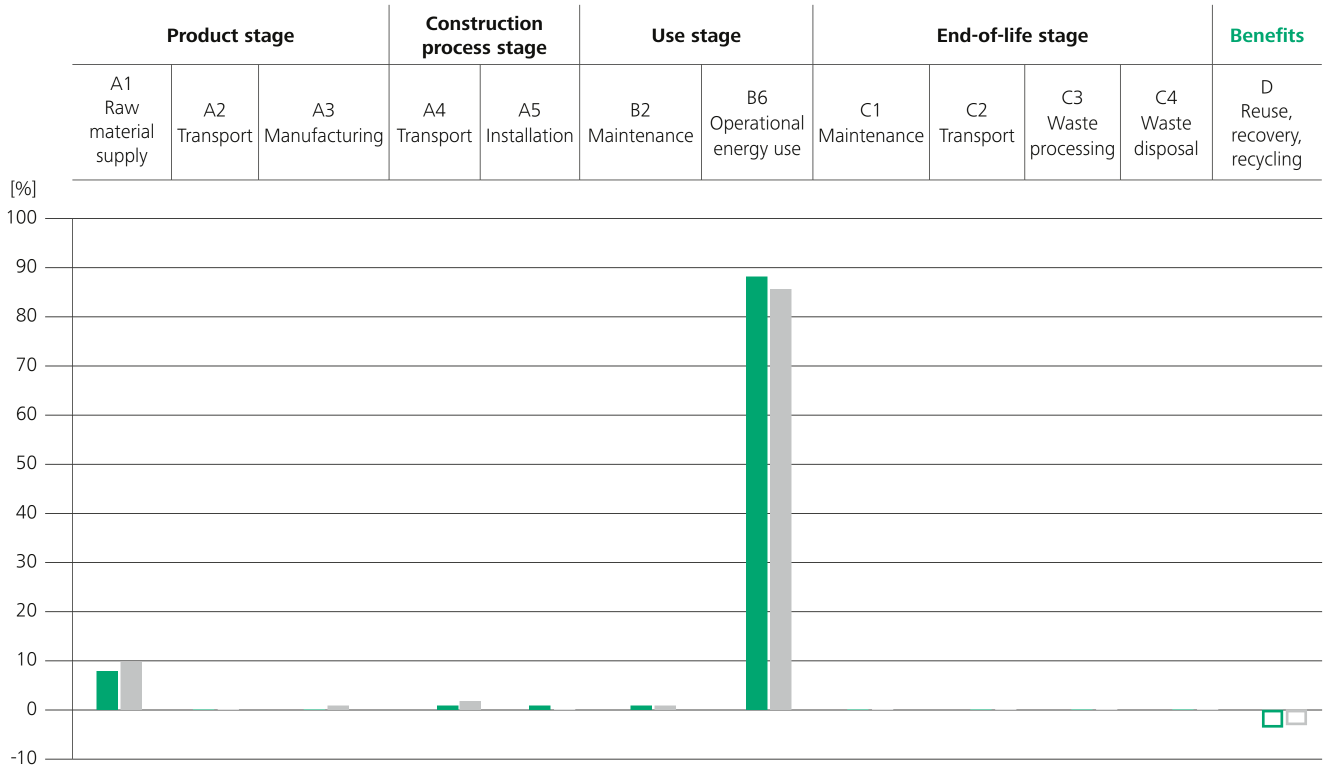
System boundary



Our mission: reduce emissions

Consolidated impact based on a reference service life of 25 years
Values shown refer to the representative unit of Schindler 5000 X, as shown on page 7. The most relevant processes, energy, and material flows are indicated.

- Climate change total (GWP_{tot})
- Resource use - fossil fuels (ADPF)



Data reflects UC4 results

Summary
Energy rating efficiency has been further improved compared to the previous product generation. In the operations stage, we have achieved a Class A energy efficiency rating for the defined representative elevator. The energy consumption of the elevator during operation followed by the material supply for production have the biggest impact on resources. The profile of the impacts of the energy consumption depends on the chosen electricity supply. The Chinese supply mix was considered for the installation in Guangzhou. Further relevant factors are the elevator lifetime and the usage category. With shorter lifetime and lower usage, the portion of materials becomes more important.

Environmental impact
In the LCA, impact assessment methods and characterization factors were used at the midpoint level, as requested in the PCR (i.e. without normalization and weighting). Selected core environmental impact categories for this study were global warming (IPCC 2013 100 year horizon), effects on the stratospheric ozone layer (WMO, 2014), acidification (Seppälä et al., 2006), eutrophication (Struijs et. Al 2009b), photochemical ozone creation (Van Zelm et al.), abiotic depletion of elements (CML 2001, baseline, August 2016 version), abiotic depletion of fossil fuels (Guinée et al.), and water deprivation potential (Boulay et al., 2016).

Impacts per functional unit
The PCR defines the following functional unit for product comparison.

The primary purpose of an elevator is to vertically transport goods and passengers. Therefore, for the purpose of this EPD, the functional unit is the result of a load transported over a distance, expressed in tonne - kilometer [tkm].

The Transportation Performance (TP) indicates the total amount of tkm performed by the elevator over the defined service life with an average load, according to ISO 25745-2.

For the defined representative unit and a lifetime of 25 years, the TP per applied usage category is:

Usage Category	Transportation Performance (TP)
4	29548.6 tkm

Minimizing material, maximizing space

Material that matters

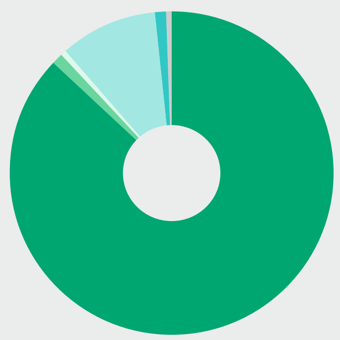
The table and graph below show the resulting material composition of the installed elevator with a total weight of 17759.4 kg, without packaging. It is mainly composed of ferrous metals and concrete. The biogenic carbon content in the product is below 5%

At the end of use almost all material is suitable for recycling. An average material loss of 5% in production was assumed additionally for the consumption of raw material. The Schindler 5000 X elevators emit no VOCs or other harmful substances once installed. The cabling and wiring in a Schindler elevator can also be ordered halogen free. Hazardous substances are avoided as much as possible, in accordance with REACH, its candidate list and other regulations. However, the following substances may still exist above 0.1% weight by weight in articles used in our products:

Substance	CAS-No.	Present in
Lead	7439-92-1	Batteries, Metal alloys
Diboron Trioxide	1303-86-2	Electronic articles
Boric Acid	10043-35-3	Electronic articles

Used material – an overview

Product components	Weight (kg)	Weight (%)	Post-consumer material weight (%)
Ferrous metal	15430.16	86.88	unknown
Non-ferrous metals	210.57	1.19	unknown
Plastics and rubbers	95.96	0.54	0
Inorganic materials	1748.07	9.84	0
Organic materials	194.53	1.10	0
Lubricants	18.90	0.11	0
Electric and electronic equipment	54.79	0.31	unknown
Batteries and accumulators	6.40	0.04	unknown
Other materials	0.00	0.00	0
Total	**17759.38**	**100%**	



Weight (%)

Packaging material

The table shows the typical composition of material used for packaging in relation to the total weight of the elevator system – once the elevator arrives on the construction site.

Schindler seeks to maximize the transport capacity per pallet for each delivery. Furthermore, almost all materials are suitable for recycling, e.g. paperboard and wood.

Composition of packaging material

Product components	Weight (kg)	Weight (%)	Weight (%) packaging vs product	Biogenic carbon content (kg C)
Wood*	2025.00	95.74	11.40	1.01E+03
Cardboard*	37.00	1.75	0.21	1.70E+01
Plastic	37.00	1.75	0.21	0.00E+00
Steel	16.10	0.76	0.09	0.00E+00
Total	**2115.10**	**100%**	**11.91%**	**1.03E+03**

*Renewable material

Potential environmental impact

Table of results – core environmental impact UC 4 per tkm

	EN15804	Product stage				Construction process stage		Use stage		End-of-life stage					Net Benefits
Impact category	**Unit**	**A1**	**A2**	**A3**	**Sum A1–A3**	**A4**	**A5**	**B2**	**B6**	**C1**	**C2**	**C3**	**C4**	**Total**	**D**
GWP_{tot}	kg CO_2 eq.	1.17E+00	1.59E-02	4.82E-02	1.24E+00	1.69E-01	1.32E-01	1.15E-01	1.30E+01	4.26E-03	6.51E-03	6.77E-03	2.74E-02	1.47E+01	-4.96E-01
GWP_{fos}	kg CO_2 eq.	1.18E+00	1.56E-02	1.75E-01	1.37E+00	1.69E-01	4.61E-03	1.14E-01	1.30E+01	4.26E-03	6.51E-03	6.75E-03	1.49E-02	1.47E+01	-4.97E-01
GWP_{bio}	kg CO_2 eq.	-1.06E-02	5.48E-06	-1.28E-01	-1.38E-01	5.80E-05	1.28E-01	3.67E-04	1.74E-03	5.71E-07	2.88E-06	9.49E-06	1.25E-02	9.49E-06	2.38E-03
GWP_{luluc}	kg CO_2 eq.	1.41E-03	5.99E-06	7.97E-04	2.21E-03	6.12E-05	3.40E-07	3.65E-04	1.53E-03	5.01E-07	3.71E-06	2.12E-06	5.50E-07	4.17E-03	7.84E-05
ODP	kg CFC 11 eq.	6.99E-08	3.38E-09	4.11E-09	7.74E-08	3.70E-08	-3.46E-11	8.74E-09	8.47E-08	2.77E-11	1.31E-09	1.59E-10	2.62E-10	2.09E-07	-1.57E-08
AP	mol H^+ eq.	9.29E-03	7.91E-05	9.12E-04	1.03E-02	8.65E-04	2.39E-05	1.34E-03	6.85E-02	2.24E-05	3.17E-05	7.89E-06	1.30E-05	8.11E-02	-4.07E-03
EP_{fw}	kg P eq.	8.03E-05	1.50E-07	4.38E-06	8.48E-05	1.58E-06	1.25E-07	1.24E-05	2.82E-04	9.24E-08	8.14E-08	6.69E-08	3.28E-08	3.81E-04	-4.16E-05
EP_{fw}	kg PO4 eq.	2.42E-04	4.50E-07	1.32E-05	2.55E-04	4.75E-06	3.76E-07	3.74E-05	8.50E-04	2.78E-07	2.45E-07	2.01E-07	9.88E-08	1.15E-03	-1.25E-04
EP_{mar}	kg N eq.	1.28E-03	2.61E-05	1.98E-04	1.50E-03	2.88E-04	4.38E-06	1.66E-04	1.40E-02	4.58E-06	9.69E-06	1.63E-06	5.81E-06	1.60E-02	-4.91E-04
EP_{ter}	mol N eq.	1.69E-02	2.88E-04	2.13E-03	1.93E-02	3.18E-03	4.82E-05	2.27E-03	1.54E-01	5.05E-05	1.07E-04	1.82E-05	5.66E-05	1.79E-01	-6.03E-03
POCP	kg NMVOC eq.	6.03E-03	8.19E-05	5.94E-04	6.71E-03	9.06E-04	2.20E-05	6.82E-04	4.00E-02	1.31E-05	3.09E-05	4.87E-06	1.46E-05	4.83E-02	-2.81E-03
ADPE*	kg Sb eq.	1.43E-04	4.49E-07	1.22E-06	1.45E-04	4.48E-06	3.99E-09	4.96E-05	3.22E-05	1.05E-08	3.06E-07	2.19E-08	2.07E-08	2.31E-04	-1.22E-05
ADPF*	MJ	1.30E+01	2.31E-01	1.65E+00	1.49E+01	2.51E+00	4.99E-02	1.31E+00	1.15E+02	3.76E-02	9.36E-02	1.84E-02	1.91E-02	1.34E+02	-3.99E+00
WDP*	m^3 depriv.	3.83E-01	7.56E-04	2.45E-02	4.08E-01	8.13E-03	7.81E-04	4.11E-02	1.34E+00	4.40E-04	3.79E-04	5.09E-03	3.19E-03	1.81E+00	-9.77E-02
Additional impact															
GWP_{GHG}**	kg CO_2 eq.	1.14E+00	1.55E-02	1.70E-01	1.32E+00	1.68E-01	4.45E-03	1.08E-01	1.26E+01	4.12E-03	6.45E-03	6.73E-03	8.82E-03	1.42E+01	-4.71E-01

GWP_{tot} Climate change total
GWP_{fos} Climate change – fossil
GWP_{bio} Climate change – biogenic
GWP_{luluc} Climate change – land use and land use change
ODP Ozone Depletion
AP Acidification
EP_{fw} Eutrophication aquatic freshwater
EP_{mar} Eutrophication aquatic marine
EP_{ter} Eutrophication terrestrial
POCP Photochemical ozone formation
ADPE Depletion of abiotic resources – minerals and metals
ADPF Depletion of abiotic resources – fossil fuels
WDP Water use
GWP_{GHG} Climate change - greenhouse gas

* 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.
**The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. Thus, this indicator is almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Impact on natural resources

Use of resources

Material resources are based on specific data of the product, i.e. new and replacement material, packaging, and auxiliary materials used in the manufacturing.

Energy resources are calculated based on measurements or LCI-data. All data has been extended to their life cycle scope.

Table of results – use of resources UC 4 per tkm

	EN15804	**Product stage**				**Construction process stage**		**Use stage**		**End-of-life stage**					**Net Benefits**
Impact category	**Unit**	**A1**	**A2**	**A3**	**Sum A1–A3**	**A4**	**A5**	**B2**	**B6**	**C1**	**C2**	**C3**	**C4**	**Total**	**D**
PERE	MJ	8.79E-01	2.67E-03	7.10E-01	1.59E+00	2.80E-02	3.81E-03	1.00E-01	1.17E+01	3.83E-03	1.48E-03	1.89E-03	6.02E-04	1.34E+01	-3.99E-01
PERM	MJ	1.38E-01	0.00E+00	8.09E-01	9.48E-01	0.00E+00	0.00E+00	7.59E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E+00	0.00E+00
PERT	MJ	1.02E+00	2.67E-03	1.52E+00	2.54E+00	2.80E-02	3.81E-03	1.76E-01	1.17E+01	3.83E-03	1.48E-03	1.89E-03	6.02E-04	1.44E+01	-3.99E-01
PENRE	MJ	1.29E+01	2.31E-01	1.65E+00	1.48E+01	2.51E+00	4.99E-02	1.31E+00	1.15E+02	3.76E-02	9.36E-02	1.84E-02	1.91E-02	1.33E+02	-3.99E+00
PENRM	MJ	1.02E-01	0.00E+00	0.00E+00	1.02E-01	0.00E+00	0.00E+00	3.80E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-01	0.00E+00
PENRT	MJ	1.30E+01	2.31E-01	1.65E+00	1.49E+01	2.51E+00	4.99E-02	1.31E+00	1.15E+02	3.76E-02	9.36E-02	1.84E-02	1.91E-02	1.34E+02	-3.99E+00
SM*	kg	1.66E-01	0.00E+00	1.83E-04	1.66E-01	0.00E+00	0.00E+00	8.52E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-01	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	8.17E-05	8.17E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.17E-05	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	8.17E-05	8.17E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.17E-05	0.00E+00
FW	m^3	1.04E-02	2.21E-05	6.11E-04	1.10E-02	2.37E-04	1.83E-05	1.15E-03	3.22E-02	1.05E-05	1.12E-05	1.58E-04	9.40E-05	4.48E-02	-2.19E-03

PERE Use of renewable primary energy excluding renewable energy resources used as raw material
PERM Use of renewable primary energy resources used as raw material
PERT Total use of renewable primary energy resources (primary energy and primary energy resources used as raw material)
PENRE Use of non-renewable primary energy excluding non-renewable energy resources used as raw material
PENRM Use of non-renewable primary energy resources used as raw material
PENRT Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw material)
SM Use of secondary material
RSF Use of renewable secondary fuels
NRSF Use of non-renewable secondary fuels
FW Net use of fresh water

*Average recycled content was considered for metal supply; ferrous metal 30% (World Steel Association), aluminum 74%, copper 20% (ecoinvent).

Recognizing value at the end of life

Waste – Categories

Information on waste is given in three categories, considering potential risks from deposition of materials. The highest amount of waste is related to categories with low risk „non-hazardous waste". Relevant contributions result from raw material extraction and transformation including mining and processing of metals and from manufacturing.

Table of results – waste categories UC 4 per tkm

	EN15804	**Product stage**				**Construction process stage**		**Use stage**		**End-of-life stage**					**Net Benefits**
Impact category	**Unit**	**A1**	**A2**	**A3**	**Sum A1–A3**	**A4**	**A5**	**B2**	**B6**	**C1**	**C2**	**C3**	**C4**	**Total**	**D**
HWD	kg	1.61E-04	6.12E-07	1.23E-06	1.63E-04	6.62E-06	-4.12E-09	2.32E-05	2.20E-05	7.21E-09	2.59E-07	1.72E-08	3.54E-08	2.15E-04	-3.67E-05
NHWD	kg	2.95E-01	1.00E-02	2.02E-02	3.25E-01	1.19E-01	1.03E-04	2.37E-02	1.05E+00	3.47E-04	2.81E-03	1.19E-03	6.46E-02	1.59E+00	-2.14E-01
RWD	kg	2.73E-05	1.51E-06	2.06E-06	3.09E-05	1.65E-05	-6.71E-09	3.65E-06	6.63E-05	2.17E-08	5.87E-07	6.70E-08	9.01E-08	1.18E-04	-1.49E-06

HWD Hazardous waste disposal
NHWD Non-hazardous waste disposal
RWD Radioactive waste disposal

Waste – Output flow

The elevator consists of a high number of materials with recycling potential. Plastic and organic material delivered to municipal incineration were considered for energy recovery. No parts are considered for re-use.

Table of results – environmental output flow UC 4 per tkm

	EN15804	**Product stage**				**Construction process stage**		**Use stage**		**End-of-life stage**				
Impact category	**Unit**	**A1**	**A2**	**A3**	**Sum A1–A3**	**A4**	**A5**	**B2**	**B6**	**C1**	**C2**	**C3**	**C4**	**Total**
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	2.67E-02	2.67E-02	0.00E+00	7.16E-02	3.80E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E-01	6.69E-01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.92E-03	7.92E-03
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.21E-02	1.39E-02
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.49E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E-02	2.60E-02

CRU Components for re-use
MFR Materials for recycling
MER Materials for energy recovery
EEE Exported Energy Electrical
EET Exported Energy Thermal

Scenarios

Electricity and district heat in manufacturing (A3) and operation (B6) stage
Electricity and district heat are used during the manufacturing stage from suppliers in different countries. Each country has its own electricity and district heat mix with its own composition and environmental impact. The following table shows the GWP_{GHG} emission factors in kg CO_2 eq./kWh of the country specific supply mix. Chinese electricity was applied for the operational energy use stage (B6).

Country	Electricity kg CO_2 eq./kWh	District Heat kg CO_2 eq./kWh
China	1.07	0.13
Switzerland	0.11	0.06
Liechtenstein		

Transport to installation site (A4)
Transport from Schindler hub to the installation site in Guangzhou. A load factor based on ecoinvent 3.6 including empty returns has been considered.

Means of transport	Distance	Load factor
Truck 16 – 32 metric tons, EURO 4, Diesel	1460 km	5.79 t

Maintenance (B2)
Proper maintenance assures good operation over the entire service life. This includes preventive replacement of worn parts. For the commuting of the maintenance personnel, an annual average per installation was applied based on the fleet milage of the region.

Scenario	Amount	
Preventive maintenance interval	As per component individual plan	
Commuting to installation	1.3 km/year	Passenger car petrol
	60 km/year	Trolleybus

Preventive maintenance replacement materials	Weight (kg)	Weight (%)
Ferrous metal	814.40	79.31
Non-ferrous metals	32.50	3.16
Plastics and rubbers	3.74	0.36
Inorganic materials	0.40	0.04
Lubricants	112.10	10.92
Electric and electronic equipment	38.16	3.72
Batteries and accumulators	25.60	2.49
Total	**1026.90**	**100%**

Energy consumption in operation phase (B6) and energy efficiency classification
Increasing energy efficiency is essential in order to reduce the environmental impact of the elevator and the building. The longest phase in the life cycle is the usage stage, which is up to 25 years or longer, depending on maintenance and modernization.

Schindler energy efficiency calculation and classification is performed according to ISO 25745-2. The typical usage expectation for a Schindler 5000 X is between 500 to 1000 trips per day. The classification and estimated annual energy consumption always refer to a specific configuration. Usage, load capacity, energy saving options and site conditions also influence the final rating.

Usage category	Assumption	Estimated annual energy consumption	Energy efficiency classification
UC4	750 trips per day	13928 kWh	Class A

According to the representative elevator, as defined for the Life Cycle Assessment, see page 7.

End of life (C2 – C4)
Most materials are suitable for recycling, for example metal and glass, where a recycling rate of 90% is assumed. Plastic and wood are assumed to be disposed of using waste incineration. Energy recovery is assumed standard for municipal waste incineration facilities.

The amount of material delivered to recovery systems is used for the calculations of net benefits in module D. A net flow calculation is used according to EN 15804. Input and outflows of recycled materials are considered.

Processes	Unit*	Amount kg/kg
Collection process	kg collected separately	1
	kg collected with mixed construction waste	0
Recovery system	kg for re-use	0
	kg for recycling	0.90
	kg for energy recovery	0.01
Disposal	kg product or material for final deposition	0.09
Distance for end-of-life treatment	km	30

* Expressed per functional unit or per declared unit of components products or materials and by type of material

References

References

ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

PCR 2019:14 Construction Products

C-PCR-008 (TO PCR 2019 :14) Lifts (Elevators)

ISO 25745-2:2015 Energy performance of lifts, escalators and moving walks - Part 2: Energy calculation and classification for lifts (elevators)

ecoinvent database v3.6, SimaPro V9

Glossary

LCA – Life Cycle Assessment: Assessment methodology of the environmental impact of all relevant material and energy flows throughout the entire life cycle of a product, according to ISO 14040.

LCI – Life Cycle Inventory: Creation of inventory of input and output flows for a product system. These flows include inputs such as water, energy, and raw materials. Outputs are releases to air, land, and water. Inventories are based on literature analysis or process simulation.

EPD – Environmental Product Declaration: A declaration that provides quantified environmental data using predetermined parameters defined in a Product Category Rule, according to ISO 14025.

PCR – Product Category Rule: A set of specific rules, requirements, and guidelines for developing environmental declarations for one or more product categories.

REACH – Registration, Evaluation, Authorization and Restriction of Chemicals: EU regulation (EC 1907/2006) that addresses the production and use of chemical substances, and their potential impacts on both human health and the environment.

RSL – Reference Service Life: The reference service life considered for the LCA corresponds to the designed lifetime of the product.

FU – Functional Unit: For lifts it is defined as the transportation of a load over a distance, expressed as one tonne [t] transported over one kilometer [km], i.e. tonne-kilometer [tkm] over a vertical (or inclined) trajectory.

UC – Usage Category: Defines the intensity of the lift usage by categories, based on average number of trips per day, according to ISO 25745-2.

Sustainability
We Elevate... Our World

Sustainability at Schindler is more than striving to minimize the use of natural resources. We facilitate sustainable, smart urban mobility, while committing to a sustainable supply chain for all our products and driving innovation for green building management.

Sustainability at Schindler also means enabling an inclusive work environment where our workforce, which is as diverse as our customers and passengers, can thrive. It also means creating value in the communities where we operate by helping develop young talent through education and training, by fostering lifelong learning for our technicians, and by designing products and systems that make it easy and safe for people to move about in cities.