FUJITEC

Environmental Product Declaration

In accordance with ISO 14025 and
EN15804:2012+A2:2019
for REXIA/ZEXIA lifts from FUJITEC.

Programme: International EPD System
Programme operator: EPD International AB
EPD registration number: S-P-06414
Publication date: 2022-07-28
Valid until: 2027-07-27

REXIA Machine-Room-Less Lift

ZEXIA Machine Room Lift

EPD®

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

Programme information

General information

Table 1: EPD programme operator details

Programme:	EPD International AB Box 210 60 100 31 Stockholm Sweden www.environdec.com info@environdec.com
ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR). Product category rules (PCR): EPD International Product Category Rules (PCR) for construction products (PCR 2019:14 v1.1). Complementary PCR for Lifts (c-PCR-008). The product group classification for the assessed product is UN CPC 4354.	
PCR review was conducted by: The Technical Committee of the International EPD System. See https://www.environdec.com/about-us/the-international-epd-system-about-the-system for a list of members. Review chair:Claudia Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat https://www.environdec.com/contact-us. The c-PCR review was conducted by: Gorka Benito (chair)	
Independent third-party verification of the declaration and data, according to ISO 14025:2010: ☐ Internal ☒ External Covering: ☐ EPD process certification ☒ EPD verification	
Third party verifier: Dr Hüdai Kara – Managing Director at Metsims Approved by: The International EPD System Technical Committee, supported by the Secretariat	
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. Note that EPDs within the same product category but from different programmes may not be comparable. In addition, EPDs of construction products may not be comparable if they do not comply with EPD International's PCR 2019:14 and c-PCR-008, even if they comply with earlier versions of this PCR. Therefore, 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.

Comparability between EPDs based on this c-PCR-008 (to PCR 2019:14) is only achievable, if the following performance characteristics are equivalent: functional unit, reference service lifetime, usage category, travel height, number of stops, rated load, rated speed, and geographic region.

Contact information

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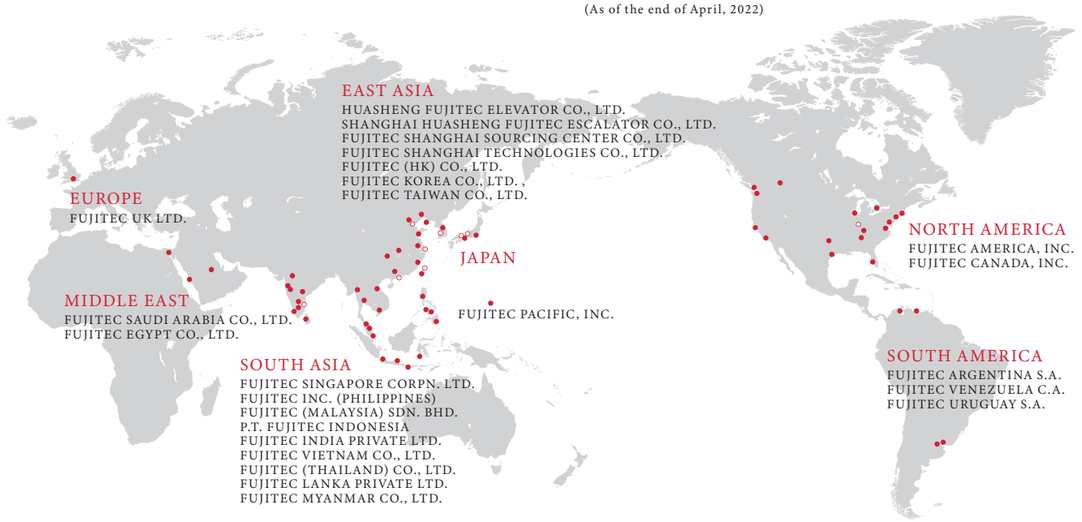
Programme operator:	EPD® ECO PLATFORM EPD VERIFIED EPD International AB, Box 210 60, 100 31 Stockholm, Sweden. For further information see www.environdec.com info@environdec.com

About FUJITEC

Founded in Japan in 1948, the Fujitec Group has over the years build its reputation for high quality products to many iconic buildings around the globe. Our history as a specialist manufacturer of elevators has given us the technological excellence and product quality that makes our elevators, escalators, and moving walks in demand around the world.
Since our founding, the company strives to care for every stage of our products life-cycle, product endurance through quality engineering and flexible programs for new installation, modernized product lines, and preventative maintenance services.
As a globally recognized company with a high reputation from people around the world, Fujitec continues to contribute to the development of cities of the new age.

● ··· Business Operation
○ ··· Production Base
(As of the end of April, 2022)

※ Our R&D and Production base are ISO 9001 and ISO 14001 certified.



Sustainability Policy

Sustainability Policy

We believe that by following our Management Philosophy we can achieve harmonious coexistence with society and nature and contribute to the creation of sustainable societies. We partner with stakeholders in a variety of business activities that encompass the pursuit of safety and security, human resources development, technology transfer, social contribution activities, and environmental activities.

Sampo-yoshi

- Good for the Buyer
- Good for the Seller
- Good for Society

Corporate Code of Conduct

1. The first priority is on human life and the protection of human rights
2. Assurance of product safety
3. Maximize use of funds and assets
4. Equitable and sound business transactions
5. Free and fair competition
6. Co-existence and co-prosperity with local communities

Materiality and Major Topics

Materialities	SDG goals	Major Topics	Initiatives
Pursuing safety and reilability		Safety and security for users	(1) Prevent serious accidents involving users (2) Pursue educational activities
		Safety and security of products and services	(3) Technical development of disaster-resistant elevators (4) Technical development of escalators with advanced safety features (5) Stable products and services enabled by advanced technical skills of field engineers
		Safety and security of employees	(6) Implement health and safety management guidelines consistently and thoroughly (7) Provide safe and secure work environments for and promote the health of our employees
Encourage diverse human resources		Respect basic human rights	(1) Communicate the Corporate Code of Conduct throughout the organization (2) Implement human rights policies consistently and thoroughly through supplier vetting
		Foster a corporate culture that recognizes diverse values	(3) Establish workplace environments and systems that recognize employee diversity (4) Strengthen organizational capabilities through personnel exchange, across organizational boundaries (5) Offer diverse work styles through the application of digital technologies
		Nurture open-minded and energetic human resources	(6) Encourage skills transfer on a global level (7) Cultivate global human resources to foster an open organizational climate (8) Evolve our organization through comprehensive human resource development that encourages individual growth
Improve technology and product capabilities		Offer beautiful urban functions	(1) Develop designs that highlight Fujitec uniqueness
		Technological innovation for a new era	(2) Develop environmentally-friendly products tailored to new lifestyles and diverse societies (3) Develop modernization packages that enhance safety and environmental performance
		Provide a robust social infrastructure	(4) Develop technologies that enable predictive maintenance and early recovery from disasters through the use of AI and IoT (5) Strengthen global deployment of remote monitoring systems (6) Improve service quality through elevator and escalator operation diagnosis systems
Efforts to reduce environmental impact		Contribute to a low-carbon society in response to climate change	(1) Pursue management and reduction measures for energy consumption, GHG emissions, and waste based on ISO 14001 (2) Enhance awareness of the importance of global warming counter measures and decarbonization through consistent in-house education (3) Save resources, reduce waste materials, and recycle by improving products and construction methods
		Strengthen our ability to conserve energy	(4) Expand environmentally-friendly products and services
		Implement product life cycle management	(5) Improve eco-efficiency through improved operational efficiencies in collaboration with partner companies
Coexist with society and local communities		Work in harmony with society	(1) Provide opportunities for mutual understanding and cultural development among diverse people
		Seek co-prosperity with local communities	(2) Offer educational support for children in local communities (3) Engage in activities to preserve the natural environment and landscape in local communities
Build a management infrastructure to support corporate value		Strengthen corporate govemance	(1) Improve the effectiveness of Board of Director operations (2) Strengthen support systems for information sharing to outside directors
		Effective stakeholder communications	(3) Expand stakeholder communication
		Conduct risk management to preserve corporate value	(4) Share risk management policies on a global level and establish a centralized management system (5) Reduce information security risks by shifting data centers to cloud computing
		Rigorously enforce compliance	(6) Establish compliance promotion guidelines, communicate guidelines internally, and continue training

LCA Information

Functional unit

The function of a lift is to transport passengers and goods vertically between floors of a building. The functional unit captures the primary functions that are provided by the product systems and serves as a basis of comparison between systems. Additional functions not described above and therefore are not captured in the functional unit definition. The c-PCR for lifts (c-PCR-008) prescribes the use of a functional unit, which is defined as:

“the transportation of a load over a distance, expressed as one tonne [t] transported over one kilometre [km], i.e. tonne-kilometre[tkm] over a vertical (or inclined) trajectory”

In this study, the functional unit also served as a reference flow and their definitions are identical.

The geographic scope of this EPD is Europe.

The designed reference service life (RSL) was defined by FUJITEC as 25 years for each lift and as prescribed by c-PCR-008 for a generic lift.

A key aspect of the functional unit is the transportation performance, as this is the value (in tonne.km) that the lifecycle impacts of a lift are divided by in order to generate results by functional unit. Transportation performance was calculated using the following approach prescribed by c-PCR-008:

1. Calculation of the average car load, %Q in tonnes:
   %Q = (lift load in kg / 1000) × percentage value from table 3 of ISO 25745-2

2. Calculation of the one-way average travel distance for target installation, S_{av} in meters:
   S_{av} = one-way travel distance of the reference cycle according to ISO 25745-1 in metres × percentage value from table 2 of ISO 25745-2

3. Calculation of the distance travelled by the lift during service life, s_{RSL} in kilometres:
   s_{RSL} = (S_{av} / 1000) × number of trips per day according to the selected usage category from table 1 of ISO 25745-2 × number of operating days per year × RSL

4. Transportation performance (TP) in tonne.km is ultimately derived using:
   TP = %Q × s_{RSL}

Values of transportation performance for an REXIA / ZEXIA (RZ-M) lift was calculated using the above approach to be 7,049 tonne.km.

System boundary

The system boundary of a product system determines the unit processes to be included in the LCA study and which data as inputs and/or outputs to/from the system can be omitted. In this LCA study and resulting EPD, the system boundary was defined as **cradle-to-grave**, covering extraction/cultivation of raw materials, processing of raw materials, production of the finished product, all transportation and waste stages. In addition, the construction process, maintenance, and operational energy use were included as well as the end-of-life of the product.

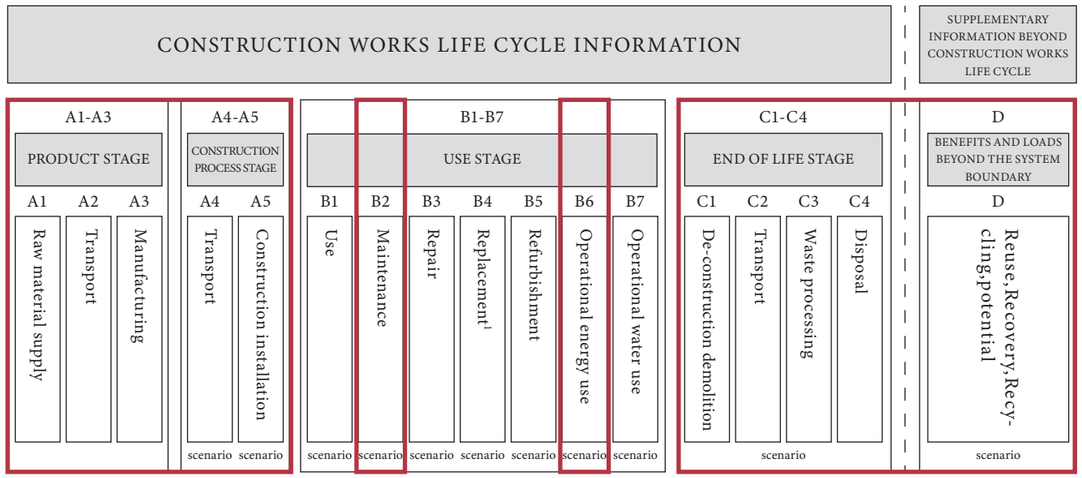


Figure 1: system boundary (source: EN 15978)

This boundary comprises the following modules given in the c-PCR-008, PCR 2019:14 and 15804:2012+A2:2019: the product stage (modules A1-A3), construction and process stage (A4-A5), use stage (B2, B6), end-of-life stage (modules C1-C4) and benefit and loads beyond the system boundary (module D) – see Figure 1.

Product information

The lift assessed in this study has a flexible range and can be customised for specific use, based on the customer's requirements. It is installed in residential buildings, offices/hotels or for public transportation and based on gearless traction machines with permanent magnetic synchronous motors. The traction machine is installed in a separate machine room (included within this EPD) or in a machine-room-less configuration. The lift is controlled by multiple microcomputers incorporated e.g. in hall indicators, car operating boards and control panels. They can be operated with a 1-car or 2-car selective collective operation or group control operation for three to eight cars. The car design can be customised with a variety of car ceilings, panels, floors, and operating boards depending on the customer's requirements.

The lift has flexibility in terms of options for load capacity, speed, travel height and number of stops, depending on the customer's requirements. A specific lift has been chosen to represent the REXIA/ZEXIA range (RZ-M), which is a "middle of the range" model in terms of specifications.

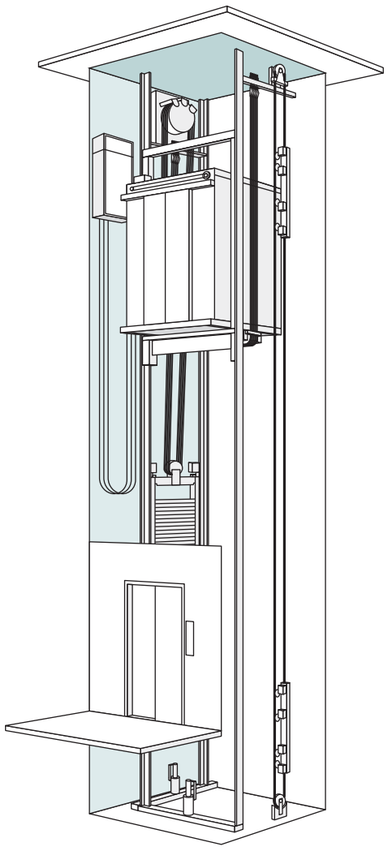
The product group classification for the assessed products is UN CPC 4354.

The basic characteristics of REXIA/ZEXIA lifts are described in Table 2.

Three Core Strengths

Fujitec has manufacturing plants in Japan, South Korea, USA, China, and India. Approximatly 55% of the componcnts of REXIA / ZEXIA are produced or assembled in South Korea and remaining 45% of components parts are produced or procured in China.

REXIA



ZEXIA

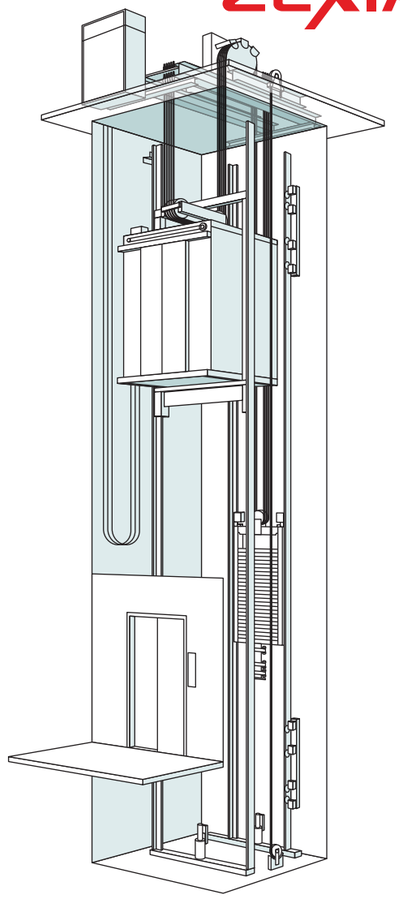


Table 2: product specifications for the REXIA/ZEXIA (RZ-M)

Technical specification	Range of values for REXIA/ZEXIA	Specific values for RZ-M
Commercial name	REXIA/ZEXIA	REXIA
Type of installation	New specific lift without modernisation	
Main purpose	Transport of passengers	
Type of lift	Electric	
Type of drive system	Gearless traction	
Capacity rated load	450 – 2,000 kg	1,275 kg
Rated speed	1.0 – 4.0 m/s	1.6 m/s
Number of stops	Up to 40	9
Travel height	Up to 230 m	30.6
Number of operating days per year range (fixed)	365	
Applied usage category (UC), according to ISO 25745-2	UC1-6	UC4
Designed reference service life (RSL)	25 years	
Geographic region of installation	Europe	
Recommended application	Residential / commercial / office / administrative / hotel / hospital / shopping centre / transportation / industrial	
Building rise (typical)	Low to medium rise	
Optional equipment	None	
Additional requirements	Non-seismic	

LCA information

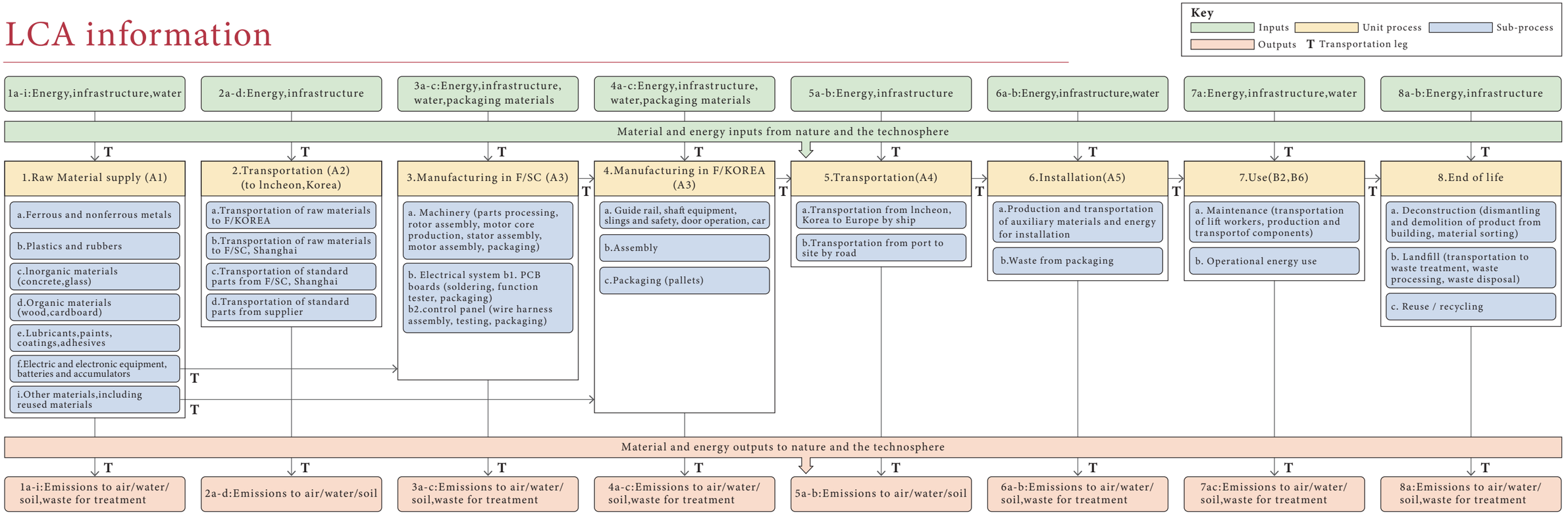


Figure 2: system diagram for REXIA/ZEXIA lifts.

Cut-off criteria

In the process of building a life cycle inventory (LCI) it is typical to exclude items considered to have a negligible contribution to results. In order to do this in a consistent and robust manner there must be confidence that the exclusion is fair and reasonable. To this end, cut-off criteria were defined in this study, which allow items to be excluded if they meet the criteria. In accordance with EPD International's PCR, exclusions could be made if they were expected to be within the below criteria:

- A process can be excluded if it contributes to <1% of the total mass or energy input of a unit process;
- A maximum of 5% of the total mass or energy of the lifecycle can be excluded; and
- The excluded process doesn't meet the following exceptions:
  - Significant effects on energy use in extraction, use or disposal;
  - Significant environmental relevance (i.e. likely to contribute to an increase/decrease in impacts of more than 1%); and
  - Are classed as hazardous waste.

Data collection procedures

Quantitative and qualitative data were collected for all processes within the system boundary and these data were used to compile the LCI. These comprised specific data (primary data) and generic data (secondary data).

Specific data were sought as a preference and were collected from FUJITEC's sites for lift assembly in Korea and part manufacture in China. These specific data were collected using data collection sheets via an iterative process and represent a time period from 2020.01.01 to 2020.12.31. Generic data were collected for all other lifecycle stages from Eugeos' 15804+A2_IA v4.1 extended version of ecoinvent v3.6 (cut-off).

Life Cycle Impact Assessment (LCIA) method

The LCIA methods used in this study for all mandatory impact categories and environmental information describing resource use, waste and other output flows prescribed in EN 15804:2012+A2:2019 and PCR 2019:14.

The LCA software openLCA (version 1.10.3) and Microsoft Excel were used to build a model for the product system under investigation using specific and generic inventory data. All generic LCI data were from the LCI database Eugeos' 15804+A2_IA v4.1 extended version of ecoinvent v3.6 (cut-off). In addition, openLCA was used to apply characterisation models and factors from the impact assessment methods to generate LCIA results. Characterisation models and factors were used unaltered and as provided in this LCA. Microsoft Excel was subsequently used to format results exported from openLCA for further modelling and to generate figures and tables for the background LCA report and the EPD.

Co-product allocation procedures

For cases where there is more than one product in the system being studied, EPD International's PCR prescribes the following procedure for the allocation of material and energy flows and environmental emissions.

- In the first instance, allocation should be avoided, by process sub-division.
- Where these methods are not applicable, the ISO 14040/44 requires that allocation reflects the physical relationships of the different products or functions. Allocation based on physical relationships such as mass or energy is a practical interpretation of this and is an approach often used in LCA.
- For some processes, allocation based on mass is not considered appropriate and, in these cases, economic allocation is used.

In this study, allocation procedures for multi-product processes followed the ISO approach above.

End-of-life allocation procedures

In this study a "cut-off" method (aka recycled content or 100:0 approach) was applied to all cases of end-of-life allocation, including in the case of generic data, where the ecoinvent v3.6 with a cut-off by classification end-of-life allocation method was used. In this approach, environmental burdens and benefits of recycled / reused materials and recovered energy are given to the product system consuming them, rather than the system providing them and are quantified based on recycled content of the material under investigation. The cut-off point is where an end-of-life state is reached, including any sorting, cleaning, and processing of waste prior to recycling, reuse, or energy recovery, following the "polluter pays principle". This is a common approach in LCA for materials where there is a loss in inherent properties during recycling, the supply of recycled material exceeds demand and recycled content of the product is independent of whether it is recycled downstream. It is in compliance with the ISO standards on LCA, EN15804, EN 15978 and is prescribed in EPD International's PCR. The exception to the use of this end-of-life allocation method was for module D, where loads and benefits beyond the system boundary, following a closed-loop approximation end-of-life allocation method, are presented separately.

Grid electricity mixes used

Details of the grid electricity mixes used in this LCA / EPD for manufacturing [A3] and use stages [B6]. The impacts of electricity have been calculated using the electricity fuel mixes for each country (kg CO_2e / kWh).

Activity	Module	Grid mix	kg CO_2e/kWh
Parts manufacturing	A3	China	1.08
Lift manufacturing	A3	South Korea	0.65
Use of lift	B6	Europe	0.43

Content declaration

The lift under investigation is made up many components that can be grouped as follows: car, weight, guide rail, traction machine, entrance, rope, sheave, mounting, panel, cable, buffer, pulley, shaft equipment, governor, fixture, operators, cover, and box (Table 4 and Figure 4). Most of these components are made from steel, with some stainless steel, aluminium, electronical components, and – to a lesser extent – plastics and rubbers are also used. The composition of a REXIA/ZEXIA (RZ-M) lift (representing 100% of the product content) is provided in Table 3 and Figure 3. The proportion of these materials is very similar across all lifts within REXIA/ZEXIA range.

FUJITEC do not specify post-industrial or post-consumer recycled content in their purchased materials, therefore averages for the region as determined in the ecoinvent v3.6 database have been used. The products contain 0% bio-based material and do not contain any substances hazardous to health or the environment (in particular carcinogenic, mutagenic, toxic to reproduction, allergic, PBT5 or vPvB6 substances). No substances that are listed in the "Candidate List of Substances of very high concern for authorisation" are contained in the lift.

Table 3: content declaration of a REXIA/ZEXIA (RZ-M) lift

Material	RZ-M mass (kg)	RZ-M mass (%)
Ferrous metal	11,570	94%
Non-ferrous metals	334	3%
Plastics and rubbers	155	1%
Inorganic materials	-	0%
Organic materials	23	0%
Lubricants	8	0%
Electric and electronic equipment	178	1%
Batteries and accumulators	35	0%
Refrigerants in car air conditioners	-	0%
Other materials	-	0%
Total	**12,304**	**100%**

REXIA / ZEXIA (RZ-M) content declaration

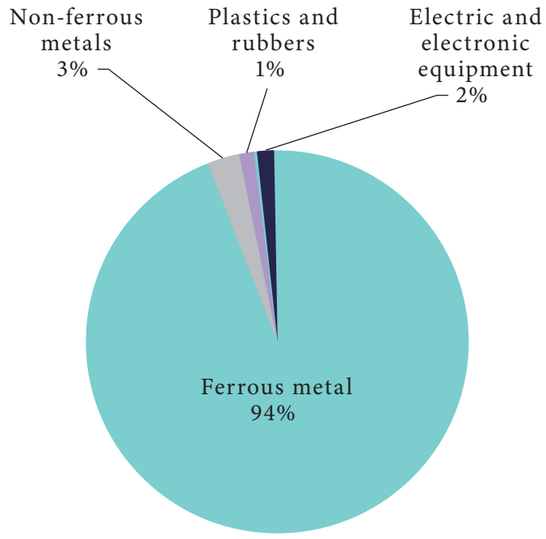


Figure 3: content declaration of a REXIA/ZEXIA (RZ-M)

Table 4: part groups of a REXIA/ZEXIA (RZ-M)

Material	RZ-M mass (kg)	RZ-M mass (%)
Weight	2,597	21%
Guide Rail	4,132	34%
Rope	177	1%
Traction machine	811	7%
Entrance	1,430	12%
Car	1,223	10%
Mounting	561	5%
Cable	331	3%
Sheave	167	1%
Chain	122	1%
Panel	233	2%
Buffer	115	1%
Shaft equipment	96	1%
Operation	208	2%
Govenor	23	0%
Pulley	19	0%
Box	14	0%
Fixture	41	0.1%
Wire	5	0%
Cover	-	0%
Total	**12,304**	**100%**

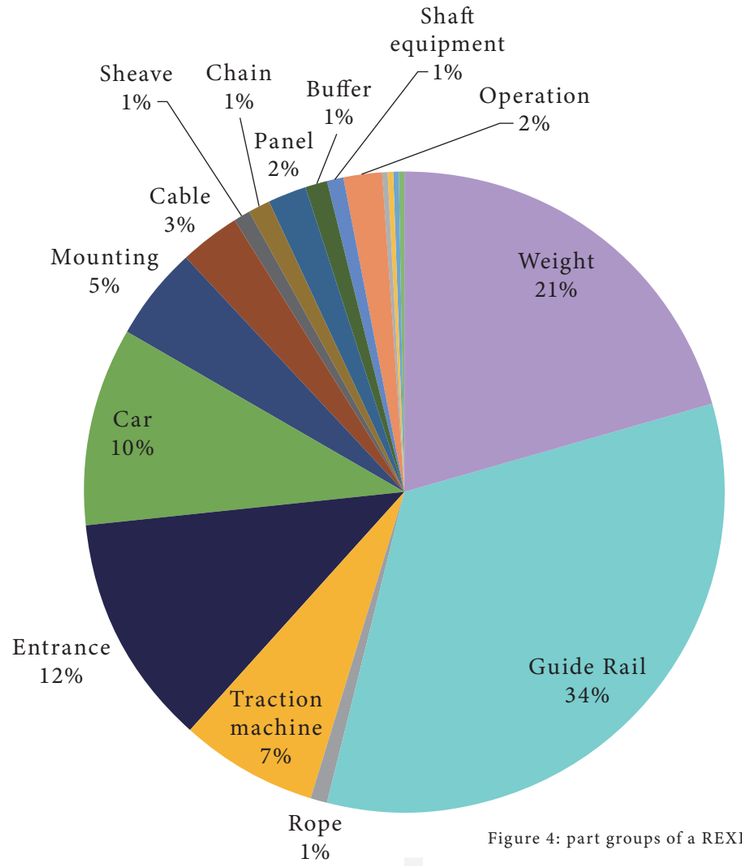


Figure 4: part groups of a REXIA/ZEXIA (RZ-M) lift

Environmental performance

The environmental performance of a REXIA/ZEXIA lift (RZ-M) is declared and reported using the parameters and units as specified in PCR 2019:14. These LCIA results and other environmental results are presented in Table 5 - Table 11 per functional unit, broken down by module.

The functional unit for this study was defined as:

"the transportation of a load over a distance, expressed as one tonne [t] transported over one kilometre [km], i.e. tonne-kilometre [tkm] over a vertical (or inclined) trajectory"

Table 5: environmental performance of a REXIA/ZEXIA lift (RZ-M) per tonne.km (parameters describing environmental impacts, table 1 of 3)

Parameters describing environmental impacts (table 1 of 3)									
			GWP-total	GWP -fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply (A1)	A1	6.83	6.85	-2.28E-02	7.03E-03	3.86E-07	7.61E-02	1.05E-02
	Transport (A2)	A2	0.03	0.03	-6.48E-06	1.34E-05	5.76E-09	5.01E-04	4.90E-06
	Manufacturing (A3)	A3	1.90	1.83	7.25E-02	3.77E-04	3.84E-08	8.39E-03	5.31E-04
	Total (of product stage, A1-3)	A1-3	8.76	8.71	4.97E-02	7.42E-03	4.30E-07	8.50E-02	1.11E-02
Construction process stage	Transport (A4)	A4	0.44	0.44	-1.82E-04	2.59E-04	9.08E-08	1.13E-02	6.27E-05
	Construction (A5)	A5	0.01	0.01	-8.81E-06	6.19E-06	1.66E-09	3.98E-05	2.44E-06
Use stage	Use (B1)	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance (B2)	B2	0.33	0.33	-1.96E-03	4.61E-04	4.21E-08	4.13E-03	5.90E-04
	Repair (B3)	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement (B4)	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment (B5)	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use (B6)	B6	7.81	7.75	4.15E-02	1.80E-02	6.52E-07	4.24E-02	7.71E-03
	Operational water use (B7)	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition (C1)	C1	0.00	0.00	-3.10E-10	2.18E-10	5.84E-14	1.40E-09	8.59E-11
	Transport (C2)	C2	0.11	0.11	1.75E-05	9.60E-06	2.29E-08	6.49E-04	5.94E-06
	Waste processing (C3)	C3	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal (C4)	C4	0.01	0.00	3.38E-03	1.91E-07	2.43E-10	2.89E-06	1.24E-07
Total	Total	A1-C4	17.46	17.34	9.24E-02	2.62E-02	1.24E-06	1.44E-01	1.95E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential (D)	D	-5.48	-5.49	1.71E-02	-1.16E-02	-2.99E-07	-4.19E-02	-6.28E-03

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
GWP-biogenic = Global warming potential, biogenic;
GWP-luluc = Global warming potential, land use and land use change;
ODP = Depletion potential of the stratospheric ozone layer;
AP = Acidification potential, accumulated exceedance; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

MND = module not declared; MND = module not relevant; INA = indicator not assessed; AGG = aggregated

Table 6: environmental performance of a REXIA/ZEXIA lift (RZ-M) per tonne.km (parameters describing environmental impacts, table 2 of 3)

Parameters describing environmental impacts (table 2 of 3)									
			EP-marine	EP-terrestrial	POCP	ADP-mineral &metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply (A1)	A1	1.00E-02	9.00E-02	3.31E-02	1.84E-03	94.27	87.71	0.00E+00
	Transport (A2)	A2	1.00E-04	1.40E-03	3.74E-04	3.00E-07	0.38	0.12	0.00E+00
	Manufacturing (A3)	A3	0.00E+00	2.00E-02	5.20E-03	3.00E-06	24.04	7.11	0.00E+00
	Total (of product stage, A1-3)	A1-3	1.00E-02	1.10E-01	3.87E-02	1.85E-03	118.68	94.95	0.00E+00
Construction process stage	Transport (A4)	A4	3.00E-03	3.00E-02	8.04E-03	4.00E-06	5.78	2.03	0.00E+00
	Construction (A5)	A5	1.00E-05	1.00E-04	3.05E-05	7.00E-07	0.14	0.43	0.00E+00
Use stage	Use (B1)	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance (B2)	B2	0.00E+00	5.00E-03	2.23E-03	1.83E-04	5.62	36.71	0.00E+00
	Repair (B3)	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement (B4)	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment (B5)	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use (B6)	B6	1.00E-02	7.00E-02	1.65E-02	0.00E+00	118.71	2225.27	0.00E+00
	Operational water use (B7)	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition (C1)	C1	0.00E+00	3.00E-09	1.07E-09	2.40E-11	0.00	0.00	0.00E+00
	Transport (C2)	C2	0.00E+00	3.00E-03	1.06E-03	6.40E-07	1.39	0.85	1.00E-08
	Waste processing (C3)	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00	0.00E+00
	Disposal (C4)	C4	6.00E-05	1.00E-05	0.00E+00	6.00E-09	0.02	0.10	0.00E+00
Total	Total	A1-C4	2.31E-02	2.18E-01	6.66E-02	2.04E-03	250.34	2360.33	1.00E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential (D)	D	-1.00E-02	-6.00E-02	-2.38E-02	-1.20E-03	-74.95	-273.39	0.00E+00

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and PM = Particulate matter.

MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated

Table 7: environmental performance of a REXIA/ZEXIA lift (RZ-M) per tonne.km (parameters describing environmental impacts, table 3 of 3)

Parameters describing environmental impacts (table 3 of 3)							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply (A1)	A1	0.40	7.64	0.00E+00	0.00E+00	11.85
	Transport (A2)	A2	0.00	0.01	0.00E+00	0.00E+00	0.30
	Manufacturing (A3)	A3	0.15	0.12	0.00E+00	0.00E+00	-1.08
	Total (of product stage, A1-3)	A1-3	0.55	7.77	0.00E+00	0.00E+00	11.08
Construction process stage	Transport (A4)	A4	0.03	0.11	0.00E+00	0.00E+00	2.36
	Construction (A5)	A5	0.00	0.01	0.00E+00	0.00E+00	0.05
Use stage	Use (B1)	B1	MND	MND	MND	MND	MND
	Maintenance (B2)	B2	0.04	0.31	0.00E+00	0.00E+00	1.16
	Repair (B3)	B3	MND	MND	MND	MND	MND
	Replacement (B4)	B4	MND	MND	MND	MND	MND
	Refurbishment (B5)	B5	MND	MND	MND	MND	MND
	Operational energy use (B6)	B6	4.24	0.46	0.00E+00	0.00E+00	1.58
	Operational water use (B7)	B7	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition (C1)	C1	0.00	0.00	0.00E+00	0.00E+00	0.00
	Transport (C2)	C2	0.01	0.01	0.00E+00	0.00E+00	0.01
	Waste processing (C3)	C3	0.00	0.00	0.00E+00	0.00E+00	0.00
	Disposal (C4)	C4	0.00	0.00	0.00E+00	0.00E+00	0.00
Total	Total	A1-C4	4.87	8.67	0.00E+00	0.00E+00	16.24
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential (D)	D	-0.31	-2.61	0.00E+00	0.00E+00	-6.83

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated

Note that the LCIA results are relative expressions and do not predict impacts on category end-points, the exceeding of thresholds, safety margins or risks.

Table 8: environmental performance of a REXIA/ZEXIA lift (RZ-M) per tonne.km (parameters describing resource use, primary energy)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ, net calorific value	MJ, net calorific value	MJ, net calorific value	MJ, net calorific value	MJ, net calorific value	MJ, net calorific value
Product stage	Raw material supply (A1)	A1	9.52	0.00	9.52	100.05	0.00	100.05
	Transport (A2)	A2	0.00	0.00	0.00	0.38	0.00	0.38
	Manufacturing (A3)	A3	1.19	0.00	1.19	26.48	0.00	26.48
	Total (of product stage, A1-3)	A1-3	10.71	0.00	10.71	126.90	0.00	126.90
Construction process stage	Transport (A4)	A4	0.05	0.00	0.05	5.84	0.00	5.84
	Construction (A5)	A5	0.01	0.00	0.01	0.15	0.00	0.15
Use stage	Use (B1)	B1	MND	MND	MND	MND	MND	MND
	Maintenance (B2)	B2	0.52	0.00	0.52	6.22	0.00	6.22
	Repair (B3)	B3	MND	MND	MND	MND	MND	MND
	Replacement (B4)	B4	MND	MND	MND	MND	MND	MND
	Refurbishment (B5)	B5	MND	MND	MND	MND	MND	MND
	Operational energy use (B6)	B6	26.63	0.00	26.63	192.28	0.00	192.28
	Operational water use (B7)	B7	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition (C1)	C1	0.00	0.00	0.00	0.00	0.00	0.00
	Transport (C2)	C2	0.01	0.00	0.01	1.40	0.00	1.40
	Waste processing (C3)	C3	0.00	0.00	0.00	0.00	0.00	0.00
	Disposal (C4)	C4	0.00	0.00	0.00	0.02	0.00	0.02
Total	Total	A1-C4	37.92	0.00	37.93	332.81	0.00	332.81
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential (D)	D	-7.47	0.00	-7.47	-79.47	0.00	-79.47

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials;
PERM = Use of renewable primary energy resources used as raw materials;
PERT = Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials);
PENRE = Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw materials;
PENRM = Use of non-renewable primary energy resources used as raw materials; and
PENRT = Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials).

MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated

Table 9: environmental performance of a REXIA/ZEXIA lift (RZ-M) per tonne.km (Parameters describing resource use, secondary materials and fuels, use of water)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ, net calorific value	MJ, net calorific value	m^3
Product stage	Raw material supply (A1)	A1	0.30	9.00E-02	-3.09	2.61E-02
	Transport (A2)	A2	0.00	1.00E-04	0.00	1.79E-05
	Manufacturing (A3)	A3	0.00	1.00E-02	0.05	-5.39E-04
	Total (of product stage, A1-3)	A1-3	0.30	1.00E-01	-3.04	2.56E-02
Construction process stage	Transport (A4)	A4	0.00	1.00E-03	-0.01	2.35E-04
	Construction (A5)	A5	0.00	3.90E-04	0.00	3.27E-05
Use stage	Use (B1)	B1	MND	MND	MND	MND
	Maintenance (B2)	B2	0.00	1.10E-02	-0.02	1.40E-03
	Repair (B3)	B3	MND	MND	MND	MND
	Replacement (B4)	B4	MND	MND	MND	MND
	Refurbishment (B5)	B5	MND	MND	MND	MND
	Operational energy use (B6)	B6	0.06	2.33E+00	0.55	1.31E-01
	Operational water use (B7)	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition (C1)	C1	0.00	1.40E-08	0.00	1.15E-09
	Transport (C2)	C2	0.00	0.00E+00	0.00	1.51E-04
	Waste processing (C3)	C3	0.00	0.00E+00	0.00	0.00E+00
	Total	C4	0.00	1.00E-05	0.00	1.92E-05
Total	Disposal (C4)	A1-C4	0.37	2.44E+00	-2.52	1.58E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential (D)	D	1.42	-6.00E-02	3.11	-2.66E-02

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels; and
FW = Net use of fresh water.

MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated

Table 10: environmental performance of a REXIA/ZEXIA lift (RZ-M) per tonne.km
(Other environmental information describing waste categories)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply (A1)	A1	2.40	53.86	2.00E-04
	Transport (A2)	A2	0.00	0.02	2.59E-06
	Manufacturing (A3)	A3	0.24	2.45	0.00E+00
	Total (of product stage, A1-3)	A1-3	2.64	56.34	2.00E-04
Construction process stage	Transport (A4)	A4	0.01	0.23	4.10E-05
	Construction (A5)	A5	0.00	0.01	8.70E-07
Use stage	Use (B1)	B1	MND	MND	MND
	Maintenance (B2)	B2	0.04	3.34	2.00E-05
	Repair (B3)	B3	MND	MND	MND
	Replacement (B4)	B4	MND	MND	MND
	Refurbishment (B5)	B5	MND	MND	MND
	Operational energy use (B6)	B6	0.53	37.11	1.10E-03
	Operational water use (B7)	B7	MND	MND	MND
End of life	Deconstruction, demolition (C1)	C1	0.00	0.00	3.10E-11
	Transport (C2)	C2	0.00	0.02	1.05E-05
	Waste processing (C3)	C3	0.00	0.00	0.00E+00
	Total	C4	0.00	0.10	0.00E+00
Total	Disposal (C4)	A1-C4	3.21	97.15	1.37E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential (D)	D	-1.63	-31.82	-1.00E-04

HWD = Hazardous waste-disposed;
NHWD = Non-hazardous waste disposed; and
RWD = Radioactive waste disposed (total low, intermediate and high level waste).

MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated

Table 11: environmental performance of a REXIA/ZEXIA lift (RZ-M) per tonne.km (Other environmental information describing output flows - at end of life and biogenic carbon content)

Other environmental information describing output flows - at end of life and biogenic carbon content								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply (A1)	A1	0.00E+00	0.25	1.70E-03	0.00	0.00	0.00
	Transport (A2)	A2	0.00E+00	0.00	1.00E-06	0.00	0.00	0.00
	Manufacturing (A3)	A3	0.00E+00	0.00	1.00E-04	0.00	0.00	0.00
	Total (of product stage, A1-3)	A1-3	0.00E+00	0.26	1.90E-03	0.00	0.00	0.00
Construction process stage	Transport (A4)	A4	0.00E+00	0.00	1.50E-05	0.00	0.00	0.00
	Construction (A5)	A5	0.00E+00	0.00	3.97E-06	0.00	0.00	0.00
Use stage	Use (B1)	B1	MND	MND	MND	MND	MND	MND
	Maintenance (B2)	B2	0.00E+00	0.00	1.60E-04	0.00	0.00	0.00
	Repair (B3)	B3	MND	MND	MND	MND	MND	MND
	Replacement (B4)	B4	MND	MND	MND	MND	MND	MND
	Refurbishment (B5)	B5	MND	MND	MND	MND	MND	MND
	Operational energy use (B6)	B6	0.00E+00	0.01	2.29E-02	0.00	0.00	0.00
	Operational water use (B7)	B7	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition (C1)	C1	0.00E+00	0.00	1.40E-10	0.00	0.00	0.00
	Transport (C2)	C2	0.00E+00	0.00	1.60E-06	0.00	0.00	0.00
	Waste processing (C3)	C3	0.00E+00	0.00	0.00E+00	0.00	0.00	0.00
	Disposal (C4)	C4	0.00E+00	0.00	0.00E+00	0.00	0.00	0.00
Total	Total	A1-C4	0.00E+00	0.28	2.50E-02	0.00	0.00	0.00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential (D)	D	0.00E+00	1.41	-1.00E-03	0.00	0.00	0.00

CRU = Components for re-use;
MFR = Materials for recycling;
MER = Materials for energy recovery;
EE = Exported energy;
Biogenic carbon (product); and
Biogenic carbon (packaging.

MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated

Figure 5 shows the breakdown of each parameter describing environmental impacts, as a percentage in a 100% stacked bar chart, for cradle-to-grave lifecycle stages of a REXIA/ZEXIA lift over a tonne.km, based on characterised mid-point results. These environmental hotspot results show which processes contribute most (and least) to the cradle-to-grave system boundary.

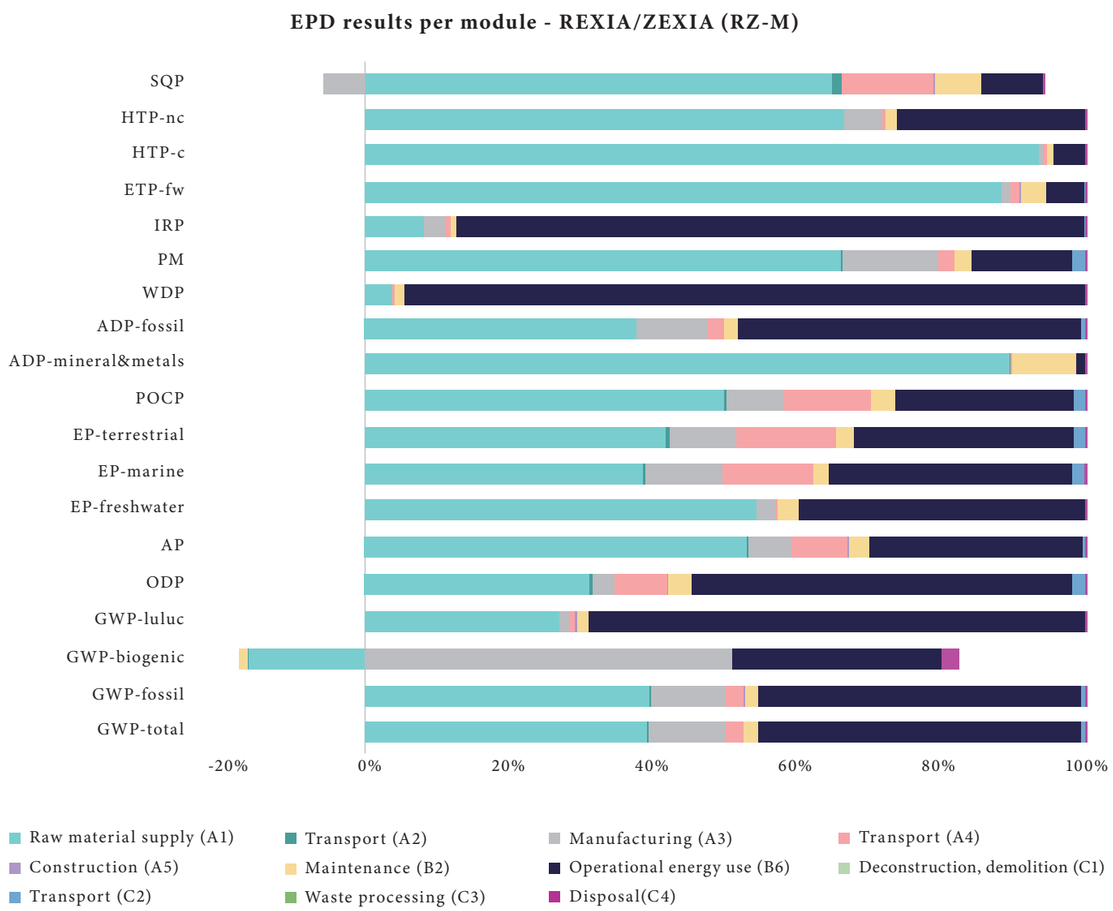


Figure 5: LCIA hotspots for cradle-to-grave lifecycle stages of a REXIA/ZEXIA lift (RZ-M) per tonne.km

The following points are evident from Figure 5:

- Raw material supply (A1) is a major hotspot for almost all impact categories, with the exception of WDP, IRP, ODP and GWP-luluc, where it is less important;
- Transport (A2) has a minor to immaterial contribution for all impact categories;
- Manufacturing (A3) makes a notable contribution for the majority of impact categories, with the exception of HTP-c, ETP-fw, IRP, WDP, ODP, GWP-luluc, where it immaterial;
- Transportation (A4) make a notable contribution for some impact categories (e.g. ODP, AP, EP, and POCP);
- In the case of ODP, AP, EP, and POCP, impurities in fuel (e.g. nitrogen, sulphates) used for sea freight are the main contributor;
- Operational energy use (B6) is the major hotspot for many impact categories; and
- All other life cycle stages are immaterial.

Energy Efficiency

Knowledge of the energy efficiency is essential for reducing the environmental impact of the lifts and the building. Operational energy use was calculated according to ISO 25745-2.

Lifts in the REXIA/ZEXIA range are capable of achieving an A classification, where A is the best energy efficiency class in the A to G range. The efficiency class is dependent on the specific lift configuration. The REXIA/ZEXIA RZ-M is classified as B based on the configuration modelled in this LCA / EPD.

These classifications shall always refer to a specific configuration and is measured at the installation site. Usage pattern, load capacity, energy saving options and site conditions influence the final rating.

Energy efficiency calculations

a) Model number	RZ-M
b) Rate load in kg	1,275 kg
c) Rate speed in m/s	1.6 m/s
d) Number of stops	9 stops
e) Travelled height in metres	30.6 m
f) Number of operating days per year	360 days
g) Applied usage category (UC) according to ISO 25745-2	UC4
h) Typical usage expectation	750 trips per day
i) Annual energy consumption (kWh)	5,104 kWh

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2022年7月版　EPD(ZR)2207-Ada(E)