

**PROGRAMME OPERATOR**

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COMPANY INFORMATION

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SCOPE OF DECLARATION

The MRPI certificate is drafted in accordance with ISO 14025 and EN 15804. Furthermore, the publications: Bepalingsmethode Milieuprestaties Gebouwen en GWW-Werken versie 2.0 November 2014 and the MRPI-verification protocol v3.0, May 2017 have been followed. The study is carried out by SGS INTRON in 2017-2018 based on data over the year 2016 and is documented in SGS INTRON report A892480/R20170632. The EPD and the LCA are verified according to the EPD-MRPI® verification protocol May 2017 by NIBE.

The intended use of this EPD is business-to-business communication of the environmental performance of the NEXIEZ-MRL elevator. EPD's of construction products may not be comparable if they do not comply with NEN-EN15804.

VISUAL PRODUCT**PRODUCT**

NEXIEZ-MRL (machine room less) elevator

MRPI®-REGISTRATION

1.1.00029.2018

EPD-REGISTRATION

00000802

DATE OF ISSUE

31-12-2018

DATE OF EXPIRY

31-12-2023

DECLARED UNIT

The transportation of a load over a distance using the NEXIEZ-MRL 6 stop elevator, usage category 3 and a rated load of 1050 kg with a reference service life of 25 years in the Netherlands expressed in tonkilometer (tkm).

DESCRIPTION OF PRODUCT

NEXIEZ-MRL is our current global design machine-room-less elevator. It consumes 70% less energy compared to in 1980s thanks to regenerative converter (PCNV), LED lighting and call allocation control system (ΣAI-22 and ΣAI-2200C). It also has a number of optional emergency features that enhance the safety. This is highly customizable elevator with all kind of add-ons.

MORE INFORMATION:

www.mitsubishielectric.com/elevator

DEMONSTRATION OF VERIFICATION

CEN standard EN15804 serves as the core PCR ^a	
independent verification of the declaration and data, according to EN ISO 14025:2010	
☐ internal	☒ external
(where appropriate ^b) Third party verifier: NIBE	
 <Kamiel Jansen>	
a Product Category Rules	
b Optional for B-to-B communication; mandatory for B-to-C communication (see EN ISO 14025:2010,9.4).	

GENERAL INFORMATION

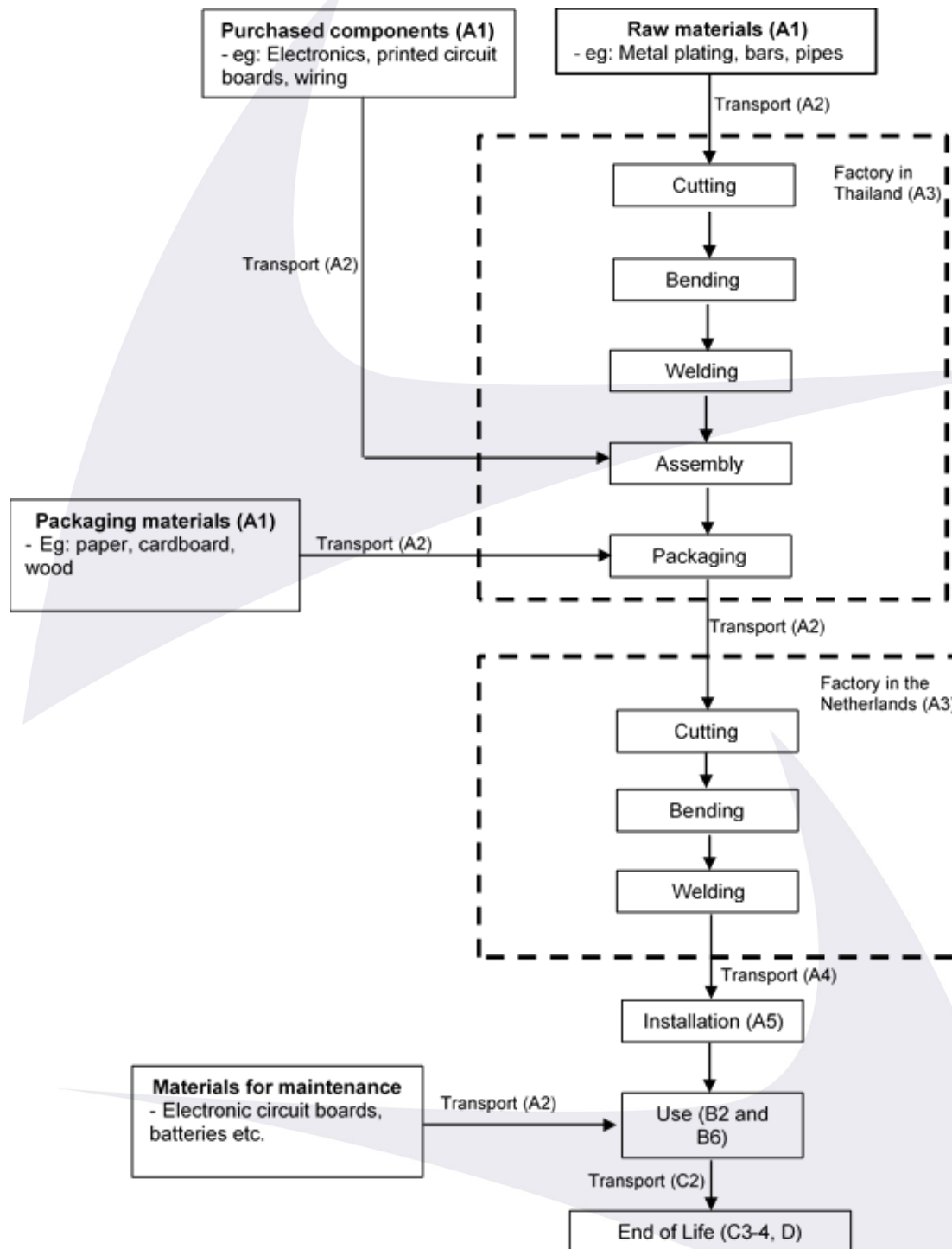
The amount of transport (tkm) during the service life of the elevator has been determined using the method described in Environdec PCR for elevators (2015). The electricity use during the use phase of the elevator was measured by Mitsubishi according to the ISO 25745 standard.

For processes taking place in the Netherlands the Dutch grid mix is used (Ecoinvent approach). The grid mix used can be summarized as follows:

Electricity source	Share in electricity mix (%)
<i>Hard coal</i>	35
<i>Natural gas</i>	44
<i>Nuclear</i>	5
<i>Wind</i>	6
<i>Oil</i>	1
<i>Municipal waste incineration</i>	4
<i>Biomass</i>	2
<i>Remainder</i>	3

As the amount of electricity from renewable sources is expected to increase the overall contribution of life cycle phase B6 is expected to decrease. This could be a reason to revise the LCA on this point in the future.

Total primary energy and emissions to air			
		Values per elevator, with reference operation 1 tkm transport	Values per elevator for the whole life cycle
Total primary energy	MJ	692	1078397
Emissions to air			
CO ₂ *	kg	39.3	61306
NO _x	kg	0.07	114
SO _x	kg	0.09	136
Particulates < 2.5 um	kg	0.02	31
* Includes fossil and biogenic CO ₂ emissions. Excludes other substances contributing to environmental effect GWP.			



DETAILED PRODUCT DESCRIPTION

In this study, some choices we made regarding the specific product and the intended application. In the following table the properties of the NEXIEZ-MRL and the application in this study are specified.

INDEX	VALUES
Type of installation	New lift
Commercial name	NEXIEZ-MRL
Main purpose	Passenger lift
Type of lift	Electric
Type of drive system	Gearless traction
Rated load (fixed or range)	1050 kg
Rated speed (fixed or range)	1.60 m/s
Number of stops (fixed or range)	6
Travelled height (fixed or range)	18 m
Number of operating days per year (fixed or range)	365
Applied usage category (UC) according to ISO 25745-2	3
Designed Reference Service Life (RSL)	25 years
Geographic region of intended installation	Netherlands

COMPONENT*	Production [wt. %]	Maintenance [wt. %]
Ferrous metals	92.6	64.5
Non-ferrous metals	2.1	0.0
Plastics and rubbers	0.7	3.6
Inorganic materials (e.g. concrete)	0.1	0.0
Organic materials (e.g. paper or wood)	1.4	0.0
Lubricants (e.g. oils and greases), paintings, coatings, adhesives and fillers	0.3	0.0
Electric and electronic equipment	2.7	4.8
Batteries and accumulators	0.2	27.1
Refrigerants in car air conditioners	0.0	0.0
Other materials	0.0	0.0
Total mass (kg)	5792	498

* > 1% TOTAL MASS

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE			USE STAGE			END OF LIFE STAGE			BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES				
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling- potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	MNA	MNA	MNA	X	MNA	X	X	X	X	X

REPRESENTATIVENESS

This EPD is representative for the production of NEXIEZ-MRL, usage category 3, 6 stop elevator. It includes the production in Thailand, shipment to the Netherlands and assembly at MEE (Veenendaal, NL). The operation of the elevator is situated in NL by using the Dutch grid mix for electricity consumption (according to Ecoinvent 3.4). Also, the waste treatment of the elevator is situated in NL (by using the default waste treatment scenarios from the Dutch National LCA database).

The LCA study has been completed in 2018 and is based on process data from Mitsubishi of reference year 2016, collected in the period 2017-2018.

ENVIRONMENTAL IMPACT per functional or declared unit

UNIT	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1-4	D
ADPE [kg Sb-Eq.]	9.80E-04	4.24E-07	2.02E-07	2.78E-07	0	0	0.0014064	INA	INA	INA	2.14E-05	INA	4.32E-05	-1.71E-04
ADPF [kg Sb-Eq.]	9.20E-02	5.29E-03	6.91E-03	6.83E-04	0	0	0.0291358	INA	INA	INA	1.99E-01	INA	1.83E-02	-3.25E-02
GWP [kg CO ₂ -Eq.]	1.38E+01	7.67E-01	9.31E-01	9.35E-02	0	0	4.3256217	INA	INA	INA	2.44E+01	INA	2.71E+00	-4.99E+00
ODP [kg CFC11-Eq.]	8.49E-07	1.23E-07	4.53E-08	1.71E-08	0	0	4.298E-07	INA	INA	INA	1.28E-06	INA	2.39E-07	-2.41E-07
POCP [kg ethene-Eq.]	1.24E-02	7.81E-04	2.04E-04	5.63E-05	0	0	0.0025365	INA	INA	INA	2.80E-03	INA	1.29E-03	-6.40E-03
AP [kg SO ₂ -Eq.]	8.45E-02	1.45E-02	2.35E-03	4.77E-04	0	0	0.0262049	INA	INA	INA	4.12E-02	INA	1.31E-02	-2.34E-02
EP [kg (PO ₄) ³⁻ -Eq.]	2.31E-02	1.35E-03	3.22E-04	9.98E-05	0	0	0.0177324	INA	INA	INA	9.60E-03	INA	1.80E-03	-4.80E-03
HTP [kg DCB-Eq.]	3.70E+01	3.36E-01	1.31E-01	3.52E-02	0	0	2.9554519	INA	INA	INA	2.05E+00	INA	1.66E+01	-2.38E+01
FAETP [kg DCB-Eq.]	2.70E-01	6.46E-03	1.37E-02	1.16E-03	0	0	0.1852895	INA	INA	INA	5.76E-02	INA	7.22E-02	-3.89E-02
MAETP [kg DCB-Eq.]	8.77E+02	2.94E+01	5.45E+01	3.71E+00	0	0	412.00538	INA	INA	INA	2.74E+02	INA	1.76E+02	-1.56E+02
TETP [kg DCB-Eq.]	2.12E-01	1.10E-03	1.34E-03	1.31E-04	0	0	0.0408481	INA	INA	INA	1.29E-01	INA	2.39E-01	-2.91E-02

ADPE = Abiotic depletion potential for non-fossil resources;
ADPF = Abiotic depletion potential for fossil resources
GWP = Global warming potential;
ODP = Depletion potential of the stratospheric ozone layer;
POCP = Formation potential of tropospheric ozone photochemical oxidants;
AP = Acidification potential of land and water;
EP = Eutrophication potential;
HTP = Human Toxicity Potential;
FAETP = Fresh-water Aquatic Ecotoxicity Potential;
MAETP = Marine Aquatic Ecotoxicity Potential;
TETP = Terrestrial Ecotoxicity Potential.

RESOURCE USE per functional or declared unit

	UNIT	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1-4	D
PERE	[MJ]	1.20E+01	1.98E-01	5.97E-01	1.16E-02	0	0	3.87E+00	INA	INA	INA	2.24E+01	INA	4.37E+00	4.24E+00
PERM	[MJ]	4.26E+00	4.46E-02	2.68E-02	6.45E-03	0	0	9.51E-01	INA	INA	INA	1.50E+01	INA	1.23E+00	9.78E-01
PERT	[MJ]	1.62E+01	2.43E-01	6.23E-01	1.81E-02	0	0	4.82E+00	INA	INA	INA	3.75E+01	INA	5.59E+00	5.22E+00
PENRE	[MJ]	1.67E+02	1.11E+01	1.32E+01	1.43E+00	0	0	5.66E+01	INA	INA	INA	3.91E+02	INA	4.10E+01	5.34E+01
PENRM	[MJ]	0	0	0	0	0	0	0	INA	INA	INA	0	INA	0	0
PENRT	[MJ]	1.67E+02	1.11E+01	1.32E+01	1.43E+00	0	0	5.66E+01	INA	INA	INA	3.91E+02	INA	4.10E+01	5.34E+01
SM	[kg]	0	0	0	0	0	0	0	INA	INA	INA	0	INA	0	0
RSF	[MJ]	0	0	0	0	0	0	0	INA	INA	INA	0	INA	0	0
NRSF	[MJ]	0	0	0	0	0	0	0	INA	INA	INA	0	INA	0	0
FW	[m³]	1.04E-01	1.41E-03	8.96E-03	2.45E-04	0	0	4.73E-02	INA	INA	INA	9.15E-02	INA	1.26E-02	2.52E-02

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;
 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;
 PENRT = Total use of non-renewable primary energy resources;
 SM = Use of secondary material;
 RSF = Use of renewable secondary fuels;
 NRSF = Use of non-renewable secondary fuels;
 FW = Use of net fresh water.

OUTPUT FLOWS AND WASTE CATEGORIES per functional or declared unit

	UNIT	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1-4	D
HWD	[kg]	1.75E-03	7.84E-05	1.45E-05	1.05E-05	0	0	3.58E-04	INA	INA	INA	1.85E-03	INA	5.04E-04	-5.63E-04
NHWD	[kg]	3.98E+00	8.20E-02	5.97E-02	6.69E-02	0	0	6.15E-01	INA	INA	INA	9.29E-01	INA	2.27E+00	-1.99E+00
RWD	[kg]	INA	INA	INA	INA	0	0	INA	INA	INA	INA	INA	INA	INA	INA
CRU	[kg]	INA	INA	INA	INA	0	0	INA	INA	INA	INA	INA	INA	INA	INA
MFR	[kg]	INA	INA	INA	INA	0	0	INA	INA	INA	INA	INA	INA	INA	INA
MER	[kg]	INA	INA	INA	INA	0	0	INA	INA	INA	INA	INA	INA	INA	INA
EEE	[MJ]	INA	INA	INA	INA	0	0	INA	INA	INA	INA	INA	INA	INA	INA
EET	[MJ]	INA	INA	INA	INA	0	0	INA	INA	INA	INA	INA	INA	INA	INA

HWD = Hazardous waste disposed;
 NHWD = Non-hazardous waste disposed;
 RWD = Radioactive waste disposed;
 CRU = Components for re-use;
 MFR = Materials for recycling;
 MER = Materials for energy recovery;
 EEE = Exported electrical energy;
 EEE = Exported thermal energy.

DECLARATION OF SVHC

No substances that are listed in the latest "Candidate List of Substances of Very High Concern for authorization" are included in the product that exceeds the limit for registration.

Mitsubishi Electric in brief

Utilizing its technological prowess and extensive experience, Mitsubishi Electric has remained a leader in the vertical transportation market since entering the business in 1931. The Company's creative, innovative spirit, represented by production of the world's first spiral escalator and elevator group-control systems that use artificial- intelligence technologies, continues to receive high evaluations industry-wide. Our products and systems are renowned for their high levels of quality, reliability and safety; and it is this sense of security and trust fostered with building owners and end-users alike that has led to the global expansion of our elevator/escalator business and the after-sales network to service it. We understand responsibilities as a good corporate citizen, and continue to implement measures for protecting the environment and ensuring a sustainable society for future generations. A number of original technologies are being introduced to ensure more efficient products, systems and manufacturing operations, thereby enhancing productivity, reducing energy consumption and providing smoother, faster and more comfortable vertical transportation system

Sustainability vision of Mitsubishi Electric Group

The Mitsubishi Electric Group recognizes that our planet needs to be protected for future generations. Limiting our impact on the environment is thus one of our top management priorities. We aim to become a "global leading green company" by solving problems globally through producing energy-saving products and systems and by building social infrastructure in business activities around the world, in order to contribute to creating an affluent society where both a "sustainable society" and "safe, secure, and comfortable lifestyles" are simultaneously achieved.

We will apply our technological expertise and new innovations to minimize the environmental impact of our business mainly through reduction of greenhouse gases emission and promotion of sustainable resource circulation, and to help preserve biodiversity. The Mitsubishi Electric Group will also strive to make positive contributions through the continuous improvement of our products and services, focusing on size and weight reduction, high performance, resource savings and energy efficiency.

We encourage employees and their families to take part in environmental activities with their communities, and thereby foster environmental awareness. As a responsible corporate citizen, we will also inform the public about our environmental initiatives to promote mutual understanding.

In addition to abiding by the law and respecting social norms, we shall remain sensitive to societal changes and make environmental consideration a permanent part of our activities.

As represented by our corporate statement "Changes for the Better", our ultimate aim is to improve the quality of people's lives while making positive contributions to the Earth's environment.

REFERENCES

- Applicable PCR: SBK; Milieuprestaties Gebouwen en GWW Werken, version 2.0, November 2014
- The functional unit and the product description of the elevator is adopted from the approach in: Environdec PCR: Lifts (elevators), Product Classification: UN CPC 4354, 2015-10-14, valid until: 2019-10-14
- ISO, 2012 "Energy performance of lifts, escalators and moving walks — Part 1: Energy measurement and verification" ISO 25745-1
- ISO, 2015 "Energy performance of lifts, escalators and moving walks — Part 2: Energy calculation and classification for lifts (elevators)" ISO 25745-2
- Dutch National LCA database (NMDv2.2)
- Ecoinvent database v3.4