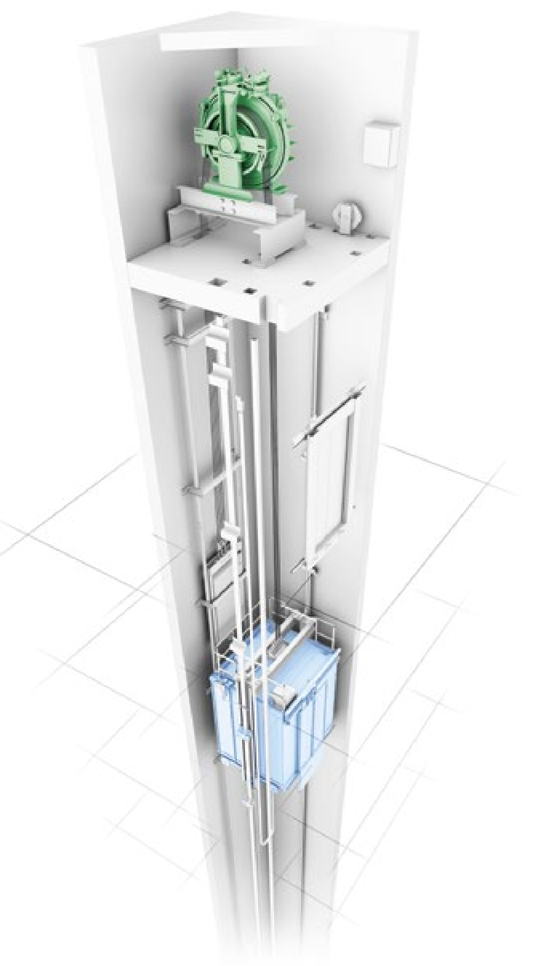
Dedicated to People Flow™



Environmental product declaration

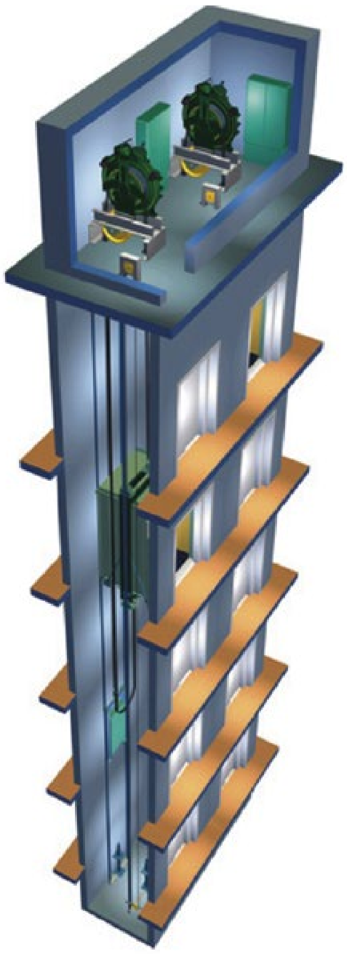
KONE MiniSpace®

Environmental product declaration

General information

The Environmental Product Declaration (EPD) provides you as a KONE customer information on environmental performance of KONE products and services. The Environmental Product Declaration is carried out according to the ISO 14025 standard. The reference LCAs were carried out in accordance to ISO 14040 and ISO 14044.

Furthermore, the ISO 14001 Environmental Management System is implemented in several KONE units. For the latest, updated information on KONE Elevators & Escalators, including Environmental Management, see **www.kone.com**.



Product description

- **Elevator for Office Buildings**
- **KONE MiniSpace® Platform**
- **Load range: 630 kg – 3200 kg**
- **Speed range: 1 m/s – 8 m/s**

The results of the Environmental Product Declaration are valid for typical elevator for Office Building based on KONE MiniSpace® Platform.

Environmental performance

The Life Cycle Assessment (LCA) is a tool for assessing the environmental impacts associated with a product, process or service throughout its life cycle. The LCA of an Elevator for Office Buildings based on KONE MiniSpace® Platform was applied in compliance with the requirements of the ISO 14040 and ISO 14044 standards.

Functional Unit
The function of an elevator is to give people access to multi-storey buildings. The functional unit is 1km distance travelled by the elevator. The LCA results for the whole life cycle are also represented in this EPD.

System Boundaries
The Life Cycle Assessment covers the important environmental aspects for raw material production, component manufacturing, transportation, installation, use, maintenance and end of life treatment i.e full chain assessment. The Life Cycle Assessment includes consumption of raw materials and energy resources as well as emissions and waste generation.

The Life Cycle Assessment is based on estimated lifetime of 25 years with frequency of starts 400 000 per year installed in Brussels. Two MiniSpace cases were calculated: 16 floors, 13 persons (1000 kg), 2,5 m/s with braking resistor (Case 1) and 30 floors, 21 persons (1600 kg), 3,5 m/s with MLB regenerative drive (Case 2). National mix of energy has been used for calculating emissions during component manufacturing and Belgium mix of energy has been used for calculating emissions caused by energy consumption during the use stage.

The total recycling ratio for metals is assumed to be 95%. Metals are recovered as scrap from manufacturing processes and from end of life treatment.

The data used in Life Cycle Assessment is collected from the manufacturer and the suppliers as well as LCA-databases. If no suitable data was available, the expert opinion or the best estimation was used.

The most significant environmental impacts

MiniSpace 2,5 m/s Case 1
About 73% of carbon dioxide (CO2) emissions, 59% of nitrogen oxide (NOX) emissions and 61% of sulphur oxide (SOX) emissions are generated during the use stage. By comparison, during material production carbon dioxide emissions are 14%, and during component manufacturing 7% of the total carbon dioxide emissions. About 88% of the total primary energy is consumed during the use stage.

MiniSpace 3,5 m/s Case 2
About 62% of carbon dioxide (CO2) emissions, 49% of nitrogen oxide (NOX) emissions and 55% of sulphur oxide (SOX) emissions are generated during the use stage. By comparison, during material production carbon dioxide emissions are 22%, and during component manufacturing 6% of the total carbon dioxide emissions. About 81% of the total primary energy is consumed during the use stage.

	MiniSpace 2,5 m/s Case 1		MiniSpace 3,5 m/s Case 2	
	Values are calculated per functional unit	Values are calculated per the whole life time of the elevator	Values are calculated per functional unit	Values are calculated per the whole life time of the elevator
Total primary energy	23,0 MJ	2 758 500 MJ	32,7 MJ	3 923 400 MJ
Emissions to air				
CO_2	0,72 kg	86 499,2 kg	1,1 kg	134 342,2 kg
NO_x	1,65E-03 kg	198,0 kg	2,56E-03 kg	307,5 kg
SO_x	2,06E-03 kg	247,4 kg	2,99E-03 kg	358,6 kg
Particulates	2,86E-4 kg	34,3 kg	4,68E-04 kg	56,2 kg

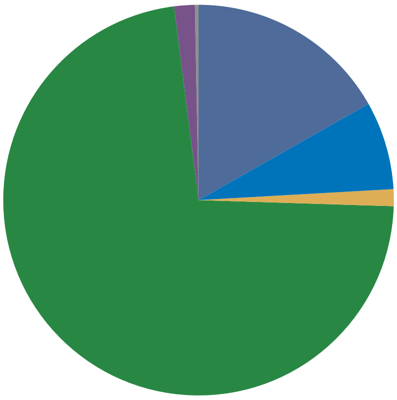
The Impact Assessment phase of LCA evaluates the significance of potential environmental impacts throughout the product life cycle. The impact assessment has been done using two different methods to improve the reliability and usability of impact assessment. The next table includes the total environmental impacts during the life cycle of the elevator according to the Swedish system for environmental product declarations.

		MiniSpace 2,5 m/s Case 1		MiniSpace 3,5 m/s Case 2	
Category of impact	Equivalent unit	Values are calculated per functional unit	Values are calculated per the whole life time of the elevator	Values are calculated per functional unit	Values are calculated per the whole life time of the elevator
Global warming (GWP)	kg CO_2	0,75	89 815	1,16	139 310
Ozone depletion (ODP)	kg CFC-11	1,07E-08	1,29E-03	1,36E-08	1,63E-03
Eutrophication	kg O_2	0,011	1 359,6	0,0174	2088,7
Photochemical oxidants (POCP)	kg ethylene	6,25E-05	7,5	8,75E-05	10,5
Acidification (AP)	kmol H+	1,03E-04	12,4	1,53E-04	18,4

The shares of the total environmental impacts of the life cycle stages have been calculated using Eco-Indicator 99(H,A) method also. The absolute values of the eco-indicators are not highly relevant because the main purpose is to compare relative differences between products or processes.

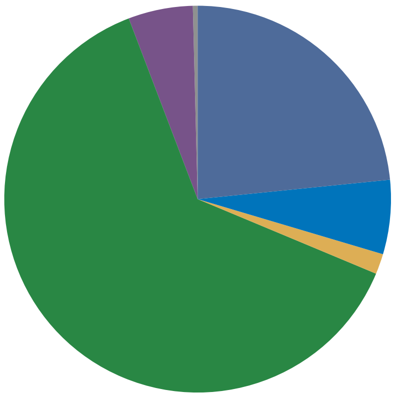
The shares of the total environmental impacts of the life cycle stages using Eco-Indicator 99 method

MiniSpace 2,5 m/s case 1



The stage of the life cycle	EI99 value-%
Raw material production	16.8
Component manufacturing	7.3
Transportation to usage place	1.4
Use	72.5
Maintenance	1.7
End of life treatment	0.3

MiniSpace 3,5 m/s case 2



The stage of the life cycle	EI99 value-%
Raw material production	23.4
Component manufacturing	6.2
Transportation to usage place	1.7
Use	62.9
Maintenance	5.4
End of life treatment	0.4

The most significant environmental aspects of the elevator are fossil fuels particularly natural gas and crude oil, and air emissions particularly carbon dioxide, nitrogen oxides, sulphur oxides and particulates according to Eco-Indicator 99 method. Eco-Indicator 99 method is one commonly used application for the environmental impact assessment.

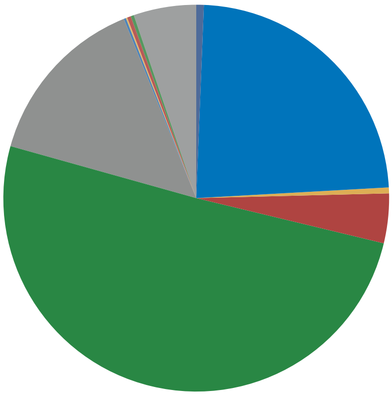
The Life Cycle Assessment shows that the most of the environmental impacts of an elevator life cycle are due to the electricity used for operating the elevator during the use stage. Electricity is consumed in moving passengers and goods, illumination and control of the equipment.

Elevator electricity consumption during the use stage		
	MiniSpace 2,5 m/s Case 1	MiniSpace 3,5 m/s Case 2
The frequency of starts/year	The energy consumption/year (kWh)	The energy consumption/year (kWh)
400 000	6 900	8 900

Additional environmental information

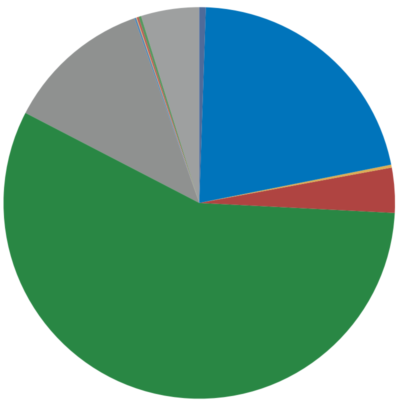
Product material content
KONE MiniSpace® Platform is mainly composed of steel and cast iron.

MiniSpace 2,5 m/s case 1



Material weight %	
Aluminum	0.6
Cast iron	23.3
Copper, brass and similar alloys	0.5
Stainless steel	4.1
Steel	50.3
Steel (zinc coated)	14.5
Tin	0
Plastics	0.2
Rubber	0.1
Glass	0.3
Others	0.3
Electronics and electromechanical components	5.2

MiniSpace 3,5 m/s Case 2



Material weight %	
Aluminum	0.5
Cast iron	21.3
Copper, brass and similar alloys	0.2
Stainless steel	3.7
Steel	56.6
Steel (zinc coated)	11.5
Tin	0
Plastics	0.1
Rubber	0.06
Glass	0.2
Others	0.2
Electronics and electromechanical components	4.8

The product does not contain asbestos, paints containing lead or cadmium pigments, capacitors containing PCBs or PCTs, ozone layer-depleting chemicals such as CFCs, or chlorinated solvents. Mercury is not used in applications other than lighting. Cadmium stabilizers are not used in plastics.

Recycling description

At the end of life the elevator is dismantled and about 41% (MiniSpace 2,5 m/s Case 1) and about 36 % (MiniSpace 3,5 m/s Case 2) of the material weight (some steel and cast iron components) can be sorted and reused without pre-processing. The additional end of life treatment of the elevator is multimetal scrap recycling. The metals, that are about 94% of the elevator material weight, are recyclable. When metals are recycled there is a clear reduction in environmental impacts, primarily because recycling of metals lowers the demand for primary metals as raw materials. Plastics are used for energy recovery or disposed in landfills.

An elevator includes a lead battery and, depending on selection of lighting, may include standard fluorescent lamps that contain mercury. Both require dismantling and hazardous waste management procedure to be followed when disposed. The KONE EcoDisc® elevator hoisting machine contains no oil. Electronics and electromechanical components waste is collected and treated separately.

Packaging includes wood (about 92-95% of the packaging weight), plywood, cardboard and plastics. Wood, plywood and cardboard can be recycled or used for energy recovery. Plastics are used for energy recovery or disposed in landfills.

Glossary

Acidification potential (AP)
Chemical alternation of the environment, resulting in hydrogen ions being produced more rapidly than they are dispersed or neutralized. Occurs mainly through fallout of sulfur and nitrogen compounds from combustion processes. Acidification can be harmful to terrestrial and aquatic life.

Eco-Indicator 99 (EI99)
Pollutants are allocated to impact categories and are normalized by means of division through the national total impact potentials. The environmental effects are then assigned to 'damage categories' which include the effects on human health, the quality of an ecosystem and the fossil and mineral resources.

Eutrophication potential (EP)
Enrichment of bodies of water by nitrates and phosphates from organic material or the surface runoff. This increases the growth of aquatic plants and can produce algal blooms that deoxygenate water and smother other aquatic life.

Functional unit
Quantified performance of a product system for use as a reference unit.

Global warming potential (GWP)
The index used to translate the level of emissions of various gases into a common measure to compare their contributions to the absorption by the atmosphere of infrared radiation. GWPs are calculated as the absorption that would result from the emission of 1 kg of a gas to that from emission of 1 kg of carbon dioxide over 100 years.

Ozone depletion potential (ODP)
The index used to translate the level of emissions of various substances into a common measure to compare their contributes to the breakdown of the ozone layer. ODPs are calculated as the change that would result from the emission of 1 kg of a substance to that from emission of 1 kg of CFC-11 (a freon).

Photochemical ozone creation potential (POCP)
The index used to translate the level of emissions of various gases into a common measure to compare their contributions to the change of ground-level ozone concentration. POCPs are calculated as the change that would result from the emission of 1 kg of a gas to that from emission of 1 kg of ethene.

Primary energy
Primary energy is energy that has not been subjected to any conversion or transformation process (e.g. coal, crude oil, sunlight, uranium).

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