ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 50693:2019

HEADQUARTERS:
Viale della Libertà 8,
Montemesola, Taranto, Italy

PRODUCT:
Moravia and Vieste luminaire bodies for public lighting - Lorelux® brand

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EPD ITALY

GENERAL INFORMATION

SCOPE OF APPLICATION

This EPD refers to the Moravia (70W) and Vieste (75W) luminaires bodies of the Lorelux brand produced by Niteko S.r.l in the production site of Montemesola (TA), Italy. The products, whose body is made of 50% recycled polyethylene and 50% virgin polyethylene, are designed to communicate data and information to the national electricity supplier. The study was conducted in accordance with:

- PCR EPDItaly 007 - Electronic and electrical products and systems, published on 13/01/2023
- PCR EPDItaly020 - Public lighting, Electronic and Elecrical products and systems public lighting equipment, rev. 1 published on 09/03/2021

TECHNICAL SUPPORT

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CPC CODE

465 'Electric filament or discharge lamps; arc lamps; lighting equipment; parts thereof'

PROGRAM

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OWNER OF THE EPD

Niteko S.r.l
Via della libertà 8, Montemesola,
Taranto

COMPARABILITY AND ACCOUNTABILITY

EPDs published within the same product category, but from different programmes, may not be comparable. In particular, EPDs of similar products may not be comparable if they do not comply with the relevant technical standard.

Niteko S.r.l. releases EPDItaly from any non-compliance with environmental legislation. The holder of the declaration shall be responsible for supporting information and evidence; EPDItaly disclaims any responsibility for the manufacturer's information, data and results of life cycle assessment.

THIRD-PARTY VERIFICATION

This declaration has been developed according to the EPDItaly Regulation (revision 5.2 of 16/02/2022); further information and the Regulation itself with its annexes can be found at www.epditaly.it

Reference has been made to PCR EPDItaly020 - Public lighting, Electronic and Elecrical products and systems public lighting equipment, provides additional technical and regulatory requirements to be applied to the products covered by this EPD. The framework standard is EN 50693:2019 'Product Category Rules for life cycle assessments of electronic and electrical products and systems'.

EN 50693:2019 is the framework reference for PCRs.	
Independent verification of the EPD and the data it contains according to the ISO standard 14025:2010	
☐ Internal	☒ External
Third-party verification performed by:	ICMQ S.p.A. Via G. De Castillia, 10 20124 Milan Accredited by Accredia

COMPANY AND PRODUCT DESCRIPTION

The company

Since 2011, when Niteko S.r.l. was established, the company has focused exclusively on the production of LED street and large area lighting fixtures. This experience has allowed it to acquire specific skills in the sector in order to offer customers the best possible service. The company's commitment and passion in experimenting with new technologies offers the best design, production, installation and lifetime support of different solutions.

The company pays special attention to developing solutions that work in the intended environment. Niteko S.r.l. has always been committed to guaranteeing its LED luminaires for a lifetime of 20 years. Thanks to direct contact with the customer, it is possible to provide customised photometries, with the power, colour temperature and RAL configurations of the product exactly matching the required specifications.

With the Lorelux® brand, Niteko S.r.l. wants to demonstrate that it is also making a positive contribution to the industry in terms of the environmental aspects that are directly linked to the production of luminaire bodies. In fact, the luminaires in the study are characterised by an outer shell made exclusively of polyethylene derived from post-consumer recycling. This is why the company looks for continuous improvement and is always investing in new solutions and applications, looking for different ways to help our partners grow and evolve.

Products

The objects of this EPD declaration are the Moravia and Vieste luminaires bodies of the Lorelux® brand.

The individual luminaire heads analysed are produced in the same factory in Taranto.

The products all consist of a recycled polyethylene outer shell and contain an assembly of various printed circuit boards and mechanical structures.

Light source	75 W (Vieste) 70 W (Moravia)
Technology	LED
Lighting management and control system	Luminous flux controller, programmed or with TLC
Luminaires body	Solid-coloured PE with aluminium alloy heat sink
Structural Elements	Metal pole

Material content declaration

Material (IEC 62474)	Moravia		Vieste	
	%	kg	%	kg
M-100 Stainless steel	1,2%	0,09	1,2%	0,09
M-119 Other ferrous alloys, non-stainless steels	23,3%	1,79	23,9%	1,79
M-120 Aluminium and its alloys	19,6%	1,51	20,1%	1,51
M-121 Copper and its alloys	0,7%	0,06	0,8%	0,06
M-149 Other non-ferrous metals and alloys	0,1%	0,01	0,1%	0,01
M-161 Glass	6,2%	0,48	6,4%	0,48
M-201 PolyEthylene (PE)	41,7%	3,20	40,1%	3,00
Printed wiring boards	2,1%	0,16	2,1%	0,16
LED	0,0%	0,00	0,0%	0,00
M-204 PolyCarbonate (PC)	2,0%	0,15	2,1%	0,15
M-220 Polymethylmethacrylate (PMMA)	0,9%	0,07	0,9%	0,07
M-258 PolyAmide (PA)	0,8%	0,06	0,9%	0,06
M-320 NBR	0,2%	0,02	0,2%	0,02
M-321 Silicone	0,8%	0,06	0,8%	0,06
M-339 Other elastomers	0,4%	0,03	0,4%	0,03
PACKAGING				
M-340 Wood	73,5%	4,17	80,6%	4,17
M-341 Paper	24,7%	1,40	17,4%	0,90
M-201 PolyEthylene (PE)	1,8%	0,10	1,9%	0,10

METHODOLOGICAL CHOICES

The functional unit

The functional unit is a luminaire body with LED technology intended for lighting public in Italy and Europe.

The Reference Service Life (RSL) of 40,000 hours is in line with the reference PCR EPDItaly011.

The boundaries of the system

The system boundaries determine the process units to be included in the LCA study and which type of data 'input' and/or 'output' to the system can be omitted. The analysis carried out is defined as "from-cradle-to-grave" and therefore the life cycle of the counter under study is divided into the phases schematised in the following figure (from PCR EPDItaly007).

Table 1. System boundaries; includes the life cycle phases considered in the analysis

Production phase		Distribution phase	Installation phase	Maintenance phase	End-of-life phase
UPSTREAM	CORE	DOWNSTREAM			
Raw material extraction, including waste recycling processes, the production of semi-finished and auxiliary products, including their packaging	Product manufacture and assembly	According to EN 50693			
Transport of raw materials to the production site	Packaging				
	Waste Recycling Processes				
	Internal transport between plants				

The production phase refers to the manufacture of the luminaire body, starting with the raw materials up to the moment the product is released onto the market, as detailed below:

- Processing of raw materials and final assembly of the luminaire body; impacts related to the transformation of matter and energy (electricity) are included;
- Transport of raw materials and semi-finished products throughout the supply chain;
- Production and packaging of the finished product, including the packaging intended for the distribution of the luminaire head in the target market; for production at the Niteko plant, the company itself quantified the consumption resulting from the assembly stations of the luminaire heads (equal to 70 Wh per luminaire), to which was then added 10% of the total plant consumption, attributable to the general activities of lighting, opening and closing doors, etc.
- Process waste generated, including its transport to recycling or disposal sites.

The following steps include the processes listed below, which take place outside the plant and involve the finished product:

- Distribution, i.e. transport from final production to distribution sites and finally to the installation site;
- The installation phase, which includes the installation of the pole and the end of life of the packaging;

- the use of the product, i.e. the impacts generated in relation to the energy consumed from the luminaire body throughout its life;
- the end of life of the product, which includes the transport of the luminaire body to the collection site (once it has reached the end of its useful life), the dismantling operations and finally the distribution and destination of the different material streams (to recycling or disposal).

Data categories and software used

The inventory analysis was conducted using specific data provided by Niteko S.r.l. regarding the production and assembly of luminaire heads, packaging and product distribution.
Selected data from:

- international databases (in particular Ecoinvent 3.8) for the production processes of raw materials and semi-finished products, packaging materials, electricity and means of transport, as well as the end-of-life of the product;
- ISPRA sector documents for the recycling and disposal quota of packaging waste.
- EPDs registered in the EPD International programme, with reference to the production of the structure for public lighting.

In addition, data on transport distances (by land and sea) were estimated with the online calculators Google Maps (maps.google.com) and SeaRates (www.searates.com). The software used for the calculation of impacts is Simapro version 9.04.

Exclusions

In the LCA study, the processes excluded from the analysis are as follows:

- the construction of company plants and machinery for processing (with a life span of more than three years) products;
- the production of glues and ink used in packaging;
- staff business trips and home-work transfers;
- research and development and office activities;
- electricity consumption for lighting and storage at the production site;
- maintenance of the plant's machinery.

Allocation Rules

In general, for primary data, the use of specific data on the production of individual luminaire bodies was preferred, when available. The allocation rule used to calculate the inputs and outputs of the specific data, when necessary, is the mass allocation rule. Specifically, the production of waste in the plant was allocated to the production of Lorelux® model luminaire bodies.

For selected generic data, the allocations in the database are used.

The specific data refer to the year 2022.

Description of the production cycle

The components that make up Lorelux® street lighting luminaires (recycled polyethylene outer cover and internal LEDs) arrive from European and international suppliers at the Niteko factory in Taranto, Italy, where they are assembled. The luminaire bodies covered by this EPD were shipped to customers in the following areas:

- Moravia: 22% in Italy and 78% in Europe.
- Vieste: 83% in Italy and 17% in Europe.

Installation, use and end of life

The installation phase of the luminaire body includes the end of life of the packaging, as required by the reference PCR. For the end of life of packaging, the figure was taken from the ISPRA 2022 Report (data as of 2021) for Italy and from Eurostat statistics for other countries (last available update: 2020).

The use phase is defined by the power consumption during the product's lifetime.
The following formula is used:

$$Euse[kWh] = \frac{Puse * RSL * fgrid}{1000}$$

Where:
P_{use} = Lamp power
RSL = Reference Service Life, set at 40,000 operating hours
f_{grid} = percentage of electricity from the grid. This factor is included if the products under consideration can also be powered by batteries. In this case the factor is 1.

The end-of-life of the product has been modelled according to its main components. The components inside the cover are treated according to the Ecolamp consortium.

About the EPD declaration

This declaration is a specific EPD and refers to the global geographical area.

Environmental impacts were calculated using Simapro 9 software.

ENVIRONMENTAL PERFORMANCE

The environmental performance of the Moravia and Vieste luminaires bodies manufactured by Niteko S.r.l, as detailed below, is based on the Life Cycle Assessment (LCA) methodology and has been calculated in accordance with reference standards. As it is possible to configure the power required during the use phase, the environmental impacts related to the maximum power of the luminaire body are reported.

Table 2: Results of Life Cycle Impacts - Moravian Luminaire Body

Impact category	Unit	Production		Distribution	Installation	Use	End of life product	Total
		UPSTREAM	CORE	DOWNSTREAM				
GWP - fossil	kg CO2 eq	4,27E+01	1,49E+01	2,61E+00	3,66E+02	1,96E+03	7,66E-02	2,39E+03
GWP - biogenic	kg CO2 eq	4,01E-01	1,51E-03	1,54E-04	3,35E+01	6,18E+00	1,77E-01	4,02E+01
GWP - luluc: use and transformation soil	kg CO2 eq	6,64E-02	1,82E-04	2,13E-05	6,19E-01	2,33E+00	7,11E-06	3,01E+00
GWP - total: Potential of global warming 100a	kg CO2 eq	4,32E+01	1,49E+01	2,61E+00	4,00E+02	1,97E+03	2,54E-01	2,43E+03
ODP - Ozone formation photochemical	kg NMVOC eq	1,64E-01	7,68E-02	1,29E-02	1,09E+00	3,76E+00	3,55E-04	5,10E+00
AP - Acidification	mol H+ eq	3,02E-01	7,40E-02	1,22E-02	1,21E+00	8,30E+00	2,81E-04	9,90E+00
EP-freshwater - Eutrophication, fresh water	kg P eq	2,40E-02	8,27E-05	1,07E-05	6,91E-02	2,71E+00	4,84E-06	2,80E+00
EP- marine - Eutrophication, marina	kg N eq	4,65E-02	2,71E-02	4,54E-03	3,51E-01	1,81E+00	9,08E-04	2,24E+00
EP - Terrestrial - Eutrophication, terrestrial	mol N eq	4,61E-01	2,97E-01	4,98E-02	3,04E+00	1,38E+01	1,13E-03	1,76E+01
WDP - Water Utilisation	m3 depriv.	1,63E+01	9,18E-02	-6,24E-03	2,79E+01	4,44E+02	4,94E-04	4,89E+02
ADP-fossil - Resource use, fossils	MJ	6,18E+02	2,05E+02	3,73E+01	4,15E+03	2,84E+04	6,64E-01	3,34E+04
ADP-minerals&metals - Use of resources, minerals and metals	kg Sb eq	4,27E-03	6,24E-07	1,14E-07	7,02E-03	2,34E-04	2,47E-09	1,15E-02
PERE - total resource consumption renewable energy resources	MJ	3,30E+01	8,37E-01	5,71E-02	8,25E+02	3,02E+03	6,76E-03	3,88E+03
PERM - total consumption of renewable energy resources, matter first	MJ	1,00E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,00E+02
PERT- - total consumption of resources renewable energies	MJ	1,33E+02	8,37E-01	5,71E-02	8,25E+02	3,02E+03	6,76E-03	3,98E+03
PENRE - total consumption of resources non-renewable energy resources	MJ	4,56E+02	2,05E+02	3,73E+01	4,15E+03	2,84E+04	6,64E-01	3,33E+04
PENRM - total consumption of non-renewable energy resources, material	MJ	1,62E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,62E+02
PENRT - total consumption of non-renewable energy resources, energy resources	MJ	6,18E+02	2,05E+02	3,73E+01	4,15E+03	2,84E+04	6,64E-01	3,34E+04

MS - Use of secondary raw material	kg	3,28E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,28E+00
FW - Freshwater consumption	m3	5,08E-01	4,09E-03	1,02E-04	2,70E+01	4,33E+01	3,00E-05	7,08E+01
HWD - Hazardous Waste	kg	1,22E-02	5,31E-04	9,80E-05	1,82E-06	7,99E-03	1,80E-06	2,08E-02
NHWD - Non-hazardous waste	kg	4,67E+00	1,11E-02	1,54E-03	1,29E+00	1,24E+02	6,20E-01	1,30E+02
RWD - Radioactive Waste	kg	1,32E-03	1,45E-03	2,67E-04	4,75E-06	1,46E-01	4,51E-06	1,49E-01
MER - Material for Recovery energy	kg	0,00E+00	1,45E-01	0,00E+00	1,76E-01	0,00E+00	0,00E+00	3,21E-01
MFR - Material for Recycling	kg	0,00E+00	1,95E-03	0,00E+00	8,72E-01	0,00E+00	4,05E-03	8,78E-01
CRU - Components for Reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE - Exported thermal energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE- Electricity exported	MJ	0,00E+00	7,03E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,03E-02

Table 3: Results of Life Cycle Impacts - Vieste Luminaire Body

Impact category	Unit	Production		Distribution	Installation	Use	End of life product	Total
		UPSTREAM	CORE	DOWNSTREAM				
GWP - fossil	kg CO2 eq	4,19E+01	1,45E+01	8,04E-01	3,66E+02	1,54E+03	7,45E-02	1,97E+03
GWP - biogenic	kg CO2 eq	3,51E-01	1,49E-03	4,75E-05	3,34E+01	1,44E+01	1,77E-01	4,83E+01
GWP - luluc: use and transformation soil	kg CO2 eq	6,16E-02	1,78E-04	6,56E-06	6,19E-01	8,57E-01	7,06E-06	1,54E+00
GWP - total: Potential of global warming 100a	kg CO2 eq	4,23E+01	1,45E+01	8,05E-01	4,00E+02	1,56E+03	2,52E-01	2,02E+03
ODP - Ozone formation photochemical	kg NMVOC eq	1,62E-01	7,47E-02	3,98E-03	1,09E+00	3,28E+00	3,47E-04	4,60E+00
AP - Acidification	mol H+ eq	2,99E-01	7,20E-02	3,77E-03	1,21E+00	7,44E+00	2,75E-04	9,02E+00
EP-freshwater - Eutrophication, fresh water	kg P eq	2,38E-02	8,12E-05	3,32E-06	6,91E-02	1,06E+00	4,82E-06	1,15E+00
EP- marine - Eutrophication, marina	kg N eq	4,50E-02	2,64E-02	1,40E-03	3,51E-01	1,25E+00	8,84E-04	1,67E+00
EP - Terrestrial - Eutrophication, terrestrial	mol N eq	4,52E-01	2,89E-01	1,54E-02	3,04E+00	1,18E+01	1,10E-03	1,56E+01
WDP - Water Utilisation	m3 depriv.	1,58E+01	9,11E-02	-1,92E-03	2,79E+01	7,10E+02	4,94E-04	7,54E+02
ADP-fossil - Resource use, fossils	MJ	6,01E+02	2,00E+02	1,15E+01	4,15E+03	2,26E+04	6,48E-01	2,76E+04
ADP-minerals&metals - Use of resources, minerals and metals	kg Sb eq	4,27E-03	6,07E-07	3,53E-08	7,02E-03	7,28E-05	2,42E-09	1,14E-02
PERE - total consumption of renewable energy resources, resources energetic	MJ	3,99E+01	8,30E-01	1,76E-02	8,25E+02	6,04E+03	6,71E-03	6,90E+03
PERM - total consumption of resources renewable energy sources, raw material	MJ	9,19E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,19E+01
PERT- - total consumption of resources renewable energies	MJ	1,32E+02	8,30E-01	1,76E-02	8,25E+02	6,04E+03	6,71E-03	7,00E+03

PENRE - total consumption of non-renewable energy resources, energy resources	MJ	4,48E+02	2,00E+02	1,15E+01	4,15E+03	2,26E+04	6,48E-01	2,74E+04
PENRM - total consumption of non-renewable energy resources, material	MJ	1,53E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,53E+02
PENRT - total consumption of non-renewable energy resources, energy resources	MJ	6,01E+02	2,00E+02	1,15E+01	4,15E+03	2,26E+04	6,48E-01	2,76E+04
MS - Use of secondary raw material	kg	3,18E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,18E+00
FW - Freshwater consumption	m3	4,97E-01	3,25E-02	1,55E-03	3,16E-05	2,70E+01	3,10E+01	5,85E+01
HWD - Hazardous Waste	kg	1,21E-02	1,41E-03	8,23E-05	4,34E-06	7,97E-02	4,40E-06	2,73E-02
NHWD - Non-hazardous waste	kg	4,61E+00	0,00E+00	4,74E-04	1,42E+00	4,45E+01	6,10E-01	5,12E+01
RWD - Radioactive Waste	kg	1,29E-03	1,45E-01	8,23E-05	4,34E-06	7,97E-02	4,40E-06	8,25E-02
MER - Material for Recovery energy	kg	0,00E+00	0,00E+00	0,00E+00	1,21E-01	0,00E+00	0,00E+00	1,21E-01
MFR - Material for Recycling	kg	0,00E+00	0,00E+00	0,00E+00	3,00E+00	0,00E+00	3,86E-03	3,15E+00
CRU - Components for Reuse	kg	0,00E+00	7,03E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE - Exported thermal energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE- Electricity exported	MJ	0,00E+00	7,03E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,03E-02

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