Environmental Product Declaration

In accordance with ISO 14025:2006 for:

Chain actuator - Windows automation Apro line - art. 1123.3

from

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-08066
Publication date:	2023-07-28
Valid until:	2028-07-28

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®

MASTER
HARDWARE FOR WINDOWS AND DOORS

Content

Programme information

The International EPD® System	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden	www.environdec.com info@environdec.com

Product Category Rules (PCR)

PCR: PCR 2019:11 AC and DC gear motors for automation systems (1.02)
UN CPC codes: 46111 "Motors of an output not exceeding 37.5 W; other DC motors; DC generators"

Life Cycle Assessment (LCA)

LCA accountability: Ing. Francesca Intini, T&A - Tecnologia & Ambiente srl

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third-party verifier: Adriana Del Borghi delborghi@tetisinstitute.it

Approved by: The International EPD® System

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.

EPDs within the same product category but registered in different EPD programmes may not be comparable.

Company information

Owner of the EPD: Master Italy srl

Contact: Ufficio Tecnico
info@masteritaly.com

Description of the organisation: Since 1986, Master Group has been designing accessories and components for doors and windows in aluminium, with a process made of research, investments, study of the aluminium's world, and through a deep attention to the quality of the materials, the research of technologies able to allow production of goods made for high performances, and to find new market's needs, and to customers' satisfaction and constant care. Present in more than 58 countries worldwide, Master is nowadays a global brand, focused on: development of new international markets, attention to safety and quality of products, continuous improvement, and waste reduction according to lean manufacturing's principles, implementation of the new model for industrial automation INDUSTRY 4.0, with particular attention to maintaining human capital central in all strategic and productive operations.
Master Group realizes 97% of the added value of its in-house production, covering all the steps that precede product marketing: from the analysis of market needs to design, prototyping and production.

Product-related or management system-related certifications: Master Italy obtained the following certifications:
- ISO 9001 – Quality Management System
- ISO 14001 – Environmental Management System
- ISO 45001 – Health and Safety Management System

Master Italy is committed with three Ps (People, Prosperity and Planet) to:
- ensuring the dignity, equality and prosperous lives of workers;
- to protect the planet's natural resources and climate for future generations.

Name and location of production site: S.P.37 Conversano - Castiglione Km. 0,570 Z.I. 70014 Conversano (BA) - ITALY

Product information

Product name: CHAIN ACTUATOR – Windows automation APRO line - art. 1123.3

Product identification: APRO was born from an industrial research project with the aim of developing a range of accessories capable of transforming any window into an integrated home automation element. APRO therefore represents the line of intelligent systems for the windows of the future that allows you to: manage access control, guarantee high safety standards and ensure maximum living comfort.

Product description: Chain actuator for motorized opening of one or more bottom hinge or top hinge windows with pushbutton control or via APP.

UN CPC code: 46111

Geographical scope Global

Technical information	Value
Nominal force (N)	350
Nominal velocity (mm/s)	6
Electric power assimilated in the motion phase (W)	16
Electric power assimilated in the stand-by phase (W)	0.01
Time for performing one operating cycle (s)	170-200
Number of cycles per day (n)	10
Reference service life (Years)	10

LCA information

Functional unit / declared unit:

The functional unit of the product is a drive capable of assure a rated output equal to 10 W for the movement of an object

Reference service life:

The reference service life (RSL) is defined as 10 years.

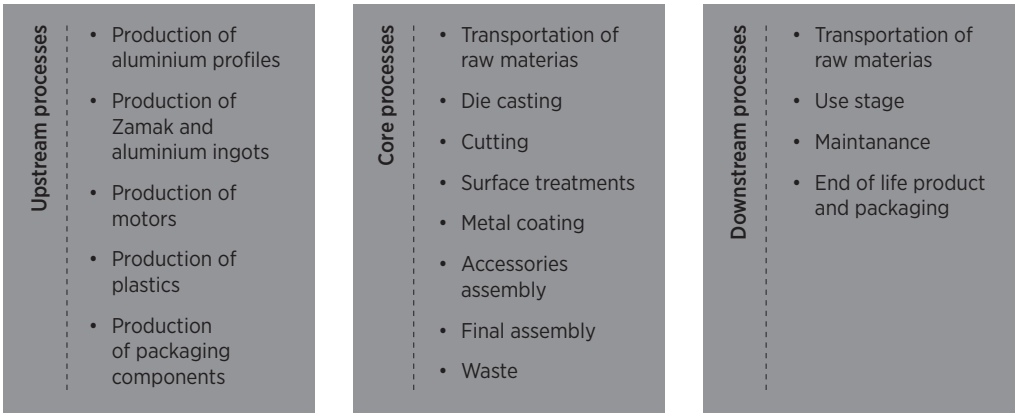
Time representativeness:

Reference year for data 2022, data used for LCA calculations 2022.

Database(s) and LCA software used:

SimaPro 9.5 Ecoinvent 3.9

System diagram:



The life cycle of chain actuator product includes Upstream, Core and Downstream processes. The system boundary determines those unitary processes which have to be included in the LCA study.

Description of system boundaries:

Cradle to gate

The Upstream Processes include:
- extraction and production of raw material for all main parts and components and its packaging;
- manufacturing of semi-finished goods;
- production of electricity and fuels used in the upstream module;
- manufacturing of additives;
- production processes for components and packaging.

The Core Processes include:
- external transportation to the core processes;
- internal transports;
- assembly/preparation phase;
- waste treatment in the core module and emissions;
- consumption of fuels and energy in the core module.

The Downstream Processes include:
- transportation to the construction site (assumption 16-32 t truck over 3500 km);
- life time operation of the product excluding power losses and emissions;
- maintenance, replacements of parts, during reference service life;
- end-of-life processes.

Installation phase has a negligible impact.
Based on the technical information regarding the product, energy consumption the use phase is calculated as follow:

$$\text{Consumption } [kWh/y] = \left[\left(\frac{P_m}{1000} \times t_m\right) + \left(\frac{P_s}{1000} \times t_s\right)\right] \times 24 \times 365$$

Where:
P_m = electric power assimilated in the motion phase [W]
t_m = motion ratio [%]
P_s = electric power assimilated in the stand-by phase [W]
t_s = stand-by ratio [%]

The energy consumption in the use phase is calculated for the service life of 10 years.

More information:

1% cut-off rule was applied for input flows in the inventory.

Content declaration

Product

Product components	[%]
Aluminium	20%
Steel	62%
Zamak	10%
Circuit boards	4%
Plastic	3%
Other	1%
TOTAL	100%

Packaging materials	[%]
Film/LDPE	2%
Corrugated board	98%
TOTAL	100%

The declared unit represents the Chain actuator of the WINDOWS AUTOMATION APRO LINE with the highest material content, therefore for each indicator, declare the highest result of the Chain actuator APRO LINE products (“worst-case product”).
In this EPD the conversion factor is included. The mass for piece is adopted to convert the results for 1 kg.

This declaration applies also to products Art. 1123.1 and Art. 1123.2.
The Chain actuator, including packaging, weighs 1,26 kg.
The Chain actuator, excluding packaging, weighs 1,002 kg.

Name	Value	Unit
Declared unit	1,000	piece
Mass of declared Product	1,002	kg
Conversion factor to 1 kg	0,998	piece

The product do not contain substances which exceed the limits for registration with the European Chemicals Agency regarding the “Candidate List of Substances of Very High Concern for Authorisation”.

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product:
The content of recycled or recovered material or by-products included per functional unit (considering the pre and post-consumer material used and adopting the mass balance method) is equal to 5%.

Results of the environmental performance indicators

Impact category indicators for 1 piece

PARAMETER		UNIT	Upstream	Core	Downstream without use phase	Use phase	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	7,86E+00	3,24E-01	8,45E-01	2,43E+01	3,33E+01
	Biogenic	kg CO_2 eq.	-9,70E-02	3,60E-03	9,44E-01	1,25E-01	9,76E-01
	Land use and land transformation	kg CO_2 eq.	4,61E-02	9,17E-05	4,11E-04	5,13E-02	9,79E-02
	TOTAL	kg CO_2 eq.	7,81E+00	3,28E-01	1,79E+00	2,87E+01	3,86E+01
Ozone layer depletion (ODP)		3%	2,25E-07	8,95E-09	1,84E-08	1,71E-07	4,24E-07
Acidification potential (AP)		1%	5,18E-02	1,58E-03	2,83E-03	1,26E-01	1,82E-01
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	5,40E-03	2,73E-05	6,01E-05	1,16E-02	1,70E-02
	Aquatic marine	kg N eq.	9,41E-03	4,16E-04	1,14E-03	2,39E-02	3,49E-02
	Aquatic marine	mol N eq.	9,46E-02	4,48E-03	1,03E-02	2,41E-01	3,51E-01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	3,70E-02	1,58E-03	4,26E-03	7,18E-02	1,15E-01
Abiotic depletion potential (ADP)	Metals and minerals[1]	kg Sb eq.	8,83E-04	6,02E-07	2,70E-06	1,36E-04	1,02E-03
	Fossil resources[1]	MJ, net calorific value	9,99E+01	4,66E+00	1,19E+01	3,15E+02	4,31E+02
Water deprivation potential (WDP) [1]		m^3 world eq. deprived	2,32E+00	4,08E-02	5,50E-02	4,25E+00	6,67E+00

Additional mandatory and voluntary impact category indicators for 1 piece

PARAMETER	UNIT	Upstream	Core	Downstream without use phase	Use Phase	TOTAL
GWP-GHG[2]	kg CO_2 eq.	7,95E+00	3,25E-01	1,04E+00	2,44E+01	3,37E+01

Resource use indicators for 1 piece

PARAMETER		UNIT	Upstream	Core	Downstream without use phase	Use Phase	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,88E+01	4,00E-06	1,89E-01	4,37E+01	6,27E+01
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	1,88E+01	4,00E-06	1,89E-01	4,37E+01	6,27E+01
Primary energy resources - Non - renewable	Use as energy carrier	MJ, net calorific value	1,11E+02	2,44E-04	1,27E+01	3,35E+02	4,58E+02
	Used as raw materials	MJ, net calorific value	7,26E-01	0,00E+00	0,00E+00	0,00E+00	7,26E-01
	TOTAL	MJ, net calorific value	1,11E+02	2,44E-04	1,27E+01	3,35E+02	4,59E+02
Secondary material (optional)		kg	4,75E-02	0,00E+00	0,00E+00	0,00E+00	4,75E-02
Renewable secondary fuels (optional)		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels (optional)		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water (optional)		m^3	1,07E-01	1,25E-03	1,91E-03	1,74E-01	2,85E-01

[1] The results of this environmental impact indicator shall be used with care as the uncertainties of the results are high and as there is limited experience with the indicator.
[2] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.

Waste indicators for 1 piece

PARAMETER	UNIT	Upstream	Core	Downstream without use phase	Use Phase	TOTAL
Hazardous waste disposed	kg	1,50E-03	0,00E+00	7,58E-05	5,61E-04	2,14E-03
Non-hazardous waste disposed	kg	1,81 E+00	0,00E+00	7,06E-01	1,76E+00	4,30E+00
Radioactive waste disposed	kg	2,09E-04	0,00E+00	3,93E-06	8,48E-04	1,06E-03

Output flow indicators for 1 piece

PARAMETER	UNIT	Upstream	Core	Downstream without use phase	Use Phase	TOTAL
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	2,33E-02	0,00E+00	2,58E-01	0,00E+00	2,81E-01
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ per energy carrier	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ per energy carrier	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Additional environmental information

Chain actuator Art. 1123.3 presented in the EPD responds to the CE marking.
In this section the conversion factors are used to convert the result to 1 kg of Chain actuator Art. 1123.3, equal to 0,998 pieces.

Impact category indicators for 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream without use phase	Use phase	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq.	7,88E+00	3,25E-01	8,47E-01	2,43E+01	3,34E+01
	Biogenic	kg CO_2 eq.	-9,72E-02	3,61E-03	9,47E-01	1,25E-01	9,78E-01
	Land use and land transformation	kg CO_2 eq.	4,62E-02	9,19E-05	4,12E-04	5,14E-02	9,81E-02
	TOTAL	kg CO_2 eq.	7,83E+00	3,28E-01	1,79E+00	2,87E+01	3,87E+01
Ozone layer depletion (ODP)		3%	2,26E-07	8,97E-09	1,85E-08	1,71E-07	4,25E-07
Acidification potential (AP)		1%	5,19E-02	1,58E-03	2,84E-03	1,26E-01	1,83E-01
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	5,41E-03	2,74E-05	6,02E-05	1,16E-02	1,71E-02
	Aquatic marine	kg N eq.	9,43E-03	4,17E-04	1,14E-03	2,40E-02	3,50E-02
	Aquatic marine	mol N eq.	9,48E-02	4,49E-03	1,03E-02	2,42E-01	3,52E-01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	3,71E-02	1,59E-03	4,27E-03	7,20E-02	1,15E-01
Abiotic depletion potential (ADP)	Metals and minerals[1]	kg Sb eq.	8,85E-04	6,03E-07	2,70E-06	1,36E-04	1,02E-03
	Fossil resources[1]	MJ, net calorific value	1,00E+02	4,67E+00	1,20E+01	3,15E+02	4,32E+02
Water deprivation potential (WDP) [1]		m^3 world eq. deprived	2,33E+00	4,09E-02	5,51E-02	4,26E+00	6,68E+00

[1] The results of this environmental impact indicator shall be used with care as the uncertainties of the results are high and as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators for 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream without use phase	Use Phase	TOTAL
GWP-GHG[2]	kg CO_2 eq.	7,97E+00	3,26E-01	1,05E+00	2,44E+01	3,38E+01

Resource use indicators for 1 kg

PARAMETER		UNIT	Upstream	Core	Downstream without use phase	Use Phase	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,89E+01	4,01E-06	1,89E-01	4,38E+01	6,29E+01
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	1,89E+01	4,01E-06	1,89E-01	4,38E+01	6,29E+01
Primary energy resources - Non - renewable	Use as energy carrier	MJ, net calorific value	1,11E+02	2,44E-04	1,27E+01	3,35E+02	4,59E+02
	Used as raw materials	MJ, net calorific value	7,28E-01	0,00E+00	0,00E+00	0,00E+00	7,28E-01
	TOTAL	MJ, net calorific value	1,12E+02	2,44E-04	1,27E+01	3,35E+02	4,60E+02
Secondary material (optional)		kg	4,76E-02	0,00E+00	0,00E+00	0,00E+00	4,76E-02
Renewable secondary fuels (optional)		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels (optional)		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water (optional)		m3	1,07E-01	1,25E-03	1,91E-03	1,75E-01	2,85E-01

Waste indicators for 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream without use phase	Use Phase	TOTAL
Hazardous waste disposed	kg	1,51E-03	0,00E+00	7,60E-05	5,62E-04	2,15E-03
Non-hazardous waste disposed	kg	1,82E+00	0,00E+00	7,08E-01	1,76E+00	4,31E+00
Radioactive waste disposed	kg	2,09E-04	0,00E+00	3,94E-06	8,50E-04	1,06E-03

Output flow indicators for 1 kg

PARAMETER	UNIT	Upstream	Core	Downstream without use phase	Use Phase	TOTAL
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	2,33E-02	0,00E+00	2,58E-01	0,00E+00	2,82E-01
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ per energy carrier	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ per energy carrier	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

[2] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.

Additional social and economic information

The Sustainable Development Goals (SDGs) are 17 objectives contained in a major action plan on which the governments of the 193 UN member countries have agreed. The SDGs serve to set common and measurable goals that encourage everyone – governments, companies like Master Italy – to act globally to achieve them, gathering and providing a wide variety of forces, knowledge and resources. This will make it possible to build alliances that push for a more prosperous, fairer and more equitable society.

There are 9 SDGs which Master Italy is committed to contribute to this epochal change, in which the main focus' remain: People, Prosperity and Planet.

People is the chapter of Masterability dedicated to the actions that the company enhance for its people.
It is the natural prosecution of the of the three years project People in which the objective is the increase of the welfare of the employees and improve the corporate environment. Always aiming at increasing skills and personal and professional growth.

Planet is the chapter dedicated to the actions that the company is putting in place to preserve the environment in which we operate and live.
These are initiatives aimed at reducing the environmental impact by acting both directly on production processes and on environmental policies, to support and encourage virtuous behaviour inside and outside the company walls.

Prosperity is a very broad concept dealing with a prosperous and healthy growth in various contexts such as economy, culture, art, environment, sustainability and human rights. Prosperity, therefore the common well-being, can be achieved only if men and women have the same rights and possibilities, this is the reason why Master Italy is committed to promoting equal opportunities for education, sustainability, art and nature to the local community

References

General Programme Instructions of the International EPD® System. Version 4.0.

PCR 2019:11 AC and DC gear motors for automation systems (1.02) UN CPC codes: 46111 "Motors of an output not exceeding 37.5 W; other DC motors; DC generators"

Analisi del ciclo di vita di una selezione di prodotti della Linea APRO Automazioni Master Italy, Ver.1.2, Luglio 2023

MASTER
HARDWARE FOR WINDOWS AND DOORS

SCANSIONA IL QR CODE E GUARDA
IL NOSTRO CANALE YOUTUBE
SCAN QR CODE AND FIND OUT
MASTER TUBE CHANNEL

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