Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Fire sealing systems for penetrations with cables, pipes and ventilation ducts

from

Protega, AB

Global Program Operator

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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

Company information

Owner of the EPD: Protega, AB

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Description of the organisation: Since 1988, our goal has been to manufacture and market absolutely world-class fire protection products from our site in Trelleborg. Step by step, the company developed from selling a few products and is today offering a complete range of products in passive fire protection for load-bearing steel and wood structures and fireproof surfaces, as well as sealing system. We have grown slowly but surely, without compromising on our own high-quality standards. Our driving force is to preserve great values, which makes our environmental work crucial for us. A lot of research and work is behind our product's high environmental assessments.
It is together with our customers that we build a safe and sustainable world. Together with them we preserve what is of value – both human and economic.

Product-related or management system-related certifications: The company has implemented quality management in accordance with the standard requirements of EN ISO 9001: 2015 and environmental management standards in accordance with the requirements of EN ISO 14001: 2015.

Name and location of production site(s): Verkstadsgatan 6B, SE-231 66, Trelleborg, Sweden

Product information

Product name: Fire sealing systems for penetrations with cables, pipes and ventilation ducts

Product identification: Mastics and penetration systems has CE marking or local type approval and represents that products comply with the EU's New Approach or local Directives. Our products are manufactured in compliance with European Assessment Document (EAD) which specifies all requirements for factory made fire resistant mastics:
a) European Assessment Document (EAD) EAD 350141-00-1106 "Linear joint and gap seals"
b) European Assessment Document (EAD) EAD 350454-00-1104 "Penetration seals"
c) EN 13501
Company is ISO certified with certification for both ISO 9001:2015 (Quality Standard) and ISO 14001:2015 (Environmental Standard).

Product description: This EPD takes into account these types of Fire sealing systems:

- Protega Novaflex
- Protega Novatherm SP
- Protega Ecomastic SP
- Protega Novastripe
- Protega Novapipe W
- Protega Novapipe S
- Protega Firestop

Products are white/grey and water-based. These products are described as reactive mastics and they are optimized for different fire scenarios in different kind of structures and in both horizontal and vertical position. These products are used for linear seals in fire class up to EI240, fire penetrations of cables, pipes and ducts in fire classes up to EI120 and eaves protection up to fire class 90 minutes.

In the event of a fire, the mastic maintains its resistance ability to prevent temperature increase and hot gases to penetrate the protected solution.
The mastics are used indoor in systems for fire penetrations and linear seals. The products can be applied using skeleton gun, sausage/sealant gun or spatula. Details concerning surface pre-treatment, application requirements and drying behaviour can be seen in the current technical information sheet (see www.protega.se).

Technical data:
Protega Novaflex, Protega Novatherm SP, Protega Ecomastic SP, Protega Novastripe, Protega Novapipe W, Protega Novapipe S and Protega Firestop do not contain any hazardous substances exceeding the limit values in accordance with the /REACH Directive, Annex XVII/ and the /ECHA candidate list/ of substances of very high concern.

Name	Value	Unit
Density (dry product)	1300-1500	kg/m3
Solids content	70-80	%
pH value	8-10	log10(aH+)
Fire resistance /EN1366-3, 4/,/EN13501-2/, ASFP TGD 19	EI30-240	min
Durability /EAD 350454-00-1104/, /EAD 350141-00-1106/	Type Z_2	

Content information:

Name	Value	Unit
Polymer dispersion -50%	35-50	% [m/m]
Pigment TiO2	0-8	% [m/m]
Ammonium polyphosphate	0-10	% [m/m]
Filler	35-45	% [m/m]
Dispersing agents	< 2.5	% [m/m]
Thixotropic agents	< 3	% [m/m]
Defoamers	< 2	% [m/m]
Coalescent	< 4,5	% [m/m]
Water	0.5-25	% [m/m]

UN CPC code: 3511 Paints and Varnishes and related products.

LCA information

Functional unit / declared unit: In accordance with the PCR the declared unit is 1 kilogram of the wet product.

Name	Dry content	Coefficient to calculate 1 kg of dry product
Protega Novaflex	75%	0.75
Protega Novatherm SP	76%	0.76
Protega Ecomastic SP	77%	0.77
Protega Novastripe, Protega Novapipe W, Protega Novapipe S	72%	0.72
Protega Firestop	67%	0.67

Reference service life: For the above mentioned products. when used for the intended purpose. the service life is at least 10 years. in accordance with /EAD 350141-00-1106 and EAD 350454-00-1104 /. The respective “Technical Approval Body” has recommended a service life of 25 years for dry interior applications – category Z2 in accordance with /EAD 350141-00-1106 and EAD 350454-00-1104 /. However. the practical service life can be far longer. A precondition for a long service life is that the requirements of correct handling and regular inspection of sealing solutions are satisfied.
The information concerning service life cannot be interpreted as a guarantee given by the manufacturer. but serves as an aid towards the selection of the right product. taking account of the expected and economically reasonable service life of the building.
When the products are used according to the standard codes of practice. adverse influences through ageing are not known.

Time representativeness: Primary data was collected internally. The production data refers to the average of the year 2020.

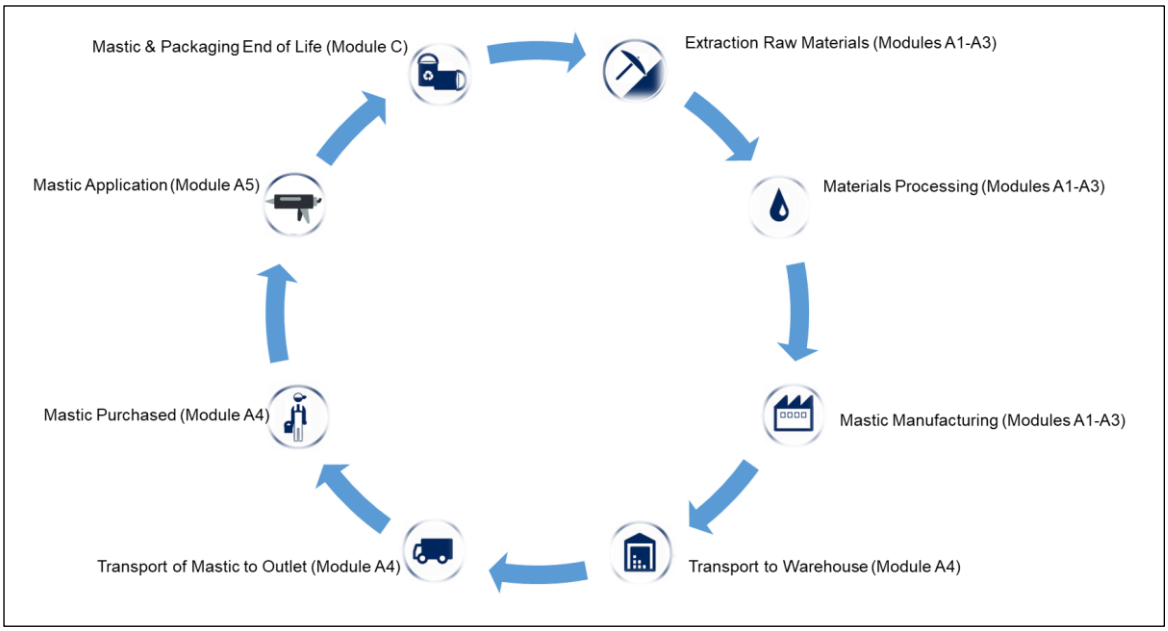
Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and process materials obtained from the background system. The used database is Ecoinvent 3.6. The LCA software used is One Click LCA.

Description of system boundaries: Cradle to gate with options. The LCA was carried out considering the Product stage phases (A1. A2. A3). Distribution (A4). End of life (C1. C2. C3. C4). Potential environmental benefits (D) in accordance with EN 15804.

Data quality: The foreground data collected internally is based on yearly production amounts and extrapolations of measurements on specific machines and plants. Overall. the data quality can be described as good. The primary data collection has been done thoroughly.

Cut-off criteria: 100 % of total material and energy input flows have been included in the life cycle analysis.

System diagram:



System boundary:

	Product stage			Construc-tion process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	x	x	x	x	x	MNR	MNR	MNR	MNR	MNR	MNR	MNR	x	x	x	x	x
Geography	EU	EU	EU	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Description of the system boundary (X = Included in LCA; MND = Module Not declared; MNR = Module Not relevant)

Product stage:

A1: This stage considers the extraction and processing of raw materials.

A2: The raw materials are transported to the manufacturing plant. In this case. the model includes road transportation of each raw material.

A3: This stage includes the manufacture of products and packaging. It has considered all the energy consumption and waste generated in the production plant.

Production process description

The product is approximately 1/4 water; the remaining 3/4 comprises of binder. filler and additives that aid performance. Protega mastics are manufactured using dispersing units. All raw materials are checked and the quantity for a batch is weighed. Then all raw materials are mixed with water in the dispersing unit. After and during the batch preparation is an internal quality control carried out. The control includes technical quality characteristics relating to mastics and fire protection requirements. The internal control is supervised by external monitoring together with third party testing of some products. All these tests are made with well documented intervals.

Construction process stage:

A4: This stage includes transport from the production gate to the construction site where the product shall be installed.

Transportation is calculated based on data form manufacturer and a scenario with the parameters described in the following table.

Parameter	Value/Description
Vehicle type used for transport	EURO 5 truck with a trailer with an average load of 16-32t
Distance	100 % of production: Truck – 573 km;
Capacity utilization	56 % of the capacity in volume

A5: During the installation phase, the treatment of waste deriving from packaging.

Use stage:

In normal use scenario. it is assumed that no maintenance (B2). repair (B3). replacement (B4) and refurbishment (B5) is needed during the 10 years of life of the product.

Damages or repairs should be treated in the same way as new application with the mastics. These changes are not considered.

End of Life stage:

This stage includes the transportation and management of waste produced after the study reference time has elapsed. The end-of-life stage is composed by modules C1 Deconstruction. C2 Transport. C3 Waste treatment and C4 Waste disposal. Landfill has been assumed as end of life scenario. The impact of building demolition has been considered negligible compared to other impacts of a building's life cycle.

Collection process specified by type	Dry mass of the mastics, kg (mixed with the rest of building waste)
Recovery system specified by type	No reuse. recycling or energy recovery
Disposal specified by type	Dry mass of the mastics, kg to landfill
Assumptions for the development of the scenario (e.g. transportation)	EURO 5 truck with a trailer with an average load of 16-32t 50 km of average distance to the landfill

Environmental Information

Note: Environmental impacts according to EN 15804+A1. CML/ISO 21930 are presented below

Results for Protega Novaflex. Protega Novatherm SP. Protega Ecomastic SP. Protega Novastripe. Protega Novapipe W. Protega Novapipe S

Core environmental impact indicators according to 15804:2012+A2:2019

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1 -A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	1.29E0	1.4E-2	1.81E-1	1.49E0	5.47E-2	1.69E-1	0	6.26E-3	0	8.96E-2	0
GWP-fossil	kg CO_2 eq.	1.28E0	1.4E-2	2.02E-1	1.5E0	5.52E-2	1.42E-1	0	6.25E-3	0	8.95E-2	0
GWP-biogenic	kg CO_2 eq.	8.75E-3	1.01E-5	-2.08E-2	-1.21E-2	4.01E-5	2.77E-2	0	3.33E-6	0	6.51E-5	0
GWP-luluc	kg CO_2 eq.	5.3E-4	4.25E-6	1.34E-4	6.69E-4	1.66E-5	7.55E-7	0	2.22E-6	0	3.89E-6	0
ODP	kg CFC_{-11} eq.	1.54E-7	3.29E-9	1.83E-8	1.76E-7	1.3E-8	2.11E-10	0	1.42E-9	0	2.46E-9	0
AP	mol H^+ eq.	1.18E-2	6.14E-5	7.48E-4	1.26E-2	2.32E-4	2.09E-5	0	2.55E-5	0	6.77E-5	0
EP-freshwater *	kg P eq	8.88E-4	1.14E-7	6.9E-6	8.95E-4	4.49E-7	2.86E-8	0	5.23E-8	0	1.43E-7	0
EP-marine	kg N eq.	9.99E-4	1.83E-5	1.54E-4	1.17E-3	6.99E-5	9.35E-6	0	7.59E-6	0	2.29E-5	0
EP-terrestrial	mol N eq.	1.01E-2	2.03E-4	1.52E-3	1.19E-2	7.72E-4	1.01E-4	0	8.38E-5	0	2.52E-4	0
POCP	kg NMVOC eq.	3.74E-3	6.46E-5	5.78E-4	4.39E-3	2.48E-4	2.48E-5	0	2.57E-5	0	9.19E-5	0
ADP-minerals&metals**	kg Sb eq.	1.62E-5	2.38E-7	1.58E-6	1.8E-5	9.42E-7	2.93E-8	0	1.69E-7	0	8.52E-8	0
ADP-fossil**	MJ	2.66E1	2.18E-1	5.9E0	3.27E1	8.59E-1	2.05E-2	0	9.43E-2	0	1.87E-1	0
WDP	m^3	6.61E-1	8.07E-4	9.46E-2	7.56E-1	3.19E-3	3.05E-4	0	3.03E-4	0	8.33E-3	0
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; 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; EP-freshwater = Eutrophication potential. fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential. fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential. Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential. deprivation-weighted water consumption * Required characterisation method and data are in kg P-eq. Multiply by 3.07 to get PO4e. **EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation. human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.											

Use of resources

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1 -A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	9.28E-1	2.73E-3	5.87E-1	1.52E0	1.08E-2	3.38E-4	0	1.33E-3	0	3.24E-3	0
PERM	MJ	0	0	2.66E-1	2.66E-1	0	3.17E-4	0	0	0	0	0
PERT	MJ	9.28E-1	2.73E-3	8.54E-1	1.78E0	1.08E-2	6.55E-4	0	1.33E-3	0	3.24E-3	0
PENRE	MJ	1.96E1	2.18E-1	3.68E0	2.35E1	8.59E-1	2.05E-2	0	9.43E-2	0	1.87E-1	0
PENRM	MJ	1.37E0	0	2.23E0	3.59E0	0	0	0	0	0	0	0
PENRT	MJ	2.1E1	2.18E-1	5.9E0	2.71E1	8.59E-1	2.05E-2	0	9.43E-2	0	1.87E-1	0
SM	kg	1.14E-2	0	5.26E-4	1.19E-2	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	1.2E-2	4.52E-5	1.68E-3	1.37E-2	1.79E-4	3.55E-5	0	1.61E-5	0	2.1E-4	0
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water											

Waste production and output flows

Waste production

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1 -A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2.96E-1	2.12E-4	8.08E-3	3.05E-1	8.34E-4	9.7E-4	0	9.57E-5	0	3.32E-4	0
Non-hazardous waste disposed	kg	1.41E0	2.33E-2	2.75E-1	1.71E0	9.23E-2	4.68E-2	0	6.57E-3	0	7.5E-1	0
Radioactive waste disposed	kg	2.97E-5	1.49E-6	2.01E-5	5.12E-5	5.89E-6	6.92E-8	0	6.46E-7	0	1.12E-6	0

Output flows

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1 -A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	3.5E-2	3.5E-2	0	0	0	0	0	0	0
Material for recycling	kg	0	0	1E-3	1E-3	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy. electricity	MJ	0	0	0	0	0	0	0	0	0	0	0
Exported energy. thermal	MJ	0	0	0	0	0	0	0	0	0	0	0

ENVIRONMENTAL IMPACTS – EN 15804+A1. CML / ISO 21930

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP	kg CO_2 eq.	1.24E0	1.39E-2	1.92E-1	1.45E0	5.47E−2	1.42E−1	0	6.2E−3	0	6.358E−2	0
ODP	kg CFC_{-11} eq.	1.83E-7	2.61E-9	1.9E-8	2.05E-7	1.03E−8	1.83E−10	0	1.13E−9	0	1.959E−9	0
AP	kg SO_2 eq.	1.2E-2	3.07E-5	6.32E-4	1.27E-2	1.12E−4	1.44E−5	0	1.25E−5	0	2.979E−5	0
EP	kg PO_4^3 eq.	2.36E-3	5.98E-6	2.35E-4	2.6E-3	2.27E−5	1.16E−5	0	2.58E−6	0	2.996E−3	0
POCP	kg C_2H_4e	5.47E-4	1.85E-6	4.82E-5	5.97E-4	7.12E−6	2.80E−7	0	8.25E−7	0	1.331E−5	0
ADP-minerals & metals	kg Sb eq.	1.62E-5	2.38E-7	1.58E-6	1.8E-5	9.42E−7	2.93E−8	0	1.69E−7	0	8.524E−8	0
ADP-fossil	MJ	2.66E1	2.18E-1	5.9E0	3.27E1	8.59E−1	2.05E−2	0	9.43E−2	0	1.867E−1	0
Acronyms	GWP = Global Warming Potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential; EP = Eutrophication potential; POCP = Formation of ozone of lower atmosphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential. deprivation-weighted water consumption											

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO2e	1.28E0	1.4E-2	2.02E-1	1.5E0	5.52E-2	1.42E-1	0	6.25E-3	0	8.95E-2	0

Environmental Information

Note: Environmental impacts according to EN 15804+A1. CML/ISO 21930 are presented below

Results for Protega Firestop

Core environmental impact indicators according to 15804:2012+A2:2019

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1 -A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	7.18E-1	1.06E-2	1.81E-1	9.1E-1	5.47E-2	1.69E-1	0	3.05E-3	0	8E-2	0
GWP-fossil	kg CO_2 eq.	7.15E-1	1.06E-2	2.02E-1	9.27E-1	5.52E-2	1.42E-1	0	3.04E-3	0	8E-2	0
GWP-biogenic	kg CO_2 eq.	2.64E-3	7.71E-6	-2.08E-2	-1.82E-2	4.01E-5	2.77E-2	0	2.21E-6	0	5.82E-5	0
GWP-luluc	kg CO_2 eq.	1.8E-4	3.19E-6	1.34E-4	3.18E-4	1.66E-5	7.55E-7	0	9.16E-7	0	3.48E-6	0
ODP	kg CFC_{-11} eq.	6.26E-8	2.49E-9	1.84E-8	8.34E-8	1.3E-8	2.11E-10	0	7.16E-10	0	2.19E-9	0
AP	mol H^+ eq.	2.22E-3	4.46E-5	7.49E-4	3.02E-3	2.32E-4	2.09E-5	0	1.28E-5	0	6.05E-5	0
EP-freshwater *	kg P eq	2.33E-4	8.63E-8	6.9E-6	2.4E-4	4.49E-7	2.86E-8	0	2.48E-8	0	1.28E-7	0
EP-marine	kg N eq.	4.11E-4	1.34E-5	1.54E-4	5.78E-4	6.99E-5	9.35E-6	0	3.85E-6	0	2.04E-5	0
EP-terrestrial	mol N eq.	4.56E-3	1.48E-4	1.52E-3	6.24E-3	7.72E-4	1.01E-4	0	4.26E-5	0	2.25E-4	0
POCP	kg NMVOC eq.	1.6E-3	4.77E-5	5.79E-4	2.23E-3	2.48E-4	2.48E-5	0	1.37E-5	0	8.21E-5	0
ADP-minerals& metals**	kg Sb eq.	6.64E-6	1.81E-7	1.58E-6	8.4E-6	9.42E-7	2.93E-8	0	5.2E-8	0	7.61E-8	0
ADP-fossil**	MJ	1.62E1	1.65E-1	5.91E0	2.23E1	8.59E-1	2.05E-2	0	4.74E-2	0	1.67E-1	0
WDP	m^3	1.46E-1	6.14E-4	9.46E-2	2.41E-1	3.19E-3	3.05E-4	0	1.76E-4	0	7.44E-3	0
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; 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; EP-freshwater = Eutrophication potential. fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential. fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential. Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential. deprivation-weighted water consumption * Required characterisation method and data are in kg P-eq. Multiply by 3.07 to get PO4e. **EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation. human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.											

Use of resources

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1 -A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.74E-1	2.08E-3	5.88E-1	8.64E-1	1.08E-2	3.38E-4	0	5.96E-4	0	2.89E-3	0
PERM	MJ	0	0	2.66E-1	2.66E-1	0	3.17E-4	0	0	0	0	0
PERT	MJ	2.74E-1	2.08E-3	8.54E-1	1.13E0	1.08E-2	6.55E-4	0	5.96E-4	0	2.89E-3	0
PENRE	MJ	1.31E1	1.65E-1	3.68E0	1.69E1	8.59E-1	2.05E-2	0	4.74E-2	0	1.67E-1	0
PENRM	MJ	0	0	2.23E0	2.23E0	0	0	0	0	0	0	0
PENRT	MJ	1.31E1	1.65E-1	5.91E0	1.91E1	8.59E-1	2.05E-2	0	4.74E-2	0	1.67E-1	0
SM	kg	1.35E-3	0	5.26E-4	1.87E-3	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	3.13E-3	3.44E-5	1.68E-3	4.84E-3	1.79E-4	3.55E-5	0	9.86E-6	0	1.88E-4	0
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water											

Waste production and output flows

Waste production

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1 -A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2.31E-1	1.6E-4	8.08E-3	2.4E-1	8.34E-4	9.7E-4	0	4.6E-5	0	2.97E-4	0
Non-hazardous waste disposed	kg	3.78E-1	1.77E-2	2.75E-1	6.71E-1	9.23E-2	4.68E-2	0	5.09E-3	0	6.7E-1	0
Radioactive waste disposed	kg	1.16E-5	1.13E-6	2.01E-5	3.29E-5	5.89E-6	6.92E-8	0	3.25E-7	0	1E-6	0

Output flows

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1 -A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	3.5E-2	3.5E-2	0	0	0	0	0	0	0
Material for recycling	kg	0	0	1E-3	1E-3	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0
Exported energy. electricity	MJ	0	0	0	0	0	0	0	0	0	0	0
Exported energy. thermal	MJ	0	0	0	0	0	0	0	0	0	0	0

ENVIRONMENTAL IMPACTS – EN 15804+A1. CML / ISO 21930

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP	kg CO_2 eq.	6.87E-1	1.05E-2	1.92E-1	8.9E-1	5.47E−2	1.42E−1	0	3.02E−3	0	5.68E−2	0
ODP	kg CFC_{-11} eq.	6.12E-8	1.98E-9	1.9E-8	8.22E-8	1.03E−8	1.83E−10	0	5.69E−10	0	1.75E−9	0
AP	kg SO_2 eq.	1.83E-3	2.16E-5	6.32E-4	2.49E-3	1.12E−4	1.44E−5	0	6.2E−6	0	2.66E−5	0
EP	kg PO_4^3 eq.	8.76E-4	4.36E-6	2.35E-4	1.12E-3	2.27E−5	1.16E−5	0	1.25E−6	0	2.68E−3	0
POCP	kg C_2H_4e	1.27E-4	1.37E-6	4.82E-5	1.77E-4	7.12E−6	2.80E−7	0	3.93E−7	0	1.19E−5	0
ADP-minerals & metals	kg Sb eq.	6.64E-6	1.81E-7	1.58E-6	8.4E-6	9.42E−7	2.93E−8	0	5.2E−8	0	7.62E−8	0
ADP-fossil	MJ	1.62E1	1.65E-1	5.91E0	2.23E1	8.59E−1	2.05E−2	0	4.74E−2	0	1.67E−1	0
Acronyms	GWP = Global Warming Potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential; EP = Eutrophication potential; POCP = Formation of ozone of lower atmosphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential. deprivation-weighted water consumption											

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Results per functional or declared unit												
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO2e	7.15E-1	1.06E-2	2.02E-1	9.27E-1	5.52E-2	1.42E-1	0	3.04E-3	0	8E-2	0

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR – Construction products 2019:14. version 1.1
PCR review was conducted by: The International EPD® System
Independent third-party verification of the declaration and data. according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Vladimir Kočí, LCA Studio 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 from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability. see EN 15804 and ISO 14025.

References

General Programme Instructions of the International EPD® System. Version 3.01;

PCR 2019:14 Construction products (version 1.1);

EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations.

Core rules for the product category of construction products;

ISO 14044:2006/Amd 2:2020 Environmental management. Life Cycle Assessment. Requirements and guidelines.

ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations. Principles and procedures.

Tools and database

One Click LCA tool;

Ecoinvent 3.6 database

Contact information

EPD owner:	PROTEGA Protega. AB https://www.protega.se/
LCA author:	vesta sustainability consulting Vesta Consulting. UAB https://www.vestaconsulting.lt/
Programme operator:	EPD® The International EPD® System https://www.environdec.com

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THE INTERNATIONAL EPD SYSTEM

Appendix II

Self-declaration from EPD owner, specific Norwegian requirements

1 Applied electricity data set used in the manufacturing phase

The electricity mix for the electricity used in manufacturing (A3) is the electricity grid mix

For the manufacturing process (A3) 100% renewable electricity from Vattenfall AB is used. The renewable sources of electricity are evidenced by Vattenfall AB. Documentation of certificate is provided.

National electricity grid	Unit	Value
Hydroelectricity (Ecoinvent 3.6)	kg CO_2e / kWh	0.0039
Nuclear electricity, pressure water reactor (Ecoinvent 3.6)	kg CO2e / kWh	0.0113
Nuclear electricity, boiling water reactor (Ecoinvent 3.6)	kg CO_2e / kWh	0.0122
Wind electricity (Ecoinvent 3.6)	kg CO_2e / kWh	0.025

2 Content of dangerous substances

- ⊗ The product contains no substances given by the REACH Candidate list or the Norwegian priority list.
- □ The product contains substances that are less than 0.1% by weight given by the REACH Candidate or the Norwegian priority list.
- □ The product contains dangerous substances more than 0.1% by weight given in the REACH candidate list or the Norwegian Priority List, concentrations is given in the EPD:

Dangerous substances from the REACH candidate list or the Norwegian Priority List	**CAS No.**	**Quantity (concentration, wt%/FU(DU)).**
Substance 1		
Substance n		

3 Transport from the place of manufacture to a central warehouse

Transport distance, and CO_2-eqv./DU from transport of the product from factory gate to central warehouse in Oslo shall be given. The following table shall be included in the EPD:

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy use	Unit	Value (l/t)	Kg CO2-eqv./DU
Boat							
Truck	56 % of the capacity in volume	EURO 5 truck with a trailer with an average load of 16-32t	590	Diesel	l/tkm	<?>	0.17 kg CO2eqv / tonkm (ecoinvent 3.6)
Railway							
Rail							
Air							
Total							

4 Impact on the indoor environment

⊗ Indoor air emission testing has been performed; specify test method and reference; SS-EN ISO 16000-10:2006

☐ No test has being performed

☐ Not relevant; specify _____