Statement of Verification

BREG EN EPD No: 000781 Issue: 01

This is to verify that the Environmental Product Declaration provided by:

kreon nv

are in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:
1 m^2 of Vektron metal ceiling system with a weight of 5.73kg/m^2.

Company Address

kreon nv
Industrieweg Noord 1152
3660 Oudsbergen
Belgium

vektron

Signed for BRE Global Limited

Emma Baker
Operator

01 April 2026	01 April 2026	31 March 2031
Date of this Issue	Date of First Issue	Expiry Date

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Environmental Product Declaration

EPD Number: 000781

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE 2025 Product Category Rules (PN 514 Rev 3.2) for Type III environmental product declaration of construction products to EN 15804:2012+A2:2019
Commissioner of LCA study	**LCA consultant/Tool**
kreon nv Industrieweg Noord 1152 3660 Oudsbergen Belgium	Francis Yu – BRE LINA A2
Declared/Functional Unit	**Applicability/Coverage**
1 m2 of Vektron metal ceiling system with a weight of 5.73kg/m2.	Product Average.
EPD Type	**Background database**
Cradle to Gate with options	Ecoinvent 3.8

Demonstration of Verification
CEN standard EN 15804 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: Bala Subramanian
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Once the product is manufactured, the tiles will be shipped from the factory in Turkey. In the meantime, the clip-in carrier parts will be shipped from Kreon HQ warehouse in Belgium.

Manufacturing site:
Kreon Aydınlatma Sanayi ve Ticaret.A.Ş.,
Çatalmeşe Mahallesi Reşadiye Cad.No:76,
Alemdağ 34794 Çekmeköy-İstanbul,
Türkiye

HQ warehouse:
Kreon nv
Industrieweg-Noord 1152,
3660 Oudsbergen,
Belgium

Construction Product:

Product Description

Vektron metal ceiling systems are manufactured from hot-dipped galvanised steel with a variety of perforations and colours. Manufactured in accordance with European and TAIM standards. Panels are either part of a hidden carrier system (Vektron Clip-in & Vektron Hook-on) or part of a visual bandraster system (Vektron Lay-on). All Vektron metal ceiling systems can be offered as fully bespoke metal ceilings to meet specific project requirements. And are developed as a finished product, ready for installation without the need for final preparation and finishing (plaster skimming and painting).

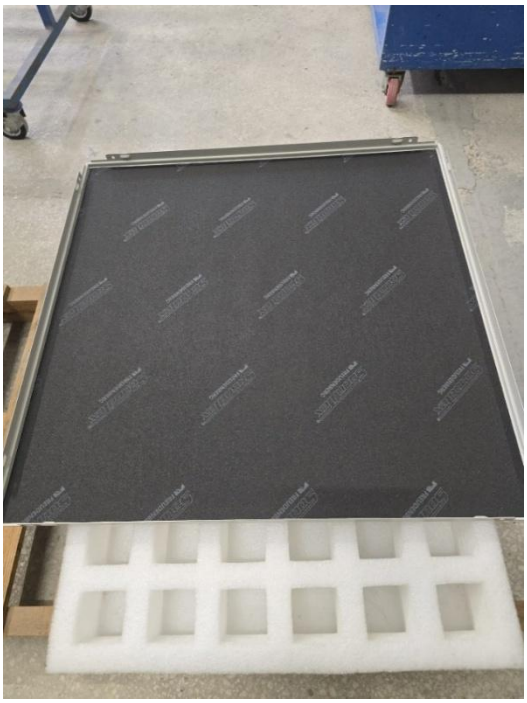
Different edge finishing options or wall connections are available for all types: L-, C-, W-profile. Suspended ceilings with panel tiles are also effective in sound and heat insulation. Insulation properties can be increased by leaving air gaps between the panels. This feature makes them especially preferred in areas where sound insulation is important, such as offices and meeting rooms, public buildings, retail premises, airports, restaurants, exhibition spaces.

This is a product average EPD and the average weight 5.73 kg/m2 is calculated by dividing the total production weight by the total production volume. The composition used in the LCA is an average for all Vektron metal ceiling systems and the manufacturing process is identical.

Technical Information

Property	Value, Unit
Material	0,5-0,7 mm hot-dipped galvanised steel with a minimum zinc coating of 50 g/m².
Size	Vektron Clip-in tiles: 600 x 600mm cassette panels. Other sizes are available on request and are manufactured with a thickness depending on the dimensions of the Vektron tile. Vektron Lay-on tiles: sizes vary in length up to 2400mm and width up to 800mm. Thickness depending on the dimensions of the vektron tile. Vektron Hook-on tiles: sizes vary in length up to 2400mm and width up to 800mm, manufactured with a thickness depending on the dimensions in accordance with EN13964:2014.
Edge	Vektron clip-in tiles have a shadow gap of 3mm wide and 8mm high, on every side of the tile. Vektron Lay-on tiles: Standard height of the lay-on detail is 30mm. The edge detail can vary in height depending on the demanded specifications. Vektron Hook-on tiles: The edge detail can vary in height depending on the demanded specifications. Standard height of the hook-on detail is 45m
Perforation pattern	Vektron clip-in tiles: The standard perforation has a hole diameter of 2.5mm with a square pitch and an open area of 16.5% and an unperforated border of 100mm or 10mm. Other perforations are available from 1-8mm. Custom perforations on request. Vektron Lay-on tiles: The standard perforation has a hole diameter of 2.5mm with a square pitch, an open area of 16.5% and an unperforated border of 100mm or 10mm. Other perforations are available. Custom perforations on request. Vektron Hook-on tiles: Standard perforation diameter 2.5mm square grid 16% perforated with unperforated border of 100mm or plain. Other perforations available as per the catalogue.
Finish	Electrostatically applied polyester powder coating with a paint thickness of minimum 60µm.
Colour	8 standard colours available. Other RAL colours on request.
Gloss rate	≤5% - ≤20% depending on colour.
Light reflection	Vektron clip-in tiles: >80% Vektron Lay-on and Vektron Hook-on tiles: >80% (vektron white)

Note: The technical information is extracted from Vektron ceiling solutions specification sheet of vektron clip-in ceiling system, vektron lay-on ceiling system and vektron hook-on ceiling system, please contact Kreon for details, or visit Ceilings | vektron — ceiling solutions



Main Product Contents

Material/Chemical Input	%
Galvanised steel	95
Powder paint	4
Insulation	1

Manufacturing Process

Vektron ceiling systems are manufactured from hot-dipped galvanised steel with a variety of perforations and colours resulting in either standard or customized sizes.

Process starts by cutting of hot-dipped galvanised steel in desired sizes, perforated (optional), punched and edged or pressed according to technical drawing.

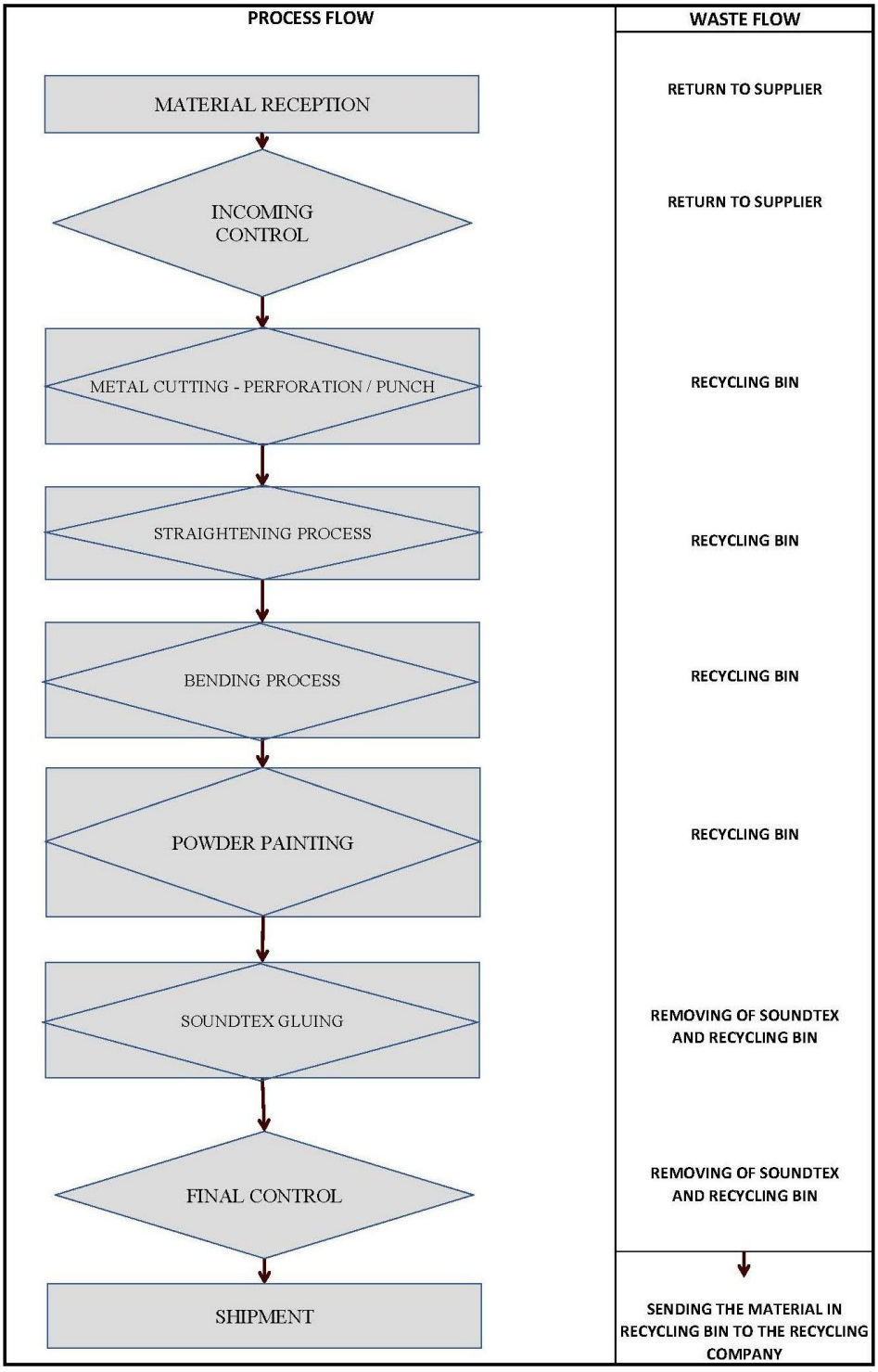
The panels are not made from pre-coated material but given a high-quality powder coating after the cleaning process.

An acoustic fleece is bonded to the back side of the panel with a heat application process.

After inspection the panels are packaged in cardboard boxes with polystyrene corners and PP straps before being palletized. The products are manufactured at the factory in Turkey and Turkish grid electricity has been used for manufacturing process.

Once the products are packaged, the products will be delivered to the warehouse in Belgium for storage and distribution. Belgium grid electricity and renewable electricity generated by on-site solar panels have been used for the warehouse in Belgium.

Process flow diagram



Construction Installation

The installation and maintenance have to be executed in accordance with the operation and maintenance manual. Please contact Kreon for details.

End of Life

Default end-of-life scenarios from BRE PCR PN514 REV 3.2 has been used for this product. i.e. 95% of the steel waste goes to recycling and 5% goes to landfill. 100% of paint waste goes to landfill. 100% of glass reinforced plastic waste to incineration. 100% recovery rate of the product has been assumed at its end of life.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 m2 of Vektron metal ceiling system with a weight of 5.73kg/m2.

System boundary

This is a Cradle-to-Gate with Options LCA, reporting all production life cycle stages of modules A1 to A3, construction stages A4, A5, end-of-life stages C1-C4, and D in accordance with EN 15804:2012+A2:2019 and BRE 2025 Product Category Rules (PN 514 Rev 3.2). The intended purpose of this LCA is for the data and results to be used in a published third-party verified EPD.

Data sources, quality and allocation

Specific primary data derived from Kreon nv's production process at Kreon Aydınlatma Sanayi ve Ticaret.A.Ş, Çatalmeşe Mahallesi Reşadiye Cad.No:76, Alemdağ 34794 Çekmeköy-İstanbul, Turkey factory, and Kreon nv's storage process (for clip-in carrier parts) at Industrieweg-Noord 1152, 3660, Oudsbergen, Belgium warehouse, have been modelled using the LINA LCA A2 software A2 and the ecoinvent 3.8 database. In accordance with the requirements of EN 15804:2012+A2:2019, the most current available data has been used. The manufacturer-specific data from Kreon nv covers a period of one year (01/01/2024 – 31/12/2024). Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e. raw material production) from the ecoinvent 3.8 database. All ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN 15804:2012+A2:2019.

The LCA study is for Vektron metal ceiling system. The factory in Turkey also produces other products and the warehouse in Belgium also stores other products. At the factory in Turkey, all energy and waste have been allocated to the product by square metre according to the provisions of the BRE PCR PN514 Rev 3.2 and EN 15804:2012+A2:2019. Water and wastewater have been obtained from actual measurement.
At the warehouse in Belgium, all energy, waste, water and wastewater have been obtained from actual measurement. Site wide values for energy, water and wastewater have been taken from bills. Figures for the raw materials, ancillary materials and packaging were from actual usages.

Data quality level and criteria are extracted form EN 15804+A2, Table E.1.

Quality Level	Geographical representativeness	Technical representativeness	Time representativeness
Very Good	Data from area under study.	Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e. identical technology).	Less than 3 years difference between the reference year according to the documentation, and the time period for which data are representative

Specific UK datasets have been selected from the ecoinvent LCI for this LCA. The quality level of geographical and technical representativeness is therefore very good. The quality level of time representativeness is very good as the background LCI datasets are based on ecoinvent v3.8 which was compiled in 2021. Therefore, there is less than 3 years between the ecoinvent LCI reference year and the time period for which the LCA was undertaken.

Location -based approach has been used for the electricity.
Turkey consumption mix electricity data was used for the manufacturing site with an emissions factor of 0.638 kgCO2eq/kWh. Belgium consumption mix electricity data was used for the warehouse with an emissions factor of 0.266 kgCO2eq/kWh. Belgium renewable electricity data (roof, mono solar PV) was used for the on-site solar electricity generation at the warehouse with an emissions factor of 0.106 kgCO2eq/kWh.

EU natural gas data (at industrial furnace) was used for the manufacturing site in Turkey and the warehouse in Belgium with an emissions factor of 0.256 kgCO2eq/kWh.

Cut-off criteria

A cut-off approach by EN 15804+A2 has been used in the EPD. All processes associated with the manufacturing process have been included. At the manufacturing site in Turkey, all inputs or outputs have been included and all raw materials, ancillaries, packaging, transport, energy, water use and wastes are included, except for direct emissions to air, water and soil, which are not measured. At the warehouse in Belgium, all energy, packaging, water and waste have been included. Direct emissions to air, water and soil have been excluded as they are not measured. No raw materials and ancillaries used at Belgium site, as they are irrelevant. There is no repackaging activity takes place at the Belgium site for the products coming from Turkish site.
Upstream extraction and/or processing of inputs are included within the use of the background datasets within LINA. There is no detailed information about the insulator material. Therefore, a default ecoinvent dataset - ‘glass fibre reinforced plastic, polyester resin’ has been used as a proxy for the insulator.

Information on the impact categories, indicators, characterisation methods, units and characterisation factors to be applied is stated in Annex C of EN15804+A2.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	1.58E+01	1.58E+01	6.19E-02	1.47E-02	9.19E-07	2.02E-01	7.45E-03
	Transport	A2	2.27E+00	2.27E+00	1.93E-03	8.90E-04	5.24E-07	9.20E-03	1.46E-04
	Manufacturing	A3	3.63E+00	4.07E+00	-4.57E-01	1.46E-02	3.89E-07	1.52E-02	1.92E-03
	Total (Consumption grid)	A1-3	2.17E+01	2.21E+01	-3.93E-01	3.02E-02	1.83E-06	2.26E-01	9.52E-03
Construction process stage	Transport	A4	1.91E-02	1.90E-02	1.62E-05	7.48E-06	4.41E-09	7.73E-05	1.23E-06
	Construction	A5	5.59E-01	1.10E-01	4.49E-01	7.94E-06	3.34E-09	2.02E-04	4.39E-06
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
95% steel wate to recycling and 5% steel waste to landfill + 100% insulator waste to incineration Scenario									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.91E-02	1.90E-02	1.62E-05	7.48E-06	4.41E-09	7.73E-05	1.23E-06
	Waste processing	C3	4.32E-01	4.32E-01	1.21E-04	3.20E-05	6.66E-08	3.25E-03	9.98E-06
	Disposal	C4	1.50E-03	1.50E-03	1.48E-06	1.41E-06	6.05E-10	1.41E-05	1.37E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.48E+00	-5.49E+00	1.64E-02	-1.59E-03	-2.20E-07	-2.00E-02	-2.18E-03

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
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; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral &metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	2.10E-02	7.34E-01	7.00E-02	5.75E-04	1.84E+02	8.01E+00	2.47E-06
	Transport	A2	2.77E-03	3.03E-02	9.27E-03	7.88E-06	3.43E+01	1.54E-01	1.96E-07
	Manufacturing	A3	3.64E-03	3.06E-02	8.75E-03	5.74E-06	5.96E+01	8.13E-01	1.04E-07
	Total (Consumption grid)	A1-3	2.74E-02	7.95E-01	8.80E-02	5.88E-04	2.78E+02	8.98E+00	2.77E-06
Construction process stage	Transport	A4	2.33E-05	2.54E-04	7.79E-05	6.62E-08	2.88E-01	1.30E-03	1.64E-09
	Construction	A5	8.86E-05	9.55E-04	2.82E-04	3.05E-08	2.62E-01	8.73E-03	2.70E-09
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
95% steel wate to recycling and 5% steel waste to landfill + 100% insulator waste to incineration Scenario									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.33E-05	2.54E-04	7.79E-05	6.62E-08	2.88E-01	1.30E-03	1.64E-09
	Waste processing	C3	1.45E-03	1.58E-02	4.34E-03	1.68E-07	4.28E+00	1.75E-02	8.66E-08
	Disposal	C4	4.89E-06	5.35E-05	1.56E-05	3.41E-09	4.18E-02	1.92E-03	2.83E-10
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4.72E-03	-5.01E-02	-2.75E-02	-4.13E-06	-5.58E+01	-4.10E-01	-3.66E-07

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	9.17E-01	6.25E+02	1.09E-07	6.05E-07	5.57E+01
	Transport	A2	1.76E-01	2.67E+01	8.66E-10	2.80E-08	2.35E+01
	Manufacturing	A3	1.07E-01	3.04E+01	1.22E-09	2.28E-08	5.04E+01
	Total (Consumption grid)	A1-3	1.20E+00	6.82E+02	1.12E-07	6.56E-07	1.30E+02
Construction process stage	Transport	A4	1.48E-03	2.25E-01	7.28E-12	2.36E-10	1.98E-01
	Construction	A5	2.19E-03	2.16E-01	9.78E-11	4.85E-10	4.96E-02
Use stage	Use	B1	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND
95% steel wate to recycling and 5% steel waste to landfill + 100% insulator waste to incineration Scenario							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.48E-03	2.25E-01	7.28E-12	2.36E-10	1.98E-01
	Waste processing	C3	1.93E-02	2.75E+00	1.07E-10	2.22E-09	5.50E-01
	Disposal	C4	1.85E-04	2.64E-02	6.69E-13	1.73E-11	8.77E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.10E-01	-1.64E+02	-2.91E-08	-1.12E-07	-1.10E+01

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, primary energy

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	1.49E+01	0.00E+00	1.49E+01	1.69E+02	7.61E-02	1.69E+02
	Transport	A2	4.83E-01	0.00E+00	4.83E-01	3.36E+01	0.00E+00	3.36E+01
	Manufacturing	A3	3.90E+00	9.54E+00	1.34E+01	5.69E+01	2.65E+00	5.96E+01
	Total (Consumption grid)	A1-3	1.93E+01	9.54E+00	2.88E+01	2.60E+02	2.72E+00	2.62E+02
Construction process stage	Transport	A4	4.06E-03	0.00E+00	4.06E-03	2.83E-01	0.00E+00	2.83E-01
	Construction	A5	-9.33E+00	9.34E+00	9.98E-03	-1.01E+00	1.29E+00	2.84E-01
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
95% steel wate to recycling and 5% steel waste to landfill + 100% insulator waste to incineration Scenario								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	4.06E-03	0.00E+00	4.06E-03	2.83E-01	0.00E+00	2.83E-01
	Waste processing	C3	2.48E-02	0.00E+00	2.48E-02	2.63E+00	1.57E+00	4.20E+00
	Disposal	C4	3.56E-04	0.00E+00	3.56E-04	4.10E-02	0.00E+00	4.10E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.24E+00	0.00E+00	-1.24E+00	-5.52E+01	0.00E+00	-5.52E+01

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	2.30E+00	0.00E+00	0.00E+00	1.97E-01
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	3.82E-03
	Manufacturing	A3	3.94E-01	0.00E+00	0.00E+00	2.11E-02
	Total (Consumption grid)	A1-3	2.69E+00	0.00E+00	0.00E+00	2.22E-01
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	3.21E-05
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	2.08E-04
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
95% steel wate to recycling and 5% steel waste to landfill + 100% insulator waste to incineration Scenario						
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	3.21E-05
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	4.23E-04
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	4.48E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-9.96E-03

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	5.35E+00	2.70E+01	3.88E-04
	Transport	A2	3.78E-02	6.71E-01	2.32E-04
	Manufacturing	A3	1.49E-01	8.91E+00	5.51E-05
	Total (Consumption grid)	A1-3	5.53E+00	3.66E+01	6.75E-04
Construction process stage	Transport	A4	3.17E-04	5.64E-03	1.95E-06
	Construction	A5	3.33E-03	3.38E-01	1.64E-06
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
95% steel wate to recycling and 5% steel waste to landfill + 100% insulator waste to incineration Scenario					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.17E-04	5.64E-03	1.95E-06
	Waste processing	C3	7.47E-03	9.28E-02	2.95E-05
	Disposal	C4	4.34E-05	6.13E-04	2.74E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.06E-01	-1.05E+01	-6.20E-05

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	1.62E-01	2.71E-09	0.00E+00	0.00E+00	3.15E-01
	Total (Consumption grid)	A1-3	0.00E+00	1.62E-01	2.71E-09	0.00E+00	0.00E+00	3.15E-01
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	7.52E-01	6.00E-04	0.00E+00	0.00E+00	1.73E-01
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
95% steel wate to recycling and 5% steel waste to landfill + 100% insulator waste to incineration Scenario								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	5.40E+00	5.10E-02	5.78E-01	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

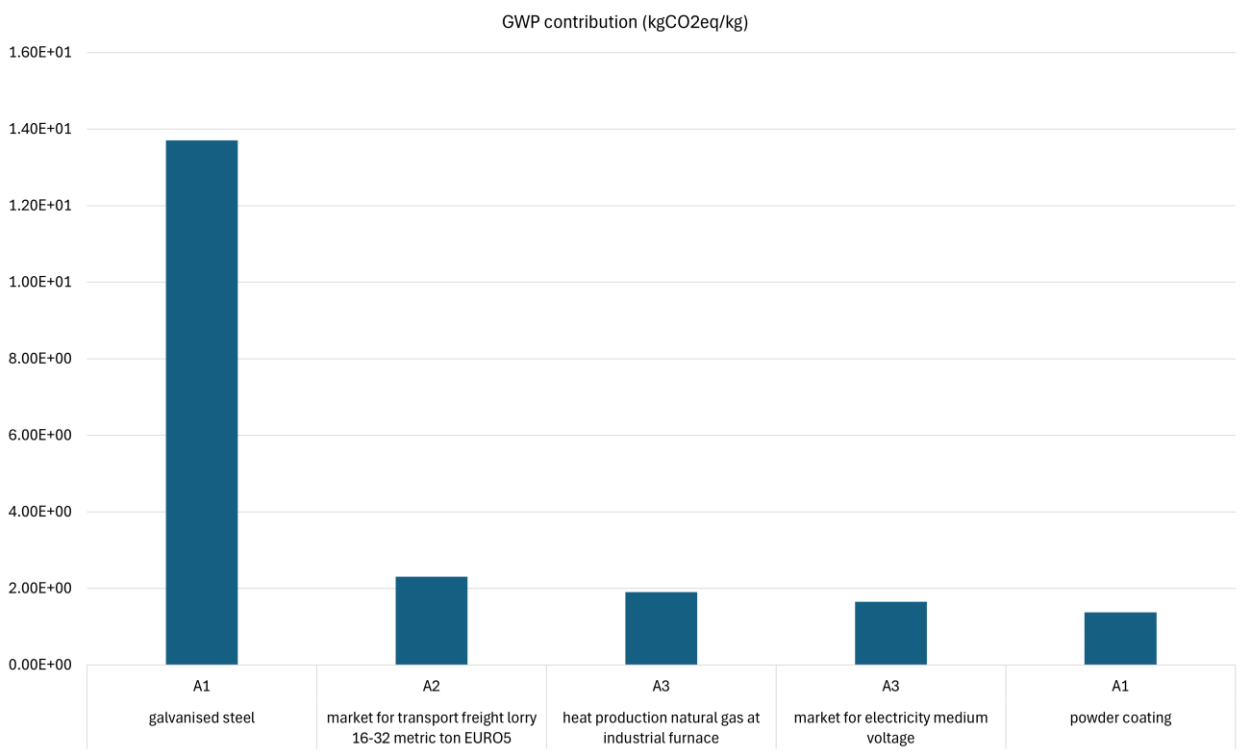
Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	20km by road has been modelled for module A4 as a typical distance from the warehouse to construction sites. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module A4 if required.		
	Road, 16-32 metric ton, euro5	km	20
A5 – Installation in the building	The installation and maintenance have to be executed in accordance with the operation and maintenance manual. Please contact Kreon for details.		
	Packaging waste – Pallet waste	kg	0.254
	Packaging waste - Plastic wrap	kg	0.000658
	Packaging waste - Strech film	kg	0.00166
	Packaging waste - Cardboard box	kg	0.385
	Packaging waste - PE film	kg	0.0278
	Pallets (low impact pallets)	kg	0.0254
	Stretch film	kg	0.0006
C1 – Deconstruction	When a project has reached end of life, the tiles can still be used and harvested by specific companies to offer them for other projects. Kreon will always recommend this when asked for a demounting proposal. The dismantling process is manual, so no additional energy or materials are required. 100% recovery rate has been assumed for the waste product from the demolition site.		
C2 – Transport from site to pre-processing facility or landfill	A typical 20km road transport assumption has been given in this module and the EPD end users can convert the environmental impacts to any specific distance.		
	Road, 16-32 metric ton, euro5	km	20
C3 - Pre-processing of uninstalled product	There is currently no process in place to dispose of the product waste. Therefore, default end-of-life scenarios from BRE PCR PN514 REV 3.2 has been used for this product. i.e. 95% of the steel waste goes to recycling and 5% goes to landfill. 100% of glass reinforced plastic waste to incineration. Since the product waste has not undergone any pre-processing, the paint waste will be processed together with the steel waste, i.e. steel end-of life scenario will be used for paint waste in module C3 and C4. 100% recovery rate of the product has been assumed at its end of life. Galvanized steel makes up 95.19%, i.e. 5.73*95.19% = 5.4544 kg. Paint makes up 3.92%, i.e. 5.73*3.92% =0.2246 kg. 95% goes to recycling, i.e. 95%* (5.4544+0.2246) = 95%*5.679= 5.39505 kg. GRP Insulator waste makes up 0.89%, i.e. 5.73*0.89%=0.051 kg. 100% of 0.051kg goes to incineration.		
	95% of Steel (with paint) waste to recycling	kg	5.395
	100% of Plastic waste to incineration	kg	0.051

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C4 – Disposal	There is currently no process in place to dispose of the product waste. Therefore, default end-of-life scenarios from BRE PCR PN514 REV 3.2 has been used for this product. i.e. 95% of the steel waste goes to recycling and 5% goes to landfill. 100% of glass reinforced plastic waste to incineration. Since the product waste has not undergone any pre-processing, the paint waste will be processed together with the steel waste, i.e. steel end-of life scenario will be used for paint waste in module C3 and C4. 100% recovery rate of the product has been assumed at its end of life. Galvanized steel makes up 95.19%, i.e. 5.73*95.19% = 5.4544 kg. Paint makes up 3.92%, i.e. 5.73*3.92% =0.2246 kg. 5% goes to landfill, i.e. 5%* (5.4544+0.2246) = 5%*5.679= 0.28395 kg.		
	5% of Steel (with paint) waste to landfill	kg	0.28395
Module D	In C3, 95% of steel waste (i.e. 5.1817 kg, without paint) goes to recycling, in which recycled content accounts for 37.8%. Therefore, only virgin steel content (62.2%, i.e. 5.1817*62.2%= 3.223 kg) can be claimed for benefits from recycling in module D. In C3, Insulator waste makes up 0.89%, i.e. 5.73*0.89%=0.051 kg. Incineration of plastic mixture waste dataset is used as a proxy to calculate the benefits in Module D, therefore, a specific calorific value for incineration is unable to be provided. But the electricity benefit realised from the incineration process is 3.66MJ/kg, the heat benefit realised from the incineration process is 7.66MJ/kg. For benefits due to incineration of insulator waste, the EU electricity (Electricity, high voltage (RER) market group for electricity, high voltage, 2021) with an emission factor of 0.396kgCO2eq/kWh, EU heat (Heat, district or industrial, natural gas (RER) market for heat, district or industrial, natural gas, 2021) with an emission factor of 0.187kgCO2eq/kWh, and EU heat (Heat, district or industrial, other than natural gas (RER) market for heat, district or industrial, other than natural gas, 2021) with an emission factor of 0.244kgCO2eq/kWh have been used as the background data for the energy recovered.		
	Benefits due to recycling of steel	kg	3.223
	Benefits due to incineration of insulator	kg	0.051

Interpretation

Out of the total mass of input materials, galvanised steel accounts for 95%, powder paint accounts for 4%, and insulator accounts for 1%. The bulk of the environmental impacts and primary energy demand are attributed to the manufacturing phase, covered by information modules A1-A3 of EN15804:2012+A2:2019.

As a result, galvanised steel contributes the most on GWP and overall environmental impacts.



Individual product calculation

The LCA results in the EPD are for 1 m2 of Vektron metal ceiling system with an average weight of 5.73kg/m2. The environmental impacts of other product sizes in this series can be obtained from multiplying the 5.73kg/m2 LCA results by the scaling factors below. The proportion/breakdown of impacts remain the same throughout the range.

(For example, to calculate the environmental impacts of the blank tile product with a weight of 6.68kg/m2, the EPD users need to multiply the LCA results in the EPD by a scaling factor of 1.1662).

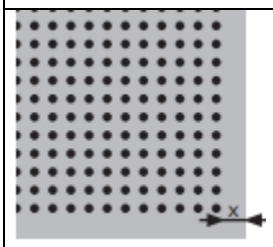
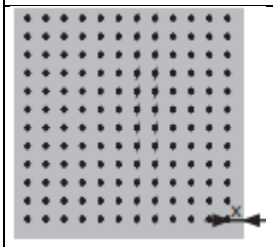
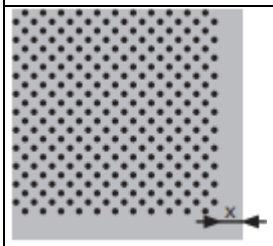
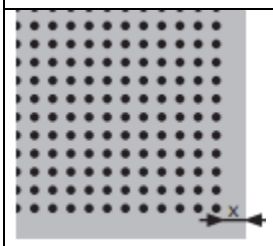
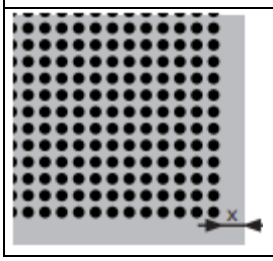
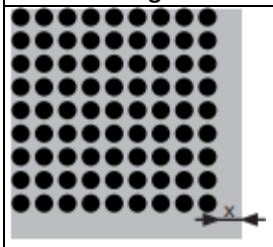
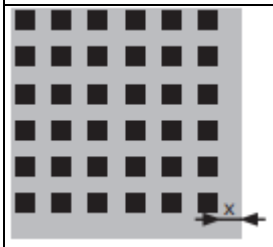
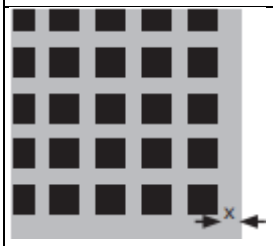
Image	Type	Option	Weight (kg/m2)	Scaling factor
NA	**Blank tile** no perforation	open area / tile: 0.00%	6.68	1.1662
	**Standard perforation** dia 2,5mm, square pitch 5,5mm % open area/perfofield: 16.5%	standard perforation (x=+/-100mm) open area / tile: 7.10%	6.30	1.1003
		full perforation (x=+/-12mm) open area / tile: 15.00%	5.88	1.0269
	**Perforation R0** dia 0,8mm, square pitch 5,0mm % open area/perfofield: 1,5%	standard perforation (x=+/-100mm) open area / tile: NA	NA	NA
		full perforation (x=+/-12mm) open area / tile: 1.50%	6.60	1.1523
	**Perforation R1** dia 1,8mm, diagonal pitch 2,47mm % open area/perfofield: 21%	standard perforation (x=+/-100mm) open area / tile: 9.00%	6.20	1.0826
		full perforation (x=+/-12mm) open area / tile: 19.00%	5.67	0.9898
	**Perrforation R2** dia 3mm, square pitch 3,43mm % open area/perfofield: 30,1%	standard perforation (x=+/-100mm) open area / tile: 13.20%	5.98	1.0437
		full perforation (x=+/-12mm) open area / tile: 27.70%	5.21	0.909
	**Perforation R3** dia 3,2mm, square pitch 4,6mm % open area/perfofield: 38,3%	standard perforation (x=+/-100mm) open area / tile: 16.50%	5.80	1.013
		full perforation (x=+/-12mm) open area / tile: 27.70%	5.21	0.909

Image	Type	Option	Weight (kg/m2)	Scaling factor
	**Perforation R5** dia 5mm, diagonal pitch 6,4mm % open area/perfofield: 48,2%	standard perforation (x=+/-100mm) open area / tile: 22.30%	5.50	0.9592
		full perforation (x=+/-12mm) open area / tile: 44.20%	4.33	0.7559
	**Perforation S5** dia 5mm, square pitch 10mm % open area/perfofield: 25,6%	standard perforation (x=+/-100mm) open area / tile: 11.70%	6.06	1.0576
		full perforation (x=+/-12mm) open area / tile: 23.40%	5.44	0.949
	**Perforation S8** dia 5mm, diagonal pitch 6,4mm % open area/perfofield: 48,2%	standard perforation (x=+/-100mm) open area / tile: 18.20%	5.71	0.9972
		full perforation (x=+/-12mm) open area / tile: 37.20%	4.70	0.8209

References

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