ENVIRONMENTAL-PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	BETOMAX systems GmbH & Co. KG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-BET-20220197-ICC2-EN
Issue date	03.08.2022
Valid to	02.08.2027

COMAX Reinforcement Continuity System

BETOMAX systems GmbH & Co. KG

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

BETOMAX systems GmbH & Co. KG

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-BET-20220197-ICC2-EN

This declaration is based on the product category rules:

Reinforcing Steel, 08.03.2023
(PCR checked and approved by the SVR)

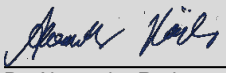
Issue date

03.08.2022

Valid to

02.08.2027

Dipl.-Ing Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)



Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.)

COMAX Reinforcement Continuity System

Owner of the declaration

BETOMAX systems GmbH & Co. KG
Dyckhofstraße 1
41460 Neuss
Germany

Declared product / declared unit

1 kg reinforcement continuity system COMAX type P with reinforcing steel B500B and cases made of galvanised steel including packaging.

Scope:

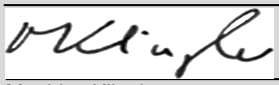
This EPD represents the LCA related to the life cycle of the COMAX P reinforcement continuity system of the company BETOMAX systems with reinforcing steel bars of the diameters 8, 10 and12 mm bent into the box. The reinforcing connectors are manufactured in the short box length of 0.83 m or the standard length of 1.25 m at the Halle (Saale) production site considered for this report. In addition to the reinforcing steel and the galvanised cases, the reinforcement continuity system boxes have a plastic cover and two plastic end caps each. The life cycle assessment key figures were collected and verified for the year 2020.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804 bezeichnet*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally



Matthias Klingler,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The COMAX type P reinforcement continuity system system is used to connect reinforced concrete components produced in adjoining phases and is used in the scope of the standard *DIN EN 1992-1-1:2011-01, Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings* in conjunction with the standard *DIN EN 1992-1-1/NA:2013-04, National Annex - Nationally determined parameters - Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings.* The COMAX reinforcement continuity system is distributed in accordance with the Directive on the marketing of construction products in the European area pursuant to *Regulation (EU) No 305/2011* of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

2.2 Application

The use of reinforcement continuity system makes it possible, after stripping the formwork of a first reinforced concrete construction segment, to simply bend the reinforcing steel out of the box at a 90° angle for the continuation of the planned connection and subsequent concreting of the second concrete component. The design is to be carried out on the basis of the applicable reinforced concrete construction standard and the national approval, taking into account the country-specific annex of the Eurocode. The handling of the construction product COMAX P is described by the BETOMAX general building approval (abZ) Z-21.8-2056.

2.3 Technical Data

General technical key figures for COMAX based on applicable design guidelines.

Design values of the sheet type P crosswise to the joint

Name	Value	Unit
Reinforcing steel	B500B	-
Yield strength	435	N/mm²
Reduced yield strength	348	N/mm²
Coefficient c	0.5	-

Performance values of the reinforcing steel according to the declaration of performance in relation to its essential characteristics according to *DIN EN 10080:2005-08, Steel for the reinforcement of concrete - Weldable reinforcing steel - General.*

2.4 Delivery status

The standard box length corresponds to 1.25 m, and there is also the serially produced short box length of 0.83 m. Longer or shorter box lengths are produced to order. The height of the box, including the cover, is 30 mm. Due to the structuring with slight perforation along the bottom of the box, there is also a slight overhang on the underside of the box.
COMAX reinforcement continuity system essentially consist of two parts. A moulded deposit box made of galvanised sheet metal and a reinforcing steel partly bent into this box. The cantilevered length of steel in the as-delivered condition is mainly formed in a stirrup shape or hook geometry. The other part of the reinforcing steel is in the bent-in state in the box depth and is closed over the length of the box by a cover. At the longitudinal ends, the system is closed with two end caps inserted in each case during production.
The cases are produced in widths of 60, 80, 110, 140, 160, 190, 220 and 240 mm. The standard nominal centre distances of the perforations in the longitudinal axis of the boxes are 100, 150, 200, 250 and 300 mm. The COMAX P boxes are equipped with steel bars of 8, 10 and 12 mm diameter.
Delivery is made on recyclable Euro pallets, which are usually stacked up to 1.70 m high.

2.5 Base materials/Ancillary materials

Weight distribution in percentage list without packaging using the example of the representative COMAX P-box of stirrup type S1 with a sheet width of 140 mm, a bar diameter of 12 mm and a stirrup spacing of 200 mm. The anchorage length at the considered element is 150 mm, the stirrup width is dimensioned with 110 mm and the deflection length of the reinforcement bar of grade B500B with 460 mm.

Component shares COMAX P 140-12/20 Type S1

Name	Value	Unit
Stirrup B500B	74.8	%
Box Plate P 140	15.3	%
Cover P 140	9.7	%
End Caps P 140	0.15	%

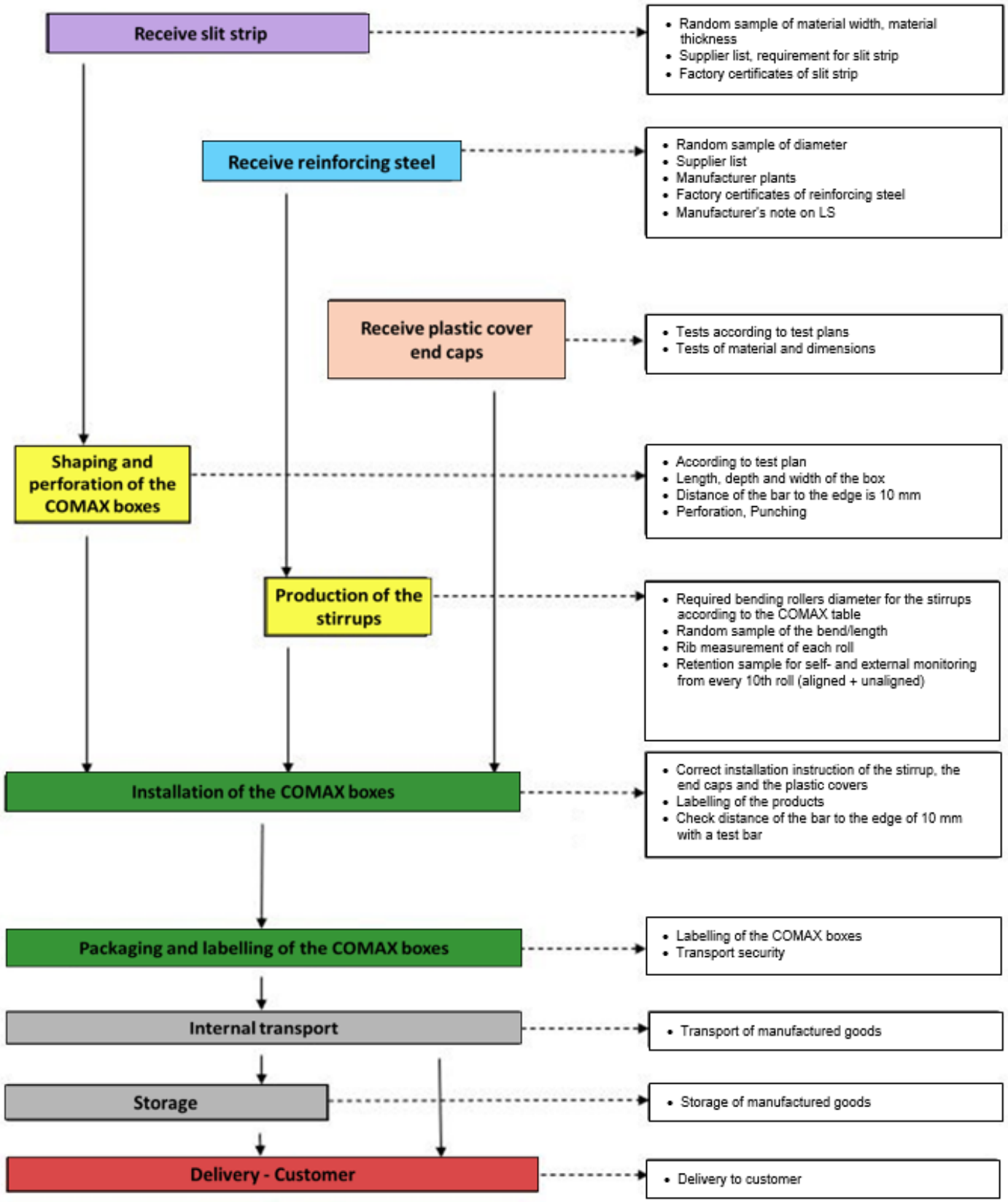
The product contains substances on the ECHA list of Substances of Very High Concern (SVHC) (date 17.01.2022) above 0.1% by mass: **no**.
The product contains other CMR substances of category 1A or 1B not on the candidate list above 0.1% by mass in at least one sub-product: **no**.
Biocidal products have been added to the present construction product or it has been treated with biocidal products (it is therefore a treated product within the meaning of the Biocidal Products Regulation (EU) No 528/2012): **no**.

2.6 Manufacture

The reinforcing steel of the reinforcement continuity system is delivered to the factory in coils and further processed into the required stirrup shape. Galvanised sheet metal is folded on a profile line into the shape of the cases with rollers and perforated by rollers. The COMAX cover is produced from hard polyvinyl chloride (PVC) recycled material and is simply pulled on during assembly. The material of the prefabricated COMAX end caps is polypropylene (PP) regranulate and is also inserted during the assembly process.

Production process of the COMAX P rebending boxes at the ISO 9001 certified production site in Halle (Saale):

Production Process COMAX Reinforcement Continuity System



2.7 Environment and health during manufacturing

No hazardous emissions of dusts or solvents occur during production. No process water is needed during production, so apart from the use of normal household water, no waste water pollution or treatment takes place. Current measured values on chemical-biological components in the waste water are therefore not kept.

2.8 Product processing/Installation

The reinforcement continuity system are properly nailed to the formwork with the covering in place and then concrete is

poured over them in the planned component. After the concrete has hardened and the formwork has been removed, the cover can be easily removed by means of two perforated lines which run along the longitudinal axis of the box. Reinforcing steel lying in the box and running straight out can be bent out with the help of a bending-back tube.

2.9 Packaging

The COMAX reinforcement continuity systems are delivered on recyclable pallets, with the shipment wrapped in foil and secured. Four reinforcing bars each secure the transport goods against slipping sideways.

2.10 Condition of use

In order to protect the reinforcement continuity system from mechanical failure on the component over the period of the use phase, corresponding load cases according to *EN 1991-1-1* are to be applied. Under exclusion of extraordinary impacts, further changes in the material composition are not to be expected.

2.11 Environment and health during use

Steel cases with pre-bent reinforcing steel are installed in concrete according to EN 206 over the period of use. Portland cement clinker is exempt from registration according to *REACH* (en: Registration, Evaluation, Authorisation and Restriction of Chemicals) and is to be used in conjunction with *Regulation (EU) No. 453/2010* for the cement-bound building material. No safety data sheet is required for the use of the COMAX P box. The handling is therefore to be classified as harmless if the reinforcement continuity systems are handled professionally.

2.12 Reference service life

The service life of a reinforcement continuity system in the installed state, taking into account appropriate guidelines, is determined in the planning phase using the *EN 1990* standard. In general, the service life for building construction may be assumed to be 50 years and regulation class 4. However, the service life of the installed reinforcement continuity system can be considerably longer due to the material properties.
There are no evaluations of the reference service life (RSL) according to *ISO 15686-4*. In order to prevent the risk of premature ageing due to corrosion, the reinforcing steel must be protected from water ingress with a sufficient concrete cover in accordance with *EN 1992-1-1* when the load cases are applied correctly.

2.13 Extraordinary effects

Fire

The reinforcement continuity system must be protected against the effects of fire by a sufficient concrete cover when set in concrete. The specification of the reinforced concrete component with installed COMAX reinforcement continuity system for the expected fire resistance duration and the fire resistance class is carried out in accordance with *EN 13501-2*.

Water

When installed, the product does not contribute to any contamination of the groundwater, air or soil, even due to the installation situation in normal weather conditions or even floods.

Mechanical destruction

Static dimensioning taking into account the aspects of stability must be carried out on all planned structures. Reinforcement continuity system are equipped with ductile reinforcing steel and support prudent planning.

2.14 Re-use phase

The COMAX box used in the building is finally recycled when the building is demolished and the steel and concrete are separated. Reinforcing steel can be 100% recycled back into the manufacturing process. The steel is demolished together with the concrete and recycled. The other waste products can be disposed of normally or go into the reprocessing of the old concrete.

2.15 Disposal

The waste code according to *AVV* for the disposal of steel and iron corresponding to the category construction and demolition waste is 17 04 05.

2.16 Further information

For additional information on the COMAX reinforcement continuity system, please visit www.betomax.de.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is one (1) kg of the representative product COMAX P 140-12/20 type S1 including packaging materials. Of this, 0.965 kg is for the COMAX reinforcement continuity system and 0.035 kg is for the packaging.

Declared unit

Name	Value	Unit
Declared unit	1	kg
Density (bulk density)	7850	kg/m^3

3.2 System boundary

Type of EPD: Cradle to factory gate (with options).
The modules A1-A3, A5, C1-C4 and D are used in accordance with *EN 15804*. The following points were taken into account in the preparation of the life cycle assessment:

Module A1-A3

All upstream chains of the raw materials and materials, as well as their procurement transports. Production processes including energy and waste waste flows (cradle to factory gate). Waste produced are taken into account up to the End of Waste status.

Module A5

Recycling of the packaging material.

Module C1

The removal of the reinforcement continuity system from the building.

Module C2

Transport to the disposal company.

Module C3

Material recovery (recycling) of the product.

Modules D

Reporting of credits generated by waste treatment in modules A5 and C3.

3.3 Estimates and assumptions

No estimates and assumptions were made that would be relevant for the interpretation of the LCA results.

3.4 Cut-off criteria
Almost all material and energy flows entering the product system were taken into account. 0.28 mass % were cut off. It can be assumed that the sum of the neglected mass fractions does not exceed 5% of the results from the impact categories.

3.5 Background data
The "Software for Holistic Balancing" (*GaBi 10.6*) with database version 2022.1 was used to model the life cycle.

3.6 Data quality
The most recent background data sets from the GaBi databases were used for the life cycle assessment. The data sets used are not older than 10 years, for the most part they are not older than 3 years. Data collection for the products investigated was based on evaluations of internal production data and the collection of LCA-relevant data within the supplier chain. The geographical reference was taken into account when using the data sets. The data collected was checked for plausibility and consistency, which means that a good level of representativeness can be assumed.

3.7 Period under review
The data collection refers to the analysis period from 01.01.2020 to 31.12.2020.

3.8 Geographic Representativeness
Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Germany

3.9 Allocation
The material input and output flows were determined on the basis of the corresponding production quantities. The energy input and output flows were taken into account on the basis of the corresponding total quantities from the 2020 calendar year and allocated to COMAX production on the basis of the production quantity. The credits from module A5 are reported in module D.

3.10 Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. The *GaBi 10.6* software with the database Version 2022.1 was used.

4. LCA: Scenarios and additional technical information
Characteristic product properties
Information on biogenic carbon

The biogenic carbon content was calculated based on the product components. Biogenic carbon is only found in the packaging (wooden pallet).

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.013	kg C

The following technical information is the basis for the declared modules or can be used to develop specific scenarios in the context of a building assessment if modules are not declared (MND).

Disposal of the packaging (A5)
In module A5, only the disposal of the packaging is declared.

Name	Value	Unit
Packaging metal	0.004	kg
Plastic packaging (foil, cover, end caps)	0.096	kg
Packaging Euro pallet	0.03	kg

End of life (C1-C4)

Name	Value	Unit
Collected separately steel	0.87	kg
Collected as mixed construction waste	-	kg
Reuse	-	kg
Recycling	0.84	kg
Energy recovery	-	kg
Landfilling	-	kg
Loss (estimated)	3	%

The end-of-life processes are modelled with data sets that represent the European average. Intra-European transports and recovery rates were taken into account.

Reuse, recovery and recycling potential (D)
In Module D, the credits from the energy recovery of the packaging materials (resulting from Module A5) are modelled. Credits for the reinforcement continuity system at the end of life do not take place, as the product consists of 100% secondary material.

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 kg COMAX P Rückbiegeanschluss (0.965 kg) inkl. Verpackung (0.035 kg)

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2-Äq.	5.55E-01	2.99E-01	2.58E-02	7.12E-03	0	0	-1.07E-01
GWP-fossil	kg CO_2-Äq.	6.04E-01	2.51E-01	2.56E-02	7.07E-03	0	0	-5.86E-02
GWP-biogenic	kg CO_2-Äq.	-4.88E-02	4.88E-02	0	0	0	0	-4.88E-02
GWP-luluc	kg CO_2-Äq.	1.84E-04	2.44E-05	1.68E-04	4.77E-05	0	0	-6.41E-06
ODP	kg CFC11-Äq.	1.3E-10	2.34E-13	5.64E-15	6.95E-16	0	0	-3.94E-13
AP	mol H^+-Äq.	1.55E-03	6.77E-05	9.46E-05	2.51E-05	0	0	-7.68E-05
EP-freshwater	kg PO_4-Äq.	1.98E-06	6.26E-08	9E-08	2.53E-08	0	0	-8.01E-08
EP-marine	kg N-Äq.	3.84E-04	2.29E-05	4.36E-05	1.16E-05	0	0	-2.09E-05
EP-terrestrial	mol N-Äq.	4.07E-03	2.84E-04	4.87E-04	1.3E-04	0	0	-2.24E-04
POCP	kg NMVOC-Äq.	1.27E-03	6.4E-05	8.91E-05	2.26E-05	0	0	-5.84E-05
ADPE	kg Sb-Äq.	1.54E-07	5.82E-09	4.85E-09	7.14E-10	0	0	-8.8E-09
ADPF	MJ	9.38E+00	4.45E-01	3.51E-01	9.29E-02	0	0	-9.97E-01
WDP	m^3 world-Äq. deprived	1.53E-01	1.95E-02	6.95E-04	7.9E-05	0	0	-6.14E-03

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 kg COMAX P Rückbiegeanschluss (0.965 kg) inkl. Verpackung (0.035 kg)

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	3.8E+00	1.16E-01	2.48E-02	6.44E-03	0	0	-2.72E-01
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	3.8E+00	1.16E-01	2.48E-02	6.44E-03	0	0	-2.72E-01
PENRE	MJ	9.34E+00	4.95E-01	3.52E-01	9.33E-02	0	0	-9.97E-01
PENRM	MJ	5E-02	-5E-02	0	0	0	0	0
PENRT	MJ	9.39E+00	4.45E-01	3.52E-01	9.33E-02	0	0	-9.97E-01
SM	kg	1.08E+00	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	4.94E-03	5.08E-04	3.69E-05	7.44E-06	0	0	-2.6E-04

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

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 kg COMAX P Rückbiegeanschluss (0.965 kg) inkl. Verpackung (0.035 kg)

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
HWD	kg	8.32E-10	3.38E-11	2.18E-12	4.94E-13	0	0	-1.35E-10
NHWD	kg	2.8E-02	1.49E-01	6.19E-05	1.52E-05	0	0	-5.02E-04
RWD	kg	8.26E-04	1.38E-05	1.15E-06	1.73E-07	0	0	-7.8E-05
CRU	kg	0	0	0	0	0	0	0
MFR	kg	2.42E-02	4.3E-03	0	0	8.44E-01	0	0

MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	2.43E-01	0	0	0	0	0
EET	MJ	0	-4.77E-01	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 kg COMAX P Rückbiegeanschluss (0.965 kg) inkl. Verpackung (0.035 kg)

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
PM	Disease incidence	ND	ND	ND	ND	ND	ND	ND
IR	kBq U235-Äq.	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND	ND
SQP	SQP	ND	ND	ND	ND	ND	ND	ND

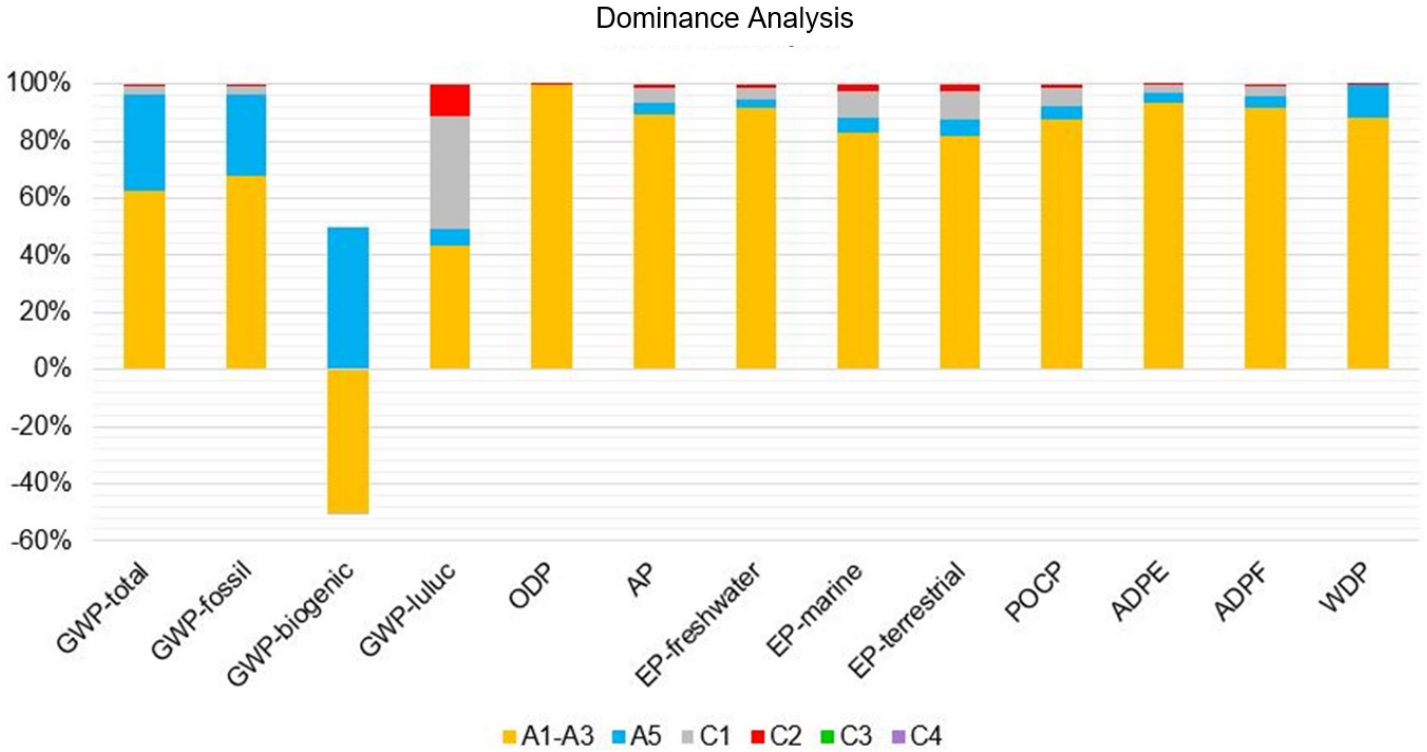
PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 - applies to the indicator "Potential human exposure efficiency relative to U235". This impact category mainly addresses the potential effect of low dose ionising radiation on human health in the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents and occupational exposure, nor does it consider effects due to the disposal of radioactive waste in underground facilities. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.

Disclaimer 2 - applies to the indicators: "Abiotic depletion potential for non-fossil resources", "Abiotic depletion potential for fossil resources", "Water (user) deprivation potential', "Potential comparative Toxic Unit for ecosystems", "Potential comparative Toxic Unit for humans - cancerogenic", "Potential comparative Toxic Unit for humans - not cancerogenic", "Potential soil quality index".
The results of this environmental impact indicator must be used with caution, as the uncertainties in these results are high or as there is limited experience with the indicator.

The impact assessment results are only relative statements that do not make any statements about endpoints of the impact categories, exceedance of thresholds, safety margins or risks. For all indicators mentioned, the characterisation factors of *EK-JRC* were applied.

6. LCA: Interpretation



Module A1-A3, which contains the provision of raw materials and processing, is decisive in almost all impact categories. The reinforcement continuity system COMAX P causes a GWP_{total} of 0.55 kg CO2 -eq in module A1-A3. Of this, 63% is caused by the provision of the steel bends, followed by the slit strip with 18%. The secondary plastics used play a subordinate role.

Module A5, which represents the packaging treatment, contributes 34 % to the GWP_{total}. The decisive factor here is the incineration of the cover plate. In most other categories, the steel sheets also have the greatest influence. The negative contribution of the $GWP_{biogenic}$ in module A1-A3 is caused by the use of Euro-wood pallets. In A5, the biogenically bound carbon leaves the system again. The contribution of module C1

to the GWP_{luluc} (40 %) is mainly explained by the need for diesel to demolish and dismantle the COMAX P from the building. Little variance can be assumed between the COMAX P reinforcement continuity system covered in this EPD, as only the weight ratio of steel to plastic changes slightly.

7. Requisite evidence

No evidence required.

8. References

Standards

EN 206
DIN EN 206:2021-06, Concrete - Specification, performance, production and conformity.

EN 1990
DIN EN 1990:2021-10, Eurocode: Basis of structural design.

EN 1991-1-1
EN 1991-1-1:2010-12, Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings.

EN 1992-1-1
DIN EN 1992-1-1:2011-01, Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings.

EN 1992-1-1/NA:2013-04
DIN EN 1992-1-1/NA:2013-04, National Annex - Nationally determined parameters - Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings.

EN 10080
DIN EN 10080:2005-08, Steel for the reinforcement of concrete - Weldable reinforcing steel - General.

EN 13501-2
DIN EN 13501-2:2016-12, Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services.

EN 15804
EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

ISO 9001
BS EN ISO 9001:2015-11, Quality management systems - Requirements.

ISO 14025
EN ISO 14025:2011, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

ISO 15686-4
ISO 15686-4:2014-01, Building Construction - Service Life Planning - Part 4: Service Life Planning using Building Information Modelling.

Further literature

AVV
Waste Catalogue Ordinance (AVV) of 10 December 2001 (BGBl. I p. 3379), last amended by Article 1 of the Ordinance of 30 June 2020 (BGBl. I p. 1533).

EK-JRC
European Commission - LCA, EF 3.0, http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml

GaBi 10.6
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