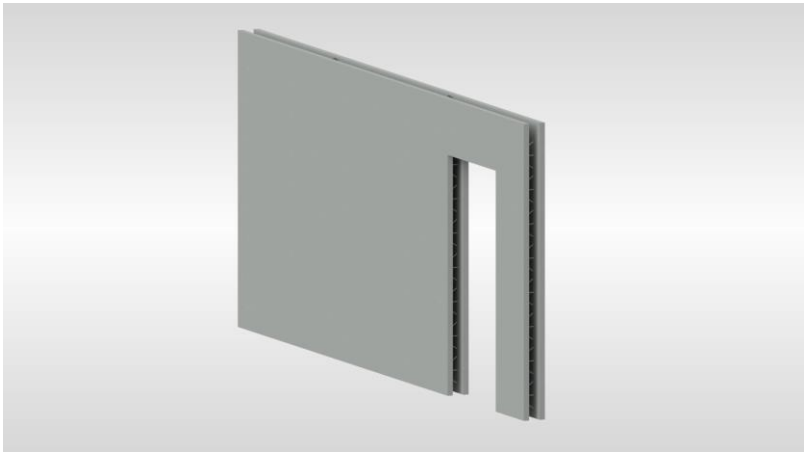
ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Prefabricated Concrete Double-Wall Elements
Heidelberg Materials Precast Abetong



EPD HUB, HUB-0485
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Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Heidelberg Materials Precast Abetong
Address	Box 24, S-351 03 VÄXJÖ, Sweden
Contact details	info.precastabetong@heidelbergmaterials.com
Website	www.precastabetong.heidelbergmaterials.se

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4, and modules C1-C4, D
EPD author	Andreas Lidö, Heidelberg Materials Precast Abetong
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	Elisabet Amat as an authorized verifier acting for EPD Hub Limited

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Prefabricated Concrete Double-Wall Elements
Additional labels	-
Product reference	-
Place of production	Vislanda, Sweden, Kvicksund, Sweden
Period for data	Data for the calendar year 2021 is used in this study.
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 metric ton of concrete element
Declared unit mass	1000 kg
GWP-fossil, A1-A3 (kgCO2e)	1,62E2
GWP-total, A1-A3 (kgCO2e)	1,62E2
Secondary material, inputs (%)	2,84
Secondary material, outputs (%)	80,7
Total energy use, A1-A3 (kWh)	445,0
Total water use, A1-A3 (m3e)	2,72

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Heidelberg Materials Precast Abetong is one of the leading companies for the development, manufacture and sale of concrete elements and concrete-based products. The company employs more than 500 employees and has a turnover of approximately SEK 1,3 billion per year and is part of the international building materials group Heidelberg Materials. The company's production of concrete elements and products takes place in a responsible manner in one of the six factories. The finished parts are then transported out to construction sites, where Heidelberg Materials Precast Abetong or the customer handles the assembly. Customers are found in both the construction and agriculture sectors.

PRODUCT DESCRIPTION

The product is prefabricated concrete double-wall elements consisting of aggregate, cement, reinforcement and the necessary cast-in-material of steel for transport and assembling. It is filled with concrete at the construction site. The product is used as walls mainly in heated buildings. The product fulfils the requirements of SS-EN 13369:2018 Common rules for precast concrete products and SS-EN 14992:2007+A1:2012 Precast concrete products - Wall elements.

Technical specifications:
Concrete strength C30/37.
Exposure classes up to X0 and XC1.
Life length class up to L100 (100 years).
Fire classes up to REI60.

Typical dimensions are:
Length of element 6,0 m.
Height of element 3,0 m.
Thickness of element 200 mm.
(Panel thickness 50 mm)

Further information can be found at
www.precastabetong.heidelbergmaterials.se.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	4,6	Europe
Minerals	95,4	Sweden
Fossil materials	0	
Bio-based materials	0	

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	-

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 metric ton of concrete element
Mass per declared unit	1000 kg
Functional unit	
Reference service life	

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The production of double-wall elements starts by manufacturing parts for the custom-made moulds. At the same time, the reinforcement is prepared by bending and cutting meshes and bars into the designed dimensions. The casting table is cleaned before the moulds are assembled. Reinforcement and cast-in-materials are mounted, form oil applied and the elements casted. As the concrete sets and reaches the right consistency, the surface treatment is applied (generally fine rolling). After curing the concrete reaches the designed demoulding strength and the elements can be lifted to an intermediate storage area for quality control and finishing, before they are finally transported out into the storage yard ready for delivery to the construction site.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

After notification from the construction site, the elements are loaded onto lorries for transport. The transports are optimised for both efficient assembling at the construction site and reducing the number of required vehicles. Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions and environmental impacts of fuel production. Average distance of transportation from production plant to building site is assumed as 100 km and the transportation method is assumed to be lorry. Transportation does not cause losses. Optional A5 module is not declared.

PRODUCT USE AND MAINTENANCE (B1-B7)

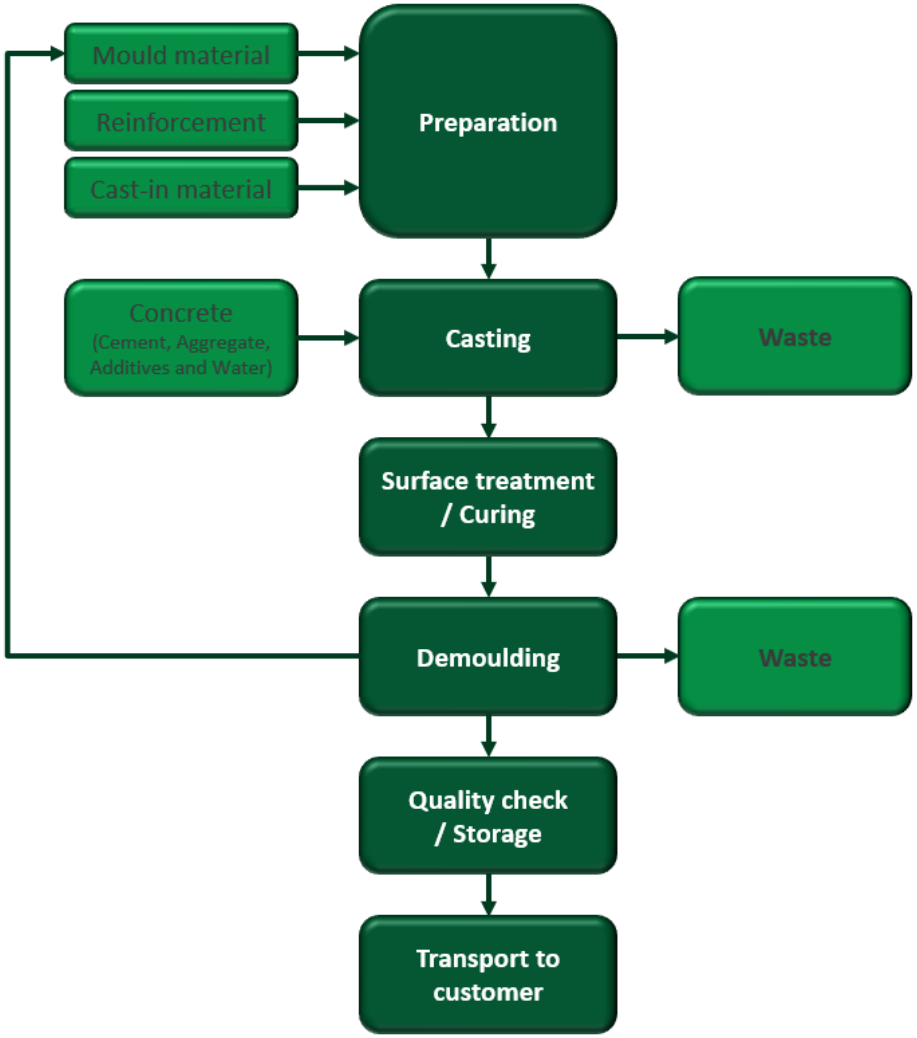
This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At the end-of-life, in the demolition phase 100% of the waste is assumed to be collected as separate construction waste. The demolition process consumes energy in the form of diesel fuel used by building machines (C1). The dismantled concrete elements are delivered to the nearest construction waste treatment plant (C2). At the waste treatment plant, waste that can be reused, recycled or recovered for energy is separated

and diverted for further use (C3). Unusable materials are disposed of in a landfill (C4). Due to the recycling potential of reinforcement steel and concrete, they can be used as secondary raw material. 95% of the steel and 80% of the concrete are recycled, this avoids the use of virgin raw materials (D).

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	Allocated by mass or volume
Packaging materials	Not applicable
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	%

This EPD is product and factory specific and does not contain average calculations.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent 3.6 and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	1,49E2	7,6E0	6,13E0	1,62E2	8,63E0	MND	MND	MND	MND	MND	MND	MND	MND	3,3E0	4,36E0	4,08E0	9,97E-1	-2,32E1
GWP – fossil	kg CO_2e	1,48E2	7,59E0	6E0	1,62E2	8,71E0	MND	MND	MND	MND	MND	MND	MND	MND	3,3E0	4,35E0	4,14E0	9,94E-1	-2,32E1
GWP – biogenic	kg CO_2e	1E-1	5,39E-3	3,98E-2	1,46E-1	6,6E-3	MND	MND	MND	MND	MND	MND	MND	MND	9,17E-4	3,3E-3	-6,17E-2	1,97E-3	5,13E-2
GWP – LULUC	kg CO_2e	7,99E-2	2,51E-3	9,22E-2	1,75E-1	2,74E-3	MND	MND	MND	MND	MND	MND	MND	MND	2,79E-4	1,37E-3	1,5E-3	2,95E-4	-7,48E-3
Ozone depletion pot.	kg $CFC_{-11}e$	4,74E-6	1,84E-6	2,11E-6	8,69E-6	2,14E-6	MND	MND	MND	MND	MND	MND	MND	MND	7,12E-7	1,07E-6	8,16E-7	4,09E-7	-1,01E-6
Acidification potential	mol H^+e	3,73E-1	2,79E-2	2,03E-2	4,22E-1	2,8E-2	MND	MND	MND	MND	MND	MND	MND	MND	3,45E-2	1,4E-2	4,51E-2	9,44E-3	-1,06E-1
EP-freshwater[2)]	kg Pe	4,44E-3	6,41E-5	7,24E-5	4,58E-3	7,39E-5	MND	MND	MND	MND	MND	MND	MND	MND	1,33E-5	3,7E-5	8,76E-5	1,2E-5	-1,08E-3
EP-marine	kg Ne	4,91E-2	6,1E-3	3,3E-3	5,85E-2	6,16E-3	MND	MND	MND	MND	MND	MND	MND	MND	1,52E-2	3,08E-3	1,7E-2	3,25E-3	-2,14E-2
EP-terrestrial	mol Ne	1,01E0	6,79E-2	3,83E-2	1,12E0	6,85E-2	MND	MND	MND	MND	MND	MND	MND	MND	1,67E-1	3,43E-2	1,88E-1	3,58E-2	-2,49E-1
POCP ("smog")[3)]	kg NMVOCe	3,03E-1	2,52E-2	1,18E-2	3,4E-1	2,69E-2	MND	MND	MND	MND	MND	MND	MND	MND	4,59E-2	1,34E-2	5,18E-2	1,04E-2	-1,18E-1
ADP-minerals & metals[4)]	kg Sbe	1,11E-3	1,43E-4	1,75E-5	1,27E-3	1,55E-4	MND	MND	MND	MND	MND	MND	MND	MND	5,03E-6	7,75E-5	6,51E-5	9,09E-6	-6,94E-4
ADP-fossil resources	MJ	5,44E2	1,22E2	2,49E2	9,15E2	1,41E2	MND	MND	MND	MND	MND	MND	MND	MND	4,54E1	7,07E1	5,71E1	2,78E1	-2,14E2
Water use[5)]	m^3e depr.	4,39E1	4,46E-1	2,91E0	4,73E1	5,26E-1	MND	MND	MND	MND	MND	MND	MND	MND	8,46E-2	2,63E-1	2,93E-1	1,29E0	-1,34E1

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	5,36E-6	6,37E-7	1,41E-7	6,14E-6	7,64E-7	MND	MND	MND	MND	MND	MND	MND	MND	9,14E-7	3,82E-7	4,04E-6	1,83E-7	-1,68E-6
Ionizing radiation[6)]	kBq U235e	6,02E3	5,32E-1	6,08E0	6,03E3	6,18E-1	MND	MND	MND	MND	MND	MND	MND	MND	1,94E-1	3,09E-1	2,55E-1	1,14E-1	-3,65E-1
Ecotoxicity (freshwater)	CTUe	1,07E3	9,31E1	1,01E2	1,27E3	1,08E2	MND	MND	MND	MND	MND	MND	MND	MND	2,66E1	5,4E1	8,89E1	1,75E1	-6,66E2
Human toxicity, cancer	CTUh	4,42E-7	2,45E-9	1,62E-9	4,46E-7	2,72E-9	MND	MND	MND	MND	MND	MND	MND	MND	9,53E-10	1,36E-9	2,46E-9	4,15E-10	-9,2E-9
Human tox. non-cancer	CTUh	5,69E-6	1,05E-7	4,34E-8	5,84E-6	1,23E-7	MND	MND	MND	MND	MND	MND	MND	MND	2,35E-8	6,17E-8	9,71E-8	1,28E-8	2,77E-6
SQP[7)]	-	9,6E2	1,73E2	8,84E0	1,14E3	2,13E2	MND	MND	MND	MND	MND	MND	MND	MND	1,16E0	1,07E2	4,85E0	4,73E1	-9,13E1

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	1,08E2	1,55E0	6,92E1	1,78E2	1,78E0	MND	MND	MND	MND	MND	MND	MND	MND	2,45E-1	8,9E-1	2,6E0	2,25E-1	-5,82E0
Renew. PER as material	MJ	1,12E-1	0E0	0E0	1,12E-1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	1,08E2	1,55E0	6,92E1	1,79E2	1,78E0	MND	MND	MND	MND	MND	MND	MND	MND	2,45E-1	8,9E-1	2,6E0	2,25E-1	-5,82E0
Non-re. PER as energy	MJ	8,64E2	1,22E2	2,49E2	1,24E3	1,41E2	MND	MND	MND	MND	MND	MND	MND	MND	4,54E1	7,07E1	5,71E1	2,78E1	-2,14E2
Non-re. PER as material	MJ	1,41E1	0E0	0E0	1,41E1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	8,78E2	1,22E2	2,49E2	1,25E3	1,41E2	MND	MND	MND	MND	MND	MND	MND	MND	4,54E1	7,07E1	5,71E1	2,78E1	-2,14E2
Secondary materials	kg	2,84E1	0E0	1,16E-3	2,84E1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	8E0
Renew. secondary fuels	MJ	6,48E1	0E0	0E0	6,48E1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	1,25E2	0E0	0E0	1,25E2	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	2,61E0	2,47E-2	8,8E-2	2,72E0	2,94E-2	MND	MND	MND	MND	MND	MND	MND	MND	4,01E-3	1,47E-2	9,88E-3	3,04E-2	-9,89E-1

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1,41E1	1,2E-1	1,47E-1	1,43E1	1,37E-1	MND	MND	MND	MND	MND	MND	MND	MND	4,88E-2	6,87E-2	0E0	2,59E-2	-2,51E0
Non-hazardous waste	kg	3,93E2	1,25E1	1,13E1	4,16E2	1,52E1	MND	MND	MND	MND	MND	MND	MND	MND	5,22E-1	7,6E0	0E0	1,89E2	-4,19E1
Radioactive waste	kg	3,08E-3	8,36E-4	2,96E-3	6,88E-3	9,71E-4	MND	MND	MND	MND	MND	MND	MND	MND	3,18E-4	4,86E-4	0E0	1,84E-4	-3,12E-4

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	3,46E-4	0E0	0E0	3,46E-4	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	8,07E2	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Elisabet Amat, as an authorized verifier acting for EPD Hub Limited
10.06.2023

VERIFIED ISO 14025