

ENVIRONMENTAL PRODUCT DECLARATION

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

Rezept 1020 (ABI)
Andernacher Bimswerk GmbH & Co. KG

GENERAL INFORMATION

MANUFACTURER

| | |
|-----------------|------------------------------------|
| Manufacturer | Andernacher Bimswerk GmbH & Co. KG |
| Address | Füllscheuerweg 22, 56626 Andernach |
| Contact details | info@abi-beton.de |
| Website | https://www.abi-beton.de/ |

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 1.1, 5 Dec 2023 |
| Sector | Construction product |
| Category of EPD | Non-verified |
| Parent EPD number | |
| Scope of the EPD | Cradle to gate |
| EPD author | Solomon Abraha (Güteschutz Beton NRW) |
| EPD verification | Independent verification of this EPD and data, according to ISO 14025: Non-verified |
| EPD verifier | - |

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 | Rezept 1020 (ABI) |
| Additional labels | - |
| Product reference | - |
| Place of production | Germany |
| Period for data | 2023 |
| Averaging in EPD | No averaging |
| Variation in GWP-fossil for A1-A3 | -% |

ENVIRONMENTAL DATA SUMMARY

| | |
|----------------------------------------------|------------------|
| Declared unit | 1 m ³ |
| Declared unit mass | 2332 kg |
| GWP-fossil, A1-A3 (kgCO ₂ e) | 2,58E+02 |
| GWP-total, A1-A3 (kgCO ₂ e) | 2,58E+02 |
| Secondary material, inputs (%) | 0.01 |
| Secondary material, outputs (%) | 0 |
| Total energy use, A1-A3 (kWh) | 457 |
| Net fresh water use, A1-A3 (m ³) | 3.3 |

PRODUCT AND MANUFACTURER

PRODUCT DESCRIPTION

The LCA contains the assessment of one cubic meter of concrete C30/37, used for the production of precast elements, for example wall elements according to DIN EN 14992.

Further information can be found at <https://www.abi-beton.de/>.

PRODUCT RAW MATERIAL MAIN COMPOSITION

| Raw material category | Amount, mass- % | Material origin |
|-----------------------|-----------------|-----------------|
| Metals | 0 | - |
| Minerals | 98-100 | Germany |
| Fossil materials | 0-2 | - |
| Bio-based materials | - | - |

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 m ³ |
| Mass per declared unit | 2332 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 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | | |
| 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.

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.

This EPD does not cover the use phase.

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)

This EPD does not cover the use phase.

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 | - |
| Packaging materials | - |
| Ancillary materials | - |
| Manufacturing energy and waste | - |

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. The EPD Generator uses Ecoinvent v3.8, Plastics Europe, Federal LCA Commons and One Click LCA databases 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 ₂ e | 2,16E+02 | 0,00E+00 | 4,20E+01 | 2,58E+02 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| GWP – fossil | kg CO ₂ e | 2,16E+02 | 0,00E+00 | 4,20E+01 | 2,58E+02 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| GWP – biogenic | kg CO ₂ e | 0,00E+00 | 0,00E+00 | 4,80E-05 | 4,80E-05 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| GWP – LULUC | kg CO ₂ e | 8,34E-02 | 0,00E+00 | 4,22E-03 | 8,76E-02 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Ozone depletion pot. | kg CFC ₁₁ e | 8,00E-06 | 0,00E+00 | 2,48E-06 | 1,05E-05 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Acidification potential | mol H ⁺ e | 6,64E-01 | 0,00E+00 | 1,27E-01 | 7,90E-01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| EP-freshwater ²⁾ | kg Pe | 3,11E-03 | 0,00E+00 | 1,81E-03 | 4,92E-03 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| EP-marine | kg Ne | 1,82E-01 | 0,00E+00 | 3,60E-02 | 2,18E-01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| EP-terrestrial | mol Ne | 2,11E+00 | 0,00E+00 | 4,07E-01 | 2,52E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| POCP (“smog”) ³⁾ | kg NMVOCe | 5,34E-01 | 0,00E+00 | 1,09E-01 | 6,43E-01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| ADP-minerals & metals ⁴⁾ | kg Sbe | 1,07E-03 | 0,00E+00 | 1,31E-05 | 1,09E-03 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| ADP-fossil resources | MJ | 1,07E+03 | 0,00E+00 | 5,09E+02 | 1,58E+03 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Water use ⁵⁾ | m ³ e depr. | 1,78E+01 | 0,00E+00 | 2,45E+00 | 2,02E+01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO₄e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) 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 experience with the indicator.

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 | 5,32E-06 | 0,00E+00 | 1,35E-06 | 6,67E-06 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Ionizing radiation ⁶⁾ | kBq U235e | 5,81E+00 | 0,00E+00 | 6,00E-01 | 6,41E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Ecotoxicity (freshwater) | CTUe | 2,90E+03 | 0,00E+00 | 5,71E+02 | 3,47E+03 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Human toxicity, cancer | CTUh | 5,01E-08 | 0,00E+00 | 7,45E-09 | 5,75E-08 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Human tox. non-cancer | CTUh | 1,80E-06 | 0,00E+00 | 3,76E-07 | 2,18E-06 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| SQP ⁷⁾ | - | 7,03E+02 | 0,00E+00 | 5,47E+01 | 7,57E+02 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

6) EN 15804+A2 disclaimer for ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

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 | 6,60E+01 | 0,00E+00 | 3,95E+00 | 6,99E+01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Renew. PER as material | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Total use of renew. PER | MJ | 6,60E+01 | 0,00E+00 | 3,95E+00 | 6,99E+01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Non-re. PER as energy | MJ | 1,07E+03 | 0,00E+00 | 5,09E+02 | 1,58E+03 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Non-re. PER as material | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Total use of non-re. PER | MJ | 1,07E+03 | 0,00E+00 | 5,09E+02 | 1,58E+03 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Secondary materials | kg | 2,45E-01 | 0,00E+00 | 5,35E-02 | 2,99E-01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Renew. secondary fuels | MJ | 3,95E-03 | 0,00E+00 | 2,49E-04 | 4,20E-03 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Non-ren. secondary fuels | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Use of net fresh water | m ³ | 3,24E+00 | 0,00E+00 | 6,15E-02 | 3,30E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

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 | 4,63E+00 | 0,00E+00 | 3,93E+00 | 8,57E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Non-hazardous waste | kg | 1,28E+02 | 0,00E+00 | 8,43E+01 | 2,12E+02 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Radioactive waste | kg | 4,07E-03 | 0,00E+00 | 6,21E-04 | 4,69E-03 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

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 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for recycling | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for energy rec | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

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

| Impact category | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | |
|----------------------|------------------------------------|----------|----------|----------|----------|-----|----------|-----|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|----------|
| Global Warming Pot. | kg CO ₂ e | 2,15E+02 | 0,00E+00 | 4,12E+01 | 2,56E+02 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Ozone depletion Pot. | kg CFC ₁₁ e | 6,43E-06 | 0,00E+00 | 2,08E-06 | 8,51E-06 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Acidification | kg SO ₂ e | 4,93E-01 | 0,00E+00 | 9,83E-02 | 5,92E-01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Eutrophication | kg PO ₄ ³ e | 1,56E-01 | 0,00E+00 | 5,88E-02 | 2,15E-01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| POCP ("smog") | kg C ₂ H ₄ e | 1,94E-02 | 0,00E+00 | 3,56E-03 | 2,30E-02 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| ADP-elements | kg Sbe | 6,66E-04 | 0,00E+00 | 1,28E-05 | 6,79E-04 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| ADP-fossil | MJ | 1,07E+03 | 0,00E+00 | 5,09E+02 | 1,58E+03 | MND | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MNR | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |