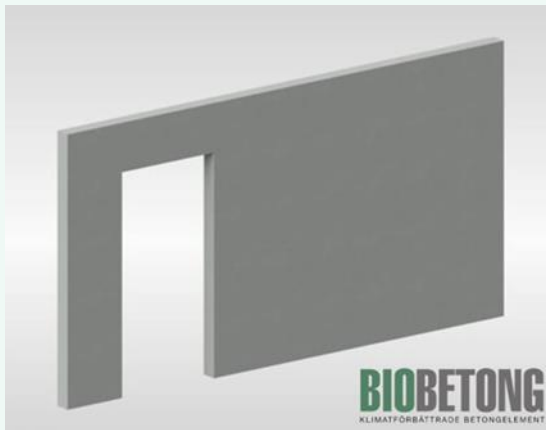


**PREFABRICATED HOMOGENEOUS WALL ELEMENTS BIOBETONG III
HEIDELBERG MATERIALS PRECAST ABETONG**



ORIGINAL DOCUMENT: [HUB-0647](#)

CHANGE: THICKNESS OF ELEMENT 200 MM INSTEAD OF 150 MM AND REINFORCEMENT FROM CELSA S-P-00305 INSTEAD OF REINFORCEMENT STEEL (REBAR), GENERIC, 100% RECYCLED CONTENT, A615 (ONE CLICK LCA).

THIS DOCUMENT HAS BEEN INTERNALLY PRODUCED AND VERIFIED BY ANDREAS LIDÖ, HEIDELBERG MATERIALS PRECAST ABETONG.

ADDITIONAL DOCUMENT TO ENVIRONMENTAL PRODUCT DECLARATION
 IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930



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 | kg CO ₂ e | 9,03E+01 | 3,83E+00 | 5,86E+00 | 1,00E+02 | 8,70E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 3,31E+00 | 4,35E+00 | 3,54E+00 | 1,04E+00 | -6,68E+00 |
| GWP – fossil | kg CO ₂ e | 8,98E+01 | 3,83E+00 | 5,71E+00 | 9,93E+01 | 8,70E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 3,31E+00 | 4,35E+00 | 3,54E+00 | 1,04E+00 | -6,65E+00 |
| GWP – biogenic | kg CO ₂ e | 4,28E-01 | 1,54E-03 | 4,5E-02 | 4,75E-01 | 3,61E-03 | MND | MND | MND | MND | MND | MND | MND | MND | 6,06E-04 | 1,81E-03 | 2,29E-03 | 6,77E-04 | -1,86E-02 |
| GWP – LULUC | kg CO ₂ e | 1,32E-01 | 1,66E-03 | 1,04E-01 | 2,38E-01 | 3,26E-03 | MND | MND | MND | MND | MND | MND | MND | MND | 3,30E-04 | 1,63E-03 | 8,19E-04 | 9,81E-04 | -8,65E-03 |
| Ozone depletion pot. | kg CFC ₁₁ e | 1,66E-06 | 9,19E-07 | 1,99E-06 | 4,57E-06 | 2,17E-06 | MND | MND | MND | MND | MND | MND | MND | MND | 7,07E-07 | 1,08E-06 | 7,22E-07 | 4,20E-07 | -5,26E-07 |
| Acidification potential | mol H ⁺ e | 2,17E-01 | 2,14E-02 | 1,7E-02 | 2,55E-01 | 2,77E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 3,44E-02 | 1,39E-02 | 3,77E-02 | 9,77E-03 | -4,19E-02 |
| EP-freshwater | kg Pe | 6,89E-04 | 2,63E-05 | 7,78E-05 | 7,93E-04 | 6,21E-05 | MND | MND | MND | MND | MND | MND | MND | MND | 1,10E-05 | 3,11E-05 | 3,11E-05 | 1,09E-05 | -3,73E-04 |
| EP-marine | kg Ne | 3,57E-02 | 4,72E-03 | 3,69E-03 | 4,41E-02 | 6,12E-03 | MND | MND | MND | MND | MND | MND | MND | MND | 1,52E-02 | 3,06E-03 | 1,55E-02 | 3,38E-03 | -9,11E-03 |
| EP-terrestrial | mol Ne | 7,88E-01 | 5,25E-02 | 4,28E-02 | 8,83E-01 | 6,78E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 1,67E-01 | 3,39E-02 | 1,71E-01 | 3,72E-02 | -1,18E-01 |
| POCP (“smog”) | kg NMVOCe | 2,06E-01 | 1,71E-02 | 1,27E-02 | 2,36E-01 | 2,67E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 4,59E-02 | 1,34E-02 | 4,70E-02 | 1,08E-02 | -3,15E-02 |
| ADP-minerals & metals | kg Sbe | 6,91E-05 | 1,02E-05 | 1,88E-05 | 9,81E-05 | 2,13E-05 | MND | MND | MND | MND | MND | MND | MND | MND | 1,68E-06 | 1,07E-05 | 5,35E-05 | 2,39E-06 | -6,14E-05 |
| ADP-fossil resources | MJ | 3,87E+02 | 5,89E+01 | 2,75E+02 | 7,21E+02 | 1,39E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 4,45E+01 | 6,95E+01 | 4,77E+01 | 2,85E+01 | -9,39E+01 |
| Water use | m ³ e depr. | 1,68E+01 | 2,68E-01 | 3,74E+00 | 2,08E+01 | 6,41E-01 | MND | MND | MND | MND | MND | MND | MND | MND | 1,20E-01 | 3,21E-01 | 2,15E-01 | 9,03E-02 | -1,21E+01 |

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 | 2,30E-06 | 3,81E-07 | 1,53E-07 | 2,83E-06 | 1,01E-06 | MND | MND | MND | MND | MND | MND | MND | MND | 9,22E-07 | 5,05E-07 | 6,78E-06 | 1,97E-07 | -5,45E-07 |
| Ionizing radiation | kBq U235e | 4,50E+03 | 3,02E-01 | 6,67E+00 | 4,51E+03 | 7,16E-01 | MND | MND | MND | MND | MND | MND | MND | MND | 2,05E-01 | 3,58E-01 | 2,53E-01 | 1,29E-01 | -1,33E+00 |
| Ecotoxicity (freshwater) | CTUe | 1,58E+02 | 4,83E+01 | 9,18E+01 | 2,98E+02 | 1,16E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 2,68E+01 | 5,78E+01 | 4,92E+01 | 1,86E+01 | -1,26E+02 |
| Human toxicity, cancer | CTUh | 1,25E-07 | 1,49E-09 | 1,79E-09 | 1,28E-07 | 3,00E-09 | MND | MND | MND | MND | MND | MND | MND | MND | 1,03E-09 | 1,50E-09 | 1,70E-09 | 4,64E-10 | -1,59E-09 |
| Human tox. non-cancer | CTUh | 1,06E-06 | 4,75E-08 | 4,18E-08 | 1,15E-06 | 1,18E-07 | MND | MND | MND | MND | MND | MND | MND | MND | 1,94E-08 | 5,88E-08 | 5,08E-08 | 1,21E-08 | -1,24E-07 |
| SQP | - | 7,21E+02 | 5,80E+01 | 2,37E+01 | 8,03E+02 | 1,62E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 5,79E+00 | 8,10E+01 | 1,60E+01 | 6,09E+01 | -8,81E+01 |

ADDITIONAL DOCUMENT TO ENVIRONMENTAL PRODUCT DECLARATION
 IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930



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 | MJ | 1,44E+02 | 7,63E-01 | 7,79E+01 | 2,23E+02 | 1,80E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 2,54E-01 | 9,00E-01 | 1,17E+00 | 2,47E-01 | -8,07E+00 |
| Renew. PER as material | MJ | 4,78E-01 | 0,00E+00 | 0,00E+00 | 4,78E-01 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | -4,78E-01 | 0,00E+00 |
| Total use of renew. PER | MJ | 1,44E+02 | 7,63E-01 | 7,79E+01 | 2,23E+02 | 1,80E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 2,54E-01 | 9,00E-01 | 1,17E+00 | -2,31E-01 | -8,07E+00 |
| Non-re. PER as energy | MJ | 4,55E+02 | 5,89E+01 | 2,75E+02 | 7,89E+02 | 1,39E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 4,45E+01 | 6,95E+01 | 4,77E+01 | 2,85E+01 | -9,39E+01 |
| Non-re. PER as material | MJ | 7,81E+00 | 0,00E+00 | 0,00E+00 | 7,81E+00 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | -7,81E+00 | 0,00E+00 |
| Total use of non-re. PER | MJ | 4,63E+02 | 5,89E+01 | 2,75E+02 | 7,97E+02 | 1,39E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 4,45E+01 | 6,95E+01 | 4,77E+01 | 2,07E+01 | -9,39E+01 |
| Secondary materials | kg | 8,83E+01 | 1,87E-02 | 1,32E-03 | 8,83E+01 | 3,92E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 1,74E-02 | 1,96E-02 | 2,24E-02 | 5,98E-03 | 1,60E-01 |
| Renew. secondary fuels | MJ | 6,97E+01 | 1,59E-04 | 0,00E+00 | 6,97E+01 | 3,45E-04 | MND | MND | MND | MND | MND | MND | MND | MND | 5,70E-05 | 1,73E-04 | 3,57E-04 | 1,56E-04 | -7,06E-04 |
| Non-ren. secondary fuels | MJ | 1,24E+02 | 0,00E+00 | 0,00E+00 | 1,24E+02 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Use of net fresh water | m ³ | 1,40E+00 | 7,49E-03 | 1,11E-01 | 1,52E+00 | 1,84E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 2,70E-03 | 9,22E-03 | 5,64E-03 | 3,12E-02 | -2,90E-01 |

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 | 8,54E-01 | 6,66E-02 | 1,66E-01 | 1,09E+00 | 1,49E-01 | MND | MND | MND | MND | MND | MND | MND | MND | 5,96E-02 | 7,45E-02 | 9,23E-02 | 0,00E+00 | -5,15E-01 |
| Non-hazardous waste | kg | 4,67E+02 | 1,10E+00 | 5,03E+01 | 5,18E+02 | 2,59E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 4,19E-01 | 1,30E+00 | 1,53E+00 | 1,97E+02 | -1,62E+01 |
| Radioactive waste | kg | 1,10E-02 | 4,07E-04 | 3,02E-03 | 1,44E-02 | 9,58E-04 | MND | MND | MND | MND | MND | MND | MND | MND | 3,13E-04 | 4,79E-04 | 3,29E-04 | 0,00E+00 | -4,51E-04 |

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 | 2,28E-03 | 0,00E+00 | 0,00E+00 | 2,28E-03 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for recycling | kg | 3,17E+00 | 0,00E+00 | 0,00E+00 | 3,17E+00 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 8,03E+02 | 0,00E+00 | 0,00E+00 |
| Materials for energy rec | kg | 1,91E-02 | 0,00E+00 | 0,00E+00 | 1,91E-02 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 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 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |