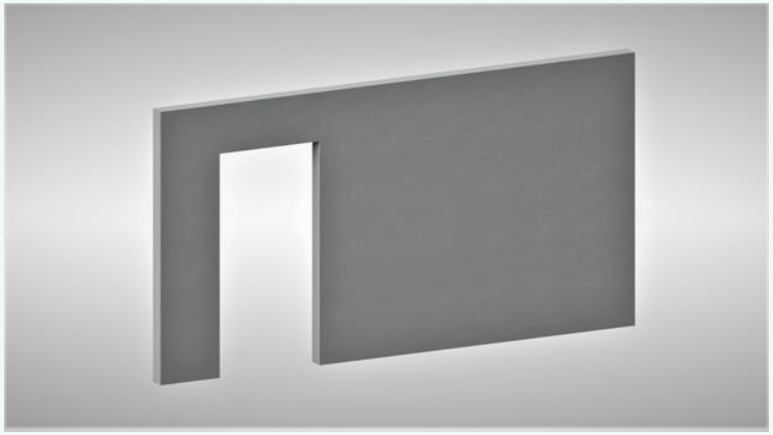
**ADDITIONAL DOCUMENT TO ENVIRONMENTAL PRODUCT DECLARATION**
IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

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



**ORIGINAL DOCUMENT: HUB-0648**

**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.**

## 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 | 9,07E+01 | 3,22E+00 | 5,03E+00 | 9,90E+01 | 8,70E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 3,31E+00 | 4,35E+00 | 3,35E+00 | 1,05E+00 | -7,30E+00 |
| GWP – fossil | kg $CO_2$e | 9,06E+01 | 3,21E+00 | 4,86E+00 | 9,87E+01 | 8,70E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 3,31E+00 | 4,35E+00 | 3,35E+00 | 1,05E+00 | -7,27E+00 |
| GWP – biogenic | kg $CO_2$e | 6,22E-02 | 1,31E-03 | 5,31E-02 | 1,17E-01 | 3,61E-03 | MND | MND | MND | MND | MND | MND | MND | MND | 6,06E-04 | 1,81E-03 | 1,30E-03 | 6,82E-04 | -1,83E-02 |
| GWP – LULUC | kg $CO_2$e | 1,29E-01 | 1,34E-03 | 1,19E-01 | 2,49E-01 | 3,26E-03 | MND | MND | MND | MND | MND | MND | MND | MND | 3,30E-04 | 1,63E-03 | 5,30E-04 | 9,88E-04 | -8,69E-03 |
| Ozone depletion pot. | kg $CFC_{-11}$e | 1,59E-06 | 7,86E-07 | 2,18E-06 | 4,56E-06 | 2,17E-06 | MND | MND | MND | MND | MND | MND | MND | MND | 7,07E-07 | 1,08E-06 | 7,02E-07 | 4,23E-07 | -5,52E-07 |
| Acidification potential | mol $H^+$e | 2,03E-01 | 1,66E-02 | 1,93E-02 | 2,39E-01 | 2,77E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 3,44E-02 | 1,39E-02 | 3,52E-02 | 9,84E-03 | -4,41E-02 |
| EP-freshwater | kg Pe | 6,25E-04 | 2,23E-05 | 9E-05 | 7,37E-04 | 6,21E-05 | MND | MND | MND | MND | MND | MND | MND | MND | 1,10E-05 | 3,11E-05 | 1,93E-05 | 1,10E-05 | -4,00E-04 |
| EP-marine | kg Ne | 2,59E-02 | 3,69E-03 | 3,4E-03 | 3,30E-02 | 6,12E-03 | MND | MND | MND | MND | MND | MND | MND | MND | 1,52E-02 | 3,06E-03 | 1,51E-02 | 3,41E-03 | -9,62E-03 |
| EP-terrestrial | mol Ne | 6,89E-01 | 4,10E-02 | 3,99E-02 | 7,70E-01 | 6,78E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 1,67E-01 | 3,39E-02 | 1,66E-01 | 3,75E-02 | -1,24E-01 |
| POCP (“smog”) | kg NMVOCe | 1,80E-01 | 1,38E-02 | 1,2E-02 | 2,06E-01 | 2,67E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 4,59E-02 | 1,34E-02 | 4,56E-02 | 1,09E-02 | -3,49E-02 |
| ADP-minerals & metals | kg Sbe | 8,23E-05 | 7,87E-06 | 2,02E-05 | 1,10E-04 | 2,13E-05 | MND | MND | MND | MND | MND | MND | MND | MND | 1,68E-06 | 1,06E-05 | 2,34E-05 | 2,41E-06 | -6,22E-05 |
| ADP-fossil resources | MJ | 3,96E+02 | 5,03E+01 | 2,88E+02 | 7,34E+02 | 1,39E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 4,45E+01 | 6,95E+01 | 4,51E+01 | 2,87E+01 | -9,93E+01 |
| Water use | $m^3$e depr. | 1,78E+01 | 2,29E-01 | 3,76E+00 | 2,18E+01 | 6,41E-01 | MND | MND | MND | MND | MND | MND | MND | MND | 1,20E-01 | 3,21E-01 | 1,58E-01 | 9,11E-02 | -1,23E+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 | 2,21E-06 | 3,47E-07 | 1,45E-07 | 2,70E-06 | 1,01E-06 | MND | MND | MND | MND | MND | MND | MND | MND | 9,22E-07 | 5,05E-07 | 6,82E-06 | 1,98E-07 | -5,81E-07 |
| Ionizing radiation | kBq U235e | 4,65E+03 | 2,58E-01 | 7,73E+00 | 4,66E+03 | 7,16E-01 | MND | MND | MND | MND | MND | MND | MND | MND | 2,05E-01 | 3,58E-01 | 2,22E-01 | 1,30E-01 | -1,31E+00 |
| Ecotoxicity (freshwater) | CTUe | 1,74E+02 | 4,14E+01 | 1,14E+02 | 3,29E+02 | 1,16E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 2,68E+01 | 5,78E+01 | 3,57E+01 | 1,87E+01 | -1,45E+02 |
| Human toxicity, cancer | CTUh | 1,29E-07 | 1,21E-09 | 1,94E-09 | 1,32E-07 | 3,00E-09 | MND | MND | MND | MND | MND | MND | MND | MND | 1,03E-09 | 1,50E-09 | 1,29E-09 | 4,68E-10 | 6,07E-09 |
| Human tox. non-cancer | CTUh | 1,12E-06 | 4,13E-08 | 5,03E-08 | 1,21E-06 | 1,18E-07 | MND | MND | MND | MND | MND | MND | MND | MND | 1,94E-08 | 5,88E-08 | 3,23E-08 | 1,22E-08 | -1,37E-07 |
| SQP | - | 2,55E+02 | 5,46E+01 | 1,19E+01 | 3,22E+02 | 1,62E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 5,79E+00 | 8,09E+01 | 1,00E+01 | 6,14E+01 | -8,99E+01 |

## 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 | 1,11E+02 | 6,41E-01 | 8,95E+01 | 2,01E+02 | 1,80E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 2,54E-01 | 9,00E-01 | 6,35E-01 | 2,49E-01 | -7,96E+00 |
| Renew. PER as material | MJ | 5,34E-01 | 0,00E+00 | 0,00E+00 | 5,34E-01 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | -5,34E-01 | 0,00E+00 |
| Total use of renew. PER | MJ | 1,11E+02 | 6,41E-01 | 8,95E+01 | 2,01E+02 | 1,80E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 2,54E-01 | 9,00E-01 | 6,35E-01 | -2,85E-01 | -7,96E+00 |
| Non-re. PER as energy | MJ | 4,62E+02 | 5,03E+01 | 2,88E+02 | 8,00E+02 | 1,39E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 4,45E+01 | 6,95E+01 | 4,51E+01 | 2,87E+01 | -9,93E+01 |
| Non-re. PER as material | MJ | 1,19E+01 | 0,00E+00 | 0,00E+00 | 1,19E+01 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | -1,19E+01 | 0,00E+00 |
| Total use of non-re. PER | MJ | 4,74E+02 | 5,03E+01 | 2,88E+02 | 8,12E+02 | 1,39E+02 | MND | MND | MND | MND | MND | MND | MND | MND | 4,45E+01 | 6,95E+01 | 4,51E+01 | 1,68E+01 | -9,93E+01 |
| Secondary materials | kg | 7,81E+01 | 1,52E-02 | 1,93E-03 | 7,81E+01 | 3,92E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 1,74E-02 | 1,96E-02 | 1,92E-02 | 6,03E-03 | 5,81E-01 |
| Renew. secondary fuels | MJ | 7,15E+01 | 1,25E-04 | 0,00E+00 | 7,15E+01 | 3,45E-04 | MND | MND | MND | MND | MND | MND | MND | MND | 5,70E-05 | 1,73E-04 | 1,82E-04 | 1,58E-04 | -6,94E-04 |
| Non-ren. secondary fuels | MJ | 1,21E+02 | 0,00E+00 | 0,00E+00 | 1,21E+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 | $m^3$ | 9,19E-01 | 6,50E-03 | 1,1E-01 | 1,04E+00 | 1,84E-02 | MND | MND | MND | MND | MND | MND | MND | MND | 2,70E-03 | 9,22E-03 | 3,89E-03 | 3,14E-02 | -2,94E-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 | 9,37E-01 | 5,59E-02 | 2,07E-01 | 1,20E+00 | 1,49E-01 | MND | MND | MND | MND | MND | MND | MND | MND | 5,96E-02 | 7,45E-02 | 7,23E-02 | 0,00E+00 | -4,90E-01 |
| Non-hazardous waste | kg | 4,83E+02 | 9,27E-01 | 1,43E+01 | 4,98E+02 | 2,59E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 4,19E-01 | 1,30E+00 | 8,80E-01 | 1,99E+02 | -1,72E+01 |
| Radioactive waste | kg | 1,04E-02 | 3,48E-04 | 3,58E-03 | 1,43E-02 | 9,58E-04 | MND | MND | MND | MND | MND | MND | MND | MND | 3,13E-04 | 4,79E-04 | 3,15E-04 | 0,00E+00 | -4,48E-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 | 2,34E-03 | 0,00E+00 | 0,00E+00 | 2,34E-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 | 1,22E+00 | 0,00E+00 | 0,00E+00 | 1,22E+00 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 8,01E+02 | 0,00E+00 | 0,00E+00 |
| Materials for energy rec | kg | 7,37E-03 | 0,00E+00 | 0,00E+00 | 7,37E-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 |
| 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 |