

# Environmental Product Declaration

In accordance with ISO 14025:2006 and  
EN 15804:2012+A2:2019/AC:2021

## ***APAO bituminous membrane***

EPD of specific product(s)



Programme operator: EPDITALY

|                             |                          |
|-----------------------------|--------------------------|
| Issued by:                  | General Membrane S.p.a.  |
| EPDITALY registration code: | EPDITALY0987             |
| Declaration name:           | APAO bituminous membrane |
| Publication date:           | 22-05-2025               |
| Valid until:                | 21-05-2030               |
| Productive unit:            | Ceggia (VE)              |



## EPD OWNER

|                         |                                                                                          |
|-------------------------|------------------------------------------------------------------------------------------|
| Company name            | <b>General Membrane S.p.a.</b>                                                           |
| Legal site              | Via Venezia, 538, 30022 Ceggia (VE)                                                      |
| Contacts about this EPD | <a href="mailto:mirco.zanatta@generalmembrane.com">mirco.zanatta@generalmembrane.com</a> |
| EPDItaly                | Via Gaetano De Castillia n° 10 - 20124 Milano, Italy                                     |

## EPD INFORMATION

|                                                               |                                                                                                                                                                                                                                         |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Products name                                                 | PHOENIX SUPER 5,4 KG MINERAL BROOF, PHOENIX SUPER 5,4 KG MINERAL, PHOENIX SUPER 4 MM, PHOENIX SOLAR TECH, GALAXY FC 3 MM, CORONA TOP MINERAL, GALAXY FC 4 MM, GENERAL GARDEN FLL, GALAXY 4,5 Kg MINERAL ,PHOENIX SUPER MINERAL BROOF HS |
| EPD type                                                      | EPD of specific product(s)                                                                                                                                                                                                              |
| Production site                                               | Via Venezia, 538, 30022 Ceggia (VE)                                                                                                                                                                                                     |
| Summary description and technical information of the products | Bituminous membrane compound that combines the very high cold flexibility typical of SBS membranes with extraordinary resistance to aging caused by UV rays and excellent stress resistance characteristics.                            |
| Scope of the products                                         | Bituminous membranes are waterproofing materials used mainly in construction to protect surfaces from water.                                                                                                                            |
| EPD type                                                      | EPD of specific products                                                                                                                                                                                                                |
| CPC Code                                                      | 542 General construction services of civil engineering works                                                                                                                                                                            |

## VERIFICATION INFORMATION

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Independent verification carried out by | SGS ICS Italia N°: 0005VV - Via Caldera, 21 - 20153 - Milano (MI) Lombardia - Italy                                                                                                                                                                                                                                                                                                                            |
| PCR                                     | This statement was developed following EPDItaly's General Programme Instruction document, available at <a href="http://www.epditaly.it">www.epditaly.it</a> .<br>PCR ICMQ-001/15 rev.3.1 12/11/2024                                                                                                                                                                                                            |
| EPDITALY Regulation                     | REGOLAMENTO DEL PROGRAMMA EPDItaly rev 6.0 30/10/2023                                                                                                                                                                                                                                                                                                                                                          |
| Project Report LCA                      | Report LCA General Membrane rev 2.0 06_05_2025                                                                                                                                                                                                                                                                                                                                                                 |
| Statement Independent Verification      | PCR review was performed by ICMQ S.p.A. – Via G. De Castillia, 10 – <a href="mailto:falbo@icmq.org">falbo@icmq.org</a> ; UNIMORE (Università Modena e Reggio Emilia) - <a href="mailto:info@epditaly.it">info@epditaly.it</a> .<br>Independent verification of the statement and data performed according to ISO 14025:2010 - <input type="checkbox"/> Internal - <input checked="" type="checkbox"/> External |
| Comparability statement                 | Environmental statements published 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 15804:2012+A2:2019.                                                                                                                                                                                 |
| Responsibility statement                | The EPD Owner releases EPDItaly from any non-compliance with environmental legislation. The EPD Owner will be responsible for supporting information and evidence. EPDItaly disclaims any responsibility regarding the information, data and results provided by the EPD Owner for the life cycle assessment.                                                                                                  |
| Validation statement                    | The database used is considered representative based on the representativeness analysis performed against data from an EPD Owner's reference product.                                                                                                                                                                                                                                                          |

## Company information

General Membrane SpA operates in the field of waterproofing materials for the building industry. The Company considers Quality and Flexibility as fundamental success factors, so it makes continuous investments in Human Resources, Organization, New Technology, both Production and Research & Development. The progressive and uninterrupted growth of the quantities produced, turnover, penetration in the Italian market, and customer loyalty confirm today the validity of this strategic decision.

These success factors have also allowed the company to face foreign markets with the necessary professionalism.

The diffusion of General Membrane products in more than 60 countries in all Continents represents 40% of the entire production, confirming that the market identifies General Membrane as a Quality Company.

General Membrane SpA designs waterproofing systems for construction with membranes based on distilled bitumen modified with polymers. Production includes membranes elastoplastomeric (APP), elastomeric (SBS) and membranes APAO based on polyalphaolefin polymers for innovative systems of long service life. With its products and systems, General Membrane caters to industry players who share the values of durability, respect for the environment and safety in the workplace.



## Scope and type of EPD

Transportation of materials from the production site to the production site in Ceggia (VE) was included. All the of the goods from suppliers to the plant are included in the model with primary type information.

The inventory quantity, expressed in kgkm, is defined as the product between the mass of the material and the distance traveled.

Processing of materials entering the plants, the mixing process, and processing to obtain bituminous membranes are included.

Following the update of Standard 15804, groups **C1, C2, C3, C4 and D were included.**

**Groups C1-C4** include impacts associated with removing the product from the building in which it is installed, transporting the waste to the treatment/disposal facility, and related activities (incineration, recycling, etc.), including landfilling.

**Group D**, on the other hand, reports benefits from the outputs of the recycling (understood as products avoided) and energy recovery processes.

## System boundaries

The detailed environmental performance (in terms of potential environmental impacts, use of resources and waste generation) is presented for the phases cradle to gate (A1-A3) with modules C1-C4 and module D.

|                  | Product stage       |           |               | Construction process stage | Use stage                 |     |             |        |             |               |                        |                       | End of life stage          |           |                  |          | Resource recovery stage            |
|------------------|---------------------|-----------|---------------|----------------------------|---------------------------|-----|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|------------------------------------|
|                  | Raw material supply | Transport | Manufacturing | Transport                  | Construction installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| Module           | A1                  | A2        | A3            | A4                         | A5                        | B1  | B2          | B3     | B4          | B5            | B6                     | B7                    | C1                         | C2        | C3               | C4       | D                                  |
| Modules declared | X                   | X         | X             | ND                         | ND                        | ND  | ND          | ND     | ND          | ND            | ND                     | ND                    | X                          | X         | X                | X        | X                                  |
| Geography        | EU                  | EU        | IT            | -                          | -                         | -   | -           | -      | -           | -             | -                      | -                     | GLO                        | GLO       | GLO              | GLO      | GLO                                |

## PRODUCT INFORMATION

|                                                |                                                                                                                                                                                          |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Declared unit</b>                           | 1 meter square (m2) of bituminous membrane with packaging for distribution                                                                                                               |
| <b>Product description</b>                     | Compound that combines the very high cold flexibility typical of APAO membranes with extraordinary resistance to aging caused by UV rays and excellent stress resistance characteristics |
| <b>Reference service life</b>                  | Not applicable                                                                                                                                                                           |
| <b>System boundaries</b>                       | Cradle to gate with modul C1-C4 and D                                                                                                                                                    |
| <b>Geographical scope</b>                      | Global according to sales market conditions.                                                                                                                                             |
| <b>Localization of the installations:</b>      | Via Venezia, 538, 30022 Ceggia (VE)                                                                                                                                                      |
| <b>EPD owner</b>                               | <b>General Membrane S.p.A.</b> - Via Venezia, 538, 30022 Ceggia (VE) <a href="mailto:mirco.zanatta@generalmembrane.com">mirco.zanatta@generalmembrane.com</a>                            |
| <b>Technical support was provided by</b>       | Spinlife S.r.l. <a href="mailto:segreteria@spinlife.it">segreteria@spinlife.it</a> – TECNO ESG Società Benefit                                                                           |
| <b>Reference period</b>                        | 01-01-2023 / 31-12-2023                                                                                                                                                                  |
| <b>Software</b>                                | SimaPro ver. 9.6.0.1 ( <a href="http://www.pre.nl">www.pre.nl</a> )                                                                                                                      |
| <b>Main database</b>                           | Ecoinvent 3.10 (Cut-off by classification)                                                                                                                                               |
| <b>Program operator</b>                        | EPDITALY Via Gaetano de Castillia 10 - Milano (MI), Italy                                                                                                                                |
| <b>Independent verification carried out by</b> | SGS ICS Italia srl                                                                                                                                                                       |

## Product information

| Bituminous membrane                | Weight [kg/m <sup>2</sup> ] | % compound | % top finish | % bottom finish | % reinforcement |
|------------------------------------|-----------------------------|------------|--------------|-----------------|-----------------|
| PHOENIX SUPER 5,4 KG MINERAL BROOF | 5,40                        | 77,81%     | 17,96%       | 0,15%           | 4,07%           |
| PHOENIX SUPER 5,4 KG MINERAL       | 5,40                        | 78,56%     | 17,96%       | 0,15%           | 3,33%           |
| PHOENIX SUPER 4 MM                 | 3,88                        | 92,17%     | 2,72%        | 0,22%           | 4,89%           |
| PHOENIX SOLAR TECH                 | 3,88                        | 91,14%     | 2,70%        | 0,22%           | 5,95%           |
| GALAXY FC 3 MM                     | 3,16                        | 91,56%     | 3,70%        | 0,30%           | 4,44%           |
| CORONA TOP MINERAL                 | 5,45                        | 78,43%     | 17,32%       | 0,14%           | 4,11%           |
| GALAXY FC 4 MM                     | 3,79                        | 92,80%     | 2,50%        | 0,20%           | 4,50%           |
| GENERAL GARDEN FLL                 | 5,45                        | 78,43%     | 17,32%       | 0,14%           | 4,11%           |
| GALAXY 4,5 Kg MINERAL              | 4,50                        | 74,27%     | 21,56%       | 0,18%           | 4,00%           |
| PHOENIX SUPER MINERAL BROOF HS     | 5,40                        | 77,81%     | 17,96%       | 0,15%           | 4,07%           |

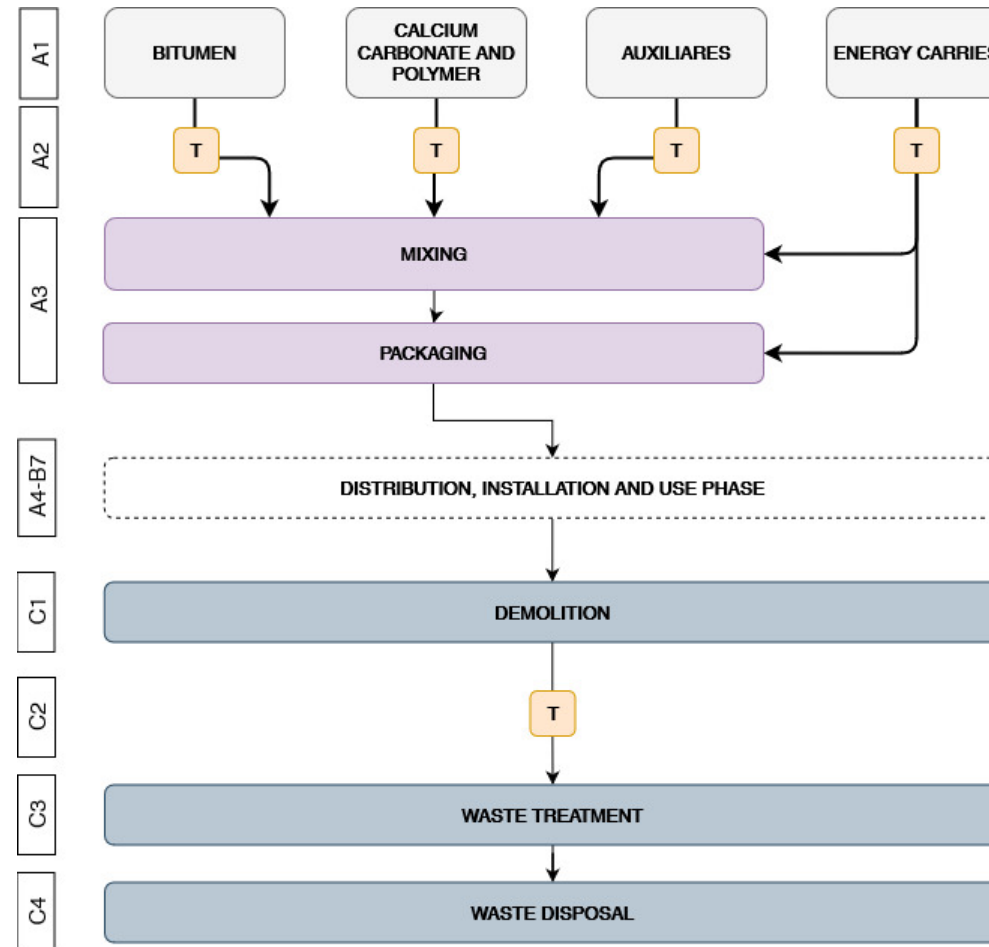
There are no biogenic materials and substances on the Candidate list of substances of very high concern (SVHC) in this product.

## Packaging information

| Bituminous membrane                | Plastic strapping [kg] | Wood pallet [kg] | Plastic cap [kg] | Biogenic material, kg C /kg product |
|------------------------------------|------------------------|------------------|------------------|-------------------------------------|
| PHOENIX SUPER 5,4 KG MINERAL BROOF | 1,98E-5                | 2,05E-2          | 1,19E-3          | 9,67E-3                             |
| PHOENIX SUPER 5,4 KG MINERAL       | 1,98E-5                | 2,05E-2          | 1,19E-3          | 9,67E-3                             |
| PHOENIX SUPER 4 MM                 | 2,17E-5                | 2,14E-2          | 1,24E-3          | 1,01E-2                             |
| PHOENIX SOLAR TECH                 | 2,16E-5                | 2,14E-2          | 1,24E-3          | 1,01E-2                             |
| GALAXY FC 3 MM                     | 2,96E-5                | 2,63E-2          | 1,52E-3          | 1,24E-2                             |
| CORONA TOP MINERAL                 | 2,86E-5                | 3,05E-2          | 1,76E-3          | 1,44E-2                             |
| GALAXY FC 4 MM                     | 2,00E-5                | 2,19E-2          | 1,27E-3          | 1,03E-2                             |
| GENERAL GARDEN FLL                 | 1,43E-5                | 1,52E-2          | 8,81E-4          | 7,19E-3                             |
| GALAXY 4,5 Kg MINERAL              | 1,78E-5                | 1,85E-2          | 1,07E-3          | 8,71E-3                             |
| PHOENIX SUPER MINERAL BROOF HS     | 1,98E-5                | 2,05E-2          | 1,19E-3          | 9,67E-3                             |



## Process flow chart



**PHOENIX SUPER 5,4 KG MINERAL BROOF - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021**

| Indicator                      | Unit                   | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D         |
|--------------------------------|------------------------|---------|---------|---------|---------|---------|---------|-----------------------|-----------|
| <b>GWP-total</b>               | kg CO <sub>2</sub> eq. | 5,72E+0 | 8,84E-1 | 3,13E-1 | 0,00E+0 | 7,79E-2 | 0,00E+0 | 1,32E+0               | -9,35E-4  |
| <b>GWP-fossil</b>              | kg CO <sub>2</sub> eq. | 5,70E+0 | 8,84E-1 | 3,04E-1 | 0,00E+0 | 7,79E-2 | 0,00E+0 | 1,32E+0               | -9,31E-4  |
| <b>GWP-biogenic</b>            | kg CO <sub>2</sub> eq. | 1,25E-2 | 1,44E-4 | 9,09E-3 | 0,00E+0 | 1,27E-5 | 0,00E+0 | 9,59E-5               | -3,64E-6  |
| <b>GWP-land use</b>            | kg CO <sub>2</sub> eq. | 3,10E-3 | 2,91E-4 | 2,01E-4 | 0,00E+0 | 2,56E-5 | 0,00E+0 | 4,33E-5               | -1,21E-7  |
| <b>ODP</b>                     | kg CFC 11 eq.          | 3,42E-6 | 1,77E-8 | 1,80E-8 | 0,00E+0 | 1,56E-9 | 0,00E+0 | 2,19E-9               | -2,13E-11 |
| <b>AP</b>                      | mol H <sup>+</sup> eq. | 2,36E-2 | 3,53E-3 | 4,60E-4 | 0,00E+0 | 3,10E-4 | 0,00E+0 | 1,00E-3               | -3,07E-6  |
| <b>EP-freshwater</b>           | kg P eq.               | 9,87E-4 | 5,94E-5 | 2,95E-5 | 0,00E+0 | 5,23E-6 | 0,00E+0 | 1,10E-5               | -1,42E-7  |
| <b>EP-marine</b>               | kg N eq.               | 4,67E-3 | 1,33E-3 | 2,17E-4 | 0,00E+0 | 1,17E-4 | 0,00E+0 | 8,86E-3               | -5,22E-7  |
| <b>EP-terrestrial</b>          | mol N eq.              | 5,07E-2 | 1,45E-2 | 1,54E-3 | 0,00E+0 | 1,27E-3 | 0,00E+0 | 2,36E-3               | -5,60E-6  |
| <b>POCP</b>                    | kg NMVOC eq.           | 3,84E-2 | 5,36E-3 | 6,33E-4 | 0,00E+0 | 4,72E-4 | 0,00E+0 | 9,32E-4               | -2,53E-6  |
| <b>ADPminerals&amp;metals*</b> | kg Sb eq.              | 2,71E-5 | 2,84E-6 | 6,11E-7 | 0,00E+0 | 2,51E-7 | 0,00E+0 | 1,76E-7               | -1,67E-9  |
| <b>ADP-fossil*</b>             | MJ                     | 2,09E+2 | 1,25E+1 | 1,50E+0 | 0,00E+0 | 1,10E+0 | 0,00E+0 | 1,45E+0               | -1,51E-2  |
| <b>WDP*</b>                    | m <sup>3</sup>         | 1,06E+0 | 5,12E-2 | 5,96E-2 | 0,00E+0 | 4,51E-3 | 0,00E+0 | -4,94E-1 <sup>A</sup> | -6,29E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

Acronyms and disclaimer

- *\*The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*
- *The additional environmental indicators calculated in the LCA study are not included in this declaration.*
- *The LCA methodology is standardized at international level by ISO 14040 and ISO 14044, the calculation methodology refers to EN 15804:2012+A2:2019/AC2021 (EF 3.1.)*
- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation

## PHOENIX SUPER 5,4 KG MINERAL BROOF - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------------------|----------|
| PERE      | MJ             | 3,26E+0 | 1,64E-1 | 8,54E-2 | 0,00E+0 | 1,45E-2 | 0,00E+0 | 2,37E-2               | -4,44E-3 |
| PERM      | MJ             | 1,09E+0 | 4,76E-2 | 2,66E+0 | 0,00E+0 | 4,20E-3 | 0,00E+0 | 7,26E-3               | -4,45E-4 |
| PERT      | MJ             | 4,35E+0 | 2,12E-1 | 2,75E+0 | 0,00E+0 | 1,87E-2 | 0,00E+0 | 3,09E-2               | -4,89E-3 |
| PENRE     | MJ             | 1,77E+1 | 1,03E+0 | 5,93E-1 | 0,00E+0 | 9,03E-2 | 0,00E+0 | 1,60E-1               | -3,70E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0               | 0,00E+0  |
| PENRT     | MJ             | 1,77E+1 | 1,03E+0 | 5,93E-1 | 0,00E+0 | 9,03E-2 | 0,00E+0 | 1,60E-1               | -3,70E-3 |
| SM        | kg             | 3,55E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0               | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0               | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0               | 0,00E+0  |
| FW        | m <sup>3</sup> | 2,59E-2 | 1,63E-3 | 1,57E-3 | 0,00E+0 | 1,43E-4 | 0,00E+0 | -1,14E-2 <sup>A</sup> | -1,66E-5 |

### Acronyms

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

\* The negative value of FW in C4 is due to data from the dataset used for the calculation

## PHOENIX SUPER 5,4 KG MINERAL BROOF - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 2,38E-3 | 8,41E-5 | 1,42E-5 | 0,00E+0 | 7,41E-6 | 0,00E+0 | 1,24E-5 | -5,73E-8 |
| NHWD      | kg   | 4,23E-1 | 5,93E-1 | 1,10E-1 | 0,00E+0 | 5,23E-2 | 0,00E+0 | 5,22E+0 | -3,46E-5 |
| RWD       | kg   | 8,37E-5 | 3,98E-6 | 2,92E-6 | 0,00E+0 | 3,51E-7 | 0,00E+0 | 6,22E-7 | -2,83E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms      HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy

## PHOENIX SUPER 5,4 KG MINERAL - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021

| Indicator           | Unit                   | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D         |
|---------------------|------------------------|---------|---------|---------|---------|---------|---------|-----------------------|-----------|
| GWP-total           | kg CO <sub>2</sub> eq. | 5,78E+0 | 6,80E-1 | 3,13E-1 | 0,00E+0 | 7,79E-2 | 0,00E+0 | 1,32E+0               | -9,35E-4  |
| GWP-fossil          | kg CO <sub>2</sub> eq. | 5,76E+0 | 6,79E-1 | 3,04E-1 | 0,00E+0 | 7,79E-2 | 0,00E+0 | 1,32E+0               | -9,31E-4  |
| GWP-biogenic        | kg CO <sub>2</sub> eq. | 1,25E-2 | 1,11E-4 | 9,09E-3 | 0,00E+0 | 1,27E-5 | 0,00E+0 | 9,59E-5               | -3,64E-6  |
| GWP-land use        | kg CO <sub>2</sub> eq. | 2,97E-3 | 2,25E-4 | 2,01E-4 | 0,00E+0 | 2,56E-5 | 0,00E+0 | 4,33E-5               | -1,21E-7  |
| ODP                 | kg CFC 11 eq.          | 3,14E-6 | 1,35E-8 | 1,80E-8 | 0,00E+0 | 1,56E-9 | 0,00E+0 | 2,19E-9               | -2,13E-11 |
| AP                  | mol H <sup>+</sup> eq. | 2,34E-2 | 2,94E-3 | 4,60E-4 | 0,00E+0 | 3,10E-4 | 0,00E+0 | 1,00E-3               | -3,07E-6  |
| EP-freshwater       | kg P eq.               | 9,66E-4 | 4,53E-5 | 2,95E-5 | 0,00E+0 | 5,23E-6 | 0,00E+0 | 1,10E-5               | -1,42E-7  |
| EP-marine           | kg N eq.               | 4,68E-3 | 1,07E-3 | 2,17E-4 | 0,00E+0 | 1,17E-4 | 0,00E+0 | 8,86E-3               | -5,22E-7  |
| EP-terrestrial      | mol N eq.              | 5,01E-2 | 1,17E-2 | 1,54E-3 | 0,00E+0 | 1,27E-3 | 0,00E+0 | 2,36E-3               | -5,60E-6  |
| POCP                | kg NMVOC eq.           | 3,86E-2 | 4,26E-3 | 6,33E-4 | 0,00E+0 | 4,72E-4 | 0,00E+0 | 9,32E-4               | -2,53E-6  |
| ADPminerals&metals* | kg Sb eq.              | 2,42E-5 | 2,17E-6 | 6,11E-7 | 0,00E+0 | 2,51E-7 | 0,00E+0 | 1,76E-7               | -1,67E-9  |
| ADP-fossil*         | MJ                     | 2,10E+2 | 9,58E+0 | 1,50E+0 | 0,00E+0 | 1,10E+0 | 0,00E+0 | 1,45E+0               | -1,51E-2  |
| WDP*                | m <sup>3</sup>         | 1,08E+0 | 3,91E-2 | 5,96E-2 | 0,00E+0 | 4,51E-3 | 0,00E+0 | -4,94E-1 <sup>A</sup> | -6,29E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

### Acronyms and disclaimer

- \*The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
- The additional environmental indicators calculated in the LCA study are not included in this declaration.
- The LCA methodology is standardized at international level by ISO 14040 and ISO 14044, the calculation methodology refers to EN 15804:2012+A2:2019/AC2021 (EF 3.1.)
- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation

## PHOENIX SUPER 5,4 KG MINERAL - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4        | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------|----------|
| PERE      | MJ             | 3,15E+0 | 1,25E-1 | 8,54E-2 | 0,00E+0 | 1,45E-2 | 0,00E+0 | 2,37E-2   | -4,44E-3 |
| PERM      | MJ             | 1,07E+0 | 3,64E-2 | 2,66E+0 | 0,00E+0 | 4,20E-3 | 0,00E+0 | 7,26E-3   | -4,45E-4 |
| PERT      | MJ             | 4,22E+0 | 1,62E-1 | 2,75E+0 | 0,00E+0 | 1,87E-2 | 0,00E+0 | 3,09E-2   | -4,89E-3 |
| PENRE     | MJ             | 1,70E+1 | 7,83E-1 | 5,93E-1 | 0,00E+0 | 9,03E-2 | 0,00E+0 | 1,60E-1   | -3,70E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| PENRT     | MJ             | 1,70E+1 | 7,83E-1 | 5,93E-1 | 0,00E+0 | 9,03E-2 | 0,00E+0 | 1,60E-1   | -3,70E-3 |
| SM        | kg             | 3,62E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| FW        | m <sup>3</sup> | 2,63E-2 | 1,24E-3 | 1,57E-3 | 0,00E+0 | 1,43E-4 | 0,00E+0 | -1,14E-2* | -1,66E-5 |

### Acronyms

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

\* The negative value of FW in C4 is due to data from the dataset used for the calculation

## PHOENIX SUPER 5,4 KG MINERAL - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 2,38E-3 | 8,41E-5 | 1,42E-5 | 0,00E+0 | 7,41E-6 | 0,00E+0 | 1,24E-5 | -5,73E-8 |
| NHWD      | kg   | 4,23E-1 | 5,93E-1 | 1,10E-1 | 0,00E+0 | 5,23E-2 | 0,00E+0 | 5,22E+0 | -3,46E-5 |
| RWD       | kg   | 8,37E-5 | 3,98E-6 | 2,92E-6 | 0,00E+0 | 3,51E-7 | 0,00E+0 | 6,22E-7 | -2,83E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms      HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy

## PHOENIX SUPER 4 MM - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021

| Indicator           | Unit                   | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D         |
|---------------------|------------------------|---------|---------|---------|---------|---------|---------|-----------------------|-----------|
| GWP-total           | kg CO <sub>2</sub> eq. | 4,16E+0 | 3,51E-1 | 2,15E-1 | 0,00E+0 | 5,31E-2 | 0,00E+0 | 8,96E-1               | -6,37E-4  |
| GWP-fossil          | kg CO <sub>2</sub> eq. | 4,15E+0 | 3,51E-1 | 2,09E-1 | 0,00E+0 | 5,31E-2 | 0,00E+0 | 8,96E-1               | -6,35E-4  |
| GWP-biogenic        | kg CO <sub>2</sub> eq. | 1,00E-2 | 5,70E-5 | 6,46E-3 | 0,00E+0 | 8,66E-6 | 0,00E+0 | 6,54E-5               | -2,48E-6  |
| GWP-land use        | kg CO <sub>2</sub> eq. | 1,84E-3 | 1,17E-4 | 1,42E-4 | 0,00E+0 | 1,75E-5 | 0,00E+0 | 2,95E-5               | -8,25E-8  |
| ODP                 | kg CFC 11 eq.          | 2,93E-6 | 6,97E-9 | 1,24E-8 | 0,00E+0 | 1,06E-9 | 0,00E+0 | 1,49E-9               | -1,45E-11 |
| AP                  | mol H <sup>+</sup> eq. | 1,61E-2 | 1,62E-3 | 3,21E-4 | 0,00E+0 | 2,11E-4 | 0,00E+0 | 6,83E-4               | -2,09E-6  |
| EP-freshwater       | kg P eq.               | 6,08E-4 | 2,33E-5 | 2,06E-5 | 0,00E+0 | 3,56E-6 | 0,00E+0 | 7,50E-6               | -9,69E-8  |
| EP-marine           | kg N eq.               | 2,92E-3 | 5,76E-4 | 1,50E-4 | 0,00E+0 | 7,96E-5 | 0,00E+0 | 6,04E-3               | -3,56E-7  |
| EP-terrestrial      | mol N eq.              | 3,17E-2 | 6,29E-3 | 1,07E-3 | 0,00E+0 | 8,67E-4 | 0,00E+0 | 1,61E-3               | -3,82E-6  |
| POCP                | kg NMVOC eq.           | 2,86E-2 | 2,26E-3 | 4,43E-4 | 0,00E+0 | 3,21E-4 | 0,00E+0 | 6,35E-4               | -1,72E-6  |
| ADPminerals&metals* | kg Sb eq.              | 2,03E-5 | 1,11E-6 | 4,26E-7 | 0,00E+0 | 1,71E-7 | 0,00E+0 | 1,20E-7               | -1,14E-9  |
| ADP-fossil*         | MJ                     | 1,62E+2 | 4,94E+0 | 1,06E+0 | 0,00E+0 | 7,50E-1 | 0,00E+0 | 9,86E-1               | -1,03E-2  |
| WDP*                | m <sup>3</sup>         | 7,90E-1 | 2,01E-2 | 4,15E-2 | 0,00E+0 | 3,07E-3 | 0,00E+0 | -3,36E-1 <sup>A</sup> | -4,29E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

### Acronyms and disclaimer

- \*The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
- The additional environmental indicators calculated in the LCA study are not included in this declaration.
- The LCA methodology is standardized at international level by ISO 14040 and ISO 14044, the calculation methodology refers to EN 15804:2012+A2:2019/AC2021 (EF 3.1.)
- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation



## PHOENIX SUPER 4 MM - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4        | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------|----------|
| PERE      | MJ             | 1,96E+0 | 6,42E-2 | 5,95E-2 | 0,00E+0 | 9,86E-3 | 0,00E+0 | 1,61E-2   | -3,03E-3 |
| PERM      | MJ             | 8,43E-1 | 1,87E-2 | 1,89E+0 | 0,00E+0 | 2,86E-3 | 0,00E+0 | 4,95E-3   | -3,03E-4 |
| PERT      | MJ             | 2,81E+0 | 8,28E-2 | 1,95E+0 | 0,00E+0 | 1,27E-2 | 0,00E+0 | 2,11E-2   | -3,33E-3 |
| PENRE     | MJ             | 1,01E+1 | 4,02E-1 | 4,12E-1 | 0,00E+0 | 6,16E-2 | 0,00E+0 | 1,09E-1   | -2,52E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| PENRT     | MJ             | 1,01E+1 | 4,02E-1 | 4,12E-1 | 0,00E+0 | 6,16E-2 | 0,00E+0 | 1,09E-1   | -2,52E-3 |
| SM        | kg             | 2,89E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| FW        | m <sup>3</sup> | 1,84E-2 | 6,37E-4 | 1,09E-3 | 0,00E+0 | 9,77E-5 | 0,00E+0 | -7,74E-3* | -1,13E-5 |

### Acronyms

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

\* The negative value of FW in C4 is due to data from the dataset used for the calculation

## PHOENIX SUPER 4 MM - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 1,97E-3 | 3,31E-5 | 1,01E-5 | 0,00E+0 | 5,05E-6 | 0,00E+0 | 8,43E-6 | -3,91E-8 |
| NHWD      | kg   | 3,46E-1 | 2,30E-1 | 7,53E-2 | 0,00E+0 | 3,56E-2 | 0,00E+0 | 3,56E+0 | -2,36E-5 |
| RWD       | kg   | 4,95E-5 | 1,55E-6 | 2,03E-6 | 0,00E+0 | 2,39E-7 | 0,00E+0 | 4,24E-7 | -1,93E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms      HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy

## PHOENIX SOLAR TECH - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021

| Indicator           | Unit                   | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D         |
|---------------------|------------------------|---------|---------|---------|---------|---------|---------|-----------------------|-----------|
| GWP-total           | kg CO <sub>2</sub> eq. | 4,24E+0 | 3,84E-1 | 2,17E-1 | 0,00E+0 | 5,34E-2 | 0,00E+0 | 9,01E-1               | -6,41E-4  |
| GWP-fossil          | kg CO <sub>2</sub> eq. | 4,23E+0 | 3,84E-1 | 2,10E-1 | 0,00E+0 | 5,34E-2 | 0,00E+0 | 9,01E-1               | -6,38E-4  |
| GWP-biogenic        | kg CO <sub>2</sub> eq. | 1,04E-2 | 6,23E-5 | 6,49E-3 | 0,00E+0 | 8,71E-6 | 0,00E+0 | 6,57E-5               | -2,50E-6  |
| GWP-land use        | kg CO <sub>2</sub> eq. | 2,03E-3 | 1,28E-4 | 1,43E-4 | 0,00E+0 | 1,76E-5 | 0,00E+0 | 2,96E-5               | -8,29E-8  |
| ODP                 | kg CFC 11 eq.          | 3,55E-6 | 7,62E-9 | 1,24E-8 | 0,00E+0 | 1,07E-9 | 0,00E+0 | 1,50E-9               | -1,46E-11 |
| AP                  | mol H <sup>+</sup> eq. | 1,68E-2 | 1,80E-3 | 3,23E-4 | 0,00E+0 | 2,13E-4 | 0,00E+0 | 6,87E-4               | -2,10E-6  |
| EP-freshwater       | kg P eq.               | 6,57E-4 | 2,54E-5 | 2,07E-5 | 0,00E+0 | 3,58E-6 | 0,00E+0 | 7,54E-6               | -9,74E-8  |
| EP-marine           | kg N eq.               | 3,01E-3 | 6,37E-4 | 1,51E-4 | 0,00E+0 | 8,00E-5 | 0,00E+0 | 6,07E-3               | -3,58E-7  |
| EP-terrestrial      | mol N eq.              | 3,35E-2 | 6,96E-3 | 1,08E-3 | 0,00E+0 | 8,72E-4 | 0,00E+0 | 1,62E-3               | -3,84E-6  |
| POCP                | kg NMVOC eq.           | 2,90E-2 | 2,49E-3 | 4,45E-4 | 0,00E+0 | 3,23E-4 | 0,00E+0 | 6,39E-4               | -1,73E-6  |
| ADPminerals&metals* | kg Sb eq.              | 1,88E-5 | 1,21E-6 | 4,28E-7 | 0,00E+0 | 1,72E-7 | 0,00E+0 | 1,21E-7               | -1,15E-9  |
| ADP-fossil*         | MJ                     | 1,64E+2 | 5,40E+0 | 1,06E+0 | 0,00E+0 | 7,54E-1 | 0,00E+0 | 9,91E-1               | -1,04E-2  |
| WDP*                | m <sup>3</sup>         | 8,00E-1 | 2,19E-2 | 4,17E-2 | 0,00E+0 | 3,09E-3 | 0,00E+0 | -3,38E-1 <sup>A</sup> | -4,31E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

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- \*The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
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- The LCA methodology is standardized at international level by ISO 14040 and ISO 14044, the calculation methodology refers to EN 15804:2012+A2:2019/AC2021 (EF 3.1.)
- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation

## PHOENIX SOLAR TECH - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4        | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------|----------|
| PERE      | MJ             | 2,11E+0 | 7,00E-2 | 5,98E-2 | 0,00E+0 | 9,92E-3 | 0,00E+0 | 1,62E-2   | -3,04E-3 |
| PERM      | MJ             | 9,23E-1 | 2,04E-2 | 1,91E+0 | 0,00E+0 | 2,88E-3 | 0,00E+0 | 4,97E-3   | -3,05E-4 |
| PERT      | MJ             | 3,03E+0 | 9,04E-2 | 1,97E+0 | 0,00E+0 | 1,28E-2 | 0,00E+0 | 2,12E-2   | -3,35E-3 |
| PENRE     | MJ             | 1,12E+1 | 4,39E-1 | 4,14E-1 | 0,00E+0 | 6,19E-2 | 0,00E+0 | 1,10E-1   | -2,54E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| PENRT     | MJ             | 1,12E+1 | 4,39E-1 | 4,14E-1 | 0,00E+0 | 6,19E-2 | 0,00E+0 | 1,10E-1   | -2,54E-3 |
| SM        | kg             | 2,85E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| FW        | m <sup>3</sup> | 1,89E-2 | 6,96E-4 | 1,10E-3 | 0,00E+0 | 9,82E-5 | 0,00E+0 | -7,78E-3* | -1,14E-5 |

### Acronyms

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

\* The negative value of FW in C4 is due to data from the dataset used for the calculation

## PHOENIX SOLAR TECH - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 2,20E-3 | 3,62E-5 | 1,01E-5 | 0,00E+0 | 5,08E-6 | 0,00E+0 | 8,48E-6 | -3,93E-8 |
| NHWD      | kg   | 3,82E-1 | 2,51E-1 | 7,57E-2 | 0,00E+0 | 3,58E-2 | 0,00E+0 | 3,58E+0 | -2,37E-5 |
| RWD       | kg   | 5,43E-5 | 1,70E-6 | 2,04E-6 | 0,00E+0 | 2,40E-7 | 0,00E+0 | 4,26E-7 | -1,94E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms      HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy

## GALAXY FC 3 MM - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021

| Indicator           | Unit                   | A1      | A2      | A3      | C1      | C2       | C3      | C4                    | D         |
|---------------------|------------------------|---------|---------|---------|---------|----------|---------|-----------------------|-----------|
| GWP-total           | kg CO <sub>2</sub> eq. | 2,90E+0 | 2,51E-1 | 1,66E-1 | 0,00E+0 | 3,90E-2  | 0,00E+0 | 6,58E-1               | -4,67E-4  |
| GWP-fossil          | kg CO <sub>2</sub> eq. | 2,89E+0 | 2,51E-1 | 1,60E-1 | 0,00E+0 | 3,89E-2  | 0,00E+0 | 6,58E-1               | -4,66E-4  |
| GWP-biogenic        | kg CO <sub>2</sub> eq. | 7,00E-3 | 4,09E-5 | 5,78E-3 | 0,00E+0 | 6,36E-6  | 0,00E+0 | 4,79E-5               | -1,82E-6  |
| GWP-land use        | kg CO <sub>2</sub> eq. | 1,24E-3 | 8,36E-5 | 1,23E-4 | 0,00E+0 | 1,28E-5  | 0,00E+0 | 2,16E-5               | -6,05E-8  |
| ODP                 | kg CFC 11 eq.          | 1,79E-6 | 5,00E-9 | 9,44E-9 | 0,00E+0 | 7,79E-10 | 0,00E+0 | 1,09E-9               | -1,07E-11 |
| AP                  | mol H <sup>+</sup> eq. | 1,10E-2 | 1,13E-3 | 2,66E-4 | 0,00E+0 | 1,55E-4  | 0,00E+0 | 5,01E-4               | -1,54E-6  |
| EP-freshwater       | kg P eq.               | 4,07E-4 | 1,67E-5 | 1,70E-5 | 0,00E+0 | 2,62E-6  | 0,00E+0 | 5,50E-6               | -7,11E-8  |
| EP-marine           | kg N eq.               | 2,00E-3 | 4,07E-4 | 1,18E-4 | 0,00E+0 | 5,84E-5  | 0,00E+0 | 4,43E-3               | -2,61E-7  |
| EP-terrestrial      | mol N eq.              | 2,16E-2 | 4,44E-3 | 8,78E-4 | 0,00E+0 | 6,36E-4  | 0,00E+0 | 1,18E-3               | -2,80E-6  |
| POCP                | kg NMVOC eq.           | 2,02E-2 | 1,60E-3 | 3,68E-4 | 0,00E+0 | 2,36E-4  | 0,00E+0 | 4,66E-4               | -1,26E-6  |
| ADPminerals&metals* | kg Sb eq.              | 1,36E-5 | 7,97E-7 | 3,50E-7 | 0,00E+0 | 1,25E-7  | 0,00E+0 | 8,82E-8               | -8,37E-10 |
| ADP-fossil*         | MJ                     | 1,16E+2 | 3,54E+0 | 9,10E-1 | 0,00E+0 | 5,50E-1  | 0,00E+0 | 7,23E-1               | -7,55E-3  |
| WDP*                | m <sup>3</sup>         | 5,44E-1 | 1,44E-2 | 3,37E-2 | 0,00E+0 | 2,26E-3  | 0,00E+0 | -2,47E-1 <sup>A</sup> | -3,14E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

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- \*The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
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- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation

## GALAXY FC 3 MM - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4        | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------|----------|
| PERE      | MJ             | 1,34E+0 | 4,60E-2 | 4,88E-2 | 0,00E+0 | 7,24E-3 | 0,00E+0 | 1,18E-2   | -2,22E-3 |
| PERM      | MJ             | 5,49E-1 | 1,34E-2 | 1,71E+0 | 0,00E+0 | 2,10E-3 | 0,00E+0 | 3,63E-3   | -2,23E-4 |
| PERT      | MJ             | 1,89E+0 | 5,94E-2 | 1,75E+0 | 0,00E+0 | 9,33E-3 | 0,00E+0 | 1,55E-2   | -2,44E-3 |
| PENRE     | MJ             | 6,74E+0 | 2,88E-1 | 3,32E-1 | 0,00E+0 | 4,52E-2 | 0,00E+0 | 8,02E-2   | -1,85E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| PENRT     | MJ             | 6,74E+0 | 2,88E-1 | 3,32E-1 | 0,00E+0 | 4,52E-2 | 0,00E+0 | 8,02E-2   | -1,85E-3 |
| SM        | kg             | 2,11E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| FW        | m <sup>3</sup> | 1,26E-2 | 4,57E-4 | 8,87E-4 | 0,00E+0 | 7,17E-5 | 0,00E+0 | -5,68E-3* | -8,29E-6 |

### Acronyms

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

\* The negative value of FW in C4 is due to data from the dataset used for the calculation

## GALAXY FC 3 MM - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 1,30E-3 | 2,37E-5 | 8,89E-6 | 0,00E+0 | 3,71E-6 | 0,00E+0 | 6,19E-6 | -2,87E-8 |
| NHWD      | kg   | 2,25E-1 | 1,65E-1 | 5,66E-2 | 0,00E+0 | 2,61E-2 | 0,00E+0 | 2,61E+0 | -1,73E-5 |
| RWD       | kg   | 3,40E-5 | 1,12E-6 | 1,64E-6 | 0,00E+0 | 1,75E-7 | 0,00E+0 | 3,11E-7 | -1,41E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms      HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy



## CORONA TOP MINERAL - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021

| Indicator           | Unit                   | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D         |
|---------------------|------------------------|---------|---------|---------|---------|---------|---------|-----------------------|-----------|
| GWP-total           | kg CO <sub>2</sub> eq. | 6,29E+0 | 7,15E-1 | 3,57E-1 | 0,00E+0 | 8,08E-2 | 0,00E+0 | 1,36E+0               | -9,69E-4  |
| GWP-fossil          | kg CO <sub>2</sub> eq. | 6,27E+0 | 7,14E-1 | 3,43E-1 | 0,00E+0 | 8,08E-2 | 0,00E+0 | 1,36E+0               | -9,66E-4  |
| GWP-biogenic        | kg CO <sub>2</sub> eq. | 1,36E-2 | 1,16E-4 | 1,38E-2 | 0,00E+0 | 1,32E-5 | 0,00E+0 | 9,95E-5               | -3,78E-6  |
| GWP-land use        | kg CO <sub>2</sub> eq. | 3,32E-3 | 2,37E-4 | 2,89E-4 | 0,00E+0 | 2,66E-5 | 0,00E+0 | 4,49E-5               | -1,25E-7  |
| ODP                 | kg CFC 11 eq.          | 4,05E-6 | 1,42E-8 | 2,02E-8 | 0,00E+0 | 1,62E-9 | 0,00E+0 | 2,27E-9               | -2,21E-11 |
| AP                  | mol H <sup>+</sup> eq. | 2,57E-2 | 3,15E-3 | 6,07E-4 | 0,00E+0 | 3,22E-4 | 0,00E+0 | 1,04E-3               | -3,18E-6  |
| EP-freshwater       | kg P eq.               | 1,08E-3 | 4,75E-5 | 3,88E-5 | 0,00E+0 | 5,42E-6 | 0,00E+0 | 1,14E-5               | -1,47E-7  |
| EP-marine           | kg N eq.               | 5,13E-3 | 1,14E-3 | 2,61E-4 | 0,00E+0 | 1,21E-4 | 0,00E+0 | 9,19E-3               | -5,42E-7  |
| EP-terrestrial      | mol N eq.              | 5,54E-2 | 1,24E-2 | 1,98E-3 | 0,00E+0 | 1,32E-3 | 0,00E+0 | 2,45E-3               | -5,81E-6  |
| POCP                | kg NMVOC eq.           | 4,15E-2 | 4,52E-3 | 8,42E-4 | 0,00E+0 | 4,89E-4 | 0,00E+0 | 9,66E-4               | -2,62E-6  |
| ADPminerals&metals* | kg Sb eq.              | 2,77E-5 | 2,27E-6 | 7,95E-7 | 0,00E+0 | 2,60E-7 | 0,00E+0 | 1,83E-7               | -1,74E-9  |
| ADP-fossil*         | MJ                     | 2,23E+2 | 1,01E+1 | 2,13E+0 | 0,00E+0 | 1,14E+0 | 0,00E+0 | 1,50E+0               | -1,57E-2  |
| WDP*                | m <sup>3</sup>         | 1,20E+0 | 4,10E-2 | 7,58E-2 | 0,00E+0 | 4,68E-3 | 0,00E+0 | -5,12E-1 <sup>A</sup> | -6,52E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

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- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation

## CORONA TOP MINERAL - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4        | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------|----------|
| PERE      | MJ             | 3,48E+0 | 1,31E-1 | 1,10E-1 | 0,00E+0 | 1,50E-2 | 0,00E+0 | 2,45E-2   | -4,61E-3 |
| PERM      | MJ             | 1,26E+0 | 3,81E-2 | 4,10E+0 | 0,00E+0 | 4,35E-3 | 0,00E+0 | 7,53E-3   | -4,62E-4 |
| PERT      | MJ             | 4,74E+0 | 1,69E-1 | 4,21E+0 | 0,00E+0 | 1,94E-2 | 0,00E+0 | 3,21E-2   | -5,07E-3 |
| PENRE     | MJ             | 1,90E+1 | 8,21E-1 | 7,43E-1 | 0,00E+0 | 9,37E-2 | 0,00E+0 | 1,66E-1   | -3,84E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| PENRT     | MJ             | 1,90E+1 | 8,21E-1 | 7,43E-1 | 0,00E+0 | 9,37E-2 | 0,00E+0 | 1,66E-1   | -3,84E-3 |
| SM        | kg             | 3,75E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| FW        | m <sup>3</sup> | 2,93E-2 | 1,30E-3 | 1,99E-3 | 0,00E+0 | 1,49E-4 | 0,00E+0 | -1,18E-2* | -1,72E-5 |

### Acronyms

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\* The negative value of FW in C4 is due to data from the dataset used for the calculation

## CORONA TOP MINERAL - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 2,67E-3 | 6,76E-5 | 2,11E-5 | 0,00E+0 | 7,69E-6 | 0,00E+0 | 1,28E-5 | -5,95E-8 |
| NHWD      | kg   | 4,91E-1 | 4,72E-1 | 1,20E-1 | 0,00E+0 | 5,42E-2 | 0,00E+0 | 5,41E+0 | -3,58E-5 |
| RWD       | kg   | 8,63E-5 | 3,18E-6 | 3,68E-6 | 0,00E+0 | 3,64E-7 | 0,00E+0 | 6,45E-7 | -2,93E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms      HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy

## GALAXY FC 4 MM - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021

| Indicator           | Unit                   | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D         |
|---------------------|------------------------|---------|---------|---------|---------|---------|---------|-----------------------|-----------|
| GWP-total           | kg CO <sub>2</sub> eq. | 4,57E+0 | 3,85E-1 | 2,35E-1 | 0,00E+0 | 5,77E-2 | 0,00E+0 | 9,74E-1               | -6,92E-4  |
| GWP-fossil          | kg CO <sub>2</sub> eq. | 4,56E+0 | 3,85E-1 | 2,28E-1 | 0,00E+0 | 5,77E-2 | 0,00E+0 | 9,74E-1               | -6,90E-4  |
| GWP-biogenic        | kg CO <sub>2</sub> eq. | 1,10E-2 | 6,25E-5 | 7,18E-3 | 0,00E+0 | 9,42E-6 | 0,00E+0 | 7,10E-5               | -2,70E-6  |
| GWP-land use        | kg CO <sub>2</sub> eq. | 2,03E-3 | 1,28E-4 | 1,57E-4 | 0,00E+0 | 1,90E-5 | 0,00E+0 | 3,20E-5               | -8,96E-8  |
| ODP                 | kg CFC 11 eq.          | 3,26E-6 | 7,64E-9 | 1,35E-8 | 0,00E+0 | 1,15E-9 | 0,00E+0 | 1,62E-9               | -1,58E-11 |
| AP                  | mol H <sup>+</sup> eq. | 1,77E-2 | 1,78E-3 | 3,54E-4 | 0,00E+0 | 2,30E-4 | 0,00E+0 | 7,43E-4               | -2,27E-6  |
| EP-freshwater       | kg P eq.               | 6,71E-4 | 2,55E-5 | 2,27E-5 | 0,00E+0 | 3,87E-6 | 0,00E+0 | 8,15E-6               | -1,05E-7  |
| EP-marine           | kg N eq.               | 3,21E-3 | 6,33E-4 | 1,64E-4 | 0,00E+0 | 8,65E-5 | 0,00E+0 | 6,57E-3               | -3,87E-7  |
| EP-terrestrial      | mol N eq.              | 3,49E-2 | 6,91E-3 | 1,18E-3 | 0,00E+0 | 9,43E-4 | 0,00E+0 | 1,75E-3               | -4,15E-6  |
| POCP                | kg NMVOC eq.           | 3,14E-2 | 2,48E-3 | 4,88E-4 | 0,00E+0 | 3,49E-4 | 0,00E+0 | 6,90E-4               | -1,87E-6  |
| ADPminerals&metals* | kg Sb eq.              | 2,23E-5 | 1,22E-6 | 4,69E-7 | 0,00E+0 | 1,86E-7 | 0,00E+0 | 1,31E-7               | -1,24E-9  |
| ADP-fossil*         | MJ                     | 1,78E+2 | 5,42E+0 | 1,17E+0 | 0,00E+0 | 8,15E-1 | 0,00E+0 | 1,07E+0               | -1,12E-2  |
| WDP*                | m <sup>3</sup>         | 8,69E-1 | 2,20E-2 | 4,56E-2 | 0,00E+0 | 3,34E-3 | 0,00E+0 | -3,66E-1 <sup>A</sup> | -4,66E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

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- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation

## GALAXY FC 4 MM - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4        | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------|----------|
| PERE      | MJ             | 2,16E+0 | 7,04E-2 | 6,55E-2 | 0,00E+0 | 1,07E-2 | 0,00E+0 | 1,75E-2   | -3,29E-3 |
| PERM      | MJ             | 9,32E-1 | 2,05E-2 | 2,11E+0 | 0,00E+0 | 3,11E-3 | 0,00E+0 | 5,38E-3   | -3,30E-4 |
| PERT      | MJ             | 3,09E+0 | 9,08E-2 | 2,17E+0 | 0,00E+0 | 1,38E-2 | 0,00E+0 | 2,29E-2   | -3,62E-3 |
| PENRE     | MJ             | 1,11E+1 | 4,41E-1 | 4,52E-1 | 0,00E+0 | 6,69E-2 | 0,00E+0 | 1,19E-1   | -2,74E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| PENRT     | MJ             | 1,11E+1 | 4,41E-1 | 4,52E-1 | 0,00E+0 | 6,69E-2 | 0,00E+0 | 1,19E-1   | -2,74E-3 |
| SM        | kg             | 3,17E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| FW        | m <sup>3</sup> | 2,03E-2 | 6,99E-4 | 1,20E-3 | 0,00E+0 | 1,06E-4 | 0,00E+0 | -8,41E-3* | -1,23E-5 |

### Acronyms

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

\* The negative value of FW in C4 is due to data from the dataset used for the calculation

## GALAXY FC 4 MM - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 2,17E-3 | 3,63E-5 | 1,12E-5 | 0,00E+0 | 5,49E-6 | 0,00E+0 | 9,16E-6 | -4,25E-8 |
| NHWD      | kg   | 3,82E-1 | 2,52E-1 | 8,21E-2 | 0,00E+0 | 3,87E-2 | 0,00E+0 | 3,87E+0 | -2,56E-5 |
| RWD       | kg   | 5,44E-5 | 1,70E-6 | 2,23E-6 | 0,00E+0 | 2,60E-7 | 0,00E+0 | 4,61E-7 | -2,09E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy

## GENERAL GARDEN FLL - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021

| Indicator                      | Unit                   | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D         |
|--------------------------------|------------------------|---------|---------|---------|---------|---------|---------|-----------------------|-----------|
| <b>GWP-total</b>               | kg CO <sub>2</sub> eq. | 6,28E+0 | 7,14E-1 | 3,08E-1 | 0,00E+0 | 8,08E-2 | 0,00E+0 | 1,36E+0               | -9,69E-4  |
| <b>GWP-fossil</b>              | kg CO <sub>2</sub> eq. | 6,26E+0 | 7,13E-1 | 3,01E-1 | 0,00E+0 | 8,08E-2 | 0,00E+0 | 1,36E+0               | -9,66E-4  |
| <b>GWP-biogenic</b>            | kg CO <sub>2</sub> eq. | 1,51E-2 | 1,16E-4 | 7,09E-3 | 0,00E+0 | 1,32E-5 | 0,00E+0 | 9,95E-5               | -3,78E-6  |
| <b>GWP-land use</b>            | kg CO <sub>2</sub> eq. | 3,35E-3 | 2,37E-4 | 1,67E-4 | 0,00E+0 | 2,66E-5 | 0,00E+0 | 4,49E-5               | -1,25E-7  |
| <b>ODP</b>                     | kg CFC 11 eq.          | 4,04E-6 | 1,42E-8 | 1,78E-8 | 0,00E+0 | 1,62E-9 | 0,00E+0 | 2,27E-9               | -2,21E-11 |
| <b>AP</b>                      | mol H <sup>+</sup> eq. | 2,57E-2 | 3,15E-3 | 4,08E-4 | 0,00E+0 | 3,22E-4 | 0,00E+0 | 1,04E-3               | -3,18E-6  |
| <b>EP-freshwater</b>           | kg P eq.               | 1,10E-3 | 4,75E-5 | 2,63E-5 | 0,00E+0 | 5,42E-6 | 0,00E+0 | 1,14E-5               | -1,47E-7  |
| <b>EP-marine</b>               | kg N eq.               | 5,14E-3 | 1,14E-3 | 2,06E-4 | 0,00E+0 | 1,21E-4 | 0,00E+0 | 9,19E-3               | -5,42E-7  |
| <b>EP-terrestrial</b>          | mol N eq.              | 5,55E-2 | 1,24E-2 | 1,39E-3 | 0,00E+0 | 1,32E-3 | 0,00E+0 | 2,45E-3               | -5,81E-6  |
| <b>POCP</b>                    | kg NMVOC eq.           | 4,11E-2 | 4,51E-3 | 5,59E-4 | 0,00E+0 | 4,89E-4 | 0,00E+0 | 9,66E-4               | -2,62E-6  |
| <b>ADPminerals&amp;metals*</b> | kg Sb eq.              | 2,76E-5 | 2,27E-6 | 5,49E-7 | 0,00E+0 | 2,60E-7 | 0,00E+0 | 1,83E-7               | -1,74E-9  |
| <b>ADP-fossil*</b>             | MJ                     | 2,20E+2 | 1,01E+1 | 1,26E+0 | 0,00E+0 | 1,14E+0 | 0,00E+0 | 1,50E+0               | -1,57E-2  |
| <b>WDP*</b>                    | m <sup>3</sup>         | 1,19E+0 | 4,10E-2 | 5,44E-2 | 0,00E+0 | 4,68E-3 | 0,00E+0 | -5,12E-1 <sup>A</sup> | -6,52E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

### Acronyms and disclaimer

- \*The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
- The additional environmental indicators calculated in the LCA study are not included in this declaration.
- The LCA methodology is standardized at international level by ISO 14040 and ISO 14044, the calculation methodology refers to EN 15804:2012+A2:2019/AC2021 (EF 3.1.)
- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation

## GENERAL GARDEN FLL - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4        | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------|----------|
| PERE      | MJ             | 3,51E+0 | 1,31E-1 | 7,71E-2 | 0,00E+0 | 1,50E-2 | 0,00E+0 | 2,45E-2   | -4,61E-3 |
| PERM      | MJ             | 1,26E+0 | 3,81E-2 | 2,06E+0 | 0,00E+0 | 4,35E-3 | 0,00E+0 | 7,53E-3   | -4,62E-4 |
| PERT      | MJ             | 4,78E+0 | 1,69E-1 | 2,13E+0 | 0,00E+0 | 1,94E-2 | 0,00E+0 | 3,21E-2   | -5,07E-3 |
| PENRE     | MJ             | 1,94E+1 | 8,20E-1 | 5,47E-1 | 0,00E+0 | 9,37E-2 | 0,00E+0 | 1,66E-1   | -3,84E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| PENRT     | MJ             | 1,94E+1 | 8,20E-1 | 5,47E-1 | 0,00E+0 | 9,37E-2 | 0,00E+0 | 1,66E-1   | -3,84E-3 |
| SM        | kg             | 4,39E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| FW        | m <sup>3</sup> | 2,98E-2 | 1,30E-3 | 1,44E-3 | 0,00E+0 | 1,49E-4 | 0,00E+0 | -1,18E-2* | -1,72E-5 |

### Acronyms

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

\* The negative value of FW in C4 is due to data from the dataset used for the calculation



## GENERAL GARDEN FLL - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 2,62E-3 | 6,75E-5 | 1,14E-5 | 0,00E+0 | 7,69E-6 | 0,00E+0 | 1,28E-5 | -5,95E-8 |
| NHWD      | kg   | 5,04E-1 | 4,71E-1 | 1,11E-1 | 0,00E+0 | 5,42E-2 | 0,00E+0 | 5,41E+0 | -3,58E-5 |
| RWD       | kg   | 8,70E-5 | 3,18E-6 | 2,68E-6 | 0,00E+0 | 3,64E-7 | 0,00E+0 | 6,45E-7 | -2,93E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms      HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy

## GALAXY 4,5 Kg MINERAL - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021

| Indicator           | Unit                   | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D         |
|---------------------|------------------------|---------|---------|---------|---------|---------|---------|-----------------------|-----------|
| GWP-total           | kg CO <sub>2</sub> eq. | 4,97E+0 | 6,00E-1 | 2,56E-1 | 0,00E+0 | 6,49E-2 | 0,00E+0 | 1,10E+0               | -7,79E-4  |
| GWP-fossil          | kg CO <sub>2</sub> eq. | 4,96E+0 | 5,99E-1 | 2,49E-1 | 0,00E+0 | 6,49E-2 | 0,00E+0 | 1,10E+0               | -7,76E-4  |
| GWP-biogenic        | kg CO <sub>2</sub> eq. | 1,04E-2 | 9,76E-5 | 6,84E-3 | 0,00E+0 | 1,06E-5 | 0,00E+0 | 7,99E-5               | -3,04E-6  |
| GWP-land use        | kg CO <sub>2</sub> eq. | 2,72E-3 | 1,99E-4 | 1,55E-4 | 0,00E+0 | 2,13E-5 | 0,00E+0 | 3,61E-5               | -1,01E-7  |
| ODP                 | kg CFC 11 eq.          | 3,08E-6 | 1,19E-8 | 1,47E-8 | 0,00E+0 | 1,30E-9 | 0,00E+0 | 1,82E-9               | -1,78E-11 |
| AP                  | mol H <sup>+</sup> eq. | 2,06E-2 | 2,62E-3 | 3,62E-4 | 0,00E+0 | 2,58E-4 | 0,00E+0 | 8,36E-4               | -2,56E-6  |
| EP-freshwater       | kg P eq.               | 8,85E-4 | 3,99E-5 | 2,33E-5 | 0,00E+0 | 4,36E-6 | 0,00E+0 | 9,17E-6               | -1,19E-7  |
| EP-marine           | kg N eq.               | 4,18E-3 | 9,52E-4 | 1,75E-4 | 0,00E+0 | 9,73E-5 | 0,00E+0 | 7,39E-3               | -4,35E-7  |
| EP-terrestrial      | mol N eq.              | 4,51E-2 | 1,04E-2 | 1,22E-3 | 0,00E+0 | 1,06E-3 | 0,00E+0 | 1,97E-3               | -4,67E-6  |
| POCP                | kg NMVOC eq.           | 3,25E-2 | 3,78E-3 | 4,97E-4 | 0,00E+0 | 3,93E-4 | 0,00E+0 | 7,77E-4               | -2,11E-6  |
| ADPminerals&metals* | kg Sb eq.              | 2,13E-5 | 1,91E-6 | 4,83E-7 | 0,00E+0 | 2,09E-7 | 0,00E+0 | 1,47E-7               | -1,39E-9  |
| ADP-fossil*         | MJ                     | 1,72E+2 | 8,45E+0 | 1,16E+0 | 0,00E+0 | 9,17E-1 | 0,00E+0 | 1,21E+0               | -1,26E-2  |
| WDP*                | m <sup>3</sup>         | 9,52E-1 | 3,44E-2 | 4,74E-2 | 0,00E+0 | 3,76E-3 | 0,00E+0 | -4,11E-1 <sup>A</sup> | -5,24E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

### Acronyms and disclaimer

- \*The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
- The additional environmental indicators calculated in the LCA study are not included in this declaration.
- The LCA methodology is standardized at international level by ISO 14040 and ISO 14044, the calculation methodology refers to EN 15804:2012+A2:2019/AC2021 (EF 3.1.)
- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation

## GALAXY 4,5 Kg MINERAL - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4        | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------|----------|
| PERE      | MJ             | 2,84E+0 | 1,10E-1 | 6,76E-2 | 0,00E+0 | 1,21E-2 | 0,00E+0 | 1,97E-2   | -3,70E-3 |
| PERM      | MJ             | 9,89E-1 | 3,20E-2 | 2,00E+0 | 0,00E+0 | 3,50E-3 | 0,00E+0 | 6,05E-3   | -3,71E-4 |
| PERT      | MJ             | 3,83E+0 | 1,42E-1 | 2,07E+0 | 0,00E+0 | 1,56E-2 | 0,00E+0 | 2,58E-2   | -4,07E-3 |
| PENRE     | MJ             | 1,57E+1 | 6,90E-1 | 4,73E-1 | 0,00E+0 | 7,53E-2 | 0,00E+0 | 1,34E-1   | -3,09E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| PENRT     | MJ             | 1,57E+1 | 6,90E-1 | 4,73E-1 | 0,00E+0 | 7,53E-2 | 0,00E+0 | 1,34E-1   | -3,09E-3 |
| SM        | kg             | 2,85E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| FW        | m <sup>3</sup> | 2,35E-2 | 1,09E-3 | 1,25E-3 | 0,00E+0 | 1,19E-4 | 0,00E+0 | -9,47E-3* | -1,38E-5 |

### Acronyms

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

\* The negative value of FW in C4 is due to data from the dataset used for the calculation

## GALAXY 4,5 Kg MINERAL - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 2,04E-3 | 5,67E-5 | 1,08E-5 | 0,00E+0 | 6,18E-6 | 0,00E+0 | 1,03E-5 | -4,78E-8 |
| NHWD      | kg   | 3,79E-1 | 3,96E-1 | 9,07E-2 | 0,00E+0 | 4,36E-2 | 0,00E+0 | 4,35E+0 | -2,88E-5 |
| RWD       | kg   | 7,03E-5 | 2,67E-6 | 2,33E-6 | 0,00E+0 | 2,92E-7 | 0,00E+0 | 5,18E-7 | -2,35E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms      HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy

## PHOENIX SUPER MINERAL BROOF HS - Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC2021

| Indicator                      | Unit                   | A1      | A2      | A3      | C1      | C2      | C3      | C4                    | D         |
|--------------------------------|------------------------|---------|---------|---------|---------|---------|---------|-----------------------|-----------|
| <b>GWP-total</b>               | kg CO <sub>2</sub> eq. | 5,72E+0 | 8,84E-1 | 3,13E-1 | 0,00E+0 | 7,79E-2 | 0,00E+0 | 1,32E+0               | -9,35E-4  |
| <b>GWP-fossil</b>              | kg CO <sub>2</sub> eq. | 5,70E+0 | 8,84E-1 | 3,04E-1 | 0,00E+0 | 7,79E-2 | 0,00E+0 | 1,32E+0               | -9,31E-4  |
| <b>GWP-biogenic</b>            | kg CO <sub>2</sub> eq. | 1,25E-2 | 1,44E-4 | 9,09E-3 | 0,00E+0 | 1,27E-5 | 0,00E+0 | 9,59E-5               | -3,64E-6  |
| <b>GWP-land use</b>            | kg CO <sub>2</sub> eq. | 3,10E-3 | 2,91E-4 | 2,01E-4 | 0,00E+0 | 2,56E-5 | 0,00E+0 | 4,33E-5               | -1,21E-7  |
| <b>ODP</b>                     | kg CFC 11 eq.          | 3,42E-6 | 1,77E-8 | 1,80E-8 | 0,00E+0 | 1,56E-9 | 0,00E+0 | 2,19E-9               | -2,13E-11 |
| <b>AP</b>                      | mol H <sup>+</sup> eq. | 2,36E-2 | 3,53E-3 | 4,60E-4 | 0,00E+0 | 3,10E-4 | 0,00E+0 | 1,00E-3               | -3,07E-6  |
| <b>EP-freshwater</b>           | kg P eq.               | 9,87E-4 | 5,94E-5 | 2,95E-5 | 0,00E+0 | 5,23E-6 | 0,00E+0 | 1,10E-5               | -1,42E-7  |
| <b>EP-marine</b>               | kg N eq.               | 4,67E-3 | 1,33E-3 | 2,17E-4 | 0,00E+0 | 1,17E-4 | 0,00E+0 | 8,86E-3               | -5,22E-7  |
| <b>EP-terrestrial</b>          | mol N eq.              | 5,07E-2 | 1,45E-2 | 1,54E-3 | 0,00E+0 | 1,27E-3 | 0,00E+0 | 2,36E-3               | -5,60E-6  |
| <b>POCP</b>                    | kg NMVOC eq.           | 3,84E-2 | 5,36E-3 | 6,33E-4 | 0,00E+0 | 4,72E-4 | 0,00E+0 | 9,32E-4               | -2,53E-6  |
| <b>ADPminerals&amp;metals*</b> | kg Sb eq.              | 2,71E-5 | 2,84E-6 | 6,11E-7 | 0,00E+0 | 2,51E-7 | 0,00E+0 | 1,76E-7               | -1,67E-9  |
| <b>ADP-fossil*</b>             | MJ                     | 2,09E+2 | 1,25E+1 | 1,50E+0 | 0,00E+0 | 1,10E+0 | 0,00E+0 | 1,45E+0               | -1,51E-2  |
| <b>WDP*</b>                    | m <sup>3</sup>         | 1,06E+0 | 5,12E-2 | 5,96E-2 | 0,00E+0 | 4,51E-3 | 0,00E+0 | -4,94E-1 <sup>A</sup> | -6,29E-4  |

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

### Acronyms and disclaimer

- \*The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
- The additional environmental indicators calculated in the LCA study are not included in this declaration.
- The LCA methodology is standardized at international level by ISO 14040 and ISO 14044, the calculation methodology refers to EN 15804:2012+A2:2019/AC2021 (EF 3.1.)
- <sup>A</sup>The negative value of WDP in C4 is due to data from the dataset used for the calculation

## PHOENIX SUPER MINERAL BROOF HS - Resource use indicators

| Indicator | Unit           | A1      | A2      | A3      | C1      | C2      | C3      | C4        | D        |
|-----------|----------------|---------|---------|---------|---------|---------|---------|-----------|----------|
| PERE      | MJ             | 3,26E+0 | 1,64E-1 | 8,54E-2 | 0,00E+0 | 1,45E-2 | 0,00E+0 | 2,37E-2   | -4,44E-3 |
| PERM      | MJ             | 1,09E+0 | 4,76E-2 | 2,66E+0 | 0,00E+0 | 4,20E-3 | 0,00E+0 | 7,26E-3   | -4,45E-4 |
| PERT      | MJ             | 4,35E+0 | 2,12E-1 | 2,75E+0 | 0,00E+0 | 1,87E-2 | 0,00E+0 | 3,09E-2   | -4,89E-3 |
| PENRE     | MJ             | 1,77E+1 | 1,03E+0 | 5,93E-1 | 0,00E+0 | 9,03E-2 | 0,00E+0 | 1,60E-1   | -3,70E-3 |
| PENRM     | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| PENRT     | MJ             | 1,77E+1 | 1,03E+0 | 5,93E-1 | 0,00E+0 | 9,03E-2 | 0,00E+0 | 1,60E-1   | -3,70E-3 |
| SM        | kg             | 3,55E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| RSF       | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| NRSF      | MJ             | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0   | 0,00E+0  |
| FW        | m <sup>3</sup> | 2,59E-2 | 1,63E-3 | 1,57E-3 | 0,00E+0 | 1,43E-4 | 0,00E+0 | -1,14E-2* | -1,66E-5 |

### Acronyms

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

\* The negative value of FW in C4 is due to data from the dataset used for the calculation

## PHOENIX SUPER MINERAL BROOF HS - Waste and other output flow indicators

| Indicator | Unit | A1      | A2      | A3      | C1      | C2      | C3      | C4      | D        |
|-----------|------|---------|---------|---------|---------|---------|---------|---------|----------|
| HWD       | kg   | 2,38E-3 | 8,41E-5 | 1,42E-5 | 0,00E+0 | 7,41E-6 | 0,00E+0 | 1,24E-5 | -5,73E-8 |
| NHWD      | kg   | 4,23E-1 | 5,93E-1 | 1,10E-1 | 0,00E+0 | 5,23E-2 | 0,00E+0 | 5,22E+0 | -3,46E-5 |
| RWD       | kg   | 8,37E-5 | 3,98E-6 | 2,92E-6 | 0,00E+0 | 3,51E-7 | 0,00E+0 | 6,22E-7 | -2,83E-8 |
| CRU       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MFR       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| MER       | kg   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |
| EE        | MJ   | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0  |

Acronyms      HWD = Hazardous waste ; NHWD = Nonhazardous waste ; RWD = Radioactive waste; ; CRU = component for re-use; MFR = material for recycling ; MER = material for energy recovery ; EE = Exported energy

## Calculation rules

**DECLARED UNIT:** 1 meter square of bituminous membrane with packaging for distribution.

**ASSUMPTIONS:** The system boundaries include the mandatory modules A1, A2, A3, C1, C2, C3, C4 and D provided by Standard EN 15804 according to a “from cradle to gate with modules C1-C4 and D” type application.

**A1-A3:** These modules group together impacts associated with the use of raw materials such as bitumen, calcium carbonate and polymers, electricity and heat consumption, transportation of incoming materials and packaging of finished products and internal transportation, processing waste and emissions, packaging to package the finished product. It should be noted that the construction, maintenance and decommissioning of infrastructure, understood as buildings, and the occupation of industrial land have not been considered, as their contribution to the environmental impact related to the declared unit is considered negligible.

Consumption of oils and other technical materials, consumption for facility lighting, and energy consumption for office activities where management activities take place are included.

It is also emphasized that the phases of product distribution, use are not included in the study.

**C1:** Uninstallation is done manually, it currently turns out to be the only method of removing the membrane where it was applied, so no impacts are associated with this module.

**C2:** The end-of-life product is sent to sorting center, thus a distance of 75 km is assumed. The means of transportation is represented by transport, freight lorry, 16-32 eur 4.

**C3** There is no incineration step with efficiency greater than 60%, so there is no impact associated with this module.

**C4** The selected disposal scenario aligns with the shares between landfill and incineration reported in annex c of the environmental footprint reference packages, assuming 94,45% landfill and 5,55% incineration.

**CUT-OFF RULES:** The criterion chosen for the initial inclusion of input and output elements is based on the definition of a **1% cut-off level**, both in terms of mass, energy and environmental significance. This means that a process has been neglected if it is responsible for less than 1% of the total mass, primary energy and total impact. However, all processes for which data were available were considered, even if they contributed less than 1%. Consequently, this threshold value was used to avoid collecting unknown data, but not to neglect data that were nonetheless available.

**DATA QUALITY:** In choosing the data to be used for the LCA study, priority was given to primary data collected at the manufacturing plants.

**ALLOCATIONS:** Allocation was avoided whenever possible by dividing the system into sub-systems. When allocation could not be avoided, it was carried out on a physical basis. Polluter pays principle was applied for waste modeling.



## References

- ISO 14040:2006/Amd 1:2020 Environmental management - Life cycle assessment - Principles and framework
- ISO 14044:2006/Amd 2:2020 Environmental management — Life cycle assessment — Requirements and guidelines — Amendment 1
- ISO 14020:2000 Environmental labels and declarations -- General principles
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction works
- PD CEN/TR 16970:2016 Sustainability of construction works – Guidance for the implementation of EN 15804
- PD CEN/TR 15941:2010 Sustainability of construction works – Environmental Product Declarations – Methodology for selection and use of generic data.
- PCR ICMQ-001/15 rev.3.1
- Regolamentoo EPDIItaly rev.6
- Report LCA General Membrane rev 2.0 06\_05\_2025

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