

# ENVIRONMENTAL PRODUCT DECLARATION

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

FRÄNKISCHE PPSU fittings

FRÄNKISCHE Rohrwerke Gebr. Kirchner GmbH & Co. KG



EPD HUB, EPD number HUB-3271

Published on 04.05.2025, last updated on 04.05.2025, valid until 03.05.2030

# GENERAL INFORMATION

## MANUFACTURER

|                        |                                                              |
|------------------------|--------------------------------------------------------------|
| <b>Manufacturer</b>    | FRÄNKISCHE Rohrwerke<br>Gebr. Kirchner GmbH & Co. KG         |
| <b>Address</b>         | Hellinger Str. 1,<br>97486 Königsberg in Bayern, Germany     |
| <b>Contact details</b> | info@fraenkische.de                                          |
| <b>Website</b>         | <a href="http://www.fraenkische.com">www.fraenkische.com</a> |

## EPD STANDARDS, SCOPE AND VERIFICATION

|                           |                                                                                                                                                                                    |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Program operator</b>   | EPD Hub, hub@epdhub.com                                                                                                                                                            |
| <b>Reference standard</b> | EN 15804+A2:2019 and ISO 14025                                                                                                                                                     |
| <b>PCR</b>                | EPD Hub Core PCR Version 1.1, 5 Dec 2023<br>EN 16904 Product Category Rules (PCR) for plastics piping systems inside buildings                                                     |
| <b>Sector</b>             | Construction product                                                                                                                                                               |
| <b>Category of EPD</b>    | Third party verified EPD                                                                                                                                                           |
| <b>Parent EPD number</b>  | -                                                                                                                                                                                  |
| <b>Scope of the EPD</b>   | Cradle to gate with options, A4-A5, and modules C1-C4, D                                                                                                                           |
| <b>EPD author</b>         | Samuel Schäff                                                                                                                                                                      |
| <b>EPD verification</b>   | Independent verification of this EPD and data, according to ISO 14025:<br><input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification |
| <b>EPD verifier</b>       | Imane Uald Lamkaddam as an authorized verifier for EPD Hub                                                                                                                         |

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

## PRODUCT

|                                          |                               |
|------------------------------------------|-------------------------------|
| <b>Product name</b>                      | FRÄNKISCHE PPSU fittings      |
| <b>Additional labels</b>                 |                               |
| <b>Product reference</b>                 | 82816300                      |
| <b>Place of production</b>               | Königsberg in Bayern, Germany |
| <b>Period for data</b>                   | 01.01.2023 - 31.12.2023       |
| <b>Averaging in EPD</b>                  | No averaging                  |
| <b>Variation in GWP-fossil for A1-A3</b> | %                             |

## ENVIRONMENTAL DATA SUMMARY

|                                                  |                 |
|--------------------------------------------------|-----------------|
| <b>Declared unit</b>                             | 1 kg of fitting |
| <b>Declared unit mass</b>                        | 1.00 kg         |
| <b>GWP-fossil, A1-A3 (kgCO<sub>2</sub>e)</b>     | 7.61E+00        |
| <b>GWP-total, A1-A3 (kgCO<sub>2</sub>e)</b>      | 7.43E+00        |
| <b>Secondary material, inputs (%)</b>            | 10.3            |
| <b>Secondary material, outputs (%)</b>           | 61              |
| <b>Total energy use, A1-A3 (kWh)</b>             | 35.2            |
| <b>Net freshwater use, A1-A3 (m<sup>3</sup>)</b> | 0.11            |

# PRODUCT AND MANUFACTURER

## ABOUT THE MANUFACTURER

FRÄNKISCHE Rohrwerke Gebr. Kirchner GmbH & Co. KG, a wholly-owned subsidiary of FRÄNKISCHE Group SE, is among the world's leading suppliers of pipe systems. The family-owned enterprise, founded in 1906 and headquartered in Königsberg, Germany, specialises in developing and producing high-quality pipes, accessories, and system components for electrical installation and drainage, plumbing and heating installation, heat recovery ventilation, and stormwater management. Three key historical inventions form the basis for the company's success and its diverse product and solution portfolio: the world's first flexible corrugated metal conduit, which revolutionised electrical installation (1952), the world's first continuously extruded flexible plastic electrical conduit (1959), and the world's first corrugated and continuously produced plastic drainage pipe (1961). FRÄNKISCHE Rohrwerke currently employs around 1,400 people and operates production sites and sales facilities in Germany, as well as branches across Europe. For more information, please refer to [www.fraenkische.com](http://www.fraenkische.com).

## PRODUCT DESCRIPTION

Pipe fitting made of PPSU for drinking water and heating system installations featuring fixation rings with integrated inspection holes, fixed stainless steel pressing sleeves and leak function.

## PRODUCT RAW MATERIAL MAIN COMPOSITION

| Raw material category | Amount, mass % | Material origin |
|-----------------------|----------------|-----------------|
| Metals                | 20.6           | EU              |
| Minerals              | -              |                 |
| Fossil materials      | 79.4           | EU              |
| Bio-based materials   | -              |                 |

## BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

|                                            |         |
|--------------------------------------------|---------|
| Biogenic carbon content in product, kg C   | 0       |
| Biogenic carbon content in packaging, kg C | 0.05236 |

## FUNCTIONAL UNIT AND SERVICE LIFE

|                        |                  |
|------------------------|------------------|
| Declared unit          | 1 kg of fittings |
| Mass per declared unit | 1.00 kg          |
| Functional unit        |                  |
| Reference service life |                  |

### SUBSTANCES, REACH - VERY HIGH CONCERN

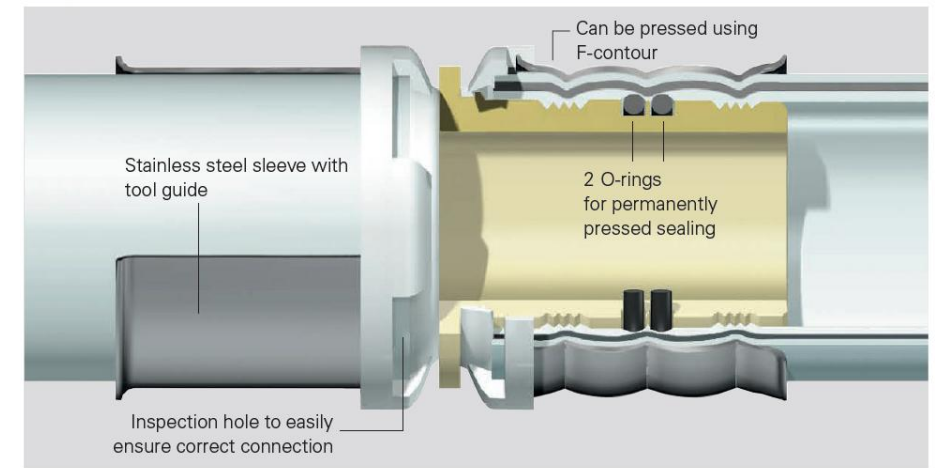
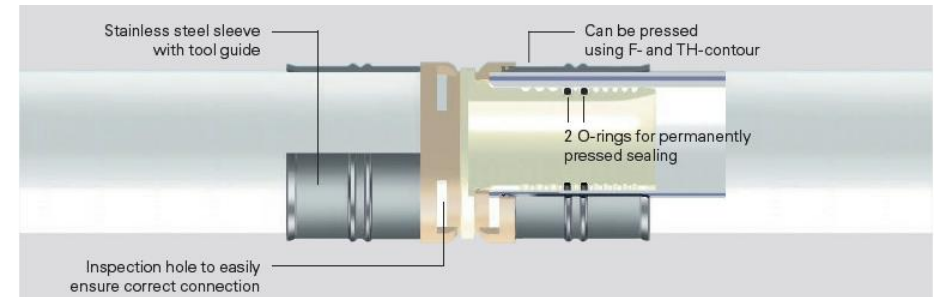
The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

| Raw Material    | Share   |
|-----------------|---------|
| Stainless steal | 20,57 % |
| PPSU            | 77,09 % |
| Polypropylene   | 2,30 %  |
| EPDM            | <1 %    |

The functional unit “1 kg of FRÄNKISCHE PPSU fitting” is based on the average material composition of all PPSU fitting dimensions and geometries which FRÄNKISCHE offers. The environmental values can be scaled using the weight of the fitting.

| Type                          | alpex                     |                  |        |        |
|-------------------------------|---------------------------|------------------|--------|--------|
| DN                            | 12                        | 15               | 20     | 25     |
| Dimension [mm]                | 16x2.0                    | 20x2.0           | 26x3.0 | 32x3.0 |
| Threadless connector material | Polyphenylsulphone (PPSU) |                  |        |        |
| Material class                | E acc. to DIN EN 13501-1  |                  |        |        |
| Pressing sleeve               | Stainless steel           |                  |        |        |
| Crimping contour              | F – TH                    |                  |        |        |
| Leak function acc. to W534    | Yes                       |                  |        |        |
| Female thread/male thread     | R/RP                      | DIN EN 10226-1   |        |        |
| Connection thread             | G                         | DIN EN ISO 228-1 |        |        |

| Type                          | alpex L                   |                  |        |        |
|-------------------------------|---------------------------|------------------|--------|--------|
| DN                            | 32                        | 40               | 50     | 65     |
| Dimension [mm]                | 40x3.5                    | 50x4.0           | 63x4.5 | 75x5.0 |
| Threadless connector material | Polyphenylsulphone (PPSU) |                  |        |        |
| Material class                | E acc. to DIN EN 13501-1  |                  |        |        |
| Pressing sleeve               | Stainless steel           |                  |        |        |
| Crimping contour              | F                         |                  |        |        |
| Leak function acc. to W534    | Yes                       |                  |        |        |
| Female thread/male thread     | R/RP                      | DIN EN 10226-1   |        |        |
| Connection thread             | G                         | DIN EN ISO 228-1 |        |        |



# PRODUCT LIFE-CYCLE

## SYSTEM BOUNDARY

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

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

Modules not declared = MND. Modules not relevant = MNR

## MANUFACTURING AND PACKAGING (A1-A3)

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

The product is manufactured from polyphenylsulfone (PPSU), polypropylene (PP), stainless steel (SST) and ethylene propylene diene monomer rubber (EPDM). The finished product is packaged in a recycled plastic bag which is stored in a boxboard carton. The plastic fittings are

produced by injection moulding. They are available in dimensions up to 75 mm. They come in different geometries such as tee, 90° elbow, 45° elbow, coupling, reduction or end cap.

The production process is certified according to the quality management system according to /DIN EN ISO 9001.

## TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. The average distance of transportation from the production plant to the installation site is based on the actual sales weighted average figures of the company in the local markets. The transportation is performed by truck.

Environmental impacts from installation into the building (A5) include emissions of energy use in installation and the packaging waste. There is no product installation loss.

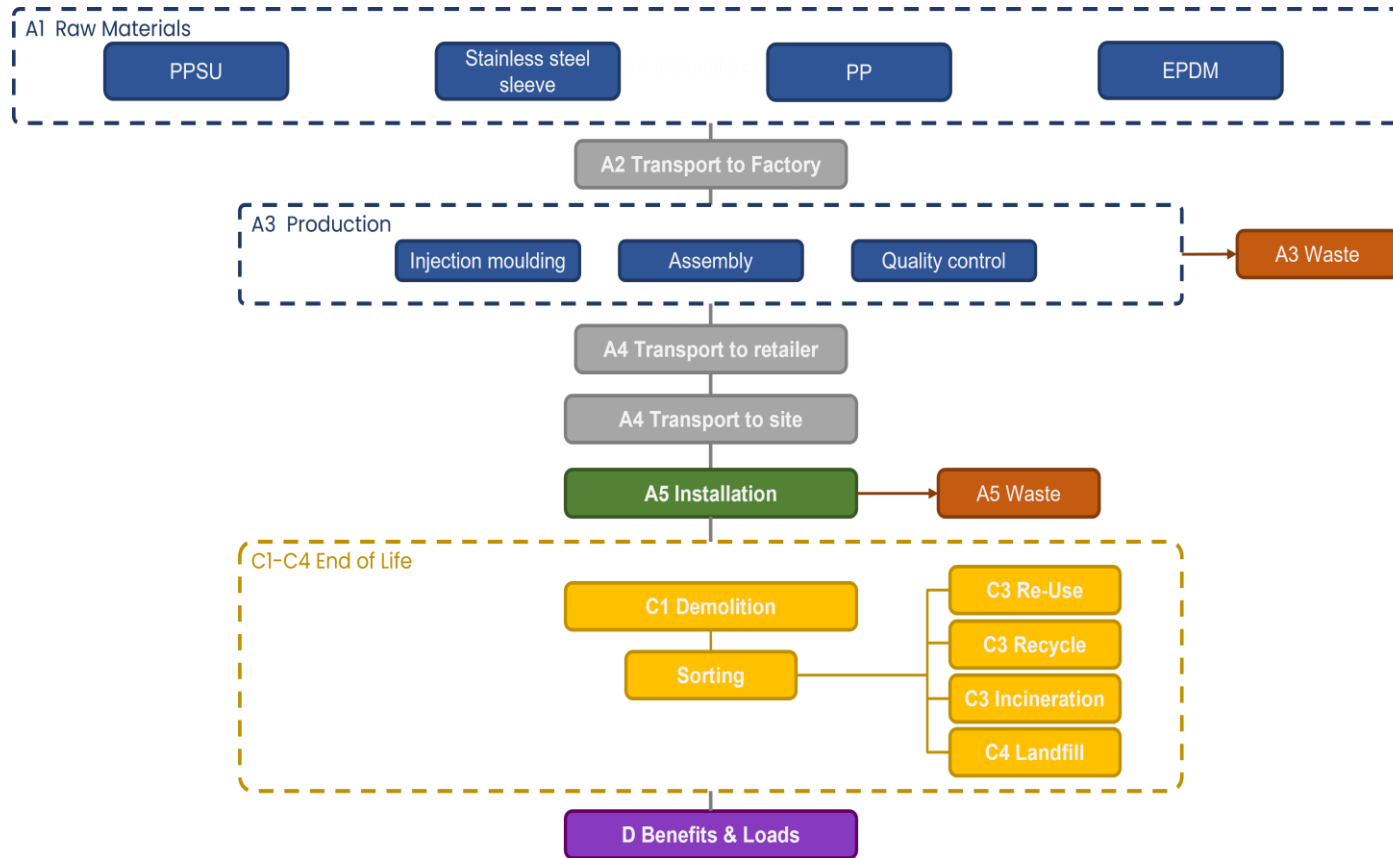
### PRODUCT USE AND MAINTENANCE (B1-B7)

The reference service life is at least 50 years, analogous to the service life of the house. There is no indication that the FRÄNKISCHE PPSU fittings have a shorter service life than the building itself. This reflects the high ageing resistance of the product when used as intended. The reference service life is not relevant due to the exclusion of Module B. Air, soil, and water impacts during the use phase have not been studied.

### PRODUCT END OF LIFE (C1-C4, D)

Since the consumption of energy and natural resources is negligible for disassembling of the end-of-life product, the impacts of demolition are assumed zero (C1). The end-of-life product is assumed to be sent to the closest facility by lorry and is assumed to be 50 km away (C2). 100% of the end-of-life product is collected separately from the demolition site while 40% is sent to recycling and 37% to incineration facilities (C3). 23 % of the end-of-life product goes to landfills (C4). Due to the recycling and incineration potential of polyethylene, the end-of-life product is converted into recycled PE while energy and heat are produced from its incineration (D). The benefits and loads of waste packaging materials in A5 are also considered in module D.

# MANUFACTURING PROCESS



# LIFE-CYCLE ASSESSMENT

## CUT-OFF CRITERIA

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

## ALLOCATION, ESTIMATES AND ASSUMPTIONS

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

| Data type                      | Allocation                  |
|--------------------------------|-----------------------------|
| Raw materials                  | Allocated by mass or volume |
| Packaging material             | No allocation               |
| Ancillary materials            | No allocation               |
| Manufacturing energy and waste | No allocation               |

## AVERAGES AND VARIABILITY

|                                   |                                  |
|-----------------------------------|----------------------------------|
| Type of average                   | Multiple products                |
| Averaging method                  | Averaged by shares of total mass |
| Variation in GWP-fossil for A1-A3 | %                                |

## LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.8, Plastics Europe, Federal LCA Commons and One Click LCA databases as sources of environmental data.

# ENVIRONMENTAL IMPACT DATA

## CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

| Impact category                     | Unit                   | A1       | A2       | A3        | A1-A3     | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4        | D         |
|-------------------------------------|------------------------|----------|----------|-----------|-----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|-----------|-----------|
| GWP – total <sup>1)</sup>           | kg CO <sub>2</sub> e   | 6,30E+00 | 4,02E-02 | 1,09E+00  | 7,43E+00  | 5,88E-02 | 2,04E-01 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 8,75E-03 | 9,52E-01 | 2,28E-02  | -1,17E+00 |
| GWP – fossil                        | kg CO <sub>2</sub> e   | 6,29E+00 | 4,02E-02 | 1,28E+00  | 7,61E+00  | 5,88E-02 | 1,13E-02 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 8,75E-03 | 9,52E-01 | 2,28E-02  | -1,10E+00 |
| GWP – biogenic                      | kg CO <sub>2</sub> e   | 0,00E+00 | 0,00E+00 | -1,92E-01 | -1,92E-01 | 0,00E+00 | 1,92E-01 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 2,51E-07 | 0,00E+00 | -4,09E-07 | -6,70E-02 |
| GWP – LULUC                         | kg CO <sub>2</sub> e   | 6,41E-03 | 1,80E-05 | 5,16E-03  | 1,16E-02  | 2,83E-05 | 1,73E-05 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 3,19E-06 | 3,17E-05 | 2,05E-06  | -9,01E-04 |
| Ozone depletion pot.                | kg CFC-11e             | 3,11E-07 | 5,93E-10 | 2,05E-08  | 3,32E-07  | 9,20E-10 | 1,31E-10 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,68E-10 | 2,64E-10 | 8,92E-11  | -3,84E-08 |
| Acidification potential             | mol H <sup>+</sup> e   | 3,62E-02 | 1,37E-04 | 1,37E-02  | 5,01E-02  | 1,47E-04 | 3,75E-05 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 2,77E-05 | 1,98E-04 | 2,34E-05  | -4,55E-03 |
| EP-freshwater <sup>2)</sup>         | kg Pe                  | 2,10E-03 | 3,13E-06 | 1,39E-03  | 3,49E-03  | 4,87E-06 | 7,79E-06 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 5,93E-07 | 6,59E-06 | 3,18E-07  | -3,46E-04 |
| EP-marine                           | kg Ne                  | 5,67E-03 | 4,50E-05 | 1,57E-03  | 7,28E-03  | 3,59E-05 | 3,29E-05 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 9,30E-06 | 1,09E-04 | 5,11E-05  | -7,59E-04 |
| EP-terrestrial                      | mol Ne                 | 5,87E-02 | 4,90E-04 | 1,64E-02  | 7,55E-02  | 3,89E-04 | 1,36E-04 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,01E-04 | 8,50E-04 | 9,63E-05  | -7,85E-03 |
| POCP (“smog”) <sup>3)</sup>         | kg NMVOC               | 3,21E-02 | 2,02E-04 | 5,11E-03  | 3,74E-02  | 2,15E-04 | 4,44E-05 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 4,30E-05 | 2,24E-04 | 3,89E-05  | -5,18E-03 |
| ADP-minerals & metals <sup>4)</sup> | kg Sbe                 | 8,25E-05 | 1,12E-07 | 1,25E-04  | 2,08E-04  | 1,90E-07 | 2,29E-08 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 2,81E-08 | 2,14E-07 | 6,58E-09  | -6,45E-06 |
| ADP-fossil resources                | MJ                     | 1,12E+02 | 5,83E-01 | 2,16E+01  | 1,34E+02  | 8,66E-01 | 1,46E-01 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,23E-01 | 2,48E-01 | 7,62E-02  | -2,94E+01 |
| Water use <sup>5)</sup>             | m <sup>3</sup> e depr. | 2,52E+00 | 2,88E-03 | 6,50E-01  | 3,17E+00  | 4,31E-03 | 2,93E-03 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 6,06E-04 | 2,82E-02 | 3,10E-04  | -2,98E-01 |

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO<sub>4</sub>e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

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

| Impact category                  | Unit      | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|----------------------------------|-----------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Particulate matter               | Incidence | 3,72E-07 | 4,02E-09 | 9,11E-08 | 4,67E-07 | 5,20E-09 | 5,38E-10 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 7,11E-10 | 1,86E-09 | 5,31E-10 | -3,57E-08 |
| Ionizing radiation <sup>6)</sup> | kBq U235e | 3,93E-01 | 5,08E-04 | 3,93E-01 | 7,87E-01 | 7,69E-04 | 1,34E-03 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,51E-04 | 1,48E-03 | 6,43E-05 | -1,56E-01 |
| Ecotoxicity (freshwater)         | CTUe      | 9,44E+02 | 8,25E-02 | 1,40E+01 | 9,58E+02 | 1,34E-01 | 3,83E-02 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,64E-02 | 3,46E-01 | 6,93E-02 | -2,31E+00 |
| Human toxicity, cancer           | CTUh      | 4,88E-08 | 6,63E-12 | 1,43E-09 | 5,03E-08 | 9,95E-12 | 3,25E-12 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,48E-12 | 5,10E-11 | 1,29E-12 | -2,15E-10 |
| Human tox. non-cancer            | CTUh      | 1,39E-07 | 3,77E-10 | 9,89E-08 | 2,38E-07 | 5,51E-10 | 1,70E-10 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 7,78E-11 | 1,71E-09 | 2,13E-10 | -8,66E-09 |
| SQP <sup>7)</sup>                | -         | 2,16E+01 | 5,87E-01 | 2,20E+01 | 4,42E+01 | 7,64E-01 | 7,87E-02 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 8,00E-02 | 3,28E-01 | 1,66E-01 | -3,89E+00 |

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

## USE OF NATURAL RESOURCES

| Impact category                    | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5        | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4        | D         |
|------------------------------------|------|----------|----------|----------|----------|----------|-----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|-----------|-----------|
| Renew. PER as energy <sup>8)</sup> | MJ   | 6,18E+00 | 7,99E-03 | 6,07E+00 | 1,23E+01 | 1,26E-02 | -2,12E+00 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 2,07E-03 | 2,35E-02 | 1,00E-03  | -1,25E+00 |
| Renew. PER as material             | MJ   | 0,00E+00 | 0,00E+00 | 1,59E+00 | 1,59E+00 | 0,00E+00 | -1,59E+00 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 5,80E-01  |
| Total use of renew. PER            | MJ   | 6,18E+00 | 7,99E-03 | 7,66E+00 | 1,38E+01 | 1,26E-02 | -3,71E+00 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 2,07E-03 | 2,35E-02 | 1,00E-03  | -6,71E-01 |
| Non-re. PER as energy              | MJ   | 9,24E+01 | 5,83E-01 | 2,14E+01 | 1,14E+02 | 8,66E-01 | 9,31E-02  | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,23E-01 | 2,47E+01 | 6,97E+00  | -2,94E+01 |
| Non-re. PER as material            | MJ   | 1,98E+01 | 0,00E+00 | 1,46E-01 | 1,99E+01 | 0,00E+00 | -1,46E-01 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 1,44E+01 | 5,34E+00  | 1,36E+01  |
| Total use of non-re. PER           | MJ   | 1,12E+02 | 5,83E-01 | 2,16E+01 | 1,34E+02 | 8,66E-01 | -5,24E-02 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,23E-01 | 3,91E+01 | 1,23E+01  | -1,58E+01 |
| Secondary materials                | kg   | 1,03E-01 | 2,48E-04 | 4,10E-02 | 1,45E-01 | 3,88E-04 | 5,99E-05  | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 5,60E-05 | 1,20E-03 | 2,41E-05  | 3,35E-01  |
| Renew. secondary fuels             | MJ   | 3,34E-04 | 3,15E-06 | 2,86E-02 | 2,89E-02 | 4,95E-06 | 5,63E-07  | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 7,07E-07 | 9,25E-06 | 4,67E-07  | -2,94E-05 |
| Non-ren. secondary fuels           | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00  |
| Use of net fresh water             | m³   | 8,74E-02 | 8,62E-05 | 1,90E-02 | 1,07E-01 | 1,29E-04 | -1,51E-04 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,68E-05 | 2,77E-04 | -6,33E-04 | -9,33E-03 |

8) PER = Primary energy resources.

## END OF LIFE – WASTE

| Impact category     | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|---------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Hazardous waste     | kg   | 3,47E+00 | 9,88E-04 | 2,00E-01 | 3,67E+00 | 1,53E-03 | 6,47E-04 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,81E-04 | 1,07E-02 | 1,13E-04 | -5,30E-02 |
| Non-hazardous waste | kg   | 1,49E+01 | 1,83E-02 | 6,23E+00 | 2,11E+01 | 2,86E-02 | 3,56E-01 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 3,75E-03 | 4,11E-01 | 8,95E-01 | -7,78E+00 |
| Radioactive waste   | kg   | 1,02E-04 | 1,24E-07 | 1,02E-04 | 2,04E-04 | 1,88E-07 | 3,89E-07 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 3,74E-08 | 3,79E-07 | 1,57E-08 | -3,98E-05 |

## END OF LIFE – OUTPUT FLOWS

| Impact category          | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D        |
|--------------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|----------|
| Components for re-use    | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for recycling  | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,65E-02 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 3,20E-01 | 0,00E+00 | 0,00E+00 |
| Materials for energy rec | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,45E-02 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 2,90E-01 | 0,00E+00 | 0,00E+00 |
| Exported energy          | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,35E-01 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

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

| Impact category      | Unit                               | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|----------------------|------------------------------------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Global Warming Pot.  | kg CO <sub>2</sub> e               | 6,25E+00 | 4,00E-02 | 1,28E+00 | 7,57E+00 | 5,85E-02 | 1,44E-02 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 8,69E-03 | 9,52E-01 | 2,19E-02 | -1,08E+00 |
| Ozone depletion Pot. | kg CFC <sub>11</sub> e             | 2,96E-07 | 4,73E-10 | 1,78E-08 | 3,14E-07 | 7,34E-10 | 1,06E-10 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,34E-10 | 2,23E-10 | 7,11E-11 | -3,12E-08 |
| Acidification        | kg SO <sub>2</sub> e               | 3,06E-02 | 1,05E-04 | 1,17E-02 | 4,24E-02 | 1,18E-04 | 2,85E-05 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 2,10E-05 | 1,44E-04 | 1,74E-05 | -3,82E-03 |
| Eutrophication       | kg PO <sub>4</sub> <sup>3</sup> e  | 1,77E-02 | 2,55E-05 | 1,50E-03 | 1,92E-02 | 2,81E-05 | 1,05E-05 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 5,32E-06 | 4,26E-05 | 9,09E-06 | -1,33E-03 |
| POCP ("smog")        | kg C <sub>2</sub> H <sub>4</sub> e | 6,70E-03 | 9,32E-06 | 6,47E-04 | 7,36E-03 | 1,11E-05 | 3,00E-06 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,99E-06 | 1,17E-05 | 4,63E-06 | -3,97E-04 |
| ADP-elements         | kg Sbe                             | 5,58E-05 | 1,09E-07 | 1,25E-04 | 1,81E-04 | 1,85E-07 | 2,23E-08 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 2,74E-08 | 2,07E-07 | 6,40E-09 | -6,37E-06 |
| ADP-fossil           | MJ                                 | 1,06E+02 | 5,75E-01 | 1,46E+01 | 1,21E+02 | 8,54E-01 | 1,20E-01 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 1,21E-01 | 2,22E-01 | 7,52E-02 | -2,66E+01 |

## ENVIRONMENTAL IMPACTS – GWP-GHG – THE INTERNATIONAL EPD SYSTE ;

| Impact category             | Unit                      | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|-----------------------------|---------------------------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| <b>GWP-GHG<sup>9)</sup></b> | <b>kg CO<sub>2</sub>e</b> | 6,30E+00 | 4,02E-02 | 1,29E+00 | 7,62E+00 | 5,88E-02 | 1,13E-02 | MND | MND | MND | MND | MND | MND | MND | 0,00E+00 | 8,75E-03 | 9,52E-01 | 2,28E-02 | -1,10E+00 |

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH<sub>4</sub> fossil, CH<sub>4</sub> biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO<sub>2</sub> is set to zero.

## VERIFICATION STATEMENT

### VERIFICATION PROCESS FOR THIS EPD

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

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

Why does verification transparency matter? Read more online

This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

### THIRD-PARTY VERIFICATION STATEMENT

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

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

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

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

Imane Uald Lamkaddam as an authorized verifier for EPD Hub Limited 04.05.2025



# ANNEX

## GWP FOSSIL FOR A1-A3 STAGES PER AVAILABLE DIMENSION

| Product number | Product description    | Dimension | Product weight (kg) | Global Warming Potential fossil for A1-A3 stages (kg CO2e/item) |
|----------------|------------------------|-----------|---------------------|-----------------------------------------------------------------|
| 82816202       | alpex bend 90° PPSU    | 16-16     | 0,025               | 0,18                                                            |
| 82820202       |                        | 20-20     | 0,034               | 0,25                                                            |
| 82826202       |                        | 26-26     | 0,055               | 0,40                                                            |
| 82832202       |                        | 32-32     | 0,073               | 0,54                                                            |
| 88440200       | alpex L elbow 90° PPSU | 40-40     | 0,132               | 0,97                                                            |
| 88450200       |                        | 50-50     | 0,204               | 1,50                                                            |
| 88463200       |                        | 63-63     | 0,289               | 2,12                                                            |
| 82826201       | alpex elbow 45° PPSU   | 26-26     | 0,053               | 0,39                                                            |
| 82832201       |                        | 32-32     | 0,069               | 0,51                                                            |
| 88440201       | alpex elbow 45° PPSU   | 40-40     | 0,123               | 0,90                                                            |
| 88450201       |                        | 50-50     | 0,190               | 1,39                                                            |
| 88463201       |                        | 63-63     | 0,266               | 1,95                                                            |
| 82816300       | alpex tee PPSU         | 16-16-16  | 0,037               | 0,27                                                            |
| 82820300       |                        | 20-20-20  | 0,049               | 0,36                                                            |
| 82826300       |                        | 26-26-26  | 0,081               | 0,59                                                            |
| 82832300       |                        | 32-32-32  | 0,105               | 0,77                                                            |
| 88440300       | alpex L tee PPSU       | 40-40-40  | 0,194               | 1,42                                                            |
| 88450300       |                        | 50-50-50  | 0,298               | 2,19                                                            |
| 88463300       |                        | 63-63-63  | 0,462               | 3,39                                                            |

|          |                          |          |       |      |
|----------|--------------------------|----------|-------|------|
| 82816350 | alpex tee reduced PPSU   | 16-20-16 | 0,041 | 0,30 |
| 82820333 | alpex tee reduced PPSU   | 20-16-16 | 0,041 | 0,30 |
| 82820330 |                          | 20-16-20 | 0,045 | 0,33 |
| 82820303 |                          | 20-20-16 | 0,042 | 0,31 |
| 82820360 |                          | 20-26-20 | 0,096 | 0,70 |
| 82826335 |                          | 26-16-20 | 0,056 | 0,41 |
| 82826330 |                          | 26-16-26 | 0,065 | 0,48 |
| 82826353 |                          | 26-20-16 | 0,057 | 0,42 |
| 82826355 |                          | 26-20-20 | 0,060 | 0,44 |
| 82826350 |                          | 26-20-26 | 0,070 | 0,51 |
| 82826303 |                          | 26-26-16 | 0,068 | 0,50 |
| 82826305 |                          | 26-26-20 | 0,070 | 0,51 |
| 82832330 |                          | 32-16-32 | 0,080 | 0,59 |
| 82832356 |                          | 32-20-26 | 0,080 | 0,59 |
| 82832350 |                          | 32-20-32 | 0,085 | 0,62 |
| 82832366 |                          | 32-26-26 | 0,091 | 0,67 |
| 82832360 |                          | 32-26-32 | 0,107 | 0,79 |
| 82840350 | alpex L tee reduced PPSU | 40-20-40 | 0,141 | 1,03 |
| 82840360 |                          | 40-26-40 | 0,154 | 1,13 |
| 82840370 |                          | 40-32-40 | 0,170 | 1,25 |
| 82850350 |                          | 50-20-50 | 0,223 | 1,64 |
| 82850360 |                          | 50-26-50 | 0,239 | 1,75 |

|          |                             |          |       |      |
|----------|-----------------------------|----------|-------|------|
| 82850370 |                             | 50-32-50 | 0,262 | 1,92 |
| 88450380 | alpex L tee reduced PPSU    | 50-40-50 | 0,338 | 2,48 |
| 82863370 |                             | 63-32-63 | 0,339 | 2,49 |
| 88463380 |                             | 63-40-63 | 0,373 | 2,74 |
| 88463390 |                             | 63-50-63 | 0,420 | 3,08 |
| 82816761 | alpex adapter with MT PPSU  | 16-R3/8  | 0,014 | 0,10 |
| 82816762 |                             | 16-R1/2  | 0,017 | 0,12 |
| 82816763 |                             | 16-R3/4  | 0,020 | 0,15 |
| 82820762 |                             | 20-R1/2  | 0,020 | 0,15 |
| 82820763 |                             | 20-R3/4  | 0,022 | 0,16 |
| 82816100 | alpex coupling PPSU         | 16-16    | 0,023 | 0,17 |
| 82820100 |                             | 20-20    | 0,031 | 0,23 |
| 82826100 |                             | 26-26    | 0,050 | 0,37 |
| 82832100 |                             | 32-32    | 0,064 | 0,47 |
| 88440100 | alpex L coupling PPSU       | 40-40    | 0,105 | 0,77 |
| 88450100 |                             | 50-50    | 0,177 | 1,30 |
| 88463100 |                             | 63-63    | 0,248 | 1,82 |
| 82820130 | alpex coupling reduced PPSU | 20-16    | 0,027 | 0,20 |
| 82826130 |                             | 26-16    | 0,036 | 0,26 |
| 82826150 |                             | 26-20    | 0,040 | 0,29 |
| 82832150 |                             | 32-20    | 0,050 | 0,37 |
| 82832160 |                             | 32-26    | 0,058 | 0,43 |

|          |                               |          |       |      |
|----------|-------------------------------|----------|-------|------|
| 82840160 | alpex L coupling reduced PPSU | 40-26    | 0,086 | 0,63 |
| 82840170 |                               | 40-32    | 0,091 | 0,67 |
| 82850170 |                               | 50-32    | 0,127 | 0,93 |
| 88450180 |                               | 50-40    | 0,149 | 1,09 |
| 88463180 |                               | 63-40    | 0,194 | 1,42 |
| 88463190 |                               | 63-50    | 0,221 | 1,62 |
| 82816820 | alpex end cap PPSU            | 16       | 0,012 | 0,09 |
| 82820820 |                               | 20       | 0,016 | 0,12 |
| 82826820 |                               | 26       | 0,026 | 0,19 |
| 82832820 |                               | 32       | 0,034 | 0,25 |
| 88316200 | alpex-plus 90° elbow          | 16-16    | 0,024 | 0,18 |
| 88320200 |                               | 20-20    | 0,033 | 0,24 |
| 88326200 |                               | 26-26    | 0,059 | 0,43 |
| 88316300 | alpex-plus tee                | 16-16-16 | 0,038 | 0,28 |
| 88320300 |                               | 20-20-20 | 0,050 | 0,37 |
| 88326300 |                               | 26-26-26 | 0,086 | 0,63 |
| 88320333 | alpex-plus reduced tee        | 20-16-16 | 0,040 | 0,29 |
| 88320330 |                               | 20-16-20 | 0,045 | 0,33 |
| 88320303 |                               | 20-20-16 | 0,046 | 0,34 |
| 88326335 |                               | 26-16-20 | 0,058 | 0,43 |
| 88326330 |                               | 26-16-26 | 0,068 | 0,50 |
| 88326355 |                               | 26-20-20 | 0,064 | 0,47 |

|          |                                     |          |       |      |
|----------|-------------------------------------|----------|-------|------|
| 88326350 |                                     | 26-20-26 | 0,074 | 0,54 |
| 88316762 | alpex-plus adapter with MT          | 16-R1/2  | 0,020 | 0,15 |
| 88320762 |                                     | 20-R1/2  | 0,024 | 0,18 |
| 88320763 |                                     | 20-R3/4  | 0,025 | 0,18 |
| 88316100 | alpex-plus coupling                 | 16-16    | 0,022 | 0,16 |
| 88320100 |                                     | 20-20    | 0,031 | 0,23 |
| 88326100 |                                     | 26-26    | 0,050 | 0,37 |
| 88320130 | alpex-plus reduced coupling         | 20-16    | 0,026 | 0,19 |
| 88326130 |                                     | 26-16    | 0,036 | 0,26 |
| 88326150 |                                     | 26-20    | 0,04  | 0,29 |
| 88316820 | alpex-plus end cap                  | 16       | 0,012 | 0,09 |
| 82816672 | alpex Flat-sealing adapter straight | 16-R1/2  | 0,035 | 0,26 |
| 82816673 |                                     | 16-R3/4  | 0,047 | 0,34 |
| 82820672 |                                     | 20-R1/2  | 0,037 | 0,27 |
| 82820673 |                                     | 20-R3/4  | 0,049 | 0,36 |

Stages A1-A3 include Raw material extraction and processing, Transport to the manufacturer, Manufacturing

The values are based on the GWP-fossil A1-A3 in table 1 on page 10. To calculate the according value to your fitting please multiply the weight of the product [kg] with the value 7,34 kg CO<sub>2</sub>eq./kg fitting.