

# ENVIRONMENTAL PRODUCT DECLARATION (EPD)

## CommScope Fiber Drop Cable Assembly HCA products for EMEA

# COMMSCOPE®



At CommScope, we believe that corporate responsibility and sustainability means making decisions that have a positive impact on our people, planet and bottom line.

CommScope's leaders have adopted a philosophy on corporate responsibility that embraces our core company values and holds us accountable to produce smart solutions that respect our people and our planet:

Meaningful integrity is a decisive personal and company-wide commitment to enable faster, smarter and more sustainable solutions while demonstrating the utmost respect for our human and natural resources.

This philosophy finds form in three pillars:

- Environmental
- Social
- Governance

Our commitment enables us to invest wisely in our future. By utilizing innovative technology, intelligent engineering and energy-efficient designs, we're building sustainable networks that make our customers more agile while also preserving the natural ecosystems from which we source our raw materials.



This declaration is an environmental product declaration (EPD) in accordance with ISO 14025, EN 15804 + A2. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

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|--|--|
| EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE  | ASTM International,<br>100 barr harbor drive west conshohocken, PA 19428   |
| GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER  | General Program Instructions. Version 8.0. April 29, 2020  |
| MANUFACTURER NAME AND ADDRESS  | CommScope, Inc. 3642 E US Highway 70, Claremont, North Carolina 28610  |
| DECLARATION NUMBER   | EPD xxx  |
| DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT  | CommScope® Fiber Drop Cable Assembly <b>HCA products for EMEA</b><br>Functional Unit: one piece of HCA product for NAR provides a connection between the main fiber network and the end user's premises, with a service life of 25 years, including end-of-life disposition. |
| REFERENCE PCR AND VERSION NUMBER   | PEP ecopassport Program: Part A PCR for Electrical, Electronic and HVAC-R Products and Part B PSR Specific Rules for Wire Cables and Accessories   |
| DESCRIPTION OF PRODUCT APPLICATION/USE   | CommScope's <b>FDCA-HCA products for EMEA</b> are pre-connectorized fiber optic cables designed to connect the main fiber network to the end user's premises. It is a critical component in FTTH (Fiber-to-the-Home) and FTTX (Fiber-to-the-X) deployments.                  |
| PRODUCT RSL DESCRIPTION (IF APPL.)   | 25 Years   |
| MARKETS OF APPLICABILITY   | <b>EMEA</b>  |
| DATE OF ISSUE  | Feb xx, 2026   |
| PERIOD OF VALIDITY   | 5 Years  |
| EPD TYPE   | Product Specific   |
| RANGE OF DATASET VARIABILITY   | N/A  |
| EPD SCOPE  | Cradle-to-Grave  |
| YEAR(S) OF REPORTED PRIMARY DATA   | 2024   |
| LCA SOFTWARE DATABASE(S) & VERSION NUMBER  | SimaPro 10.2.0.0 & Ecoinvent 3.11  |
| LCIA METHODOLOGY & VERSION NUMBER  | CML- IA Baseline 3.11, TRACI 2.2 and EN15804+A2 (adapted) 1.03   |
| The sub-category PCR review was conducted by:  |   |
| This declaration was independently verified in accordance with ISO 14025: 2006. The "PEP ecopassport Program PCR for electrical, electronic and HVAC-R products", v4.0, 2021 based on EN 15804:2012 + A2:2019, serves as the core PCR.<br><input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL | Timothy S Brooke<br>ASTM International   |
| This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:  |   |
| This life cycle assessment was independently verified in accordance with ISO 14044 and reference PCR by:   | Thomas P. Gloria, Ph. D.<br>Industrial Ecology Consultants   |

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building. This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of EN 15804:2012+A2:2019 are met. It should be noted that different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

## General Information

### Description of Company/Organization

CommScope (NASDAQ: COMM) helps design, build and manage wired and wireless networks around the world. Corporate responsibility and sustainability drive us to make decisions that benefit people, society, the planet and our bottom line. We enable faster, smarter and more sustainable solutions while respecting human and natural resources. Innovative technology, intelligent engineering and energy-efficient design help us meet our goals. CommScope builds sustainable networks that make our customers more agile, simultaneously helping to preserve the natural ecosystems from which we source components and materials.

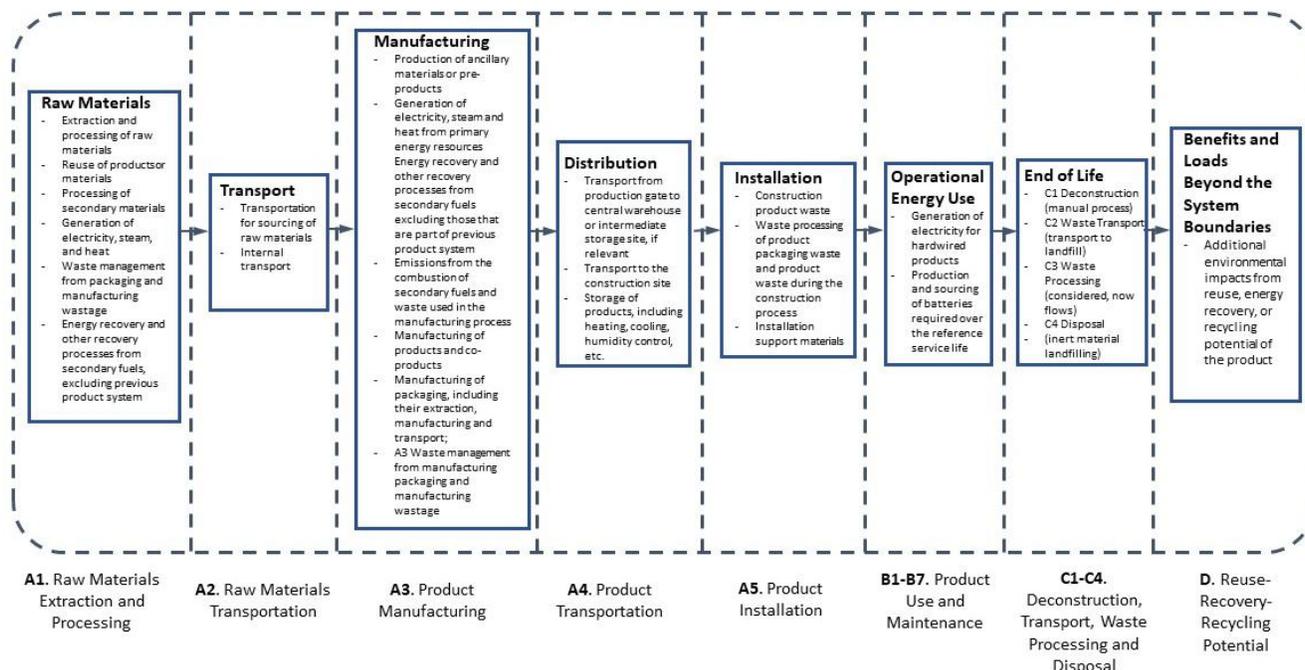
### Product Description

CommScope’s Fiber Drop Cable Assembly (Fiber Optic Drop Cable Assembly with PRODIGY™ hardened small-form size connectivity) FDCA-HCA products are pre-connectorized fiber optic cables designed to connect the main fiber network to the end user’s premises. It is a critical component in FTTH (Fiber-to-the-Home) and FTTX (Fiber-to-the-X) deployments.

This EPD covers FDCA-HCA product types (EMEA):

- HCA-A01F; HCA-H01F
- HCA-D01G
- HCA-D01K; HCA-Y01K; HCA-AA1K; HCA-H01K; HCA-HH1K; HCA-A01K

### Flow Diagram



### Manufacturer Specific EPD

This product-specific EPD was developed based on the cradle-to-grave (modules A1-C4) Life Cycle Assessment. The EPD accounts for raw material extraction and processing, transport, product manufacturing, distribution, installation, disposal, and potential benefits and loads following the end-of-life disposal. The products were analyzed by 3 parts: one meter of cable, one piece of connector/converter kit and one piece of packaging,

respectively. The total environmental impact results were sum up with the results from 3 parts together, by using the formular given in **LCA sum results calculation guidance** (page 33).

### Application

The FDCA-HCA products are pre-connectorized fiber optic cables designed to connect the main fiber network to the end user’s premises.

### Material Composition

The primary product components and/or materials must be indicated as a percentage mass to enable the user of the EPD to understand the composition of the product in delivery status.

The compositions of the FDCA-HCA products are given by one meter of cable, one piece of connector/converter kit separately as follows:

| Cables      | Weight (g/m) | LSZH   | PBT   | Glass yarn | Aramid yarn | Polyester ripcord | Gel   | Optic fiber |
|-------------|--------------|--------|-------|------------|-------------|-------------------|-------|-------------|
| Cable F     | 11.9         | 88.75% | 0.00% | 0.00%      | 10.65%      | 0.00%             | 0.00% | 0.59%       |
| Cable G     | 24.3         | 51.97% | 5.27% | 39.42%     | 0.00%       | 0.46%             | 2.59% | 0.29%       |
| Cable K old | 32.3         | 55.39% | 8.09% | 32.77%     | 1.10%       | 1.11%             | 1.32% | 0.22%       |
| Cable K new | 32.4         | 55.27% | 8.13% | 31.55%     | 2.28%       | 0.40%             | 2.16% | 0.22%       |

| Connector/<br>Converter kits         | Total weight (g) | PEI resins | PBT resin | Nylon 66 | Silicone rubber | TPE    | Ceramic | Stainless Steel | Rest resins | Epoxy |
|--------------------------------------|------------------|------------|-----------|----------|-----------------|--------|---------|-----------------|-------------|-------|
| UNIVERSAL QUARTER TURN CONNECTOR KIT | 9.29             | 56.44%     | 0.00%     | 0.00%    | 14.66%          | 10.23% | 3.16%   | 3.47%           | 6.66%       | 5.39% |
| FULLSIZE AND BAYONET CONVERTER KIT   | 29.9             | 46.52%     | 46.29%    | 5.95%    | 1.24%           | 0.00%  | 0.00%   | 0.00%           | 0.00%       | 0.00% |
| FULLSIZE CONVERTER KIT               | 15.7             | 43.46%     | 49.84%    | 5.68%    | 1.02%           | 0.00%  | 0.00%   | 0.00%           | 0.00%       | 0.00% |
| DLX CONVERTER KIT                    | 6.83             | 90.78%     | 0.00%     | 0.00%    | 0.44%           | 8.78%  | 0.00%   | 0.00%           | 0.00%       | 0.00% |

### Technical Details

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

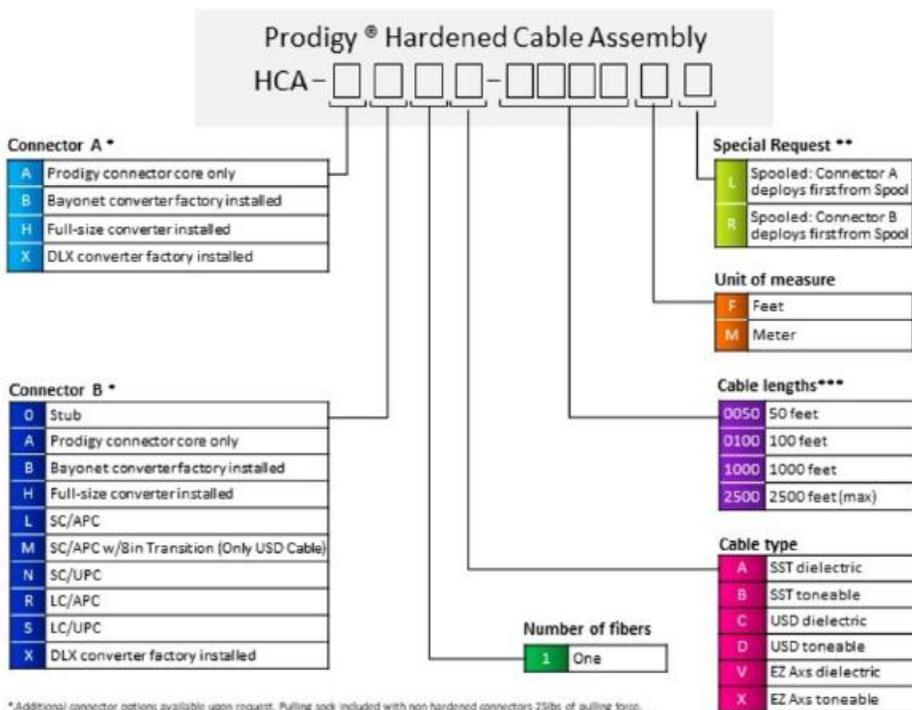
## Product Classification

|                              |   |
|------------------------------|---|
| <b>Regional Availability</b> | Asia   Australia/New Zealand   EMEA   Latin America   North America |
| <b>Product Type</b>          | Fiber drop cable assembly   |
| <b>Product Brand</b>         | PRODIGY™  |
| <b>Product Series</b>        | HCA   |

## General Specifications

|                     |       |
|---------------------|-------|
| <b>Jacket Color</b> | Black |
|---------------------|-------|

## Ordering Tree



\*Additional connector options available upon request. Pulling sock included with non-hardened connectors 25lb of pulling force.  
 \*\*Drags are automatically coiled 0 to 1000 ft unless "L" or "R" is specified for the range of length. Drags are automatically spooled at 1,000ft with connector B deploying first from spool. Add "L" to lengths over 1,000ft if Connector A needs to deploy first.  
 \*\*\*Cable length shown as an example; additional cable lengths available upon request up to 2,500

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## Mechanical Specifications

**Dust Cap Pulling Force, minimum** 445 N | 100.04 lbf

## Optical Specifications

**Fiber Mode** Singlemode

**Fiber Type** G.657.A2, TeraSPEED®

## Environmental Specifications

**Environmental Space** Outdoor

**Jacket UV Resistance** UV stabilized

## Packaging and Weights

**Packaging quantity** 1

## Methodological Framework

### Functional Unit

The declaration refers to the functional unit of one piece of FDCA-HCA product.

| Name          | Value | Unit            |
|---------------|-------|-----------------|
| Function Unit | 1     | Assembled piece |

### System Boundary

This is a cradle to grave Environmental Product Declaration. The following life cycle phases were considered:

| Life Cycle Stage                                | Life Cycle Module                         | Module | X = Included/ MND = Module Not Declared |
|---|---|--------|---|
| Product Stage                                   | Raw Material Supply & Parts manufacturing | A1     | X                                       |
|   | Transport                                 | A2     | X                                       |
|   | Assembly process                          | A3     | X                                       |
| Construction Process Stage                      | Transport from gate to the site           | A4     | X                                       |
|   | Installation process                      | A5     | X                                       |
| Use Stage                                       | Use                                       | B1**   | X                                       |
|   | Maintenance                               | B2**   | X                                       |
|   | Repair                                    | B3**   | X                                       |
|   | Replacement                               | B4**   | X                                       |
|   | Refurbishment                             | B5**   | X                                       |
|   | Operational energy use                    | B6**   | X                                       |
|   | Operational water use                     | B7**   | X                                       |
| End of Life Stage*                              | Deconstruction/ demolition                | C1**   | X                                       |
|   | Transport                                 | C2     | X                                       |
|   | Waste processing                          | C3     | X                                       |
|   | Disposal                                  | C4     | X                                       |
| Benefits and Loads Beyond the System Boundaries | Reuse-Recovery-Recycling potential        | D      | X                                       |

\*This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

\*\*There is no activity in these stages, their declared value is "0".

### Reference Service Life

The reference service life of the Dome and Base enclosure is 25 years.

### Allocation

Allocation was determined on a per piece basis for the system.

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## Cut-off Criteria

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Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For this, a documented assumption is permissible.

For Hazardous Substances the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No processes were neglected or excluded. Capital items for the production processes (machine, buildings, etc.) were not taken into consideration.

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## Data Sources

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Primary data were collected for every process in the product system under the control of CommScope. Secondary data from the Ecoinvent 3.11 database were utilized when necessary. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the product category.

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## Data Quality

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The data sources used are complete and representative of global systems in terms of geographic and technological coverage and are a recent vintage (i.e. less than ten years old). Primary data are based on direct information from CommScope manufacturing site. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

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## Period Under Review

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The period under review is the full calendar year of 2024.

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## Treatment of Biogenic Carbon

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The uptake and release of biogenic carbon throughout the product life cycle follows EN15804+A2 Section 6.4.4.

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## Comparability and Benchmarking

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A comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to EN 15804 + A2 and the building context, respectively the product-specific characteristics of performance, are taken into account. Environmental declarations from different programs may not be comparable. Full conformance with the PCR allows for EPD comparability only when all stages of a product's life cycle have been considered. However, variations and deviations are possible.

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## Units

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The LCA results within this EPD are reported in SI units.

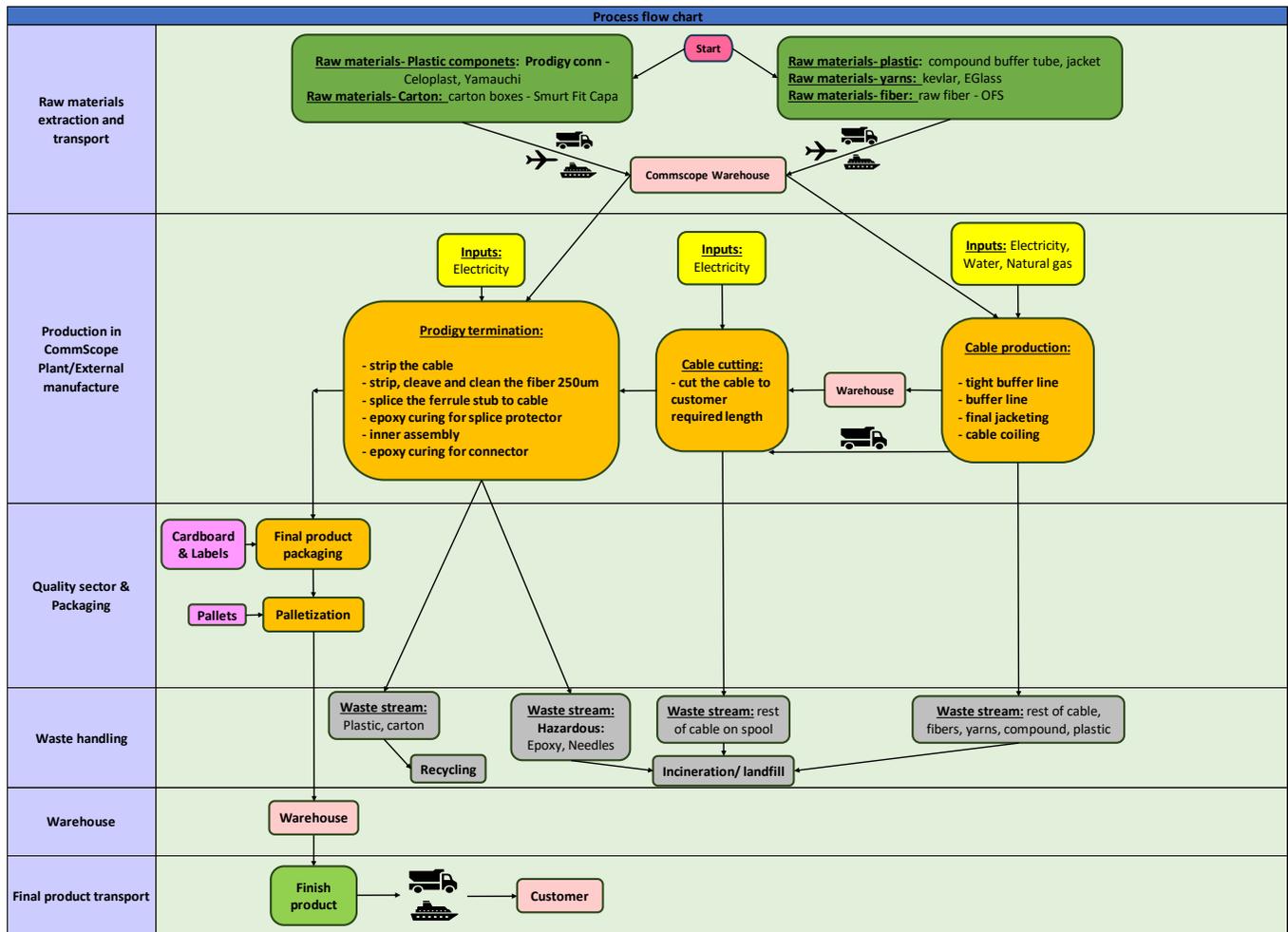
## Additional Environmental Information

### Background Data

For life cycle modeling of the products considered, SimaPro- LCA software tool, developed by PRé-Sustainability, is used. The Ecoinvent database contains consistent and documented datasets which are available online. To ensure comparability of results in the LCA, data from the Ecoinvent database were used for materials, energy, transportation, and waste treatment.

### Manufacturing

The manufacturing process for FDCA-HCA products begins with the sourcing of raw materials, primarily polymer compounds, yarns, rods, optic fiber, buffer gel etc. with transportation to CommScope manufacturing plant. Through buffer, jacketing lines, the fiber drop cable is coiled in reel and moved to cable assembly department. The cable will be cut to the required length in the final assembly first, followed by optic fiber connectorisation processes, including, cable stripping, fiber cleaving, ferrule splicing and epoxy curing etc. After optical testing, the final cable assembly product will be packaged and ready to be shipped to customers.



### Packaging

The packaging for this product depends on the length of the cable, slightly increasing with the increase of the cable length. To simply the variation, 3 packaging sizes are defined based on the cable length range. Packaging small: (cable length ≤80m); Packaging medium: (100 ≤ cable length ≤ 260m); Packaging large: (cable length ≥300m). The packaging for this product is composed of three materials: corrugated fiberboard, which is used for the outer packaging and inner buffer inserts, wooden pallets, which are primarily used for transportation, and small amount of Nylon66 cable tie.

| Packaging | Total weight (g) | Fiberboard | Wood   | Nylon 66 | Biogenic Carbon Content (kg C)* |
|-----------|------------------|------------|--------|----------|---------------------------------|
| Small     | 269.9            | 49.06%     | 50.94% | 0.00%    | 0.13                            |
| Medium    | 922.4            | 61.47%     | 37.94% | 0.59%    | 0.46                            |
| Large     | 2280.8           | 44.72%     | 54.81% | 0.47%    | 1.14                            |

\*The Biogenic Carbon Content in packaging materials is calculated based on 50% dry mass of fiberboard and wood.

## Transformation

| Transport to Installation Site (A4) |                              |          |
|-------------------------------------|------------------------------|----------|
| Description                         | Value                        | Unit     |
| Transport type                      | Truck/ lorry > 32 metric ton |          |
| Fuel type/ Liters of Fuel           | Diesel, compliant with EURO5 |          |
| Liters of Fuel                      | 35                           | l/100 km |
| Transport Distance (average)        | 3500                         | km       |
| Capacity Utilization                | 85                           | %        |
| Weight of products transported      | -                            | kg       |

## Product Installation

CommScope FDCA-HCA products are distributed and installed by trained technicians in accordance with applicable local and national standards. Installation involves only the management of packaging waste, as there is no energy consumption, material loss, or use of auxiliary materials during the process. The product is designed for complete manual installation without the need for power tools, resulting in negligible electricity use and no installation scrap.

| Installation into the building (A5)               |                 |                  |                 |                    |
|---|-----------------|------------------|-----------------|--------------------|
| Name  | Packaging Small | Packaging Medium | Packaging Large | Unit               |
| Auxiliary materials                               | -               | -                | -               | kg                 |
| Water consumption                                 | -               | -                | -               | m <sup>3</sup>     |
| Other resources                                   | -               | -                | -               | kg                 |
| Electricity consumption                           | -               | -                | -               | kWh                |
| Other energy carriers                             | -               | -                | -               | MJ                 |
| Product loss per functional unit                  | 0.00E+00        | 0.00E+00         | 0.00E+00        | kg                 |
| Waste materials at construction site              | 0.00E+00        | 0.00E+00         | 0.00E+00        | kg                 |
| Output substance (recycle)                        | 0.00E+00        | 0.00E+00         | 0.00E+00        | kg                 |
| Output substance (landfill)                       | 0.00E+00        | 0.00E+00         | 0.00E+00        | kg                 |
| Output substance (incineration)                   | 0.00E+00        | 0.00E+00         | 0.00E+00        | kg                 |
| Packaging waste (recycle)                         | 1.06E-01        | 4.54E-01         | 8.16E-01        | kg                 |
| Packaging waste (landfill)                        | 9.40E-02        | 2.85E-01         | 8.24E-01        | kg                 |
| Packaging waste (incineration)                    | 7.00E-02        | 1.83E-01         | 6.41E-01        | kg                 |
| Direct emissions to ambient air*, soil, and water | 1.03E-01        | 2.68E-01         | 9.40E-01        | kg CO <sub>2</sub> |
| VOC emissions                                     | -               | -                | -               | kg                 |

\*CO<sub>2</sub> emissions to air from disposal of packaging

| Reference Service Life   |       |       |
|--|-------|-------|
| Name   | Value | Unit  |
| Reference Service Life   | 25    | years |
| Declared product properties (at the gate) and finishes, etc.   | -     |       |
| Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes | -     |       |
| An assumed quality of work, when installed in accordance with the manufacturer's instructions  | -     |       |
| Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature | -     |       |
| Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure  | -     |       |
| Usage conditions, e.g. frequency of use, mechanical exposure   | -     |       |
| Maintenance e.g. required frequency, type and quality and replacement of components  | -     |       |

### Product Use

No cleaning, maintenance, repair, replacement or refurbishment is required. There is no operational energy or water use.

| Operational Energy Use (B6)                  |       |                |
|--|-------|----------------|
| Name   | Value | Unit           |
| Ancillary materials specified by material    | -     | kg             |
| Net freshwater consumption                   | -     | m <sup>3</sup> |
| Electricity consumption                      | -     | kWh            |
| Power output of equipment                    | -     | kWh            |
| Characteristic performance                   | -     | -              |
| Further assumptions for scenario development | -     | -              |

## Disposal

The product goes to 100% landfill. The landfilling weight is given as a range from the shortest to the longest HCA products according to the cable length.

| End of Life (C2-C4)               |                     |      |
|-----------------------------------|---------------------|------|
| Name                              | HCA                 | Unit |
| Collected separately              | 0                   | kg   |
| Collected as mixed waste          | 0                   | kg   |
| Reuse                             | 0                   | kg   |
| Recycling                         | 0                   | kg   |
| Landfilling                       | 2.63E-01 ~ 1.62E+01 | kg   |
| Incineration with energy recovery | 0                   | kg   |
| Energy conversion- Electricity    | 0                   | %    |
| Energy conversion- Heat           | 0                   | %    |

## Re-use Phase

Re-use of the product is not common. However, energy in the form of heat and electricity has been recovered from the waste processing of packaging materials at the Installation stage (A5). Energy recovery for the incineration of packaging materials was calculated according to Appendix D of the Part A PCR.

| Energy recovery Potential (D)  |                 |                  |                 |      |
|--|-----------------|------------------|-----------------|------|
| Name   | Packaging Small | Packaging Medium | Packaging Large | Unit |
| Net energy benefit of energy recovery from packaging wastes incineration (A5-Installation) in the form of heat                 | 5.94E-01        | 1.57E+00         | 5.47E+00        | MJ   |
| Net energy benefit of energy recovery from packaging wastes incineration (A5-Installation) in the form of electricity          | 2.38E-01        | 6.28E-01         | 2.19E+00        | MJ   |
| Net energy benefit of energy recovery from product wastes incineration (C2-C4 End of life Disposal) in the form of heat        | 0.00E+00        | 0.00E+00         | 0.00E+00        | MJ   |
| Net energy benefit of energy recovery from product wastes incineration (C2-C4 End of life Disposal) in the form of electricity | 0.00E+00        | 0.00E+00         | 0.00E+00        | MJ   |
| Total Net energy benefits of energy recovery in the form of heat   | 5.94E-01        | 1.57E+00         | 5.47E+00        | MJ   |
| Total Net energy benefits of energy recovery in the form of electricity  | 2.38E-01        | 6.28E-01         | 2.19E+00        | MJ   |

## LCA Results – HCA for EMEA Cables

Results shown below are for HCA Cable F (per 1 meter).

| CML-IA baseline V3.11 / EU25     |              |          |          |          |          |          |
|----------------------------------|--------------|----------|----------|----------|----------|----------|
| Impact category                  | Unit         | Total    | A1-A3    | A4       | C2       | C4       |
| Abiotic depletion                | kg Sb eq     | 1.33E-07 | 1.13E-07 | 1.59E-08 | 3.57E-09 | 2.44E-10 |
| Abiotic depletion (fossil fuels) | MJ           | 8.49E-01 | 7.46E-01 | 8.13E-02 | 1.83E-02 | 2.90E-03 |
| Global warming (GWP100a)         | kg CO2 eq    | 4.36E-02 | 3.56E-02 | 5.63E-03 | 1.26E-03 | 1.06E-03 |
| Ozone layer depletion (ODP)      | kg CFC-11 eq | 1.71E-09 | 1.58E-09 | 9.87E-11 | 2.22E-11 | 2.67E-12 |
| Photochemical oxidation          | kg C2H4 eq   | 1.21E-05 | 1.08E-05 | 8.66E-07 | 1.94E-07 | 1.89E-07 |
| Acidification                    | kg SO2 eq    | 1.18E-04 | 9.97E-05 | 1.43E-05 | 3.19E-06 | 7.09E-07 |
| Eutrophication                   | kg PO4--- eq | 2.35E-04 | 3.82E-05 | 3.89E-06 | 8.72E-07 | 1.92E-04 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| TRACI 2.2 V1.00 / US-Canadian 2008 |              |          |          |          |          |          |
|------------------------------------|--------------|----------|----------|----------|----------|----------|
| Impact category                    | Unit         | Total    | A1-A3    | A4       | C2       | C4       |
| Ozone depletion                    | kg CFC-11 eq | 2.26E-09 | 2.09E-09 | 1.30E-10 | 2.93E-11 | 3.52E-12 |
| Global warming                     | kg CO2 eq    | 4.29E-02 | 3.51E-02 | 5.58E-03 | 1.25E-03 | 9.84E-04 |
| Smog                               | kg O3 eq     | 2.02E-03 | 1.51E-03 | 3.99E-04 | 8.93E-05 | 2.26E-05 |
| Acidification                      | kg SO2 eq    | 1.24E-04 | 1.03E-04 | 1.67E-05 | 3.72E-06 | 9.31E-07 |
| Respiratory effects                | kg PM2.5 eq  | 1.59E-05 | 1.16E-05 | 3.36E-06 | 7.54E-07 | 1.36E-07 |
| Freshwater eutrophication          | kg P eq      | 2.98E-05 | 3.44E-06 | 2.33E-07 | 5.22E-08 | 2.61E-05 |
| Marine eutrophication              | kg N eq      | 3.24E-05 | 1.56E-05 | 3.42E-06 | 7.65E-07 | 1.26E-05 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set |              |          |          |          |          |          |
|--|--------------|----------|----------|----------|----------|----------|
| Impact category  | Unit         | Total    | A1-A3    | A4       | C2       | C4       |
| Acidification  | mol H+ eq    | 1.46E-04 | 1.22E-04 | 1.88E-05 | 4.21E-06 | 9.56E-07 |
| Climate change   | kg CO2 eq    | 4.44E-02 | 3.64E-02 | 5.67E-03 | 1.27E-03 | 1.11E-03 |
| Climate change - Biogenic  | kg CO2 eq    | 4.41E-04 | 4.37E-04 | 3.46E-06 | 7.77E-07 | 5.79E-07 |
| Climate change - Fossil  | kg CO2 eq    | 4.39E-02 | 3.59E-02 | 5.66E-03 | 1.27E-03 | 1.11E-03 |
| Climate change - Land use and LU change                                | kg CO2 eq    | 2.29E-05 | 2.03E-05 | 2.03E-06 | 4.56E-07 | 8.09E-08 |
| Ecotoxicity, freshwater  | CTUe         | 1.30E-01 | 7.80E-02 | 9.70E-03 | 2.18E-03 | 4.05E-02 |
| Ecotoxicity, freshwater - inorganics                                   | CTUe         | 1.17E-01 | 6.54E-02 | 9.32E-03 | 2.09E-03 | 4.04E-02 |
| Ecotoxicity, freshwater - organics                                     | CTUe         | 1.30E-02 | 1.25E-02 | 3.86E-04 | 8.67E-05 | 2.37E-05 |
| Particulate matter   | disease inc. | 1.76E-09 | 1.04E-09 | 5.73E-10 | 1.29E-10 | 2.13E-11 |
| Eutrophication, marine   | kg N eq      | 6.82E-05 | 3.57E-05 | 6.38E-06 | 1.43E-06 | 2.47E-05 |
| Eutrophication, freshwater   | kg P eq      | 6.22E-06 | 5.71E-06 | 3.99E-07 | 8.97E-08 | 1.40E-08 |
| Eutrophication, terrestrial  | mol N eq     | 3.62E-04 | 2.73E-04 | 6.95E-05 | 1.55E-05 | 3.90E-06 |
| Human toxicity, cancer   | CTUh         | 7.67E-12 | 6.46E-12 | 9.25E-13 | 2.08E-13 | 7.41E-14 |
| Human toxicity, cancer - inorganics                                    | CTUh         | 3.65E-12 | 3.11E-12 | 3.98E-13 | 8.92E-14 | 5.58E-14 |
| Human toxicity, cancer - organics                                      | CTUh         | 4.02E-12 | 3.35E-12 | 5.27E-13 | 1.18E-13 | 1.84E-14 |
| Human toxicity, non-cancer   | CTUh         | 2.99E-10 | 2.21E-10 | 5.33E-11 | 1.20E-11 | 1.29E-11 |
| Human toxicity, non-cancer - inorganics                                | CTUh         | 2.73E-10 | 2.00E-10 | 5.00E-11 | 1.12E-11 | 1.16E-11 |

|                                       |              |          |          |          |          |           |
|---------------------------------------|--------------|----------|----------|----------|----------|-----------|
| Human toxicity, non-cancer - organics | CTUh         | 2.61E-11 | 2.08E-11 | 3.30E-12 | 7.42E-13 | 1.29E-12  |
| Ionising radiation                    | kBq U-235 eq | 6.52E-03 | 6.40E-03 | 9.27E-05 | 2.08E-05 | 2.49E-06  |
| Land use                              | Pt           | 1.95E-01 | 8.60E-02 | 8.32E-02 | 1.87E-02 | 6.94E-03  |
| Ozone depletion                       | kg CFC11 eq  | 2.30E-09 | 2.15E-09 | 1.24E-10 | 2.78E-11 | 3.34E-12  |
| Photochemical ozone formation         | kg NMVOC eq  | 1.89E-04 | 1.51E-04 | 2.97E-05 | 6.67E-06 | 1.60E-06  |
| Resource use, fossils                 | MJ           | 9.62E-01 | 8.57E-01 | 8.28E-02 | 1.86E-02 | 2.94E-03  |
| Resource use, minerals and metals     | kg Sb eq     | 1.32E-07 | 1.13E-07 | 1.59E-08 | 3.57E-09 | 2.44E-10  |
| Water use                             | m3 depriv.   | 2.18E-02 | 2.33E-02 | 3.76E-04 | 8.45E-05 | -1.92E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Resource Use |  |                |          |          |          |          |           |
|--------------------------|--|----------------|----------|----------|----------|----------|-----------|
|                          | Parameter  | Unit           | Total    | A1-A3    | A4       | C2       | C4        |
| PERE                     | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 5.13E-02 | 4.97E-02 | 1.28E-03 | 2.87E-04 | 4.06E-05  |
| PERM                     | Use of renewable primary energy resources used as raw materials  | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PERT                     | Total use of renewable primary energy resources  | MJ             | 5.13E-02 | 4.97E-02 | 1.28E-03 | 2.87E-04 | 4.06E-05  |
| PENRE                    | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 1.03E+00 | 9.20E-01 | 8.80E-02 | 1.98E-02 | 3.13E-03  |
| PENRM                    | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PENRT                    | Total use of non-renewable primary energy resources  | MJ             | 1.03E+00 | 9.20E-01 | 8.80E-02 | 1.98E-02 | 3.13E-03  |
| SM                       | Use of secondary material  | kg             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| RSF                      | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| NRSF                     | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| FW                       | Net use of fresh water   | m <sup>3</sup> | 2.09E-02 | 2.24E-02 | 3.77E-04 | 8.47E-05 | -1.92E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Waste Categories and Output Flows |                               |      |          |          |          |          |          |
|---|-------------------------------|------|----------|----------|----------|----------|----------|
|   | Parameter                     | Unit | Total    | A1-A3    | A4       | C2       | C4       |
| HWD   | Hazardous waste disposed      | kg   | 2.86E-05 | 2.57E-05 | 2.36E-06 | 5.31E-07 | 6.28E-08 |
| NHWD  | Non-hazardous waste disposed  | kg   | 2.24E-02 | 1.61E-03 | 7.13E-03 | 1.60E-03 | 1.21E-02 |
| RWD   | Radioactive waste disposed    | kg   | 1.49E-06 | 1.47E-06 | 2.28E-08 | 5.12E-09 | 6.08E-10 |
| CRU   | Components for re-use         | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR   | Materials for recycling       | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MER   | Materials for energy recovery | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE  | Exported energy               | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

Results shown below are for HCA Cable G (per 1 meter).

| <b>CML-IA baseline V3.11 / EU25</b> |              |              |              |           |           |           |
|-------------------------------------|--------------|--------------|--------------|-----------|-----------|-----------|
| <b>Impact category</b>              | <b>Unit</b>  | <b>Total</b> | <b>A1-A3</b> | <b>A4</b> | <b>C2</b> | <b>C4</b> |
| Abiotic depletion                   | kg Sb eq     | 3.07E-06     | 3.03E-06     | 3.20E-08  | 7.19E-09  | 4.92E-10  |
| Abiotic depletion (fossil fuels)    | MJ           | 1.48E+00     | 1.28E+00     | 1.64E-01  | 3.67E-02  | 5.84E-03  |
| Global warming (GWP100a)            | kg CO2 eq    | 8.44E-02     | 6.84E-02     | 1.13E-02  | 2.54E-03  | 2.14E-03  |
| Ozone layer depletion (ODP)         | kg CFC-11 eq | 1.81E-08     | 1.78E-08     | 1.99E-10  | 4.46E-11  | 5.38E-12  |
| Photochemical oxidation             | kg C2H4 eq   | 2.15E-05     | 1.90E-05     | 1.74E-06  | 3.91E-07  | 3.81E-07  |
| Acidification                       | kg SO2 eq    | 2.97E-04     | 2.61E-04     | 2.88E-05  | 6.42E-06  | 1.43E-06  |
| Eutrophication                      | kg PO4--- eq | 5.05E-04     | 1.08E-04     | 7.83E-06  | 1.76E-06  | 3.87E-04  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| <b>TRACI 2.2 V1.00 / US-Canadian 2008</b> |              |              |              |           |           |           |
|---|--------------|--------------|--------------|-----------|-----------|-----------|
| <b>Impact category</b>                    | <b>Unit</b>  | <b>Total</b> | <b>A1-A3</b> | <b>A4</b> | <b>C2</b> | <b>C4</b> |
| Ozone depletion                           | kg CFC-11 eq | 2.38E-08     | 2.35E-08     | 2.63E-10  | 5.90E-11  | 7.08E-12  |
| Global warming                            | kg CO2 eq    | 8.34E-02     | 6.77E-02     | 1.12E-02  | 2.52E-03  | 1.98E-03  |
| Smog                                      | kg O3 eq     | 5.07E-03     | 4.04E-03     | 8.04E-04  | 1.80E-04  | 4.55E-05  |
| Acidification                             | kg SO2 eq    | 3.13E-04     | 2.70E-04     | 3.36E-05  | 7.50E-06  | 1.87E-06  |
| Respiratory effects                       | kg PM2.5 eq  | 4.61E-05     | 3.75E-05     | 6.77E-06  | 1.52E-06  | 2.75E-07  |
| Freshwater eutrophication                 | kg P eq      | 6.48E-05     | 1.18E-05     | 4.68E-07  | 1.05E-07  | 5.25E-05  |
| Marine eutrophication                     | kg N eq      | 7.07E-05     | 3.68E-05     | 6.88E-06  | 1.54E-06  | 2.55E-05  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| <b>EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set</b> |              |              |              |           |           |           |
|---|--------------|--------------|--------------|-----------|-----------|-----------|
| <b>Impact category</b>  | <b>Unit</b>  | <b>Total</b> | <b>A1-A3</b> | <b>A4</b> | <b>C2</b> | <b>C4</b> |
| Acidification   | mol H+ eq    | 3.69E-03     | 3.19E-04     | 3.79E-05  | 8.47E-06  | 1.93E-06  |
| Climate change  | kg CO2 eq    | 1.20E+00     | 6.97E-02     | 1.14E-02  | 2.56E-03  | 2.24E-03  |
| Climate change - Biogenic   | kg CO2 eq    | 7.91E-03     | 8.24E-04     | 6.96E-06  | 1.56E-06  | 1.17E-06  |
| Climate change - Fossil   | kg CO2 eq    | 1.19E+00     | 6.88E-02     | 1.14E-02  | 2.56E-03  | 2.24E-03  |
| Climate change - Land use and LU change                                       | kg CO2 eq    | 8.52E-04     | 6.47E-05     | 4.09E-06  | 9.19E-07  | 1.63E-07  |
| Ecotoxicity, freshwater   | CTUe         | 2.93E+00     | 2.16E-01     | 1.95E-02  | 4.39E-03  | 8.15E-02  |
| Ecotoxicity, freshwater - inorganics  | CTUe         | 2.74E+00     | 2.00E-01     | 1.88E-02  | 4.21E-03  | 8.14E-02  |
| Ecotoxicity, freshwater - organics  | CTUe         | 1.96E-01     | 1.55E-02     | 7.78E-04  | 1.75E-04  | 4.77E-05  |
| Particulate matter  | disease inc. | 2.51E-08     | 2.51E-09     | 1.15E-09  | 2.59E-10  | 4.30E-11  |
| Eutrophication, marine  | kg N eq      | 8.59E-04     | 7.19E-05     | 1.28E-05  | 2.88E-06  | 4.98E-05  |
| Eutrophication, freshwater  | kg P eq      | 2.72E-04     | 1.85E-05     | 8.04E-07  | 1.81E-07  | 2.81E-08  |
| Eutrophication, terrestrial   | mol N eq     | 8.04E-03     | 7.10E-04     | 1.40E-04  | 3.13E-05  | 7.85E-06  |
| Human toxicity, cancer  | CTUh         | 2.30E-10     | 2.85E-11     | 1.86E-12  | 4.18E-13  | 1.49E-13  |
| Human toxicity, cancer - inorganics   | CTUh         | 1.11E-10     | 2.08E-11     | 8.01E-13  | 1.80E-13  | 1.12E-13  |
| Human toxicity, cancer - organics   | CTUh         | 1.19E-10     | 7.65E-12     | 1.06E-12  | 2.38E-13  | 3.70E-14  |
| Human toxicity, non-cancer  | CTUh         | 8.74E-09     | 1.63E-09     | 1.07E-10  | 2.41E-11  | 2.60E-11  |
| Human toxicity, non-cancer - inorganics                                       | CTUh         | 7.98E-09     | 1.58E-09     | 1.01E-10  | 2.26E-11  | 2.34E-11  |
| Human toxicity, non-cancer - organics   | CTUh         | 7.68E-10     | 4.76E-11     | 6.65E-12  | 1.49E-12  | 2.59E-12  |

|                                   |              |          |          |          |          |           |
|-----------------------------------|--------------|----------|----------|----------|----------|-----------|
| Ionising radiation                | kBq U-235 eq | 1.48E-01 | 1.35E-02 | 1.87E-04 | 4.19E-05 | 5.01E-06  |
| Land use                          | Pt           | 2.99E+00 | 2.20E-01 | 1.68E-01 | 3.77E-02 | 1.40E-02  |
| Ozone depletion                   | kg CFC11 eq  | 7.97E-08 | 2.57E-08 | 2.49E-10 | 5.60E-11 | 6.72E-12  |
| Photochemical ozone formation     | kg NMVOC eq  | 7.44E-03 | 3.82E-04 | 5.99E-05 | 1.34E-05 | 3.23E-06  |
| Resource use, fossils             | MJ           | 3.85E+01 | 1.49E+00 | 1.67E-01 | 3.74E-02 | 5.92E-03  |
| Resource use, minerals and metals | kg Sb eq     | 8.99E-06 | 3.03E-06 | 3.20E-08 | 7.19E-09 | 4.91E-10  |
| Water use                         | m3 depriv.   | 9.95E-01 | 2.42E-02 | 7.58E-04 | 1.70E-04 | -3.86E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Resource Use |  |                |          |          |          |          |           |
|--------------------------|--|----------------|----------|----------|----------|----------|-----------|
| Parameter                |  | Unit           | Total    | A1-A3    | A4       | C2       | C4        |
| PERE                     | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 1.16E-01 | 1.13E-01 | 2.57E-03 | 5.78E-04 | 8.17E-05  |
| PERM                     | Use of renewable primary energy resources used as raw materials  | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PERT                     | Total use of renewable primary energy resources  | MJ             | 1.16E-01 | 1.13E-01 | 2.57E-03 | 5.78E-04 | 8.17E-05  |
| PENRE                    | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 1.82E+00 | 1.60E+00 | 1.77E-01 | 3.98E-02 | 6.30E-03  |
| PENRM                    | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PENRT                    | Total use of non-renewable primary energy resources  | MJ             | 1.82E+00 | 1.60E+00 | 1.77E-01 | 3.98E-02 | 6.30E-03  |
| SM                       | Use of secondary material  | kg             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| RSF                      | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| NRSF                     | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| FW                       | Net use of fresh water   | m <sup>3</sup> | 2.09E-02 | 2.39E-02 | 7.59E-04 | 1.71E-04 | -3.86E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Waste Categories and Output Flows |                               |      |          |          |          |          |          |
|---|-------------------------------|------|----------|----------|----------|----------|----------|
| Parameter                                     |                               | Unit | Total    | A1-A3    | A4       | C2       | C4       |
| HWD   | Hazardous waste disposed      | kg   | 9.71E-05 | 9.12E-05 | 4.75E-06 | 1.07E-06 | 1.26E-07 |
| NHWD  | Non-hazardous waste disposed  | kg   | 4.98E-02 | 7.95E-03 | 1.44E-02 | 3.23E-03 | 2.43E-02 |
| RWD   | Radioactive waste disposed    | kg   | 3.27E-06 | 3.21E-06 | 4.58E-08 | 1.03E-08 | 1.22E-09 |
| CRU   | Components for re-use         | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR   | Materials for recycling       | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MER   | Materials for energy recovery | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE  | Exported energy               | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

Results shown below are for HCA Cable K (per 1 meter).

| <b>CML-IA baseline V3.11 / EU25</b> |              |              |              |           |           |           |
|-------------------------------------|--------------|--------------|--------------|-----------|-----------|-----------|
| <b>Impact category</b>              | <b>Unit</b>  | <b>Total</b> | <b>A1-A3</b> | <b>A4</b> | <b>C2</b> | <b>C4</b> |
| Abiotic depletion                   | kg Sb eq     | 3.54E-06     | 3.49E-06     | 4.33E-08  | 9.57E-09  | 6.58E-10  |
| Abiotic depletion (fossil fuels)    | MJ           | 2.20E+00     | 1.92E+00     | 2.21E-01  | 4.89E-02  | 7.82E-03  |
| Global warming (GWP100a)            | kg CO2 eq    | 1.34E-01     | 1.13E-01     | 1.53E-02  | 3.39E-03  | 2.87E-03  |
| Ozone layer depletion (ODP)         | kg CFC-11 eq | 3.53E-08     | 3.49E-08     | 2.69E-10  | 5.94E-11  | 7.20E-12  |
| Photochemical oxidation             | kg C2H4 eq   | 3.29E-05     | 2.95E-05     | 2.35E-06  | 5.20E-07  | 5.10E-07  |
| Acidification                       | kg SO2 eq    | 4.84E-04     | 4.35E-04     | 3.87E-05  | 8.55E-06  | 1.91E-06  |
| Eutrophication                      | kg PO4--- eq | 8.01E-04     | 2.70E-04     | 1.06E-05  | 2.34E-06  | 5.19E-04  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| <b>TRACI 2.2 V1.00 / US-Canadian 2008</b> |              |              |              |           |           |           |
|---|--------------|--------------|--------------|-----------|-----------|-----------|
| <b>Impact category</b>                    | <b>Unit</b>  | <b>Total</b> | <b>A1-A3</b> | <b>A4</b> | <b>C2</b> | <b>C4</b> |
| Ozone depletion                           | kg CFC-11 eq | 4.68E-08     | 4.63E-08     | 3.55E-10  | 7.85E-11  | 9.48E-12  |
| Global warming                            | kg CO2 eq    | 1.33E-01     | 1.12E-01     | 1.52E-02  | 3.36E-03  | 2.65E-03  |
| Smog                                      | kg O3 eq     | 7.67E-03     | 6.28E-03     | 1.08E-03  | 2.39E-04  | 6.09E-05  |
| Acidification                             | kg SO2 eq    | 5.02E-04     | 4.44E-04     | 4.52E-05  | 9.98E-06  | 2.51E-06  |
| Respiratory effects                       | kg PM2.5 eq  | 6.81E-05     | 5.66E-05     | 9.14E-06  | 2.02E-06  | 3.68E-07  |
| Freshwater eutrophication                 | kg P eq      | 1.04E-04     | 3.27E-05     | 6.33E-07  | 1.40E-07  | 7.03E-05  |
| Marine eutrophication                     | kg N eq      | 1.04E-04     | 5.85E-05     | 9.27E-06  | 2.05E-06  | 3.41E-05  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| <b>EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set</b> |              |              |              |           |           |           |
|---|--------------|--------------|--------------|-----------|-----------|-----------|
| <b>Impact category</b>  | <b>Unit</b>  | <b>Total</b> | <b>A1-A3</b> | <b>A4</b> | <b>C2</b> | <b>C4</b> |
| Acidification   | mol H+ eq    | 5.92E-04     | 5.27E-04     | 5.10E-05  | 1.13E-05  | 2.58E-06  |
| Climate change  | kg CO2 eq    | 1.36E-01     | 1.14E-01     | 1.54E-02  | 3.41E-03  | 3.00E-03  |
| Climate change - Biogenic   | kg CO2 eq    | 7.13E-04     | 7.00E-04     | 9.42E-06  | 2.08E-06  | 1.56E-06  |
| Climate change - Fossil   | kg CO2 eq    | 1.35E-01     | 1.13E-01     | 1.54E-02  | 3.41E-03  | 2.99E-03  |
| Climate change - Land use and LU change                                       | kg CO2 eq    | 1.20E-04     | 1.13E-04     | 5.53E-06  | 1.22E-06  | 2.18E-07  |
| Ecotoxicity, freshwater   | CTUe         | 4.97E-01     | 3.56E-01     | 2.64E-02  | 5.84E-03  | 1.09E-01  |
| Ecotoxicity, freshwater - inorganics  | CTUe         | 4.72E-01     | 3.32E-01     | 2.54E-02  | 5.61E-03  | 1.09E-01  |
| Ecotoxicity, freshwater - organics  | CTUe         | 2.44E-02     | 2.31E-02     | 1.05E-03  | 2.32E-04  | 6.38E-05  |
| Particulate matter  | disease inc. | 5.74E-09     | 3.78E-09     | 1.56E-09  | 3.45E-10  | 5.75E-11  |
| Eutrophication, marine  | kg N eq      | 2.08E-04     | 1.21E-04     | 1.73E-05  | 3.83E-06  | 6.66E-05  |
| Eutrophication, freshwater  | kg P eq      | 6.22E-05     | 6.09E-05     | 1.09E-06  | 2.40E-07  | 3.76E-08  |
| Eutrophication, terrestrial   | mol N eq     | 1.34E-03     | 1.10E-03     | 1.88E-04  | 4.17E-05  | 1.05E-05  |
| Human toxicity, cancer  | CTUh         | 4.08E-11     | 3.75E-11     | 2.52E-12  | 5.56E-13  | 2.00E-13  |
| Human toxicity, cancer - inorganics   | CTUh         | 2.84E-11     | 2.70E-11     | 1.08E-12  | 2.39E-13  | 1.50E-13  |
| Human toxicity, cancer - organics   | CTUh         | 1.24E-11     | 1.06E-11     | 1.44E-12  | 3.17E-13  | 4.95E-14  |
| Human toxicity, non-cancer  | CTUh         | 2.29E-09     | 2.08E-09     | 1.45E-10  | 3.21E-11  | 3.48E-11  |
| Human toxicity, non-cancer - inorganics                                       | CTUh         | 2.21E-09     | 2.01E-09     | 1.36E-10  | 3.01E-11  | 3.13E-11  |
| Human toxicity, non-cancer - organics   | CTUh         | 8.45E-11     | 7.00E-11     | 9.00E-12  | 1.99E-12  | 3.47E-12  |

|                                   |              |          |          |          |          |           |
|-----------------------------------|--------------|----------|----------|----------|----------|-----------|
| Ionising radiation                | kBq U-235 eq | 2.03E-02 | 1.99E-02 | 2.52E-04 | 5.58E-05 | 6.70E-06  |
| Land use                          | Pt           | 6.10E-01 | 3.14E-01 | 2.27E-01 | 5.01E-02 | 1.87E-02  |
| Ozone depletion                   | kg CFC11 eq  | 5.15E-08 | 5.11E-08 | 3.37E-10 | 7.45E-11 | 9.00E-12  |
| Photochemical ozone formation     | kg NMVOC eq  | 6.52E-04 | 5.49E-04 | 8.08E-05 | 1.79E-05 | 4.32E-06  |
| Resource use, fossils             | MJ           | 2.57E+00 | 2.28E+00 | 2.25E-01 | 4.98E-02 | 7.92E-03  |
| Resource use, minerals and metals | kg Sb eq     | 3.54E-06 | 3.49E-06 | 4.33E-08 | 9.57E-09 | 6.58E-10  |
| Water use                         | m3 depriv.   | 3.53E-02 | 3.92E-02 | 1.02E-03 | 2.26E-04 | -5.17E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Resource Use |  |                |          |          |          |          |           |
|--------------------------|--|----------------|----------|----------|----------|----------|-----------|
| Parameter                |  | Unit           | Total    | A1-A3    | A4       | C2       | C4        |
| PERE                     | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 1.20E-01 | 1.15E-01 | 3.48E-03 | 7.69E-04 | 1.09E-04  |
| PERM                     | Use of renewable primary energy resources used as raw materials  | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PERT                     | Total use of renewable primary energy resources  | MJ             | 1.20E-01 | 1.15E-01 | 3.48E-03 | 7.69E-04 | 1.09E-04  |
| PENRE                    | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 2.74E+00 | 2.43E+00 | 2.40E-01 | 5.30E-02 | 8.44E-03  |
| PENRM                    | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PENRT                    | Total use of non-renewable primary energy resources  | MJ             | 2.74E+00 | 2.43E+00 | 2.40E-01 | 5.30E-02 | 8.44E-03  |
| SM                       | Use of secondary material  | kg             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| RSF                      | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| NRSF                     | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| FW                       | Net use of fresh water   | m <sup>3</sup> | 3.46E-02 | 3.85E-02 | 1.03E-03 | 2.27E-04 | -5.17E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Waste Categories and Output Flows |                               |      |          |          |          |          |          |
|---|-------------------------------|------|----------|----------|----------|----------|----------|
| Parameter                                     |                               | Unit | Total    | A1-A3    | A4       | C2       | C4       |
| HWD   | Hazardous waste disposed      | kg   | 1.40E-04 | 1.32E-04 | 6.43E-06 | 1.42E-06 | 1.69E-07 |
| NHWD  | Non-hazardous waste disposed  | kg   | 7.25E-02 | 1.62E-02 | 1.94E-02 | 4.30E-03 | 3.25E-02 |
| RWD   | Radioactive waste disposed    | kg   | 4.98E-06 | 4.91E-06 | 6.20E-08 | 1.37E-08 | 1.64E-09 |
| CRU   | Components for re-use         | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR   | Materials for recycling       | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MER   | Materials for energy recovery | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE  | Exported energy               | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

## LCA Results – HCA for EMEA Connector and Converters

Results shown below are for HCA connector (per 1 piece).

| CML-IA baseline V3.11 / EU25     |              |          |          |          |          |          |
|----------------------------------|--------------|----------|----------|----------|----------|----------|
| Impact category                  | Unit         | Total    | A1-A3    | A4       | C2       | C4       |
| Abiotic depletion                | kg Sb eq     | 6.63E-07 | 6.48E-07 | 1.23E-08 | 2.75E-09 | 1.88E-10 |
| Abiotic depletion (fossil fuels) | MJ           | 3.24E+00 | 3.16E+00 | 6.26E-02 | 1.41E-02 | 2.24E-03 |
| Global warming (GWP100a)         | kg CO2 eq    | 2.14E-01 | 2.07E-01 | 4.34E-03 | 9.74E-04 | 8.19E-04 |
| Ozone layer depletion (ODP)      | kg CFC-11 eq | 1.42E-06 | 1.42E-06 | 7.60E-11 | 1.71E-11 | 2.06E-12 |
| Photochemical oxidation          | kg C2H4 eq   | 1.95E-04 | 1.94E-04 | 6.68E-07 | 1.49E-07 | 1.46E-07 |
| Acidification                    | kg SO2 eq    | 6.10E-04 | 5.96E-04 | 1.10E-05 | 2.46E-06 | 5.46E-07 |
| Eutrophication                   | kg PO4--- eq | 4.89E-04 | 3.37E-04 | 3.00E-06 | 6.72E-07 | 1.48E-04 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| TRACI 2.2 V1.00 / US-Canadian 2008 |              |          |          |          |          |          |
|------------------------------------|--------------|----------|----------|----------|----------|----------|
| Impact category                    | Unit         | Total    | A1-A3    | A4       | C2       | C4       |
| Ozone depletion                    | kg CFC-11 eq | 1.42E-06 | 1.42E-06 | 1.01E-10 | 2.26E-11 | 2.71E-12 |
| Global warming                     | kg CO2 eq    | 2.11E-01 | 2.05E-01 | 4.30E-03 | 9.65E-04 | 7.58E-04 |
| Smog                               | kg O3 eq     | 1.04E-02 | 9.97E-03 | 3.09E-04 | 6.88E-05 | 1.74E-05 |
| Acidification                      | kg SO2 eq    | 6.63E-04 | 6.47E-04 | 1.29E-05 | 2.87E-06 | 7.17E-07 |
| Respiratory effects                | kg PM2.5 eq  | 9.52E-05 | 9.19E-05 | 2.59E-06 | 5.81E-07 | 1.05E-07 |
| Freshwater eutrophication          | kg P eq      | 4.05E-05 | 2.02E-05 | 1.79E-07 | 4.03E-08 | 2.01E-05 |
| Marine eutrophication              | kg N eq      | 3.95E-04 | 3.82E-04 | 2.64E-06 | 5.89E-07 | 9.74E-06 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set |              |          |          |          |          |          |
|--|--------------|----------|----------|----------|----------|----------|
| Impact category  | Unit         | Total    | A1-A3    | A4       | C2       | C4       |
| Acidification  | mol H+ eq    | 7.59E-04 | 7.40E-04 | 1.46E-05 | 3.24E-06 | 7.37E-07 |
| Climate change   | kg CO2 eq    | 2.20E-01 | 2.14E-01 | 4.37E-03 | 9.80E-04 | 8.57E-04 |
| Climate change - Biogenic  | kg CO2 eq    | 5.37E-03 | 5.36E-03 | 2.66E-06 | 5.99E-07 | 4.46E-07 |
| Climate change - Fossil  | kg CO2 eq    | 2.14E-01 | 2.08E-01 | 4.36E-03 | 9.79E-04 | 8.56E-04 |
| Climate change - Land use and LU change                                | kg CO2 eq    | 1.67E-04 | 1.65E-04 | 1.57E-06 | 3.52E-07 | 6.23E-08 |
| Ecotoxicity, freshwater  | CTUe         | 5.18E+01 | 5.18E+01 | 7.48E-03 | 1.68E-03 | 3.12E-02 |
| Ecotoxicity, freshwater - inorganics                                   | CTUe         | 4.66E+01 | 4.66E+01 | 7.18E-03 | 1.61E-03 | 3.12E-02 |
| Ecotoxicity, freshwater - organics                                     | CTUe         | 5.22E+00 | 5.21E+00 | 2.98E-04 | 6.68E-05 | 1.82E-05 |
| Particulate matter   | disease inc. | 7.10E-09 | 6.54E-09 | 4.41E-10 | 9.91E-11 | 1.64E-11 |
| Eutrophication, marine   | kg N eq      | 2.71E-04 | 2.46E-04 | 4.93E-06 | 1.10E-06 | 1.91E-05 |
| Eutrophication, freshwater   | kg P eq      | 3.84E-05 | 3.81E-05 | 3.08E-07 | 6.91E-08 | 1.08E-08 |
| Eutrophication, terrestrial  | mol N eq     | 1.80E-03 | 1.73E-03 | 5.37E-05 | 1.20E-05 | 3.00E-06 |
| Human toxicity, cancer   | CTUh         | 1.15E-09 | 1.15E-09 | 7.13E-13 | 1.60E-13 | 5.71E-14 |
| Human toxicity, cancer - inorganics                                    | CTUh         | 1.96E-11 | 1.92E-11 | 3.07E-13 | 6.88E-14 | 4.30E-14 |
| Human toxicity, cancer - organics                                      | CTUh         | 1.13E-09 | 1.13E-09 | 4.06E-13 | 9.12E-14 | 1.42E-14 |
| Human toxicity, non-cancer   | CTUh         | 1.39E-09 | 1.33E-09 | 4.11E-11 | 9.22E-12 | 9.95E-12 |
| Human toxicity, non-cancer - inorganics                                | CTUh         | 1.28E-09 | 1.23E-09 | 3.85E-11 | 8.65E-12 | 8.96E-12 |

|                                       |              |          |          |          |          |           |
|---------------------------------------|--------------|----------|----------|----------|----------|-----------|
| Human toxicity, non-cancer - organics | CTUh         | 9.90E-11 | 9.49E-11 | 2.55E-12 | 5.72E-13 | 9.92E-13  |
| Ionising radiation                    | kBq U-235 eq | 7.40E-02 | 7.39E-02 | 7.14E-05 | 1.60E-05 | 1.92E-06  |
| Land use                              | Pt           | 1.06E+00 | 9.73E-01 | 6.41E-02 | 1.44E-02 | 5.35E-03  |
| Ozone depletion                       | kg CFC11 eq  | 1.27E-06 | 1.27E-06 | 9.54E-11 | 2.14E-11 | 2.57E-12  |
| Photochemical ozone formation         | kg NMVOC eq  | 9.26E-04 | 8.97E-04 | 2.30E-05 | 5.14E-06 | 1.24E-06  |
| Resource use, fossils                 | MJ           | 4.25E+00 | 4.17E+00 | 6.38E-02 | 1.43E-02 | 2.27E-03  |
| Resource use, minerals and metals     | kg Sb eq     | 6.61E-07 | 6.46E-07 | 1.22E-08 | 2.75E-09 | 1.88E-10  |
| Water use                             | m3 depriv.   | 7.12E-02 | 7.24E-02 | 2.90E-04 | 6.51E-05 | -1.48E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

**EN15804+A2: Resource Use**

| Parameter |  | Unit           | Total    | A1-A3    | A4       | C2       | C4        |
|-----------|--|----------------|----------|----------|----------|----------|-----------|
| PERE      | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 5.20E-01 | 5.18E-01 | 9.84E-04 | 2.21E-04 | 3.13E-05  |
| PERM      | Use of renewable primary energy resources used as raw materials  | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PERT      | Total use of renewable primary energy resources  | MJ             | 5.20E-01 | 5.18E-01 | 9.84E-04 | 2.21E-04 | 3.13E-05  |
| PENRE     | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 4.32E+00 | 4.24E+00 | 6.78E-02 | 1.52E-02 | 2.41E-03  |
| PENRM     | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PENRT     | Total use of non-renewable primary energy resources  | MJ             | 4.32E+00 | 4.24E+00 | 6.78E-02 | 1.52E-02 | 2.41E-03  |
| SM        | Use of secondary material  | kg             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| RSF       | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| NRSF      | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| FW        | Net use of fresh water   | m <sup>3</sup> | 1.05E-01 | 1.06E-01 | 2.91E-04 | 6.53E-05 | -1.48E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

**EN15804+A2: Waste Categories and Output Flows**

| Parameter |                               | Unit | Total    | A1-A3    | A4       | C2       | C4       |
|-----------|-------------------------------|------|----------|----------|----------|----------|----------|
| HWD       | Hazardous waste disposed      | kg   | 6.94E-05 | 6.71E-05 | 1.82E-06 | 4.09E-07 | 4.84E-08 |
| NHWD      | Non-hazardous waste disposed  | kg   | 2.77E-02 | 1.17E-02 | 5.50E-03 | 1.24E-03 | 9.30E-03 |
| RWD       | Radioactive waste disposed    | kg   | 1.56E-05 | 1.56E-05 | 1.75E-08 | 3.94E-09 | 4.69E-10 |
| CRU       | Components for re-use         | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR       | Materials for recycling       | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MER       | Materials for energy recovery | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE        | Exported energy               | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

Results shown below are for HCA Converter full-size and bayonet (per 1 piece).

| CML-IA baseline V3.11 / EU25     |              |          |          |          |          |          |           |
|----------------------------------|--------------|----------|----------|----------|----------|----------|-----------|
| Impact category                  | Unit         | Total    | A1-A3    | A4       | C2       | C4       | D         |
| Abiotic depletion                | kg Sb eq     | 2.41E-06 | 2.36E-06 | 3.95E-08 | 8.87E-09 | 6.06E-10 | -1.35E-11 |
| Abiotic depletion (fossil fuels) | MJ           | 5.04E+00 | 4.79E+00 | 2.02E-01 | 4.53E-02 | 7.20E-03 | -3.76E-04 |
| Global warming (GWP100a)         | kg CO2 eq    | 3.19E-01 | 2.99E-01 | 1.40E-02 | 3.14E-03 | 2.64E-03 | -3.35E-05 |
| Ozone layer depletion (ODP)      | kg CFC-11 eq | 3.95E-07 | 3.95E-07 | 2.45E-10 | 5.50E-11 | 6.64E-12 | -1.68E-13 |
| Photochemical oxidation          | kg C2H4 eq   | 4.83E-04 | 4.80E-04 | 2.15E-06 | 4.82E-07 | 4.70E-07 | -5.24E-09 |
| Acidification                    | kg SO2 eq    | 1.15E-03 | 1.10E-03 | 3.56E-05 | 7.92E-06 | 1.76E-06 | -1.38E-07 |
| Eutrophication                   | kg PO4--- eq | 1.03E-03 | 5.41E-04 | 9.67E-06 | 2.16E-06 | 4.78E-04 | -8.02E-08 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| TRACI 2.2 V1.00 / US-Canadian 2008 |              |          |          |          |          |          |           |
|------------------------------------|--------------|----------|----------|----------|----------|----------|-----------|
| Impact category                    | Unit         | Total    | A1-A3    | A4       | C2       | C4       | D         |
| Ozone depletion                    | kg CFC-11 eq | 3.97E-07 | 3.96E-07 | 3.24E-10 | 7.27E-11 | 8.74E-12 | -2.12E-13 |
| Global warming                     | kg CO2 eq    | 3.15E-01 | 2.96E-01 | 1.39E-02 | 3.11E-03 | 2.44E-03 | -3.33E-05 |
| Smog                               | kg O3 eq     | 1.75E-02 | 1.62E-02 | 9.94E-04 | 2.22E-04 | 5.61E-05 | -1.95E-06 |
| Acidification                      | kg SO2 eq    | 1.20E-03 | 1.15E-03 | 4.15E-05 | 9.25E-06 | 2.31E-06 | -1.44E-07 |
| Respiratory effects                | kg PM2.5 eq  | 1.86E-04 | 1.75E-04 | 8.35E-06 | 1.87E-06 | 3.39E-07 | -4.87E-08 |
| Freshwater eutrophication          | kg P eq      | 7.83E-05 | 1.29E-05 | 5.78E-07 | 1.30E-07 | 6.47E-05 | -9.86E-09 |
| Marine eutrophication              | kg N eq      | 9.58E-04 | 9.16E-04 | 8.51E-06 | 1.90E-06 | 3.14E-05 | -1.73E-08 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set |              |          |          |          |          |          |           |
|--|--------------|----------|----------|----------|----------|----------|-----------|
| Impact category  | Unit         | Total    | A1-A3    | A4       | C2       | C4       | D         |
| Acidification  | mol H+ eq    | 1.41E-03 | 1.35E-03 | 4.69E-05 | 1.04E-05 | 2.37E-06 | -1.67E-07 |
| Climate change   | kg CO2 eq    | 3.21E-01 | 3.02E-01 | 1.41E-02 | 3.16E-03 | 2.76E-03 | -3.79E-05 |
| Climate change - Biogenic  | kg CO2 eq    | 1.57E-03 | 1.56E-03 | 8.58E-06 | 1.93E-06 | 1.44E-06 | 0.00E+00  |
| Climate change - Fossil  | kg CO2 eq    | 3.20E-01 | 3.00E-01 | 1.41E-02 | 3.16E-03 | 2.76E-03 | -3.35E-05 |
| Climate change - Land use and LU change                                | kg CO2 eq    | 2.12E-04 | 2.06E-04 | 5.05E-06 | 1.13E-06 | 2.01E-07 | -7.10E-08 |
| Ecotoxicity, freshwater  | CTUe         | 1.33E+02 | 1.32E+02 | 2.41E-02 | 5.41E-03 | 1.00E-01 | -7.34E-05 |
| Ecotoxicity, freshwater - inorganics                                   | CTUe         | 1.19E+02 | 1.19E+02 | 2.31E-02 | 5.20E-03 | 1.00E-01 | -7.18E-05 |
| Ecotoxicity, freshwater - organics                                     | CTUe         | 1.37E+01 | 1.37E+01 | 9.59E-04 | 2.15E-04 | 5.88E-05 | -1.56E-06 |
| Particulate matter   | disease inc. | 1.55E-08 | 1.37E-08 | 1.42E-09 | 3.19E-10 | 5.30E-11 | -1.55E-12 |
| Eutrophication, marine   | kg N eq      | 5.57E-04 | 4.76E-04 | 1.59E-05 | 3.55E-06 | 6.14E-05 | -3.45E-08 |
| Eutrophication, freshwater   | kg P eq      | 7.22E-05 | 7.10E-05 | 9.91E-07 | 2.23E-07 | 3.46E-08 | -1.65E-08 |
| Eutrophication, terrestrial  | mol N eq     | 2.94E-03 | 2.72E-03 | 1.73E-04 | 3.86E-05 | 9.67E-06 | -3.43E-07 |
| Human toxicity, cancer   | CTUh         | 2.88E-09 | 2.88E-09 | 2.30E-12 | 5.15E-13 | 1.84E-13 | -3.68E-15 |
| Human toxicity, cancer - inorganics                                    | CTUh         | 3.90E-11 | 3.76E-11 | 9.89E-13 | 2.22E-13 | 1.38E-13 | -2.41E-15 |
| Human toxicity, cancer - organics                                      | CTUh         | 2.84E-09 | 2.84E-09 | 1.31E-12 | 2.94E-13 | 4.56E-14 | -1.27E-15 |
| Human toxicity, non-cancer   | CTUh         | 3.13E-09 | 2.93E-09 | 1.32E-10 | 2.97E-11 | 3.21E-11 | -1.83E-13 |
| Human toxicity, non-cancer - inorganics                                | CTUh         | 2.92E-09 | 2.74E-09 | 1.24E-10 | 2.79E-11 | 2.89E-11 | -1.78E-13 |
| Human toxicity, non-cancer - organics                                  | CTUh         | 2.04E-10 | 1.91E-10 | 8.20E-12 | 1.84E-12 | 3.20E-12 | -4.98E-15 |

|                                   |              |          |          |          |          |           |           |
|-----------------------------------|--------------|----------|----------|----------|----------|-----------|-----------|
| Ionising radiation                | kBq U-235 eq | 2.11E-02 | 2.08E-02 | 2.30E-04 | 5.17E-05 | 6.17E-06  | -4.73E-06 |
| Land use                          | Pt           | 1.51E+00 | 1.24E+00 | 2.07E-01 | 4.64E-02 | 1.72E-02  | -6.33E-05 |
| Ozone depletion                   | kg CFC11 eq  | 3.56E-07 | 3.56E-07 | 3.07E-10 | 6.90E-11 | 8.29E-12  | -1.99E-13 |
| Photochemical ozone formation     | kg NMVOC eq  | 1.86E-03 | 1.77E-03 | 7.40E-05 | 1.66E-05 | 3.98E-06  | -1.01E-07 |
| Resource use, fossils             | MJ           | 5.43E+00 | 5.17E+00 | 2.06E-01 | 4.62E-02 | 7.30E-03  | -4.52E-04 |
| Resource use, minerals and metals | kg Sb eq     | 2.41E-06 | 2.36E-06 | 3.95E-08 | 8.87E-09 | 6.06E-10  | -1.33E-11 |
| Water use                         | m3 depriv.   | 1.91E-01 | 1.95E-01 | 9.34E-04 | 2.10E-04 | -4.76E-03 | -4.63E-06 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Resource Use |  |                |          |          |          |          |           |           |
|--------------------------|--|----------------|----------|----------|----------|----------|-----------|-----------|
| Parameter                | Unit   | Total          | A1-A3    | A4       | C2       | C4       | D         |           |
| PERE                     | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 2.18E-01 | 2.14E-01 | 3.17E-03 | 7.12E-04 | 1.01E-04  | -6.00E-05 |
| PERM                     | Use of renewable primary energy resources used as raw materials  | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 1.00E+00  |
| PERT                     | Total use of renewable primary energy resources  | MJ             | 2.18E-01 | 2.14E-01 | 3.17E-03 | 7.12E-04 | 1.01E-04  | 1.00E+00  |
| PENRE                    | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 5.25E+00 | 4.97E+00 | 2.19E-01 | 4.91E-02 | 7.77E-03  | -4.80E-04 |
| PENRM                    | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 1.00E+00  |
| PENRT                    | Total use of non-renewable primary energy resources  | MJ             | 5.25E+00 | 4.97E+00 | 2.19E-01 | 4.91E-02 | 7.77E-03  | 1.00E+00  |
| SM                       | Use of secondary material  | kg             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| RSF                      | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| NRSF                     | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| FW                       | Net use of fresh water   | m <sup>3</sup> | 2.81E-01 | 2.85E-01 | 9.36E-04 | 2.10E-04 | -4.76E-03 | -4.74E-06 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Waste Categories and Output Flows |                               |       |          |          |          |          |          |           |
|---|-------------------------------|-------|----------|----------|----------|----------|----------|-----------|
| Parameter                                     | Unit                          | Total | A1-A3    | A4       | C2       | C4       | D        |           |
| HWD   | Hazardous waste disposed      | kg    | 1.30E-04 | 1.23E-04 | 5.86E-06 | 1.32E-06 | 1.56E-07 | -4.14E-07 |
| NHWD  | Non-hazardous waste disposed  | kg    | 7.15E-02 | 1.98E-02 | 1.77E-02 | 3.98E-03 | 3.00E-02 | -8.67E-07 |
| RWD   | Radioactive waste disposed    | kg    | 3.16E-06 | 3.09E-06 | 5.65E-08 | 1.27E-08 | 1.51E-09 | -1.15E-09 |
| CRU   | Components for re-use         | kg    | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| MFR   | Materials for recycling       | kg    | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| MER   | Materials for energy recovery | kg    | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| EE  | Exported energy               | MJ    | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

Results shown below are for HCA Converter full-size (per 1 piece).

| <b>CML-IA baseline V3.11 / EU25</b> |              |              |              |           |           |           |
|-------------------------------------|--------------|--------------|--------------|-----------|-----------|-----------|
| <b>Impact category</b>              | <b>Unit</b>  | <b>Total</b> | <b>A1-A3</b> | <b>A4</b> | <b>C2</b> | <b>C4</b> |
| Abiotic depletion                   | kg Sb eq     | 1.21E-06     | 1.18E-06     | 2.07E-08  | 4.64E-09  | 3.18E-10  |
| Abiotic depletion (fossil fuels)    | MJ           | 2.47E+00     | 2.34E+00     | 1.06E-01  | 2.37E-02  | 3.77E-03  |
| Global warming (GWP100a)            | kg CO2 eq    | 1.55E-01     | 1.45E-01     | 7.32E-03  | 1.64E-03  | 1.38E-03  |
| Ozone layer depletion (ODP)         | kg CFC-11 eq | 1.72E-07     | 1.72E-07     | 1.28E-10  | 2.88E-11  | 3.48E-12  |
| Photochemical oxidation             | kg C2H4 eq   | 2.43E-04     | 2.41E-04     | 1.13E-06  | 2.52E-07  | 2.46E-07  |
| Acidification                       | kg SO2 eq    | 5.63E-04     | 5.39E-04     | 1.86E-05  | 4.15E-06  | 9.22E-07  |
| Eutrophication                      | kg PO4--- eq | 5.19E-04     | 2.63E-04     | 5.07E-06  | 1.13E-06  | 2.50E-04  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| <b>TRACI 2.2 V1.00 / US-Canadian 2008</b> |              |              |              |           |           |           |
|---|--------------|--------------|--------------|-----------|-----------|-----------|
| <b>Impact category</b>                    | <b>Unit</b>  | <b>Total</b> | <b>A1-A3</b> | <b>A4</b> | <b>C2</b> | <b>C4</b> |
| Ozone depletion                           | kg CFC-11 eq | 1.73E-07     | 1.72E-07     | 1.70E-10  | 3.81E-11  | 4.58E-12  |
| Global warming                            | kg CO2 eq    | 1.54E-01     | 1.43E-01     | 7.26E-03  | 1.63E-03  | 1.28E-03  |
| Smog                                      | kg O3 eq     | 8.44E-03     | 7.77E-03     | 5.21E-04  | 1.16E-04  | 2.94E-05  |
| Acidification                             | kg SO2 eq    | 5.89E-04     | 5.61E-04     | 2.18E-05  | 4.84E-06  | 1.21E-06  |
| Respiratory effects                       | kg PM2.5 eq  | 9.09E-05     | 8.54E-05     | 4.37E-06  | 9.80E-07  | 1.77E-07  |
| Freshwater eutrophication                 | kg P eq      | 3.98E-05     | 5.56E-06     | 3.02E-07  | 6.79E-08  | 3.39E-05  |
| Marine eutrophication                     | kg N eq      | 4.80E-04     | 4.58E-04     | 4.46E-06  | 9.94E-07  | 1.64E-05  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| <b>EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set</b> |              |              |              |           |           |           |
|---|--------------|--------------|--------------|-----------|-----------|-----------|
| <b>Impact category</b>  | <b>Unit</b>  | <b>Total</b> | <b>A1-A3</b> | <b>A4</b> | <b>C2</b> | <b>C4</b> |
| Acidification   | mol H+ eq    | 6.89E-04     | 6.57E-04     | 2.46E-05  | 5.47E-06  | 1.24E-06  |
| Climate change  | kg CO2 eq    | 1.57E-01     | 1.46E-01     | 7.37E-03  | 1.65E-03  | 1.45E-03  |
| Climate change - Biogenic   | kg CO2 eq    | 5.88E-04     | 5.82E-04     | 4.49E-06  | 1.01E-06  | 7.53E-07  |
| Climate change - Fossil   | kg CO2 eq    | 1.56E-01     | 1.46E-01     | 7.36E-03  | 1.65E-03  | 1.44E-03  |
| Climate change - Land use and LU change                                       | kg CO2 eq    | 8.18E-05     | 7.84E-05     | 2.65E-06  | 5.93E-07  | 1.05E-07  |
| Ecotoxicity, freshwater   | CTUe         | 6.68E+01     | 6.67E+01     | 1.26E-02  | 2.83E-03  | 5.26E-02  |
| Ecotoxicity, freshwater - inorganics  | CTUe         | 5.99E+01     | 5.98E+01     | 1.21E-02  | 2.72E-03  | 5.26E-02  |
| Ecotoxicity, freshwater - organics  | CTUe         | 6.92E+00     | 6.92E+00     | 5.02E-04  | 1.13E-04  | 3.08E-05  |
| Particulate matter  | disease inc. | 7.41E-09     | 6.47E-09     | 7.45E-10  | 1.67E-10  | 2.78E-11  |
| Eutrophication, marine  | kg N eq      | 2.73E-04     | 2.31E-04     | 8.32E-06  | 1.86E-06  | 3.22E-05  |
| Eutrophication, freshwater  | kg P eq      | 3.48E-05     | 3.42E-05     | 5.19E-07  | 1.17E-07  | 1.81E-08  |
| Eutrophication, terrestrial   | mol N eq     | 1.40E-03     | 1.29E-03     | 9.06E-05  | 2.02E-05  | 5.07E-06  |
| Human toxicity, cancer  | CTUh         | 1.45E-09     | 1.45E-09     | 1.20E-12  | 2.70E-13  | 9.64E-14  |
| Human toxicity, cancer - inorganics   | CTUh         | 1.92E-11     | 1.85E-11     | 5.18E-13  | 1.16E-13  | 7.25E-14  |
| Human toxicity, cancer - organics   | CTUh         | 1.43E-09     | 1.43E-09     | 6.85E-13  | 1.54E-13  | 2.39E-14  |
| Human toxicity, non-cancer  | CTUh         | 1.51E-09     | 1.41E-09     | 6.93E-11  | 1.56E-11  | 1.68E-11  |
| Human toxicity, non-cancer - inorganics                                       | CTUh         | 1.42E-09     | 1.32E-09     | 6.50E-11  | 1.46E-11  | 1.51E-11  |
| Human toxicity, non-cancer - organics   | CTUh         | 9.09E-11     | 8.40E-11     | 4.30E-12  | 9.65E-13  | 1.67E-12  |

|                                   |              |          |          |          |          |           |
|-----------------------------------|--------------|----------|----------|----------|----------|-----------|
| Ionising radiation                | kBq U-235 eq | 1.05E-02 | 1.03E-02 | 1.21E-04 | 2.71E-05 | 3.23E-06  |
| Land use                          | Pt           | 6.04E-01 | 4.62E-01 | 1.08E-01 | 2.43E-02 | 9.02E-03  |
| Ozone depletion                   | kg CFC11 eq  | 1.55E-07 | 1.55E-07 | 1.61E-10 | 3.62E-11 | 4.34E-12  |
| Photochemical ozone formation     | kg NMVOC eq  | 9.13E-04 | 8.64E-04 | 3.88E-05 | 8.67E-06 | 2.09E-06  |
| Resource use, fossils             | MJ           | 2.66E+00 | 2.53E+00 | 1.08E-01 | 2.42E-02 | 3.82E-03  |
| Resource use, minerals and metals | kg Sb eq     | 1.21E-06 | 1.18E-06 | 2.07E-08 | 4.64E-09 | 3.17E-10  |
| Water use                         | m3 depriv.   | 9.50E-02 | 9.69E-02 | 4.89E-04 | 1.10E-04 | -2.50E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Resource Use |  |                |          |          |          |          |           |
|--------------------------|--|----------------|----------|----------|----------|----------|-----------|
| Parameter                |  | Unit           | Total    | A1-A3    | A4       | C2       | C4        |
| PERE                     | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 8.63E-02 | 8.59E-02 | 1.66E-03 | 3.73E-04 | 5.28E-05  |
| PERM                     | Use of renewable primary energy resources used as raw materials  | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PERT                     | Total use of renewable primary energy resources  | MJ             | 8.63E-02 | 8.59E-02 | 1.66E-03 | 3.73E-04 | 5.28E-05  |
| PENRE                    | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 2.57E+00 | 2.54E+00 | 1.14E-01 | 2.57E-02 | 4.07E-03  |
| PENRM                    | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PENRT                    | Total use of non-renewable primary energy resources  | MJ             | 2.57E+00 | 2.54E+00 | 1.14E-01 | 2.57E-02 | 4.07E-03  |
| SM                       | Use of secondary material  | kg             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| RSF                      | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| NRSF                     | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| FW                       | Net use of fresh water   | m <sup>3</sup> | 1.40E-01 | 1.43E-01 | 4.90E-04 | 1.10E-04 | -2.50E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Waste Categories and Output Flows |                               |      |          |          |          |          |          |
|---|-------------------------------|------|----------|----------|----------|----------|----------|
| Parameter                                     |                               | Unit | Total    | A1-A3    | A4       | C2       | C4       |
| HWD   | Hazardous waste disposed      | kg   | 2.73E-05 | 2.66E-05 | 3.07E-06 | 6.90E-07 | 8.17E-08 |
| NHWD  | Non-hazardous waste disposed  | kg   | 3.25E-02 | 1.48E-02 | 9.28E-03 | 2.08E-03 | 1.57E-02 |
| RWD   | Radioactive waste disposed    | kg   | 1.55E-06 | 1.54E-06 | 2.96E-08 | 6.65E-09 | 7.91E-10 |
| CRU   | Components for re-use         | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR   | Materials for recycling       | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MER   | Materials for energy recovery | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE  | Exported energy               | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

Results shown below are for HCA Converter DLX (per 1 piece).

| CML-IA baseline V3.11 / EU25     |              |          |          |          |          |          |           |
|----------------------------------|--------------|----------|----------|----------|----------|----------|-----------|
| Impact category                  | Unit         | Total    | A1-A3    | A4       | C2       | C4       | D         |
| Abiotic depletion                | kg Sb eq     | 5.56E-07 | 5.45E-07 | 9.11E-09 | 2.02E-09 | 1.38E-10 | -1.35E-11 |
| Abiotic depletion (fossil fuels) | MJ           | 2.17E+00 | 2.11E+00 | 4.65E-02 | 1.03E-02 | 1.64E-03 | -3.76E-04 |
| Global warming (GWP100a)         | kg CO2 eq    | 1.37E-01 | 1.32E-01 | 3.22E-03 | 7.16E-04 | 6.03E-04 | -3.35E-05 |
| Ozone layer depletion (ODP)      | kg CFC-11 eq | 3.36E-08 | 3.35E-08 | 5.65E-11 | 1.26E-11 | 1.52E-12 | -1.68E-13 |
| Photochemical oxidation          | kg C2H4 eq   | 2.07E-04 | 2.06E-04 | 4.95E-07 | 1.10E-07 | 1.07E-07 | -5.24E-09 |
| Acidification                    | kg SO2 eq    | 4.78E-04 | 4.68E-04 | 8.14E-06 | 1.81E-06 | 4.02E-07 | -1.38E-07 |
| Eutrophication                   | kg PO4--- eq | 3.40E-04 | 2.28E-04 | 2.22E-06 | 4.94E-07 | 1.09E-04 | -8.02E-08 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| TRACI 2.2 V1.00 / US-Canadian 2008 |              |          |          |          |          |          |           |
|------------------------------------|--------------|----------|----------|----------|----------|----------|-----------|
| Impact category                    | Unit         | Total    | A1-A3    | A4       | C2       | C4       | D         |
| Ozone depletion                    | kg CFC-11 eq | 3.43E-08 | 3.42E-08 | 7.47E-11 | 1.66E-11 | 1.99E-12 | -2.12E-13 |
| Global warming                     | kg CO2 eq    | 1.35E-01 | 1.31E-01 | 3.19E-03 | 7.10E-04 | 5.57E-04 | -3.33E-05 |
| Smog                               | kg O3 eq     | 8.38E-03 | 8.09E-03 | 2.28E-04 | 5.06E-05 | 1.28E-05 | -1.95E-06 |
| Acidification                      | kg SO2 eq    | 5.14E-04 | 5.01E-04 | 9.50E-06 | 2.11E-06 | 5.27E-07 | -1.44E-07 |
| Respiratory effects                | kg PM2.5 eq  | 7.29E-05 | 7.05E-05 | 1.92E-06 | 4.27E-07 | 7.73E-08 | -4.87E-08 |
| Freshwater eutrophication          | kg P eq      | 1.92E-05 | 4.24E-06 | 1.33E-07 | 2.96E-08 | 1.48E-05 | -9.86E-09 |
| Marine eutrophication              | kg N eq      | 4.14E-04 | 4.04E-04 | 1.95E-06 | 4.33E-07 | 7.17E-06 | -1.73E-08 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set |              |          |          |          |          |          |           |
|--|--------------|----------|----------|----------|----------|----------|-----------|
| Impact category  | Unit         | Total    | A1-A3    | A4       | C2       | C4       | D         |
| Acidification  | mol H+ eq    | 5.96E-04 | 5.82E-04 | 1.07E-05 | 2.38E-06 | 5.42E-07 | -1.67E-07 |
| Climate change   | kg CO2 eq    | 1.38E-01 | 1.33E-01 | 3.24E-03 | 7.21E-04 | 6.30E-04 | -3.79E-05 |
| Climate change - Biogenic  | kg CO2 eq    | 9.96E-04 | 9.94E-04 | 1.98E-06 | 4.40E-07 | 3.28E-07 | 0.00E+00  |
| Climate change - Fossil  | kg CO2 eq    | 1.37E-01 | 1.32E-01 | 3.24E-03 | 7.20E-04 | 6.30E-04 | -3.35E-05 |
| Climate change - Land use and LU change                                | kg CO2 eq    | 1.01E-04 | 9.96E-05 | 1.16E-06 | 2.59E-07 | 4.58E-08 | -7.10E-08 |
| Ecotoxicity, freshwater  | CTUe         | 5.70E+01 | 5.70E+01 | 5.56E-03 | 1.24E-03 | 2.29E-02 | -7.34E-05 |
| Ecotoxicity, freshwater - inorganics                                   | CTUe         | 5.11E+01 | 5.11E+01 | 5.34E-03 | 1.19E-03 | 2.29E-02 | -7.18E-05 |
| Ecotoxicity, freshwater - organics                                     | CTUe         | 5.94E+00 | 5.94E+00 | 2.21E-04 | 4.91E-05 | 1.34E-05 | -1.56E-06 |
| Particulate matter   | disease inc. | 5.66E-09 | 5.24E-09 | 3.28E-10 | 7.29E-11 | 1.21E-11 | -1.55E-12 |
| Eutrophication, marine   | kg N eq      | 2.37E-04 | 2.18E-04 | 3.64E-06 | 8.10E-07 | 1.40E-05 | -3.45E-08 |
| Eutrophication, freshwater   | kg P eq      | 2.84E-05 | 2.82E-05 | 2.29E-07 | 5.08E-08 | 7.91E-09 | -1.65E-08 |
| Eutrophication, terrestrial  | mol N eq     | 1.41E-03 | 1.36E-03 | 3.96E-05 | 8.81E-06 | 2.21E-06 | -3.43E-07 |
| Human toxicity, cancer   | CTUh         | 1.24E-09 | 1.23E-09 | 5.30E-13 | 1.18E-13 | 4.20E-14 | -3.68E-15 |
| Human toxicity, cancer - inorganics                                    | CTUh         | 1.43E-11 | 1.40E-11 | 2.28E-13 | 5.06E-14 | 3.16E-14 | -2.41E-15 |
| Human toxicity, cancer - organics                                      | CTUh         | 1.22E-09 | 1.22E-09 | 3.02E-13 | 6.71E-14 | 1.04E-14 | -1.27E-15 |
| Human toxicity, non-cancer   | CTUh         | 1.27E-09 | 1.23E-09 | 3.05E-11 | 6.78E-12 | 7.32E-12 | -1.83E-13 |
| Human toxicity, non-cancer - inorganics                                | CTUh         | 1.18E-09 | 1.14E-09 | 2.86E-11 | 6.36E-12 | 6.59E-12 | -1.78E-13 |
| Human toxicity, non-cancer - organics                                  | CTUh         | 9.12E-11 | 8.81E-11 | 1.89E-12 | 4.21E-13 | 7.30E-13 | -4.98E-15 |

|                                   |              |          |          |          |          |           |           |
|-----------------------------------|--------------|----------|----------|----------|----------|-----------|-----------|
| Ionising radiation                | kBq U-235 eq | 7.05E-03 | 6.98E-03 | 5.31E-05 | 1.18E-05 | 1.41E-06  | -4.73E-06 |
| Land use                          | Pt           | 6.40E-01 | 5.77E-01 | 4.77E-02 | 1.06E-02 | 3.93E-03  | -6.33E-05 |
| Ozone depletion                   | kg CFC11 eq  | 3.07E-08 | 3.07E-08 | 7.09E-11 | 1.58E-11 | 1.89E-12  | -1.99E-13 |
| Photochemical ozone formation     | kg NMVOC eq  | 8.40E-04 | 8.19E-04 | 1.70E-05 | 3.78E-06 | 9.09E-07  | -1.01E-07 |
| Resource use, fossils             | MJ           | 2.29E+00 | 2.23E+00 | 4.74E-02 | 1.05E-02 | 1.67E-03  | -4.52E-04 |
| Resource use, minerals and metals | kg Sb eq     | 5.55E-07 | 5.43E-07 | 9.11E-09 | 2.02E-09 | 1.38E-10  | -1.33E-11 |
| Water use                         | m3 depriv.   | 7.51E-02 | 7.59E-02 | 2.16E-04 | 4.79E-05 | -1.09E-03 | -4.63E-06 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Resource Use |  |                |          |          |          |          |           |           |
|--------------------------|--|----------------|----------|----------|----------|----------|-----------|-----------|
| Parameter                | Unit   | Total          | A1-A3    | A4       | C2       | C4       | D         |           |
| PERE                     | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 9.30E-02 | 9.21E-02 | 7.32E-04 | 1.63E-04 | 2.30E-05  | -6.00E-05 |
| PERM                     | Use of renewable primary energy resources used as raw materials  | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 1.00E+00  |
| PERT                     | Total use of renewable primary energy resources  | MJ             | 9.30E-02 | 9.21E-02 | 7.32E-04 | 1.63E-04 | 2.30E-05  | 1.00E+00  |
| PENRE                    | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 2.21E+00 | 2.14E+00 | 5.04E-02 | 1.12E-02 | 1.77E-03  | -4.80E-04 |
| PENRM                    | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 1.00E+00  |
| PENRT                    | Total use of non-renewable primary energy resources  | MJ             | 2.21E+00 | 2.14E+00 | 5.04E-02 | 1.12E-02 | 1.77E-03  | 1.00E+00  |
| SM                       | Use of secondary material  | kg             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| RSF                      | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| NRSF                     | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| FW                       | Net use of fresh water   | m <sup>3</sup> | 1.14E-01 | 1.15E-01 | 2.16E-04 | 4.80E-05 | -1.09E-03 | -4.74E-06 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Waste Categories and Output Flows |                               |       |          |          |          |          |          |           |
|---|-------------------------------|-------|----------|----------|----------|----------|----------|-----------|
| Parameter                                     | Unit                          | Total | A1-A3    | A4       | C2       | C4       | D        |           |
| HWD   | Hazardous waste disposed      | kg    | 8.91E-05 | 8.74E-05 | 1.35E-06 | 3.01E-07 | 3.56E-08 | -4.14E-07 |
| NHWD  | Non-hazardous waste disposed  | kg    | 1.55E-02 | 3.65E-03 | 4.09E-03 | 9.09E-04 | 6.84E-03 | -8.67E-07 |
| RWD   | Radioactive waste disposed    | kg    | 8.34E-07 | 8.18E-07 | 1.30E-08 | 2.90E-09 | 3.45E-10 | -1.15E-09 |
| CRU   | Components for re-use         | kg    | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| MFR   | Materials for recycling       | kg    | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| MER   | Materials for energy recovery | kg    | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| EE  | Exported energy               | MJ    | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

## LCA Results – HCA Packaging

Results shown below are for HCA packaging large (per 1 piece; when cable length L ≥300m).

| TRACI 2.2 V1.00 / US-Canadian 2008 |              |          |          |          |          |           |
|------------------------------------|--------------|----------|----------|----------|----------|-----------|
| Impact category                    | Unit         | Total    | A1-A3    | A4       | A5       | D         |
| Ozone depletion                    | kg CFC-11 eq | 6.08E-08 | 3.86E-08 | 1.62E-08 | 5.94E-09 | -2.58E-09 |
| Global warming                     | kg CO2 eq    | 2.86E+00 | 1.43E+00 | 1.13E+00 | 3.02E-01 | -4.05E-01 |
| Smog                               | kg O3 eq     | 2.11E-01 | 1.08E-01 | 7.98E-02 | 2.25E-02 | -2.37E-02 |
| Acidification                      | kg SO2 eq    | 1.01E-02 | 5.66E-03 | 3.58E-03 | 8.94E-04 | -1.74E-03 |
| Respiratory effects                | kg PM2.5 eq  | 1.55E-03 | 7.01E-04 | 6.87E-04 | 1.60E-04 | -5.91E-04 |
| Freshwater eutrophication          | kg P eq      | 1.32E-03 | 3.52E-04 | 8.11E-05 | 8.88E-04 | -1.20E-04 |
| Marine eutrophication              | kg N eq      | 2.28E-03 | 1.30E-03 | 6.83E-04 | 3.03E-04 | -2.11E-04 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| CML-IA baseline V3.11 / EU25     |              |          |          |          |          |           |
|----------------------------------|--------------|----------|----------|----------|----------|-----------|
| Impact category                  | Unit         | Total    | A1-A3    | A4       | A5       | D         |
| Abiotic depletion                | kg Sb eq     | 1.00E-05 | 6.13E-06 | 3.15E-06 | 7.18E-07 | -1.64E-07 |
| Abiotic depletion (fossil fuels) | MJ           | 3.89E+01 | 1.90E+01 | 1.61E+01 | 3.74E+00 | -4.57E+00 |
| Global warming (GWP100a)         | kg CO2 eq    | 2.89E+00 | 1.44E+00 | 1.13E+00 | 3.11E-01 | -4.07E-01 |
| Ozone layer depletion (ODP)      | kg CFC-11 eq | 4.70E-08 | 3.02E-08 | 1.24E-08 | 4.51E-09 | -2.04E-09 |
| Photochemical oxidation          | kg C2H4 eq   | 6.10E-04 | 3.86E-04 | 1.75E-04 | 4.96E-05 | -6.37E-05 |
| Acidification                    | kg SO2 eq    | 8.79E-03 | 4.99E-03 | 3.05E-03 | 7.51E-04 | -1.68E-03 |
| Eutrophication                   | kg PO4--- eq | 1.11E-02 | 3.62E-03 | 1.02E-03 | 6.43E-03 | -9.74E-04 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set |              |           |           |          |          |           |
|--|--------------|-----------|-----------|----------|----------|-----------|
| Impact category  | Unit         | Total     | A1-A3     | A4       | A5       | D         |
| Acidification  | mol H+ eq    | 1.17E-02  | 6.73E-03  | 3.98E-03 | 1.00E-03 | -2.03E-03 |
| Climate change   | kg CO2 eq    | 2.28E+00  | -4.11E-01 | 1.14E+00 | 1.55E+00 | -4.60E-01 |
| Climate change - Biogenic  | kg CO2 eq    | -5.73E-01 | -1.84E+00 | 3.82E-04 | 1.27E+00 | 0.00E+00  |
| Climate change - Fossil  | kg CO2 eq    | 2.84E+00  | 1.42E+00  | 1.14E+00 | 2.77E-01 | -4.07E-01 |
| Climate change - Land use and LU change                                | kg CO2 eq    | 1.07E-02  | 1.01E-02  | 5.16E-04 | 9.52E-05 | -8.62E-04 |
| Ecotoxicity, freshwater  | CTUe         | 1.36E+01  | 1.00E+01  | 2.67E+00 | 9.28E-01 | -8.91E-01 |
| Ecotoxicity, freshwater - inorganics                                   | CTUe         | 1.09E+01  | 7.38E+00  | 2.59E+00 | 9.10E-01 | -8.72E-01 |
| Ecotoxicity, freshwater - organics                                     | CTUe         | 2.72E+00  | 2.62E+00  | 8.30E-02 | 1.86E-02 | -1.90E-02 |
| Particulate matter   | disease inc. | 2.22E-07  | 8.33E-08  | 1.11E-07 | 2.71E-08 | -1.89E-08 |
| Eutrophication, marine   | kg N eq      | 4.66E-03  | 2.79E-03  | 1.28E-03 | 5.86E-04 | -4.19E-04 |
| Eutrophication, freshwater   | kg P eq      | 8.11E-04  | 6.60E-04  | 1.24E-04 | 2.76E-05 | -2.01E-04 |
| Eutrophication, terrestrial  | mol N eq     | 4.07E-02  | 2.29E-02  | 1.39E-02 | 3.91E-03 | -4.17E-03 |
| Human toxicity, cancer   | CTUh         | 2.29E-09  | 2.03E-09  | 1.85E-10 | 7.60E-11 | -4.47E-11 |
| Human toxicity, cancer - inorganics                                    | CTUh         | 2.91E-10  | 1.66E-10  | 7.97E-11 | 4.57E-11 | -2.93E-11 |
| Human toxicity, cancer - organics                                      | CTUh         | 2.00E-09  | 1.86E-09  | 1.05E-10 | 3.03E-11 | -1.54E-11 |
| Human toxicity, non-cancer   | CTUh         | 3.33E-08  | 1.86E-08  | 1.04E-08 | 4.29E-09 | -2.22E-09 |
| Human toxicity, non-cancer - inorganics                                | CTUh         | 2.86E-08  | 1.48E-08  | 9.79E-09 | 4.08E-09 | -2.16E-09 |

|                                       |              |          |          |          |           |           |
|---------------------------------------|--------------|----------|----------|----------|-----------|-----------|
| Human toxicity, non-cancer - organics | CTUh         | 4.72E-09 | 3.87E-09 | 6.38E-10 | 2.08E-10  | -6.05E-11 |
| Ionising radiation                    | kBq U-235 eq | 1.60E-01 | 1.42E-01 | 1.41E-02 | 4.26E-03  | -5.74E-02 |
| Land use                              | Pt           | 1.98E+02 | 1.78E+02 | 1.62E+01 | 3.94E+00  | -7.69E-01 |
| Ozone depletion                       | kg CFC11 eq  | 5.81E-08 | 3.70E-08 | 1.54E-08 | 5.64E-09  | -2.42E-09 |
| Photochemical ozone formation         | kg NMVOC eq  | 1.43E-02 | 7.05E-03 | 5.71E-03 | 1.54E-03  | -1.23E-03 |
| Resource use, fossils                 | MJ           | 4.18E+01 | 2.16E+01 | 1.63E+01 | 3.81E+00  | -5.49E+00 |
| Resource use, minerals and metals     | kg Sb eq     | 9.77E-06 | 5.90E-06 | 3.15E-06 | 7.18E-07  | -1.61E-07 |
| Water use                             | m3 depriv.   | 7.48E-01 | 7.37E-01 | 8.51E-02 | -7.34E-02 | -5.63E-02 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

### EN15804+A2: Resource Use

| Parameter |  | Unit           | Total    | A1-A3    | A4       | A5        | D         |
|-----------|--|----------------|----------|----------|----------|-----------|-----------|
| PERE      | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 3.40E+01 | 3.47E+01 | 2.26E-01 | 6.06E-02  | -7.29E-01 |
| PERM      | Use of renewable primary energy resources used as raw materials  | MJ             | 3.66E+01 | 3.66E+01 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| PERT      | Total use of renewable primary energy resources  | MJ             | 7.06E+01 | 7.12E+01 | 2.26E-01 | 6.06E-02  | -7.29E-01 |
| PENRE     | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 3.89E+01 | 4.07E+01 | 1.74E+01 | 4.05E+00  | -5.83E+00 |
| PENRM     | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 4.32E-02 | 4.32E-02 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| PENRT     | Total use of non-renewable primary energy resources  | MJ             | 3.90E+01 | 4.07E+01 | 1.74E+01 | 4.05E+00  | -5.83E+00 |
| SM        | Use of secondary material  | kg             | 1.97E+00 | 1.97E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| RSF       | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| NRSF      | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| FW        | Net use of fresh water   | m <sup>3</sup> | 6.82E-01 | 8.13E-01 | 8.57E-02 | -7.34E-02 | -5.76E-02 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

### EN15804+A2: Waste Categories and Output Flows

| Parameter |                               | Unit | Total    | A1-A3    | A4       | A5       | D         |
|-----------|-------------------------------|------|----------|----------|----------|----------|-----------|
| HWD       | Hazardous waste disposed      | kg   | 1.42E-02 | 1.18E-02 | 4.92E-04 | 7.42E-03 | -5.03E-03 |
| NHWD      | Non-hazardous waste disposed  | kg   | 2.66E+00 | 1.71E+00 | 1.37E+00 | 9.54E-01 | -1.05E-02 |
| RWD       | Radioactive waste disposed    | kg   | 2.68E-05 | 3.98E-05 | 3.45E-06 | 1.05E-06 | -1.40E-05 |
| CRU       | Components for re-use         | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| MFR       | Materials for recycling       | kg   | 8.16E-01 | 0.00E+00 | 0.00E+00 | 8.16E-01 | 0.00E+00  |
| MER       | Materials for energy recovery | kg   | 6.41E-01 | 0.00E+00 | 0.00E+00 | 6.41E-01 | 0.00E+00  |
| EE        | Exported energy               | MJ   | 7.65E+00 | 0.00E+00 | 0.00E+00 | 7.65E+00 | 0.00E+00  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

Results shown below are for HCA packaging medium (per 1 piece; when  $100 \leq \text{cable length } L \leq 260\text{m}$ ).

| TRACI 2.2 V1.00 / US-Canadian 2008 |              |          |          |          |          |           |
|------------------------------------|--------------|----------|----------|----------|----------|-----------|
| Impact category                    | Unit         | Total    | A1-A3    | A4       | A5       | D         |
| Ozone depletion                    | kg CFC-11 eq | 2.81E-08 | 1.91E-08 | 6.57E-09 | 2.38E-09 | -7.41E-10 |
| Global warming                     | kg CO2 eq    | 1.28E+00 | 7.04E-01 | 4.55E-01 | 1.19E-01 | -1.16E-01 |
| Smog                               | kg O3 eq     | 9.20E-02 | 5.10E-02 | 3.23E-02 | 8.81E-03 | -6.81E-03 |
| Acidification                      | kg SO2 eq    | 4.52E-03 | 2.72E-03 | 1.45E-03 | 3.52E-04 | -5.00E-04 |
| Respiratory effects                | kg PM2.5 eq  | 6.66E-04 | 3.25E-04 | 2.78E-04 | 6.36E-05 | -1.70E-04 |
| Freshwater eutrophication          | kg P eq      | 4.70E-04 | 1.83E-04 | 3.28E-05 | 2.53E-04 | -3.44E-05 |
| Marine eutrophication              | kg N eq      | 1.02E-03 | 6.36E-04 | 2.76E-04 | 1.08E-04 | -6.04E-05 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| CML-IA baseline V3.11 / EU25     |              |          |          |          |          |           |
|----------------------------------|--------------|----------|----------|----------|----------|-----------|
| Impact category                  | Unit         | Total    | A1-A3    | A4       | A5       | D         |
| Abiotic depletion                | kg Sb eq     | 4.50E-06 | 2.94E-06 | 1.28E-06 | 2.89E-07 | -4.70E-08 |
| Abiotic depletion (fossil fuels) | MJ           | 1.71E+01 | 9.14E+00 | 6.52E+00 | 1.49E+00 | -1.31E+00 |
| Global warming (GWP100a)         | kg CO2 eq    | 1.29E+00 | 7.11E-01 | 4.59E-01 | 1.22E-01 | -1.17E-01 |
| Ozone layer depletion (ODP)      | kg CFC-11 eq | 2.18E-08 | 1.50E-08 | 5.00E-09 | 1.81E-09 | -5.85E-10 |
| Photochemical oxidation          | kg C2H4 eq   | 2.52E-04 | 1.63E-04 | 7.06E-05 | 1.88E-05 | -1.83E-05 |
| Acidification                    | kg SO2 eq    | 3.93E-03 | 2.41E-03 | 1.23E-03 | 2.97E-04 | -4.81E-04 |
| Eutrophication                   | kg PO4--- eq | 4.13E-03 | 1.87E-03 | 4.11E-04 | 1.85E-03 | -2.80E-04 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set |              |           |           |          |          |           |
|--|--------------|-----------|-----------|----------|----------|-----------|
| Impact category  | Unit         | Total     | A1-A3     | A4       | A5       | D         |
| Acidification  | mol H+ eq    | 5.25E-03  | 3.25E-03  | 1.61E-03 | 3.95E-04 | -5.81E-04 |
| Climate change   | kg CO2 eq    | 1.13E+00  | 1.14E-01  | 4.62E-01 | 5.52E-01 | -1.32E-01 |
| Climate change - Biogenic  | kg CO2 eq    | -1.48E-01 | -5.88E-01 | 1.55E-04 | 4.40E-01 | 0.00E+00  |
| Climate change - Fossil  | kg CO2 eq    | 1.27E+00  | 6.98E-01  | 4.61E-01 | 1.12E-01 | -1.17E-01 |
| Climate change - Land use and LU change                                | kg CO2 eq    | 5.46E-03  | 5.21E-03  | 2.09E-04 | 3.80E-05 | -2.47E-04 |
| Ecotoxicity, freshwater  | CTUe         | 6.74E+00  | 5.25E+00  | 1.08E+00 | 4.13E-01 | -2.56E-01 |
| Ecotoxicity, freshwater - inorganics                                   | CTUe         | 5.28E+00  | 3.83E+00  | 1.05E+00 | 4.06E-01 | -2.50E-01 |
| Ecotoxicity, freshwater - organics                                     | CTUe         | 1.46E+00  | 1.42E+00  | 3.36E-02 | 7.36E-03 | -5.45E-03 |
| Particulate matter   | disease inc. | 9.31E-08  | 3.73E-08  | 4.51E-08 | 1.07E-08 | -5.42E-09 |
| Eutrophication, marine   | kg N eq      | 2.12E-03  | 1.39E-03  | 5.18E-04 | 2.08E-04 | -1.20E-04 |
| Eutrophication, freshwater   | kg P eq      | 4.03E-04  | 3.43E-04  | 5.01E-05 | 1.01E-05 | -5.76E-05 |
| Eutrophication, terrestrial  | mol N eq     | 1.82E-02  | 1.10E-02  | 5.63E-03 | 1.53E-03 | -1.20E-03 |
| Human toxicity, cancer   | CTUh         | 7.65E-10  | 6.59E-10  | 7.47E-11 | 3.08E-11 | -1.28E-11 |
| Human toxicity, cancer - inorganics                                    | CTUh         | 1.31E-10  | 8.06E-11  | 3.22E-11 | 1.86E-11 | -8.40E-12 |
| Human toxicity, cancer - organics                                      | CTUh         | 6.33E-10  | 5.79E-10  | 4.25E-11 | 1.22E-11 | -4.42E-12 |
| Human toxicity, non-cancer   | CTUh         | 1.53E-08  | 9.43E-09  | 4.22E-09 | 1.67E-09 | -6.38E-10 |
| Human toxicity, non-cancer - inorganics                                | CTUh         | 1.29E-08  | 7.36E-09  | 3.96E-09 | 1.59E-09 | -6.21E-10 |
| Human toxicity, non-cancer - organics                                  | CTUh         | 2.40E-09  | 2.07E-09  | 2.58E-10 | 7.63E-11 | -1.74E-11 |

|                                   |              |          |          |          |           |           |
|-----------------------------------|--------------|----------|----------|----------|-----------|-----------|
| Ionising radiation                | kBq U-235 eq | 7.81E-02 | 7.06E-02 | 5.70E-03 | 1.71E-03  | -1.65E-02 |
| Land use                          | Pt           | 6.93E+01 | 6.12E+01 | 6.54E+00 | 1.55E+00  | -2.21E-01 |
| Ozone depletion                   | kg CFC11 eq  | 2.69E-08 | 1.84E-08 | 6.24E-09 | 2.26E-09  | -6.94E-10 |
| Photochemical ozone formation     | kg NMVOC eq  | 6.12E-03 | 3.20E-03 | 2.31E-03 | 6.06E-04  | -3.53E-04 |
| Resource use, fossils             | MJ           | 1.86E+01 | 1.04E+01 | 6.61E+00 | 1.52E+00  | -1.57E+00 |
| Resource use, minerals and metals | kg Sb eq     | 4.37E-06 | 2.81E-06 | 1.27E-06 | 2.88E-07  | -4.63E-08 |
| Water use                         | m3 depriv.   | 3.83E-01 | 3.65E-01 | 3.44E-02 | -1.69E-02 | -1.61E-02 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Resource Use |  |                |          |          |          |           |           |
|--------------------------|--|----------------|----------|----------|----------|-----------|-----------|
| Parameter                |  | Unit           | Total    | A1-A3    | A4       | A5        | D         |
| PERE                     | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 1.19E+01 | 1.21E+01 | 9.15E-02 | 2.43E-02  | -2.09E-01 |
| PERM                     | Use of renewable primary energy resources used as raw materials  | MJ             | 1.45E+01 | 1.45E+01 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| PERT                     | Total use of renewable primary energy resources  | MJ             | 2.63E+01 | 2.65E+01 | 9.15E-02 | 2.43E-02  | -2.09E-01 |
| PENRE                    | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 1.82E+01 | 1.83E+01 | 7.03E+00 | 1.62E+00  | -1.67E+00 |
| PENRM                    | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 2.16E-02 | 2.16E-02 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| PENRT                    | Total use of non-renewable primary energy resources  | MJ             | 1.83E+01 | 1.83E+01 | 7.03E+00 | 1.62E+00  | -1.67E+00 |
| SM                       | Use of secondary material  | kg             | 7.83E-01 | 7.83E-01 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| RSF                      | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| NRSF                     | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| FW                       | Net use of fresh water   | m <sup>3</sup> | 3.62E-01 | 3.96E-01 | 3.46E-02 | -1.69E-02 | -1.65E-02 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Waste Categories and Output Flows |                               |      |          |          |          |          |           |
|---|-------------------------------|------|----------|----------|----------|----------|-----------|
| Parameter                                     |                               | Unit | Total    | A1-A3    | A4       | A5       | D         |
| HWD   | Hazardous waste disposed      | kg   | 7.58E-03 | 6.33E-03 | 1.99E-04 | 2.69E-03 | -1.44E-03 |
| NHWD  | Non-hazardous waste disposed  | kg   | 1.02E+00 | 7.11E-01 | 5.53E-01 | 3.10E-01 | -3.02E-03 |
| RWD   | Radioactive waste disposed    | kg   | 1.59E-05 | 1.94E-05 | 1.40E-06 | 4.20E-07 | -4.02E-06 |
| CRU   | Components for re-use         | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| MFR   | Materials for recycling       | kg   | 4.54E-01 | 0.00E+00 | 0.00E+00 | 4.54E-01 | 0.00E+00  |
| MER   | Materials for energy recovery | kg   | 1.83E-01 | 0.00E+00 | 0.00E+00 | 1.83E-01 | 0.00E+00  |
| EE  | Exported energy               | MJ   | 2.20E+00 | 0.00E+00 | 0.00E+00 | 2.20E+00 | 0.00E+00  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

Results shown below are for HCA packaging small (per 1 piece; when cable length L ≤80m).

| TRACI 2.2 V1.00 / US-Canadian 2008 |              |          |          |          |          |           |
|------------------------------------|--------------|----------|----------|----------|----------|-----------|
| Impact category                    | Unit         | Total    | A1-A3    | A4       | A5       | D         |
| Ozone depletion                    | kg CFC-11 eq | 7.40E-09 | 4.78E-09 | 1.92E-09 | 7.01E-10 | -2.81E-10 |
| Global warming                     | kg CO2 eq    | 3.34E-01 | 1.67E-01 | 1.33E-01 | 3.39E-02 | -4.40E-02 |
| Smog                               | kg O3 eq     | 2.49E-02 | 1.29E-02 | 9.44E-03 | 2.63E-03 | -2.58E-03 |
| Acidification                      | kg SO2 eq    | 1.19E-03 | 6.59E-04 | 4.23E-04 | 1.05E-04 | -1.90E-04 |
| Respiratory effects                | kg PM2.5 eq  | 1.83E-04 | 8.27E-05 | 8.13E-05 | 1.89E-05 | -6.43E-05 |
| Freshwater eutrophication          | kg P eq      | 1.50E-04 | 4.42E-05 | 9.60E-06 | 9.65E-05 | -1.30E-05 |
| Marine eutrophication              | kg N eq      | 2.70E-04 | 1.55E-04 | 8.08E-05 | 3.41E-05 | -2.29E-05 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| CML-IA baseline V3.11 / EU25     |              |          |          |          |          |           |
|----------------------------------|--------------|----------|----------|----------|----------|-----------|
| Impact category                  | Unit         | Total    | A1-A3    | A4       | A5       | D         |
| Abiotic depletion                | kg Sb eq     | 1.21E-06 | 7.53E-07 | 3.73E-07 | 8.48E-08 | -1.78E-08 |
| Abiotic depletion (fossil fuels) | MJ           | 4.53E+00 | 2.18E+00 | 1.91E+00 | 4.41E-01 | -4.97E-01 |
| Global warming (GWP100a)         | kg CO2 eq    | 3.37E-01 | 1.68E-01 | 1.34E-01 | 3.49E-02 | -4.42E-02 |
| Ozone layer depletion (ODP)      | kg CFC-11 eq | 5.73E-09 | 3.73E-09 | 1.46E-09 | 5.32E-10 | -2.22E-10 |
| Photochemical oxidation          | kg C2H4 eq   | 7.05E-05 | 4.41E-05 | 2.07E-05 | 5.77E-06 | -6.92E-06 |
| Acidification                    | kg SO2 eq    | 1.02E-03 | 5.76E-04 | 3.61E-04 | 8.81E-05 | -1.82E-04 |
| Eutrophication                   | kg PO4--- eq | 1.27E-03 | 4.47E-04 | 1.20E-04 | 6.99E-04 | -1.06E-04 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN 15804 + A2 (adapted) V1.03 / EF 3.1 normalization and weighting set |              |           |           |          |          |           |
|--|--------------|-----------|-----------|----------|----------|-----------|
| Impact category  | Unit         | Total     | A1-A3     | A4       | A5       | D         |
| Acidification  | mol H+ eq    | 1.37E-03  | 7.83E-04  | 4.71E-04 | 1.17E-04 | -2.20E-04 |
| Climate change   | kg CO2 eq    | 2.70E-01  | -4.17E-02 | 1.35E-01 | 1.77E-01 | -5.00E-02 |
| Climate change - Biogenic  | kg CO2 eq    | -6.21E-02 | -2.08E-01 | 4.52E-05 | 1.46E-01 | 0.00E+00  |
| Climate change - Fossil  | kg CO2 eq    | 3.31E-01  | 1.65E-01  | 1.35E-01 | 3.11E-02 | -4.43E-02 |
| Climate change - Land use and LU change                                | kg CO2 eq    | 1.35E-03  | 1.28E-03  | 6.11E-05 | 1.12E-05 | -9.38E-05 |
| Ecotoxicity, freshwater  | CTUe         | 1.68E+00  | 1.26E+00  | 3.16E-01 | 1.07E-01 | -9.69E-02 |
| Ecotoxicity, freshwater - inorganics                                   | CTUe         | 1.34E+00  | 9.26E-01  | 3.06E-01 | 1.05E-01 | -9.48E-02 |
| Ecotoxicity, freshwater - organics                                     | CTUe         | 3.47E-01  | 3.35E-01  | 9.82E-03 | 2.18E-03 | -2.07E-03 |
| Particulate matter   | disease inc. | 2.60E-08  | 9.60E-09  | 1.32E-08 | 3.19E-09 | -2.05E-09 |
| Eutrophication, marine   | kg N eq      | 5.49E-04  | 3.31E-04  | 1.52E-04 | 6.59E-05 | -4.55E-05 |
| Eutrophication, freshwater   | kg P eq      | 1.00E-04  | 8.26E-05  | 1.47E-05 | 3.19E-06 | -2.18E-05 |
| Eutrophication, terrestrial  | mol N eq     | 4.85E-03  | 2.74E-03  | 1.65E-03 | 4.58E-04 | -4.53E-04 |
| Human toxicity, cancer   | CTUh         | 2.60E-10  | 2.29E-10  | 2.19E-11 | 8.88E-12 | -4.86E-12 |
| Human toxicity, cancer - inorganics                                    | CTUh         | 3.50E-11  | 2.03E-11  | 9.43E-12 | 5.31E-12 | -3.18E-12 |
| Human toxicity, cancer - organics                                      | CTUh         | 2.25E-10  | 2.09E-10  | 1.24E-11 | 3.57E-12 | -1.68E-12 |
| Human toxicity, non-cancer   | CTUh         | 4.06E-09  | 2.33E-09  | 1.23E-09 | 4.98E-10 | -2.42E-10 |
| Human toxicity, non-cancer - inorganics                                | CTUh         | 3.47E-09  | 1.84E-09  | 1.16E-09 | 4.74E-10 | -2.35E-10 |
| Human toxicity, non-cancer - organics                                  | CTUh         | 5.91E-10  | 4.92E-10  | 7.55E-11 | 2.40E-11 | -6.58E-12 |

|                                   |              |          |          |          |           |           |
|-----------------------------------|--------------|----------|----------|----------|-----------|-----------|
| Ionising radiation                | kBq U-235 eq | 1.95E-02 | 1.74E-02 | 1.67E-03 | 5.02E-04  | -6.24E-03 |
| Land use                          | Pt           | 2.28E+01 | 2.04E+01 | 1.91E+00 | 4.63E-01  | -8.36E-02 |
| Ozone depletion                   | kg CFC11 eq  | 7.08E-09 | 4.59E-09 | 1.82E-09 | 6.65E-10  | -2.63E-10 |
| Photochemical ozone formation     | kg NMVOC eq  | 1.69E-03 | 8.29E-04 | 6.76E-04 | 1.81E-04  | -1.34E-04 |
| Resource use, fossils             | MJ           | 4.87E+00 | 2.49E+00 | 1.93E+00 | 4.49E-01  | -5.96E-01 |
| Resource use, minerals and metals | kg Sb eq     | 1.18E-06 | 7.23E-07 | 3.73E-07 | 8.47E-08  | -1.75E-08 |
| Water use                         | m3 depriv.   | 8.10E-02 | 7.87E-02 | 1.01E-02 | -7.76E-03 | -6.12E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Resource Use |  |                |          |          |          |           |           |
|--------------------------|--|----------------|----------|----------|----------|-----------|-----------|
| Parameter                | Unit   | Total          | A1-A3    | A4       | A5       | D         |           |
| PERE                     | Use of renewable primary energy excluding renewable primary energy resources used as raw materials     | MJ             | 3.91E+00 | 3.98E+00 | 2.68E-02 | 7.14E-03  | -7.92E-02 |
| PERM                     | Use of renewable primary energy resources used as raw materials  | MJ             | 4.32E+00 | 4.32E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| PERT                     | Total use of renewable primary energy resources  | MJ             | 8.23E+00 | 8.30E+00 | 2.68E-02 | 7.14E-03  | -7.92E-02 |
| PENRE                    | Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials | MJ             | 4.58E+00 | 4.73E+00 | 2.06E+00 | 4.78E-01  | -6.34E-01 |
| PENRM                    | Use of non-renewable primary energy resources used as raw materials                                    | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| PENRT                    | Total use of non-renewable primary energy resources  | MJ             | 4.58E+00 | 4.73E+00 | 2.06E+00 | 4.78E-01  | -6.34E-01 |
| SM                       | Use of secondary material  | kg             | 7.83E-01 | 7.83E-01 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| RSF                      | Use of renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| NRSF                     | Use of non-renewable secondary fuels   | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  |
| FW                       | Net use of fresh water   | m <sup>3</sup> | 7.43E-02 | 8.83E-02 | 1.01E-02 | -7.77E-03 | -6.26E-03 |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

| EN15804+A2: Waste Categories and Output Flows |                               |       |          |          |          |          |           |
|---|-------------------------------|-------|----------|----------|----------|----------|-----------|
| Parameter                                     | Unit                          | Total | A1-A3    | A4       | A5       | D        |           |
| HWD   | Hazardous waste disposed      | kg    | 1.81E-03 | 1.51E-03 | 5.83E-05 | 8.47E-04 | -5.47E-04 |
| NHWD  | Non-hazardous waste disposed  | kg    | 3.09E-01 | 2.03E-01 | 1.62E-01 | 1.07E-01 | -1.14E-03 |
| RWD   | Radioactive waste disposed    | kg    | 3.45E-06 | 4.85E-06 | 4.08E-07 | 1.23E-07 | -1.52E-06 |
| CRU   | Components for re-use         | kg    | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| MFR   | Materials for recycling       | kg    | 1.06E-01 | 0.00E+00 | 0.00E+00 | 1.06E-01 | 0.00E+00  |
| MER   | Materials for energy recovery | kg    | 7.01E-02 | 0.00E+00 | 0.00E+00 | 7.01E-02 | 0.00E+00  |
| EE  | Exported energy               | MJ    | 8.32E-01 | 0.00E+00 | 0.00E+00 | 8.32E-01 | 0.00E+00  |

\*Stages B1 through B7 and C1 have not been considered and reported as they are not applicable in this LCA study

**LCA sum results calculation guidance**

The LCA results of HCA cables (per meter), HCA connector and converter kits (per piece), HCA packaging sizes (per piece) have been demonstrated above, respectively. The LCA sum results of HCA products can be easily calculated based on the guidance below. The product description indicates the cable type, cable length, connector numbers, converter types and numbers, which can be found in “Ordering Tree” on page 5. The packaging size is also decided by the cable length. The table below summarizes all the variations in HCA products for sum calculation. The LCA sum results can be calculated as:

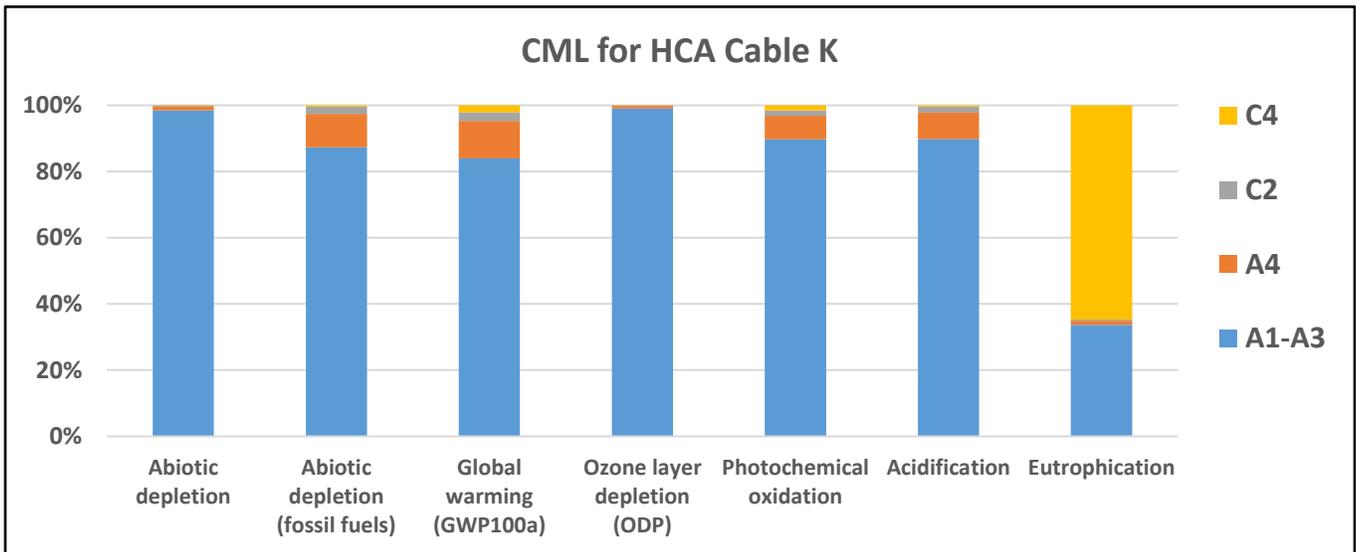
$$\sum LCA\ result\ (HCA\ product) = LCA\ result\ (HCA\ cable) * (1.01 * L + 0.2) + LCA\ result\ (HCA\ connector) * number + LCA\ results\ (HCA\ converter) * number + LCA\ result\ (HCA\ packaging)$$

| HCA product types | Cable type | Cable length for calculation* | Connector kit | Converter kit | Packaging   |
|-------------------|------------|-------------------------------|---------------|---------------|---|
| HCA-A01F          | F          | 1.01*L+0.2                    | 1             | A*1           | small (cable length ≤80m), medium (100 ≤ cable length ≤ 260m), and large (cable length ≥300m) |
| HCA-H01F          | F          | 1.01*L+0.2                    | 1             | H*1           |   |
| HCA-D01G          | G          | 1.01*L+0.2                    | 1             | D*1           |   |
| HCA-D01K          | K          | 1.01*L+0.2                    | 1             | D*1           |   |
| HCA-Y01K          | K          | 1.01*L+0.2                    | 1             | Y*1           |   |
| HCA-AA1K          | K          | 1.01*L+0.2                    | 2             | A*2           |   |
| HCA-H01K          | K          | 1.01*L+0.2                    | 1             | H*1           |   |
| HCA-HH1K          | K          | 1.01*L+0.2                    | 2             | H*2           |   |
| HCA-A01K          | K          | 1.01*L+0.2                    | 1             | A*1           |   |

\*L is the cable length in meter.

## LCA Interpretation

Based on LCA sum calculation formular and the LCA results of HCA cable, connector, converters and packaging respectively, the LCA sum result of HCA product mainly depends on the contribution of the cable, especially with the increasing of the cable length. Therefore, the LCA interpretation will be focused on cable. The figure below shows the CML results of HCA cable K, indicating stages A1-A3 are the dominant contributors across most environmental impact categories, except eutrophication. This is due to the upstream production of raw materials used in the product, along with electricity usage in the manufacturing of parts. Only for Eutrophication, stage C4 is particularly significant due to the 100% landfill of the cable at the end of life. This highlights the importance of targeting the stages A1-A3 to effectively reduce global warming potential and most other environmental impacts. In addition, to develop better recycling/reuse strategy of cable components to replace the landfill treatment.



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## Additional Environmental Information

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### Environmental and Health During Manufacturing

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CommScope values employees' health, safety and well-being. To this end, we maintain a robust company-wide environment, health and safety (EHS) management system. This is an integrated program based on the requirements of the International Standards of ISO45001 and ISO14001. To support this integrated EHS management system, CommScope utilizes a web-based platform, the BSI Entropy™ tool. This tool supports the management of our EHS processes and operations at the corporate and facility level. All EHS management system records (policies, procedures, method statements, health and safety risk assessments, environmental aspect/impact assessments, legal requirements, permits, training, internal and external audits, incidents and implemented CAPA, KPIs, and other records related to EHS) are maintained and managed in Entropy. In addition, 90% of CommScope manufacturing facilities are certified according to the ISO14001 and ISO45001 standards. Our vision and commitments are detailed in our [EHS Policy](#).

CommScope understands the need to address the environmental impacts of its products and services. CommScope engages product development teams in designing innovative and more sustainable solutions across a product's life cycle—from design and manufacturing to product use and end of life.

CommScope is committed to demonstrating a high standard of global product compliance practices. Through this commitment, we actively monitor global environmental trends and emerging regulatory requirements that may affect our products, operations, supply chain, and customer base. We are committed to be compliant with all applicable environmental product related legal and other requirements. To achieve this, we have a global organization comprising environmental specialists, engineers, and product compliance experts who are constantly ensuring our compliance status is maintained. We manage our compliance using a cross-functional approach with our engineers, designers, quality organization, supply chain organization, and production.

CommScope is committed to upholding the human rights of its employees. To ensure our employees are treated with dignity and respect, we follow a well-established Code of Ethics and Business Conduct and Labor Policy that align with recognized standards and guidelines from the International Labor Organization, the United Nations Global Compact, the UN Universal Declaration of Human Rights, SA8000 and applicable laws.

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## Environmental and Health During Installation

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There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product.

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## Extraordinary Effects

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### Fire

No extraordinary effects to the environment can be anticipated during exposure to fire.

### Water

Contains no substances that have any impact on water in case of flood.

### Mechanical Destruction

No danger to the environment can be anticipated during mechanical destruction.

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## Delayed Emissions

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Global warming potential is calculated using the CML- IA Baseline 3.11, TRACI 2.2 and EN15804+A2 (adapted) 1.03 impact assessment methodologies. Delayed emissions are not considered.

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## Environmental Activities and Certifications

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Our Sustainability Report details CommScope's efforts to operate the business ethically and with integrity; protect the environment; maintain the health, safety and well-being of our workforce; and support the communities in which we operate. To learn more, view our comprehensive Sustainability Report at <https://www.commscope.com/corporate-responsibility-and-sustainability/>.

CommScope maintains a variety of certifications based on the widely accepted industry standards:

- Quality Management System certification (ISO9001/TL9000)
- Environmental Management System certification (ISO14001)
- Health and Safety Management System certification (ISO45001)

These certificates can be downloaded from our company website:

<https://www.commscope.com/corporate-responsibility-and-sustainability/philosophy/#certifications>

Product sustainability certifications including EPDs and Health Product Declarations (HPDs) can be downloaded from our company website:

<https://www.commscope.com/corporate-responsibility-and-sustainability/product-sustainability/certifications/>

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## Further Information

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## References

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- PSR PEP ecopassport Program Product Specific Rules specific for Wires, Cables and Accessories, v4.0, 2022
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## Contact Information

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### Study Commissioner

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For more information, visit our website at  
<https://www.commscope.com/>



- Contact customer support for product and technical questions at <https://www.commscope.com/contact-us/>
- Contact product compliance at [productsustainability@commscope.com](mailto:productsustainability@commscope.com)
- Contact Corporate Responsibility & Sustainability team for sustainability questions at [sustainability@commscope.com](mailto:sustainability@commscope.com)

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