Environmental Product Declaration

In accordance with ISO14025:2006 and EN15804:2012+A2:2019

Hydroxyethylcellulose

SE Tylose GmbH & Co. KG

Owner of the declaration:
SE Tylose GmbH & Co. KG

Product name:
Hydroxyethylcellulose

Declared unit:
1 kg Hydroxyethylcellulose

Product category /PCR:
Basic Chemicals 2021:03 v.1.1.1

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-5641-4909-EN

Registration number:
NEPD-5641-4909-EN

Issue date: 03.01.2024

Valid to: 03.01.2029

The Norwegian
EPD Foundation

General information

Product:
Hydroxyethylcellulose

Program operator:
The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
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Declaration number:
NEPD-5641-4909-EN

This declaration is based on Product Category Rules:
Basic Chemicals 2021:03 v.1.1.1

Statement of liability:
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit:
1 kg Hydroxyethylcellulose

Declared unit with option:
A1-A3, A4, A5, C1, C2, C3, C4, D

Functional unit:
-

Verification:
Independent verification of the declaration and data, according to ISO14025:2010

internal ☐ external ☒

Elisabet Amat, GREENIZE
Independent verifier approved by EPD Norway

Owner of the declaration:
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Manufacturer:
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Kasteler Str. 45, 65203 Wiesbaden, Germany
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Place of production:
Wiesbaden, Germany

Management system:
ISO 9001, ISO 14001, ISO 45001, ISO 50001

Organisation no:
HRB 21112

Issue date:
03.01.2024

Valid to:
03.01.2029

Year of study:
2022

Comparability:
EPD of products may not be able to compare if they do not comply with EN 15804. EPDs from other programs than the Norwegian EPD Foundation may not be comparable.

The EPD has been worked out by:
Marvin Gornik
EurA AG

Approved

Manager of EPD Norway

Product

Product description:
Hydroxyethylcellulose (HEC) is natural cellulose which has been modified by etherification, specifically by hydroxyethylation. Tylose® HEC are nonionic cellulose ethers, which are offered as free flowing powder or in granular form and are soluble in water at any temperature. Depending on the desired viscosity of the final product in aqueous solution, cellulose from either cotton linters or from wood pulp is used. The utilised wood pulp is exclusively from manufacturers who are certified according to sustainable management of the PEFC (Programme for the Endorsement of Forest Certification Schemes).

Product specification:
Hydroxyethylcellulose (HEC) typically has a dry matter content of 95% or more when sold to the customer. Consequently, the product consists of Hyxroxyethylcellulose and water.

The type and the amount of product packaging depends on the specific customer requirements. The results are based on a representative mix of packaging materials per sold product per year. The packaging amounts to 0.043 kg per kg of product.

Materials	g	%
Hydroxyethylcellulose	950	95
Water	50	5
Packaging	42.65	-

Technical data:
The dry matter content of the product is 95%.
CAS number: 9004-62-0.

Market:
Global

Reference service life, product:
Not relevant

Reference service life, building:
Not relevant

Additional technical information
-

LCA: Calculation rules

Declared unit:
The declared unit is 1 kg of Hydroxyethylcellulose (dry matter content 95 %). Packaging burdens are declared separately.

Cut-off criteria:
All available data was considered in the LCA and no materials were cut-off.

Allocation:
No allocation applied in this study.

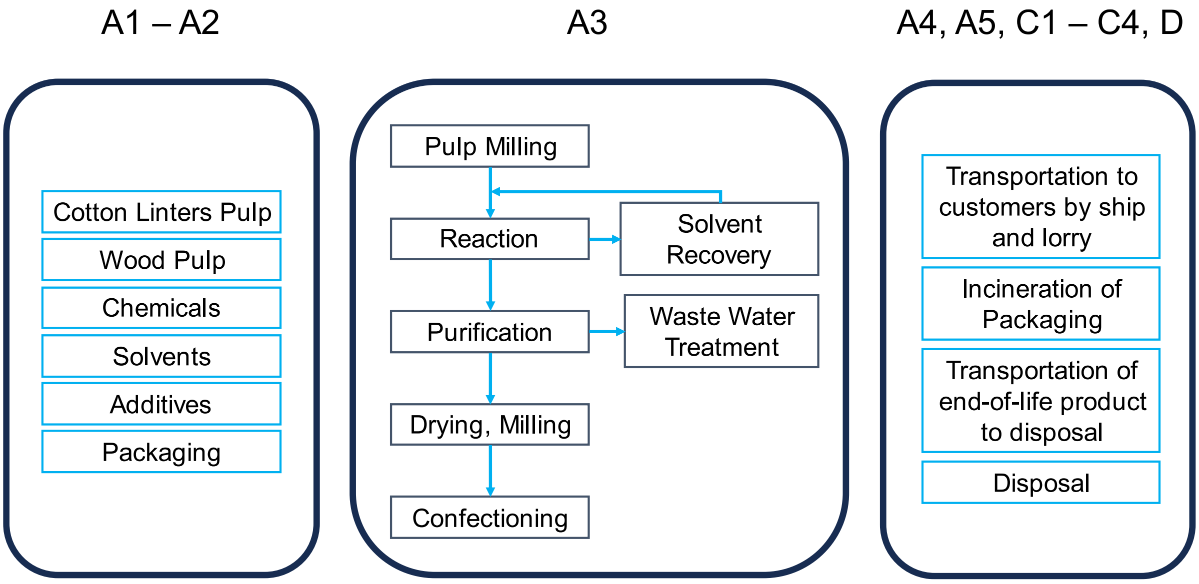
Data quality:
The performed LCA complies with the data quality requirements described in PCR 2021:03 Basic Chemicals v1.1.1. Specific data was implemented wherever possible. If not available, generic data from the ecoinvent database was used and missing data was modelled with literature data. Proxies were only used for materials with a very low mass contribution. In total, only 0.25 wt.% of the input (material only, i.e., excluding energy and media like steam, nitrogen etc.) for HEC production are proxies. Data on consumption of natural resources, energy carriers, chemicals, emissions, upstream and downstream transport modes are site specific from SE Tylose. Foreground data refers to the year 2022 and to the production site of SE Tylose in Wiesbaden, Germany. As far as possible, the supply of materials in the countries of origin as specified by SE Tylose, including corresponding transport processes to the next processing step, was considered. Thus, data from the area under study (DE) was used. If not available, data from a larger area than the area under study was included, e.g., Europe (RER) or Global (GLO), the latter representing activities that are considered as average and valid for all the countries in the world. To ensure temporal relevance, the newest currently available ecoinvent database 3.9.1 from 2023 was used. Supplier specific data is not older than the year 2019.

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Up-stream		Core	Downstream													Benefits & loads beyond system boundary
Product stage			Assembly stage		Use stage							End of life stage				
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:

The system boundary is defined as cradle-to-gate with options and includes stages A1 – A5 as well as end-of-life stages C1 – C4 and D as illustrated by the flowchart.



All processes from raw material sourcing (pulps, all utilized chemicals and additives as well as the diverse packaging solutions), transport to the production site in Wiesbaden, the chemical manufacturing including all side-processes connected until the final transport stage of the product to the worldwide customer sites, disposal of packaging material and the end-of-life stage are evaluated and included. The use-phase was excluded from the analysis, because HEC is used in a variety of products from different industry sectors like food, pharma, cosmetics and building/construction. Due to this multifunctionality, different scenarios take place at the end-of-life stage of HEC. Since a share of HEC is incorporated in building materials, the demolition phase of HEC products takes place with the whole demolition of the building/construction and should rather be allocated to the final building material (e.g. paint etc.). Therefore, the module C1 is set to zero. For module C2 a generic transportation mode of 50 km from demolition to the disposal site was assumed. Products that incorporate HEC may be processed for recycling. However, HEC itself is fully incorporated into these systems and cannot be separated from other materials inside the product. Hence, waste treatment efforts should not be allocated to HEC, but rather to the final product. Therefore, C3 was set to zero and information regarding module C3 should be taken from EPDs of the materials that incorporate HEC. For the final disposal, two scenarios were included. All material that is enclosed in building products like paint or other building material will be landfilled at end-of-life as inert material (ecoinvent dataset). HEC, that is used in ceramics is typically burned directly in sinter-ovens. The other share, that is used in food, pharma and cosmetics will go to wastewater and will ultimately be decomposed to CO_2. The modelling of combustion and decomposition is done by calculating biogenic carbon share to CO_2 (biogenic C*44/12) and fossil carbon share to fossil CO_2 (fossil C*44/12).

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to assembly/user (A4)

Transport from production place to assembly/user (A4)	Capacity utilisation (incl. return) %	Type	Distance (km)	Diesel consumption	Unit	Value [kg fuel/kg]
Truck	72	market for transport, freight, lorry, unspecified, Cutoff, S - RER	1470	3.11E-02	kg/t*km	4.57E-02
Boat	70	transport, freight, sea, container ship; Cutoff, S - GLO	10216	2.52E-03	kg/t*km	2.57E-02

For the transport processes, average data from ecoinvent 3.9.1 is used and the same average capacity load is assumed here.

Assembly (A5)

	Unit	Value
Waste treatment of packaging	kg	0.043

In total, 0.043 kg of packaging per kg HEC is necessary. It is assumed that all packaging material is incinerated.

End of Life (C1, C3, C4)

	Unit	Value
To landfill	kg	0.86
Incinerated / decomposed	kg	0.14

Landfilled material is modelled with ecoinvent dataset for inert material landfill.
The biogenic and fossil carbon content of the product at factory gate has been used to calculate the emissions of CO_2 from end-of-life (C4) for the share that is incinerated or decomposed (e.g., in wastewater treatment). As declared in the EN 15804 standard, all biogenic carbon must be released to biogenic CO_2 at the end-of-life, because biogenic CO_2 must be balanced to zero throughout the complete life cycle of a product (i.e., biogenic CO_2 uptake from atmosphere = biogenic CO_2 release at end-of-life). The fossil carbon content of HEC however is only converted to CO_2 for the share that is not landfilled. 1 kg of carbon corresponds to 44/12 kg CO_2 emissions.

Transport to waste processing (C2)

Transport from production place to assembly/user (C2)	Capacity utilisation (incl. return) %	Type	Distance (km)	Diesel consumption	Unit	Value [kg fuel/kg]
Truck	72	market for transport, freight, lorry, unspecified, Cutoff, S - RER	50	3.11E-02	kg/t*km	1.55E-03

Benefits and loads beyond the system boundaries (D)

HEC is used in a variety of products from different industry sectors like food, pharma, cosmetics, and building/construction and is always incorporated into these products. Recycling of certain building materials that incorporate HEC is possible, but these recycling potentials should be allocated to the final products. Furthermore, energy recovery from incineration of HEC itself or from incineration of methane as a byproduct from wastewater treatment processes of HEC-containing materials (e.g., from food or cosmetic industry) is possible, but is neglected here due to high uncertainties, such as loss rates and efficiencies. Therefore, module D is set to 0.

LCA: Results

The supply of raw materials (A1 – A2) dominates the environmental footprint for most impact categories by approx. 3% up to 94%, depending on the impact category, followed by energy and media related consumptions (A3), which contribute with approx. 6 – 48%. Infrastructure is also implemented, which is reflected in abiotic resource consumption (ADP-M&M) by approx. 32%. However, the data applied as well as the results need to be treated carefully, especially as no specific plant information and lifetimes were available. In the first instance and to get a first hint of the environmental impact of the plant, the ecoinvent data set / process “chemical factory, organics” was used, which includes land use, buildings, and facilities (including dismantling) of an average chemical plant. Downstream transportation to customers (A4) contributes by 2% – 21%. The end-of-life phase (C1 – C4) has a minor impact below 2 % in most categories.

Core environmental impact indicators for 1 kg of HEC

Indicator	Unit	Upstream		Core		Downstream							D
		A1	A2	A3 (product)	A3 (packaging)	A4	A5 (product)	A5 (packaging)	C1	C2	C3	C4	D
GWP - total	kg CO2 eq	3.65E-01	9.79E-02	1.55E+00	-7.10E-04	3.22E-01	0.00E+00	8.36E-02	0.00E+00	7.44E-03	0.00E+00	1.66E+00	0.00E+00
GWP - fossil	kg CO2 eq	1.97E+00	9.77E-02	1.55E+00	5.26E-02	3.22E-01	0.00E+00	2.92E-02	0.00E+00	7.43E-03	0.00E+00	2.59E-02	0.00E+00
GWP - biogenic	kg CO2 eq	-1.62E+00	1.07E-04	1.54E-03	-5.34E-02	8.42E-05	0.00E+00	5.44E-02	0.00E+00	2.23E-06	0.00E+00	1.63E+00	0.00E+00
GWP - luluc	kg CO2 eq	1.72E-02	6.53E-05	8.80E-04	1.41E-04	1.87E-04	0.00E+00	4.08E-07	0.00E+00	3.63E-06	0.00E+00	9.58E-07	0.00E+00
ODP	kg CFC11 eq	1.65E-07	1.90E-09	1.17E-07	9.69E-10	6.36E-09	0.00E+00	5.18E-11	0.00E+00	1.63E-10	0.00E+00	1.68E-10	0.00E+00
AP	molc H+ eq	1.16E-02	9.27E-04	9.05E-03	2.90E-04	4.11E-03	0.00E+00	1.28E-05	0.00E+00	3.47E-05	0.00E+00	3.14E-05	0.00E+00
EP- freshwater	kg P eq	8.55E-04	1.53E-05	4.66E-04	6.76E-05	1.92E-05	0.00E+00	1.67E-07	0.00E+00	5.36E-07	0.00E+00	2.27E-07	0.00E+00
EP -marine	kg N eq	5.47E-03	2.83E-04	1.62E-03	9.75E-05	1.18E-03	0.00E+00	6.61E-06	0.00E+00	1.38E-05	0.00E+00	1.37E-05	0.00E+00
EP - terrestrial	molc N eq	2.75E-02	3.07E-03	1.68E-02	8.02E-04	1.29E-02	0.00E+00	6.04E-05	0.00E+00	1.47E-04	0.00E+00	1.47E-04	0.00E+00
POCP	kg NMVOC eq	5.61E-03	9.42E-04	8.20E-03	2.93E-04	3.82E-03	0.00E+00	3.56E-05	0.00E+00	5.15E-05	0.00E+00	6.68E-04	0.00E+00
ADP-M&M[2]	kg Sb-Eq	1.13E-05	2.65E-07	1.16E-05	2.00E-07	7.99E-07	0.00E+00	3.60E-09	0.00E+00	2.37E-08	0.00E+00	5.23E-09	0.00E+00
ADP-fossil[2]	MJ	5.44E+01	1.37E+00	5.11E+01	1.19E+00	4.46E+00	0.00E+00	1.03E-02	0.00E+00	1.08E-01	0.00E+00	1.24E-01	0.00E+00
WDP[2]	m^3	6.50E+00	7.77E-03	3.93E-01	3.91E-02	1.97E-02	0.00E+00	3.14E-03	0.00E+00	5.47E-04	0.00E+00	4.28E-04	0.00E+00

GWP-total: *Global Warming Potential;* ***GWP-fossil:*** *Global Warming Potential fossil fuels;* ***GWP-biogenic:*** *Global Warming Potential biogenic;* ***GWP-LULUC:*** *Global Warming Potential land use and land use change;* ***ODP:*** *Depletion potential of the stratospheric ozone layer;* ***AP:*** *Acidification potential, Accumulated Exceedance;* ***EP-freshwater:*** *Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional Norwegian requirements" for indicator given as PO4 eq.* ***EP-marine:*** *Eutrophication potential, fraction of nutrients reaching freshwater end compartment;* ***EP-terrestrial:*** *Eutrophication potential, Accumulated Exceedance;* ***POCP****: Formation potential of tropospheric ozone;* ***ADP-M&M****: Abiotic depletion potential for non-fossil resources (minerals and metals);* ***ADP-fossil:*** *Abiotic depletion potential for fossil resources;* ***WDP:*** *Water deprivation potential, deprivation weighted water consumption*

Reading example: 9.0 E-03 = 9.0*10-3 = 0.009

Additional environmental impact indicators for 1 kg of HEC

Indicator	Unit	Upstream		Core		Downstream							D
		A1	A2	A3 (product)	A3 (packaging)	A4	A5 (product)	A5 (packaging)	C1	C2	C3	C4	
PM	Disease incidence	8.15E-08	7.82E-09	8.35E-08	2.66E-09	2.46E-08	0.00E+00	9.18E-11	0.00E+00	7.32E-10	0.00E+00	7.92E-10	0.00E+00
IRP[1]	kBq U235 eq.	2.45E-01	3.10E-03	1.34E-01	7.73E-03	4.97E-03	0.00E+00	1.92E-05	0.00E+00	1.48E-04	0.00E+00	1.18E-04	0.00E+00
ETP-fw[2]	CTUe	1.25E+01	6.45E-01	7.70E+00	2.67E-01	2.18E+00	0.00E+00	6.43E-02	0.00E+00	5.28E-02	0.00E+00	7.15E-02	0.00E+00
HTP-c[2]	CTUh	7.32E-10	5.54E-11	1.01E-09	2.82E-11	1.63E-10	0.00E+00	3.91E-12	0.00E+00	4.01E-12	0.00E+00	1.65E-12	0.00E+00
HTP-nc[2]	CTUh	1.32E-08	9.42E-10	1.96E-08	5.06E-10	2.83E-09	0.00E+00	2.53E-10	0.00E+00	8.38E-11	0.00E+00	3.05E-09	0.00E+00
SQP[2]	Dimensionless	1.10E+01	8.41E-01	4.00E+00	6.41E+00	2.46E+00	0.00E+00	3.07E-03	0.00E+00	8.06E-02	0.00E+00	2.55E-01	0.00E+00

***PM:** Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **ETP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality*

[1] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

[2] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Resource use for 1 kg of HEC

Parameter	Unit	Upstream		Core		Downstream							D
		A1	A2	A3 (product)	A3 (packaging)	A4	A5 (product)	A5 (packaging)	C1	C2	C3	C4	
RPEE	MJ	2.91E+00	3.87E-02	1.61E+00	2.91E+00	5.89E-02	0.00E+00	3.73E-04	0.00E+00	1.70E-03	0.00E+00	2.46E-03	0.00E+00
RPEM	MJ	1.81E+01	0.00E+00	0.00E+00	5.17E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	2.11E+01	3.87E-02	1.61E+00	5.20E+02	5.89E-02	0.00E+00	3.73E-04	0.00E+00	1.70E-03	0.00E+00	2.46E-03	0.00E+00
NRPE	MJ	5.85E+01	1.46E+00	5.58E+01	5.86E+01	4.74E+00	0.00E+00	1.12E-02	0.00E+00	1.15E-01	0.00E+00	1.32E-01	0.00E+00
NRPM	MJ	INA	0.00E+00	0.00E+00	4.15E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	5.85E+01	1.46E+00	5.58E+01	4.73E+02	4.74E+00	0.00E+00	1.12E-02	0.00E+00	1.15E-01	0.00E+00	1.32E-01	0.00E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m^3	1.51E-01	1.81E-04	9.15E-03	9.09E-04	4.58E-04	0.00E+00	7.31E-05	0.00E+00	1.27E-05	0.00E+00	9.97E-06	0.00E+00

***RPEE** Renewable primary energy resources used as energy carrier; **RPEM** Renewable primary energy resources used as raw materials; **TPE** Total use of renewable primary energy resources; **NRPE** Nonrenewable primary energy resources used as energy carrier; **NRPM** Nonrenewable primary energy resources used as materials; **TRPE** Total use of non-renewable primary energy resources; **SM** Use of secondary materials; **RSF** Use of renewable secondary fuels; **NRSF** Use of non-renewable secondary fuels; **W** Use of net fresh water; **INA** Indicator not assessed*

End of life – Waste

Parameter	Unit	Upstream		Core		Downstream							D
		A1	A2	A3 (product)	A3 (packaging)	A4	A5 (product)	A5 (packaging)	C1	C2	C3	C4	
HW	kg	3.82E-05	7.75E-06	2.10E-04	6.00E-06	2.62E-05	0.00E+00	7.21E-08	0.00E+00	6.76E-07	0.00E+00	6.03E-07	0.00E+00
NHW	kg	9.06E-02	6.47E-02	1.20E-01	1.27E-02	2.03E-01	0.00E+00	1.55E-03	0.00E+00	6.78E-03	0.00E+00	8.59E-01	0.00E+00
RW	kg	6.14E-05	8.30E-07	3.41E-05	1.97E-06	1.20E-06	0.00E+00	4.85E-09	0.00E+00	3.61E-08	0.00E+00	2.67E-08	0.00E+00

HW *Hazardous waste disposed;* ***NHW*** *Non-hazardous waste disposed;* ***RW*** *Radioactive waste disposed.*

End of life – output flow

Parameter	Unit	Upstream		Core		Downstream							D
		A1	A2	A3 (product)	A3 (packaging)	A4	A5 (product)	A5 (packaging)	C1	C2	C3	C4	
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CR *Components for reuse;* ***MR*** *Materials for recycling;* ***MER*** *Materials for energy recovery;* ***EEE*** *Exported electric energy;* ***ETE*** *Exported thermal energy.*

All processes are included within the system boundaries of HEC and packaging production.

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C/kg HEC	0.445
Biogenic carbon content in the accompanying packaging	kg C/kg Packaging	0.348

On a mass basis, the biogenic carbon content in the untreated source material, i.e., cellulose obtained from renewable resources (either wood or cotton linters) amounts to 44.45 wt.%. This is 100% of all carbon in natural cellulose and can either be measured by ultimate analysis or derived from the chemical formula. The etherification towards Hydroxyethylcellulose is currently conducted with materials from fossil resources. Hence, the degree of etherification determines the quantity of added non-biogenic carbon. The degree of etherification is pre-determined by the specific product property requirements. For HEC, the overall carbon content (biogenic + fossil) amounts to 48.53 wt.% carbon. Consequently, as the biogenic fraction is 44.45% carbon, this biogenic carbon equals 91.6% of all the product's carbon in Hydroxyethylcellulose.

Additional requirements

Location based electricity mix from the use of electricity in manufacturing

National electricity grid	Data source	value	unit
electricity, high voltage, heat and power co-generation, natural gas, conventional power plant, 100MW electrical, electricity, high voltage, Cutoff, S – DE	Ecoinvent 3.9.1	0.374	kg CO2-eq/kWh

The electricity is supplied by the on-site energy supplier InfraServ GmbH & Co. Wiesbaden KG. InfraServ was able to supply externally verified carbon footprint data for electricity. Since a carbon footprint does not give any information on other impact categories than global warming potential, the equivalent ecoinvent dataset «electricity, high voltage, heat and power co-generation, natural gas, conventional power plant, 100MW electrical, electricity, high voltage, Cutoff, S – DE» was used and adjusted with the elementary flow «carbon dioxide, fossil» as output to yield the supplier specific carbon footprint in the LCA model.

Additional environmental impact indicators required for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Additional environmental impact indicators for 1 kg of HEC

Parameter	Unit	Upstream		Core		Downstream							D
		A1	A2	A3 (product)	A3 (packaging)	A4	A5 (product)	A5 (packaging)	C1	C2	C3	C4	
GWP-IOBC	kg CO2 eq.	1.99E+00	9.78E-02	1.55E+00	5.27E-02	3.22E-01	0.00E+00	2.92E-02	0.00E+00	7.43E-03	0.00E+00	2.59E-02	0.00E+00

GWP-IOBC *Global warming potential calculated according to the principle of instantaneous oxidation.*

Additional information for end-of-life scenario of 1 kg HEC

As stated above, 86 % of sold HEC materials are incorporated into products, which will ultimately go to landfill at end-of-life. These materials can be seen as a carbon sink, as CO_2 from atmosphere is stored in these materials. Credits for carbon storage must not be declared in EPDs according to standard EN 15804. However, taking the carbon storage into account decreases the GWP-total of HEC over its whole life cycle by 35 %.

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- X The product contains no substances given by the REACH Candidate list.
- ☐ The product contains substances given by the REACH Candidate list that are less than 0,1 % by weight.
- ☐ The product contains dangerous substances, more then 0,1% by weight, given by the REACH Candidate List, see table.
- ☐ The product contains no substances given by the REACH Candidate list.
- ☐ The product is classified as hazardous waste, see table.

Indoor environment

No tests have been carried out on the product concerning indoor environment.

Carbon Footprint

Product carbon footprint (PCF) has not been worked out and verified for the product according to ISO 14067.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
Environdec: 2023	PCR 2021:03. Version 1.1.1 Basic chemicals. Product category classification: UN CPC 341, 342, 343, 345 (except subclass 3451). , Environdec. PCR 2021:03

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