



Environmental Product Declaration

for the product HYDRO BAN® - ACQUASHIELD READY
liquid waterproofing membrane single component
by Latricrete Europe



HYDRO BAN® 5 kg
HYDRO BAN® 10 kg
HYDRO BAN® 20 kg
ACQUASHIELD READY 5 kg
ACQUASHIELD READY 10 kg
ACQUASHIELD READY 20 kg

Plant at
Castelnuovo Rangone (MO)

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

Programme Operator: EPD Italy

Publisher: EPD Italy

Declaration number:

EPDHYDROBAN_2024_rev.1.0

Registration number: EPDITALY1149

Date of issue: 27/05/2026

Valid until: 27/05/2031

General information

EPD owner	
Company name	Laticrete Europe s.r.l.
Registered office	Via Paletti snc – 41051 Castelnuovo Rangone (MO)
Contact details for information on the EPD	cgirotti@laticreteeurope.com
Programme Operator	
EPD ITALY	Via Gaetano de Castillia 10 – 20124 Milan, Italy
Information on the EPD	
Product name	HYDRO BAN® 5 kg HYDRO BAN® 10 kg HYDRO BAN® 20 kg ACQUASHIELD READY 5 kg ACQUASHIELD READY 10 kg ACQUASHIELD READY 20 kg
Locations	Via Paletti 6 – 41051 Castelnuovo Rangone (MO)
Brief description and technical information	Highly flexible, self-curing synthetic rubber-based liquid waterproofing membrane.
Product application	Adheres directly to a wide range of substrates. It is suitable for both internal and external use and is ideal for wet applications and those subject to continuous immersion, such as showers and swimming pools.
Product standards (if applicable)	EN 14891 DM 01 P
CPC Code	35110 (Paints and varnishes and related products)
Type of EPD	Product-specific EPD
Verification information	
PCR (title, version, date of publication or update)	PCR ICMQ-001/15 rev3.2 (compliant with EN 15804+A2) dated 03/11/2025
EPD Italy Regulations (version, date of publication or update)	EPD Italy Programme Regulations rev 7.1 dated 05/09/2025
LCA Project Report	Studio di Life Cycle Assessment finalizzato all'ottenimento di EPD per il prodotto HYDRO BAN® - ACQUASHIELD READY di Laticrete Europe – Rev.03 of 25/05/2026
Technical support	Spin Life s.r.l – A spin-off of the University of Padua Via C. Cerato 14 – 35122 Padua mauro.fiorenzato@spinlife.it, anna.tinello@spinlife.it
	Tecno ESG SB Riviera di Chiaia, 270 – 80121 Naples m.travaglioni@tecno-group.eu
Independent verification statement	Independent verification of the declaration and data carried out in accordance with ISO 14025:2010. ☐ Internal ☒ External Third-party verification/validation carried out by: ICMQ S.p.A., Via Gaetano de Castillia 10 – 20124 Milan, Italy. Accredited by Accredia
Comparability Statement	Environmental declarations published within the same product category but originating from different schemes may not be comparable.



	In particular, EPDs for construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019.
Statement of responsibility	The EPD Owner releases EPD Italy from any liability for non-compliance with environmental legislation. The owner of the declaration shall be responsible for the information and supporting evidence. EPD Italy accepts no liability for the information, data and results provided by the EPD Owner for the life cycle assessment.

Company

The Castelnovo Rangone plant sells a variety of products and systems for new buildings or those undergoing renovation. The product range includes self-levelling screeds, waterproofing products, adhesives and systems for the installation of technical porcelain stoneware and natural stone, systems for continuous flooring, and systems for concrete repair and building restoration.

The plant was originally owned by Benfer srl, but in 2019 it became part of the Laticrete family, an American company operating worldwide in the development of high-performance building materials and systems.



Objective and purpose of the EPD

Objective and purpose of the EPD	
Objective	Assessment of potential environmental impacts
Declared unit	1 kg
Reference service life	As the products under study are intermediate products for the construction industry, their service life depends on the specific installation conditions and the exposure associated with the product. It may be influenced by atmospheric agents and mechanical or chemical loads. The use phase (Module B) is not covered by this study.
Reference period	01/01/2024–31/12/2024
System boundaries	<i>“from cradle to gate with options, modules A4-A5, modules C1-C4 and module D”</i>
Information on the LCA study	
Type of EPD	Product-specific EPD
Number of products included in the EPD	6
Reference year for data	2024
Geographical scope of the data	Global
Data quality	Quality level: “very good”
Energy mix used	% IT <i>Electricity, low voltage {IT} electricity, low voltage, residual mix Cut-off, U.</i> <i>Climate change – total = 0.647 kgCO₂ e/kWh</i>
Software used	SimaPro Craft v 10.2 PhD
Database	Ecoinvent v 3.11; Cut-off by classification
Characterisation factors	Method EN 15804 (EF 3.1)

Products

Product description

HYDRO BAN® - ACQUASHIELD READY is a thin waterproofing membrane that does not require the use of synthetic fibre reinforcement fabric, even near corners and edges, and adheres directly to numerous substrates. HYDRO BAN® is a ready-to-use single-component product that is quickly applied by brush or roller, allowing for the direct bonding of ceramic tiles and natural stone thanks to the formation of a thin protective film (0.5–0.8 mm).

The product is marketed by Laticrete Europe under two distinct trade names, HYDRO BAN and ACQUASHIELD READY, which have the same composition, production process and method of use, differing only in terms of the distribution channels for the finished product.

The product is available in three packaging formats:

- **5 kg:** packed in buckets, 80 units per pallet;
- **10 kg:** packed in buckets of 40 units per pallet;
- **20 kg:** packed in buckets of 27 units per pallet.

Description of the production process

Laticrete Europe Srl is involved in the formulation, production and packaging of liquid waterproofing membranes and other chemical products for the construction sector. The products are manufactured from raw materials, which are measured out and subjected to controlled mixing processes according to specific formulations, to produce liquid products with consistent performance characteristics.

The production process involves preparing the mixtures in specialized reactors, followed by packaging in various formats, depending on commercial requirements. The finished products are ready for use and do not require further dilution or preliminary preparation by the end user.

In the reference year of this study, the company produced 183,240.00 kg of HYDRO BAN®-ACQUASHIELD READY, whilst the plant's total production amounted to 497,300.00 kg.

Information on the LCA

System boundaries

The LCA conduct considers upstream, core and downstream processes. Specifically, the system boundaries ‘from cradle to gate with options, modules A4-A5, modules C1-C4 and module D’ were considered, which encompassed the procurement of raw materials and their transport to the production site, product formulation, distribution, application, disposal and the potential reuse, recovery and recycling phases.

Table1Modules declared in the EPD

Product stage			Construction process stage		Use stage							End-of-life stage				Resource recovery stage
Raw material supply	Transport	Manufacturing	Transport	Construction and installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy consumption	Operational water consumption	Deconstruction and demolition	Transport	Waste processing	Disposal	Reuse, recovery and recycling potential
A1	A2	A3	A4	A5*	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	ND	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X

* Balancing-out reporting for biogenic C

- A1 Raw materials. This unit covers the impacts associated with the use of raw materials such as cement, bentonite, calcium carbonate, etc., and their packaging
- A1 Electricity and natural gas. This unit groups together the impacts associated with the consumption of electricity and methane.
- A2 Transport. This unit groups together the impacts associated with the transport of materials and packaging of the finished product on arrival.
- A3 Production line processes. This unit groups together the impacts associated with production processes, as well as methane and water consumption and emissions.
- A3 Packaging. This unit groups together the impacts associated with the various packaging configurations used to package the finished product
- A3 Waste treatment. This unit groups together the impacts associated with other waste generated by the production process, based on data from the 2025 “Report on Municipal Waste” compiled by ISPRA with reference to 2024 data.
- A4 Transport. This unit groups together the impacts associated with transport from the production plant to the distribution warehouse in relation to the specific type of product under study.

The following table shows the weighted average distances and modes of transportation used, indicating the regional breakdown referenced by the dataset when applicable.

Product	Lorry [km]	Ship [km]
HYDRO BAN® 5 kg	804,76 RER 1296,00 RoW	450,53
HYDRO BAN® 10 kg	1017,63 RER 985,39 RoW	1569,24

HYDRO BAN® 20 kg	969,90 RER 1008,90 RoW	1360,35
ACQUASHIELD READY 5 kg	743,51 RER 1008,90 RoW	1440,64
ACQUASHIELD READY 10 kg	888,33 RER 253,28 RoW	4492,61
ACQUASHIELD READY 20 kg	616,24 RER 1075,00 RoW	33,05

- A5 Installation. This unit groups together the impacts associated with the installation of the product (disposal of packaging) and the balancing of the uptake of biogenic C present in the packaging of the finished product. No consumption of materials and/or energy is anticipated for the installation of the products under study. This installation module also includes the disposal of the finished product's packaging. A distance of 100 km has been assumed for the transport of the finished product's packaging waste to treatment facilities. The disposal scenario for the finished product's packaging is based on Eurostat 2022 data.
- C1: Demolition. This includes consumption associated with the dismantling and demolition of the products under study.
- C2: Waste transport. This includes the transport of dismantled materials to the disposal and/or recovery centre.
- C3: Waste treatment. Includes preliminary treatments for material fractions intended for recycling.
- C4: Disposal. Includes energy consumption associated with the disposal process of materials (landfilling and incineration).
- D: Benefits. Includes the potential benefits arising from the recycling and/or recovery of the material.

Details of the assumptions relating to the disposal and end-of-life phases are provided below.

Module	Description	Processes involved
C1	Product demolition	This includes all processes and activities involved in the demolition of products. In the absence of specific data, the energy consumption associated with the demolition of concrete structures was taken as [0.07 MJ/kg] (<i>JRC, Model for Life Cycle Assessment (LCA) of buildings</i>).
C2	Transport to the treatment site	End-of-life products are sent to sorting centres; therefore, a distance of 100 km is conservatively assumed. In the absence of information on the means of transport used, the following datasets have been conservatively applied: <i>Transport, freight, lorry, unspecified {RER} transport, freight, lorry, all sizes, EURO5 to generic market for transport, freight, lorry, unspecified Cut-off, U and Transport, freight, lorry, unspecified {RoW} transport, freight, lorry, all sizes, EURO5 to generic market for transport, freight, lorry, unspecified Cut-off, U</i> depending on the geographical distribution area (RER or RoW) and the packaging configuration.
C3	Pre-recovery treatments	It is assumed that the products cannot be reused or recycled at the end of their useful life. Therefore, no environmental impacts are allocated to this module.
C4	Disposal of materials	It is assumed that 100% of the product is ultimately disposed of in landfill at the end of its useful life. This scenario has been characterised using the dataset <i>"Inert waste {RER} treatment of inert waste, sanitary landfill Cut-off, U"</i> .

Data quality

The following were used in this study:

- raw data relating to process consumption, emissions measurements, product and waste composition, and product procurement and sales;
- specific data relating to EPD declarations from suppliers of certain raw materials;
- generic data from the Ecoinvent 3.11 database;
- proxy data accounting for less than 10%.

Exclusions from the study

The inputs subject to the cut-off are listed below:

- machinery maintenance oils have been excluded, as the quantities are insignificant and therefore considered negligible;
- yield from the production process, estimated on the basis of associated plant waste classified under the EER code and quantitatively below the cut-off threshold;

The infrastructure component has been excluded from the processes in which it originally appeared, such as the Ecoinvent database processes.

Assumptions and limitations

Where available, raw data was used to conduct this study. Where access to this type of data was not possible, datasets from the Ecoinvent database v 3.11 were used as a reference.

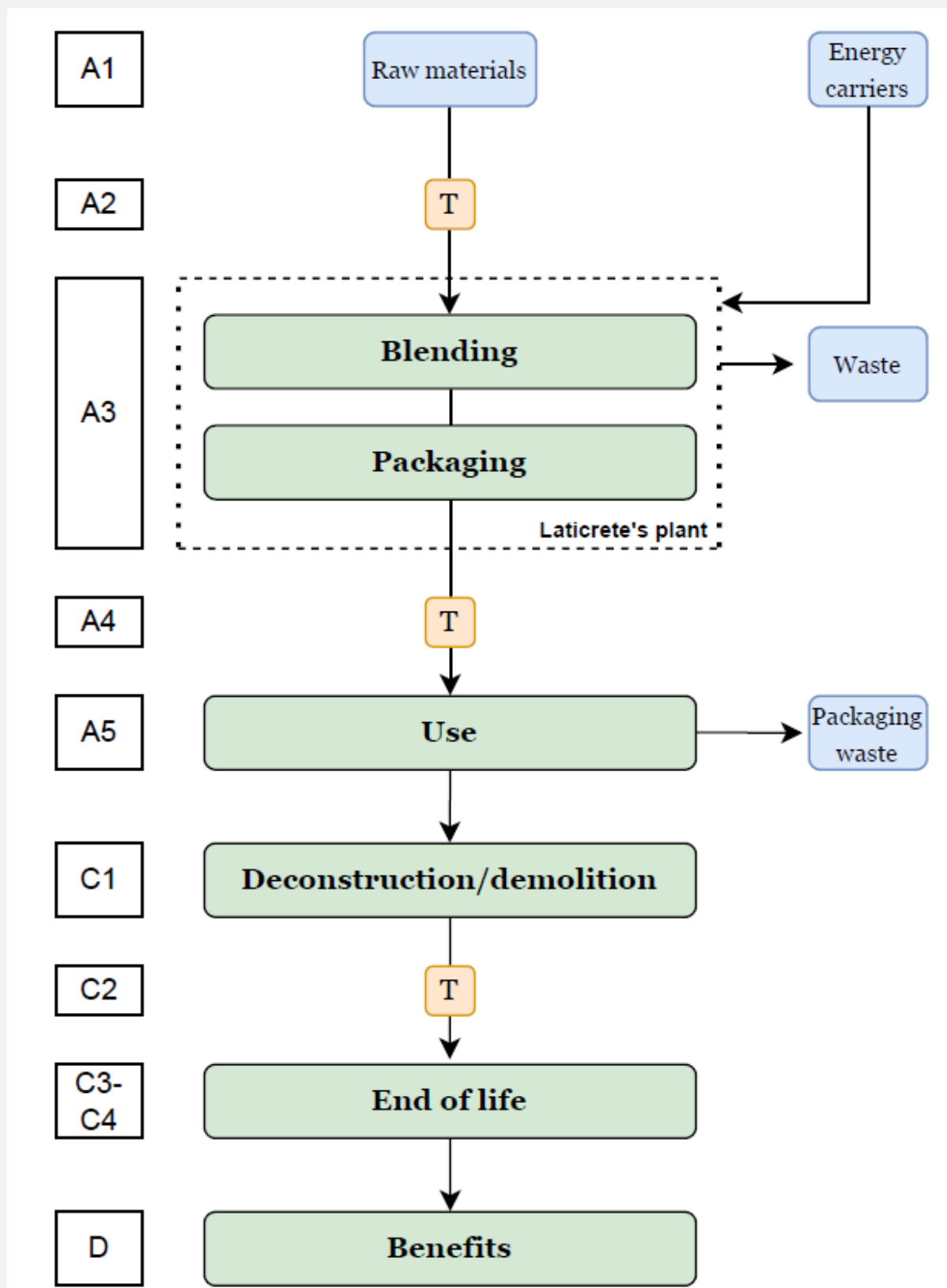
The main assumptions made in this study are set out below:

- the packaging of raw materials was assumed to be derived from the plant's packaging waste;
- composite and mixed packaging waste was modelled by reallocating plastic and paper packaging in equal quantities;
- hazardous waste was modelled using a conservative incineration dataset: *"Hazardous waste, for incineration {Europe without Switzerland} | treatment of hazardous waste, hazardous waste incineration | Cut-off, U"*;
- a distance of 100 km was assumed for the transport of packaging waste from finished products to treatment facilities;
- a distance of 100 km was assumed for the transport of finished products to treatment facilities;
- in the absence of specific data regarding the type, class and fuel type of the vehicles used for transport, a Euro 5 diesel lorry with a capacity of 16–32 tonnes was assumed.

Allocation rules

As the plant operates several production lines simultaneously, environmental impacts were allocated using 'co-product allocation'. Specifically, a mass-based allocation was adopted, calculated based on 2024 production volumes. In that reference year, the HYDRO BAN® - ACQUASHIELD READY product accounted for 36.85% of the site's total production, a figure used as the physical allocation coefficient.

Flow chart



Data collection and inventory

Product characteristics	
Product names	HYDRO BAN® - ACQUASHIELD READY
Identification code	Specific to the product and unique to it, as indicated on the packaging
Technical Specifications	Highly flexible, self-curing synthetic rubber-based liquid waterproofing membrane.
Application/use	Adheres directly to a wide range of substrates. It is suitable for both internal and external use and is ideal for wet applications and those subject to continuous immersion, such as showers and swimming pools.
Physical properties	Specific gravity of the mixture: 1.35 g/cm³ Consistency: thick liquid Mixing ratio: ready to use Application temperature: +10 °C to +30 °C Flammability: no Initial adhesion: ~ 1.0 N/mm² Adhesion after immersion in water: ~ 0.8 N/mm² Adhesion after heat exposure: ~ 1.3 N/mm² Adhesion after freeze-thaw cycles: ~ 0.9 N/mm² Adhesion after immersion in lime water: ~ 1.2 N/mm² Adhesion after immersion in chlorinated water: ~ 0.8 N/mm² Resistance to positive pressure of 1.5 bar for 7 days: no penetration Crack-bridging ability at room temperature: ~ 5.0 mm

The study aims to analyse the potential environmental impacts associated with the product HYDRO BAN® - ACQUASHIELD READY, intended for the construction sector. The product under study is manufactured by mixing ready-to-use raw materials. All inputs to the production process are listed below.

Table2Product composition

Substance	Range [%]
RESIN	58–59 %
CALCIUM CARBONATE	35–36 %
ZINC OXIDE	3–4 %
DIOL	< 1 %
PIGMENT	< 1 %
EMULSIFIER	< 1 %
PRESERVATIVE	< 1 %
GLYCOLIC ETHER	< 1 %
SODIUM HYDROXIDE	< 1 %
ANIONIC DISPERSION	< 1 %
WATER	< 1%

Table3Further product information: biogenic C content

	Quantity [kgC/kg] – 5 kg HYDRO BAN	Quantity [kgC/kg] – 10 kg HYDRO BAN	Quantity [kgC/kg] – 20 kg HYDRO BAN	Quantity [kgC/kg] – ACQUASHIELD READY 5 kg	Quantity [kgC/kg] – ACQUASHIELD READY 10 kg	Quantity [kgC/kg] – ACQUASHIELD READY 20 kg
Biogenic C content in the product	5.07E-03	5.07E-03	5.07E-03	5.07E-03	5.07E-03	5.07E-03
Biogenic C content in the packaging	1.69E-02	2.26E-02	1.13E-02	1.69E-02	2.26E-02	1.13E-02

* 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂.

This product does not contain post-consumer materials.

The declared unit does not contain any substances included in the *Candidate List of Substances of Very High Concern* (SVHC).

Data quality

Data collection	1 January 2024 – 31 December 2024
Sites	Data relating solely to the Castelnuovo Rangone (MO) site
Geography	Latricrete Europe manufactures 100% of the products covered by this EPD. The market for these products is global, with shipments to various countries across different continents.
Technology	The products are manufactured by dosing raw materials in precise formulations and mixing them to create liquid products.
LCI/LCA databases used	Ecoinvent v3.11
EPDs used	-
Data quality scheme	EN 15804:2012+A2:2019, Annex E, Table E.1
Use of 'fair' data with impacts > 30%	No "fair" data with an impact exceeding 30% in core categories was used
Use of "poor" data	No "poor" data with an impact exceeding 30% in core categories was used
Use of "very poor" data	No "very poor" data with an impact of more than 30% in core categories was used

This study does not comply with ISO 21930:2017.

LCA results

Table4Results of potential environmental impacts – HYDRO BAN 5 kg packaging

Impact category	Unit	A1	A2	A3	A1–A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO2e	1.37E+00	1.61E-01	2.05E-01	1.73E+00	4.65E-01	1.79E-01	6.40E-03	1.49E-02	0.00E+00	4.31E-02	-1.50E-01
GWP-fossil	kg CO2e	1.36E+00	1.61E-01	2.44E-01	1.76E+00	4.65E-01	1.13E-01	6.37E-03	1.49E-02	0.00E+00	9.74E-03	-1.50E-01
GWP-biogenic	kg CO2e	-1.79E-02	3.38E-05	-3.90E-02	-5.69E-02	1.09E-04	6.62E-02	1.47E-05	3.42E-06	0.00E+00	3.33E-02	-8.91E-05
GWP-luluc	kg CO2e	2.34E-02	5.32E-05	2.01E-04	2.36E-02	1.89E-04	7.14E-05	1.90E-05	5.55E-06	0.00E+00	2.45E-06	-1.09E-04
ODP	kg CFC11 eq	7.80E-08	7.92E-11	3.03E-10	7.84E-08	2.44E-10	1.16E-10	5.45E-12	7.44E-12	0.00E+00	6.46E-12	-1.92E-10
AP	mol H+ eq	4.72E-03	5.16E-04	6.60E-04	5.90E-03	1.69E-03	2.11E-04	3.16E-05	4.88E-05	0.00E+00	1.10E-04	-4.24E-04
EP-freshwater	kg P eq	2.16E-04	1.18E-06	5.15E-06	2.23E-04	4.87E-06	2.31E-06	6.24E-07	1.29E-07	0.00E+00	3.07E-07	-3.11E-06
EP-marine	kg N eq	1.07E-03	1.72E-04	1.41E-04	1.38E-03	5.27E-04	5.83E-05	4.24E-06	1.59E-05	0.00E+00	2.72E-05	-9.05E-05
EP-terrestrial	mol N eq	9.46E-03	1.89E-03	1.53E-03	1.29E-02	5.82E-03	5.92E-04	4.79E-05	1.76E-04	0.00E+00	2.95E-04	-9.88E-04
POCP	kg NMVOC eq	7.62E-03	7.82E-04	1.12E-03	9.52E-03	2.28E-03	1.65E-04	1.54E-05	7.35E-05	0.00E+00	1.07E-04	-7.09E-04
ADP-minerals&metals ²	kg Sb eq	1.16E-06	5.42E-07	1.02E-06	2.73E-06	1.53E-06	1.98E-07	1.37E-08	4.80E-08	0.00E+00	1.64E-08	-6.75E-07
ADP-fossil ²	MJ	2.96E+01	1.79E-01	7.55E-01	3.06E+01	7.07E-01	2.52E-01	1.10E-01	1.93E-02	0.00E+00	1.42E-02	-4.40E-01
WDP ²	m ³ depriv.	3.59E-01	8.83E-03	1.43E-01	5.11E-01	2.81E-02	1.77E-02	1.40E-03	9.23E-04	0.00E+00	-1.28E-01	-9.96E-02
Acronyms	GWP-fossil = Global Warming Potential of fossil fuels; GWP-biogenic = Global Warming Potential of biogenic sources; GWP-luluc = Global Warming Potential of land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential, Accumulated Exceedance; EP-freshwater = Eutrophication Potential, fraction of nutrients reaching the freshwater end compartment; EP-marine = Eutrophication Potential, fraction of nutrients reaching the marine end compartment; EP-terrestrial = Eutrophication Potential, Accumulated Exceedance; POCP = Potential for Ozone Formation in the Troposphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption											

Disclaimer 2 – “The results of this environmental impact indicator should be used with caution as the uncertainties surrounding these results are high or as there is limited experience with the indicator.

Table5Resource use results – HYDRO BAN 5 kg packaging

Impact category	Unit	A1	A2	A3	A1–A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.21E-01	3.59E-02	4.75E-01	6.32E-01	9.20E-02	1.54E-01	3.31E-02	3.31E-03	0.00E+00	4.29E-03	-4.84E-01
PERM	MJ	1.78E-01	0.00E+00	5.12E-01	6.89E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.99E-01	3.59E-02	9.86E-01	1.32E+00	9.20E-02	1.54E-01	3.31E-02	3.31E-03	0.00E+00	4.29E-03	-4.84E-01
PENRE	MJ	2.46E+00	2.28E+00	4.38E+00	9.12E+00	6.48E+00	5.23E-01	1.49E-01	2.13E-01	0.00E+00	2.30E-01	-4.39E+00
PENRM	MJ	9.05E-01	0.00E+00	2.47E+00	3.37E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.36E+00	2.28E+00	6.85E+00	1.25E+01	6.48E+00	5.23E-01	1.49E-01	2.13E-01	0.00E+00	2.30E-01	-4.39E+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
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
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
FW	m³	2.93E-03	2.64E-04	2.51E-03	5.71E-03	7.84E-04	4.13E-04	9.16E-05	2.66E-05	0.00E+00	-2.75E-03	-5.27E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water											

Table6Waste generation and output flows – HYDRO BAN packaging 5 kg

Impact category	Unit	A1	A2	A3	A1–A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	5.36E-05	1.55E-05	1.18E-04	1.87E-04	4.38×10^{-5}	3.11E-06	3.05E-07	1.43E-06	0.00E+00	1.56E-06	-7.88E-05
NHWD	kg	4.41E-02	1.09E-01	1.28E-02	1.66E-01	3.02E-01	3.65E-02	3.29E-04	1.35E-02	0.00E+00	1.00E+00	-7.30E-03
RWD	kg	4.20E-06	6.70E-07	6.12E-06	1.10E-05	1.51E-06	1.39E-06	1.08E-06	6.00E-08	0.00E+00	7.00E-08	-3.09E-06
CRU	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
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.58E-02	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
EEE	MJ	0.00E+00	0.00E+00	2.68E-03	2.68E-03	0.00E+00	1.46E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	1.99E-04	1.99E-04	0.00E+00	2.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acronyms	HWD = hazardous waste disposed of; NHWD = non-hazardous waste disposed of; RWD = radioactive waste disposed of; CRU = components for reuse; MFR = materials for recycling; MER = materials for energy recovery; EEE = electricity exported; EET = thermal energy exported											

Table 7 Results of potential environmental impacts – HYDRO BAN 10 kg packaging

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ e	1,37E+00	1,61E-01	6,59E-02	1,59E+00	4,46E-01	1,67E-01	6,40E-03	1,47E-02	0,00E+00	4,31E-02	-1,00E-01
GWP-fossil	kg CO ₂ e	1,36E+00	1,61E-01	1,25E-01	1,65E+00	4,46E-01	7,98E-02	6,37E-03	1,47E-02	0,00E+00	9,74E-03	-9,98E-02
GWP-biogenic	kg CO ₂ e	-1,79E-02	3,39E-05	-5,97E-02	-7,76E-02	1,02E-04	8,68E-02	1,47E-05	3,32E-06	0,00E+00	3,33E-02	-5,68E-05
GWP-luluc	kg CO ₂ e	2,34E-02	5,32E-05	1,53E-04	2,36E-02	1,77E-04	5,84E-05	1,90E-05	5,31E-06	0,00E+00	2,45E-06	-8,41E-05
ODP	kg CFC11 eq	7,80E-08	7,93E-11	1,74E-10	7,83E-08	2,29E-10	1,07E-10	5,45E-12	7,27E-12	0,00E+00	6,46E-12	-1,21E-10
AP	mol H ⁺ eq	4,72E-03	5,16E-04	4,06E-04	5,64E-03	1,93E-03	1,69E-04	3,16E-05	4,80E-05	0,00E+00	1,10E-04	-2,82E-04
EP-freshwater	kg P eq	2,16E-04	1,18E-06	3,21E-06	2,21E-04	4,31E-06	2,00E-06	6,24E-07	1,20E-07	0,00E+00	3,07E-07	-2,07E-06
EP-marine	kg N eq	1,07E-03	1,72E-04	8,82E-05	1,33E-03	5,84E-04	4,70E-05	4,24E-06	1,58E-05	0,00E+00	2,72E-05	-6,22E-05
EP-terrestrial	mol N eq	9,46E-03	1,89E-03	9,66E-04	1,23E-02	6,46E-03	4,79E-04	4,79E-05	1,74E-04	0,00E+00	2,95E-04	-6,81E-04
POCP	kg NMVOC eq	7,62E-03	7,83E-04	6,70E-04	9,07E-03	2,42E-03	1,30E-04	1,54E-05	7,31E-05	0,00E+00	1,07E-04	-4,61E-04
ADP-minerals&metals ²	kg Sb eq	1,17E-06	5,42E-07	6,26E-07	2,33E-06	1,44E-06	1,50E-07	1,37E-08	4,75E-08	0,00E+00	1,64E-08	-4,26E-07
ADP-fossil ²	MJ	2,96E+01	1,79E-01	4,68E-01	3,03E+01	6,30E-01	2,04E-01	1,10E-01	1,81E-02	0,00E+00	1,42E-02	-2,93E-01
WDP ²	m ³ depriv.	3,59E-01	8,84E-03	8,76E-02	4,56E-01	2,60E-02	1,60E-02	1,40E-03	9,00E-04	0,00E+00	-1,28E-01	-6,08E-02
Acronyms	GWP-fossil = Global Warming Potential of fossil fuels; GWP-biogenic = Global Warming Potential of biogenic sources; GWP-luluc = Global Warming Potential of land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential, Accumulated Exceedance; EP-freshwater = Eutrophication Potential, fraction of nutrients reaching the freshwater end compartment; EP-marine = Eutrophication Potential, fraction of nutrients reaching the marine end compartment; EP-terrestrial = Eutrophication Potential, Accumulated Exceedance; POCP = Potential for Ozone Formation in the Troposphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption											

Disclaimer 2 – “The results of this environmental impact indicator should be used with caution as the uncertainties surrounding these results are high or as there is limited experience with the indicator.

Table 8 Resource use results – HYDRO BAN 10 kg packaging

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,21E-01	3,59E-02	4,19E-01	5,76E-01	8,88E-02	1,44E-01	3,31E-02	3,33E-03	0,00E+00	4,29E-03	-5,49E-01
PERM	MJ	1,78E-01	0,00E+00	6,98E-01	8,75E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,99E-01	3,59E-02	1,12E+00	1,45E+00	8,88E-02	1,44E-01	3,31E-02	3,33E-03	0,00E+00	4,29E-03	-5,49E-01
PENRE	MJ	2,46E+00	2,28E+00	2,28E+00	7,02E+00	6,21E+00	4,25E-01	1,49E-01	2,11E-01	0,00E+00	2,30E-01	-2,77E+00
PENRM	MJ	9,05E-01	0,00E+00	1,47E+00	2,37E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,36E+00	2,28E+00	3,75E+00	9,39E+00	6,21E+00	4,25E-01	1,49E-01	2,11E-01	0,00E+00	2,30E-01	-2,77E+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
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
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
FW	m ³	2,93E-03	2,65E-04	1,56E-03	4,75E-03	7,36E-04	3,68E-04	9,16E-05	2,62E-05	0,00E+00	-2,75E-03	-3,16E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water											

Table 9 Waste generation and output flows – HYDRO BAN packaging 10 kg

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	5,36E-05	1,55E-05	6,81E-05	1,37E-04	4,18E-05	2,48E-06	3,05E-07	1,42E-06	0,00E+00	1,56E-06	-4,74E-05
NHWD	kg	4,41E-02	1,09E-01	9,10E-03	1,63E-01	2,83E-01	3,18E-02	3,29E-04	1,35E-02	0,00E+00	1,00E+00	-5,36E-03
RWD	kg	4,20E-06	6,71E-07	3,74E-06	8,62E-06	1,50E-06	1,25E-06	1,08E-06	6,16E-08	0,00E+00	7,00E-08	-1,96E-06
CRU	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
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,81E-02	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
EEE	MJ	0,00E+00	0,00E+00	2,68E-03	2,68E-03	0,00E+00	1,12E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	1,99E-04	1,99E-04	0,00E+00	2,13E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	HWD = hazardous waste disposed of; NHWD = non-hazardous waste disposed of; RWD = radioactive waste disposed of; CRU = components for reuse; MFR = materials for recycling; MER = materials for energy recovery; EEE = electricity exported; EET = thermal energy exported											

Table 10 Results of potential environmental impacts – HYDRO BAN 20 kg packaging

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO2e	1,37E+00	1,60E-01	1,93E-01	1,72E+00	4,37E-01	1,44E-01	6,40E-03	1,51E-02	0,00E+00	4,31E-02	-1,05E-01
GWP-fossil	kg CO2e	1,36E+00	1,60E-01	2,11E-01	1,73E+00	4,36E-01	9,89E-02	6,37E-03	1,51E-02	0,00E+00	9,74E-03	-1,05E-01
GWP-biogenic	kg CO2e	-1,79E-02	3,37E-05	-1,83E-02	-3,62E-02	9,98E-05	4,49E-02	1,47E-05	3,53E-06	0,00E+00	3,33E-02	-6,25E-05
GWP-luluc	kg CO2e	2,34E-02	5,30E-05	1,66E-04	2,36E-02	1,73E-04	6,46E-05	1,90E-05	5,83E-06	0,00E+00	2,45E-06	-7,56E-05
ODP	kg CFC11 eq	7,80E-08	7,90E-11	2,64E-10	7,84E-08	2,25E-10	1,08E-10	5,45E-12	7,63E-12	0,00E+00	6,46E-12	-1,34E-10
AP	mol H+ eq	4,72E-03	5,14E-04	5,58E-04	5,79E-03	1,84E-03	1,89E-04	3,16E-05	4,97E-05	0,00E+00	1,10E-04	-2,96E-04
EP-freshwater	kg P eq	2,16E-04	1,17E-06	4,49E-06	2,22E-04	4,27E-06	2,12E-06	6,24E-07	1,40E-07	0,00E+00	3,07E-07	-2,17E-06
EP-marine	kg N eq	1,07E-03	1,71E-04	1,18E-04	1,36E-03	5,59E-04	5,20E-05	4,24E-06	1,61E-05	0,00E+00	2,72E-05	-6,31E-05
EP-terrestrial	mol N eq	9,46E-03	1,88E-03	1,28E-03	1,26E-02	6,18E-03	5,28E-04	4,79E-05	1,78E-04	0,00E+00	2,95E-04	-6,89E-04
POCP	kg NMVOC eq	7,62E-03	7,80E-04	9,68E-04	9,37E-03	2,33E-03	1,46E-04	1,54E-05	7,39E-05	0,00E+00	1,07E-04	-4,95E-04
ADP-minerals&metals ²	kg Sb eq	1,16E-06	5,40E-07	8,56E-07	2,56E-06	1,41E-06	1,76E-07	1,37E-08	4,86E-08	0,00E+00	1,64E-08	-4,72E-07
ADP-fossil ²	MJ	2,96E+01	1,79E-01	6,60E-01	3,05E+01	6,24E-01	2,27E-01	1,10E-01	2,07E-02	0,00E+00	1,42E-02	-3,08E-01
WDP ²	m ³ depriv.	3,59E-01	8,80E-03	1,29E-01	4,97E-01	2,56E-02	1,71E-02	1,40E-03	9,50E-04	0,00E+00	-1,28E-01	-6,98E-02
Acronyms	GWP-fossil = Global Warming Potential of fossil fuels; GWP-biogenic = Global Warming Potential of biogenic sources; GWP-luluc = Global Warming Potential of land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential, Accumulated Exceedance; EP-freshwater = Eutrophication Potential, fraction of nutrients reaching the freshwater end compartment; EP-marine = Eutrophication Potential, fraction of nutrients reaching the marine end compartment; EP-terrestrial = Eutrophication Potential, Accumulated Exceedance; POCP = Potential for Ozone Formation in the Troposphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption											

Disclaimer 2 – “The results of this environmental impact indicator should be used with caution as the uncertainties surrounding these results are high or as there is limited experience with the indicator.

Table 11 Resource use results – HYDRO BAN 20 kg packaging

Impact category	Unit	A1	A2	A3	A1–A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,21E-01	3,58E-02	3,71E-01	5,28E-01	8,69E-02	1,44E-01	3,31E-02	3,29E-03	0,00E+00	4,29E-03	-3,28E-01
PERM	MJ	1,78E-01	0,00E+00	3,41E-01	5,19E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,99E-01	3,58E-02	7,13E-01	1,05E+00	8,69E-02	1,44E-01	3,31E-02	3,29E-03	0,00E+00	4,29E-03	-3,28E-01
PENRE	MJ	2,46E+00	2,27E+00	3,69E+00	8,42E+00	6,08E+00	4,69E-01	1,49E-01	2,15E-01	0,00E+00	2,30E-01	-3,08E+00
PENRM	MJ	9,05E-01	0,00E+00	2,16E+00	3,07E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,36E+00	2,27E+00	5,85E+00	1,15E+01	6,08E+00	4,69E-01	1,49E-01	2,15E-01	0,00E+00	2,30E-01	-3,08E+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
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
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
FW	m ³	2,93E-03	2,64E-04	2,19E-03	5,39E-03	7,23E-04	3,97E-04	9,16E-05	2,71E-05	0,00E+00	-2,75E-03	-3,70E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water											

Table 12 Waste generation results and output streams – HYDRO BAN packaging 20 kg

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	5,36E-05	1,55E-05	9,90E-05	1,68E-04	4,09E-05	2,77E-06	3,05E-07	1,44E-06	0,00E+00	1,56E-06	-5,52E-05
NHWD	kg	4,41E-02	1,09E-01	1,05E-02	1,64E-01	2,78E-01	2,91E-02	3,29E-04	1,35E-02	0,00E+00	1,00E+00	-5,07E-03
RWD	kg	4,20E-06	6,68E-07	5,43E-06	1,03E-05	1,46E-06	1,28E-06	1,08E-06	5,82E-08	0,00E+00	7,00E-08	-2,16E-06
CRU	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
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,61E-02	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
EEE	MJ	0,00E+00	0,00E+00	2,68E-03	2,68E-03	0,00E+00	1,24E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	1,99E-04	1,99E-04	0,00E+00	2,37E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	HWD = hazardous waste disposed of; NHWD = non-hazardous waste disposed of; RWD = radioactive waste disposed of; CRU = components for reuse; MFR = materials for recycling; MER = materials for energy recovery; EEE = electricity exported; EET = thermal energy exported											

Table 13 Results of potential environmental impacts – ACQUASHIELD READY 5 kg packaging

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Total GWP	kg CO ₂ e	1.37E+00	1.61E-01	2.05E-01	1.73E+00	3.99E-01	1.79E-01	6.40E-03	1.52E-02	0.00E+00	4.31E-02	-1.50E-01
GWP-fossil	kg CO ₂ e	1.36E+00	1.61E-01	2.44E-01	1.76E+00	3.99E-01	1.13E-01	6.37E-03	1.52E-02	0.00E+00	9.74E-03	-1.50E-01
Biogenic GWP	kg CO ₂ e	-1.79E-02	3.38E-05	-3.90E-02	-5.69E-02	9.21E-05	6.62E-02	1.47E-05	3.60E-06	0.00E+00	3.33E-02	-8.91E-05
GWP-land use	kg CO ₂ e	2.34E-02	5.32E-05	2.01E-04	2.36E-02	1.62E-04	7.14E-05	1.90E-05	5.97E-06	0.00E+00	2.45E-06	-1.09E-04
ODP	kg CFC11 eq	7.80E-08	7.92E-11	3.03E-10	7.84E-08	2.07E-10	1.16E-10	5.45E-12	7.73E-12	0.00E+00	6.46E-12	-1.92E-10
AP	mol H ⁺ eq	4.72E-03	5.16E-04	6.60E-04	5.90E-03	1.75E-03	2.11E-04	3.16E-05	5.02E-05	0.00E+00	1.10E-04	-4.24E-04
EP-freshwater	kg P eq	2.16E-04	1.18E-06	5.15E-06	2.23E-04	4.02E-06	2.31E-06	6.24E-07	1.45E-07	0.00E+00	3.07E-07	-3.11E-06
EP-marine	kg N eq	1.07E-03	1.72E-04	1.41E-04	1.38E-03	5.27E-04	5.83E-05	4.24E-06	1.62E-05	0.00E+00	2.72E-05	-9.05E-05
EP-terrestrial	mol N eq	9.46E-03	1.89E-03	1.53E-03	1.29E-02	5.83E-03	5.92E-04	4.79E-05	1.79E-04	0.00E+00	2.95E-04	-9.88E-04
POCP	kg NMVOC eq	7.62E-03	7.82E-04	1.12E-03	9.52E-03	2.17E-03	1.65E-04	1.54E-05	7.41E-05	0.00E+00	1.07E-04	-7.09E-04
ADP-minerals&metals ²	kg Sb eq	1.16E-06	5.42E-07	1.02E-06	2.73E-06	1.29E-06	1.98E-07	1.37E-08	4.89E-08	0.00E+00	1.64E-08	-6.75E-07
ADP-fossil ²	MJ	2.96E+01	1.79E-01	7.55E-01	3.06E+01	5.85E-01	2.52E-01	1.10E-01	2.15E-02	0.00E+00	1.42E-02	-4.40E-01
WDP ²	m ³ depriv.	3.59E-01	8.83E-03	1.43E-01	5.11E-01	2.36E-02	1.77E-02	1.40E-03	9.64E-04	0.00E+00	-1.28E-01	-9.96E-02
Acronyms	GWP-fossil = Global Warming Potential of fossil fuels; GWP-biogenic = Global Warming Potential of biogenic sources; GWP-land use = Global Warming Potential of land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential, Accumulated Exceedance; EP-freshwater = Eutrophication Potential, fraction of nutrients reaching the freshwater end compartment; EP-marine = Eutrophication Potential, fraction of nutrients reaching the marine end compartment; EP-terrestrial = Eutrophication Potential, Accumulated Exceedance; POCP = Potential for Ozone Formation in the Troposphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption											

Disclaimer 2 – “The results of this environmental impact indicator should be used with caution as the uncertainties surrounding these results are high or as there is limited experience with the indicator.

Table 14 Resource use results – ACQUASHIELD READY 5 kg packaging

Impact category	Unit	A1	A2	A3	A1–A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.21E-01	3.59E-02	4.75E-01	6.32E-01	7.82E-02	1.54E-01	3.31E-02	3.28E-03	0.00E+00	4.29E-03	-4.84E-01
PERM	MJ	1.78E-01	0.00E+00	5.12E-01	6.89E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.99E-01	3.59E-02	9.86E-01	1.32E+00	7.82E-02	1.54E-01	3.31E-02	3.28E-03	0.00E+00	4.29E-03	-4.84E-01
PENRE	MJ	2.46E+00	2.28E+00	4.38E+00	9.12E+00	5.55E+00	5.23E-01	1.49E-01	2.16E-01	0.00E+00	2.30E-01	-4.39E+00
PENRM	MJ	9.05E-01	0.00E+00	2.47E+00	3.37E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.36E+00	2.28E+00	6.85E+00	1.25E+01	5.55E+00	5.23E-01	1.49E-01	2.16E-01	0.00E+00	2.30E-01	-4.39E+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
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
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
FW	m³	2.93E-03	2.64E-04	2.51E-03	5.71E-03	6.61E-04	4.13E-04	9.16E-05	2.73E-05	0.00E+00	-2.75E-03	-5.27E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water											

Table 15 Waste generation and output flows – ACQUASHIELD READY packaging 5 kg

Impact category	Unit	A1	A2	A3	A1–A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	5.36E-05	1.55E-05	1.18E-04	1.87E-04	3.73E-05	3.11E-06	3.05E-07	1.45E-06	0.00E+00	1.56E-06	-7.88E-05
NHWD	kg	4.41E-02	1.09E-01	1.28E-02	1.66E-01	2.52E-01	3.65E-02	3.29E-04	1.35E-02	0.00E+00	1.00E+00	-7.30E-03
RWD	kg	4.20E-06	6.70E-07	6.12E-06	1.10E-05	1.29E-06	1.39E-06	1.08E-06	5.72E-08	0.00E+00	7.00E-08	-3.09E-06
CRU	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
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.58E-02	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
EEE	MJ	0.00E+00	0.00E+00	2.68E-03	2.68E-03	0.00E+00	1.46E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	1.99E-04	1.99E-04	0.00E+00	2.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acronyms	HWD = hazardous waste disposed of; NHWD = non-hazardous waste disposed of; RWD = radioactive waste disposed of; CRU = components for reuse; MFR = materials for recycling; MER = materials for energy recovery; EEE = electricity exported; EET = thermal energy exported											

Table 16 Results of potential environmental impacts – ACQUASHIELD READY 10 kg packaging

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO2e	1,37E+00	1,61E-01	6,59E-02	1,59E+00	2,90E-01	1,67E-01	6,40E-03	1,53E-02	0,00E+00	4,31E-02	-1,00E-01
GWP-fossil	kg CO2e	1,36E+00	1,61E-01	1,25E-01	1,65E+00	2,90E-01	7,98E-02	6,37E-03	1,53E-02	0,00E+00	9,74E-03	-9,98E-02
GWP-biogenic	kg CO2e	-1,79E-02	3,39E-05	-5,97E-02	-7,76E-02	6,12E-05	8,68E-02	1,47E-05	3,66E-06	0,00E+00	3,33E-02	-5,68E-05
GWP-luluc	kg CO2e	2,34E-02	5,32E-05	1,53E-04	2,36E-02	1,13E-04	5,84E-05	1,90E-05	6,13E-06	0,00E+00	2,45E-06	-8,41E-05
ODP	kg CFC11 eq	7,80E-08	7,93E-11	1,74E-10	7,83E-08	1,39E-10	1,07E-10	5,45E-12	7,84E-12	0,00E+00	6,46E-12	-1,21E-10
AP	mol H+ eq	4,72E-03	5,16E-04	4,06E-04	5,64E-03	2,25E-03	1,69E-04	3,16E-05	5,08E-05	0,00E+00	1,10E-04	-2,82E-04
EP-freshwater	kg P eq	2,16E-04	1,18E-06	3,21E-06	2,21E-04	2,24E-06	2,00E-06	6,24E-07	1,52E-07	0,00E+00	3,07E-07	-2,07E-06
EP-marine	kg N eq	1,07E-03	1,72E-04	8,82E-05	1,33E-03	6,23E-04	4,70E-05	4,24E-06	1,63E-05	0,00E+00	2,72E-05	-6,22E-05
EP-terrestrial	mol N eq	9,46E-03	1,89E-03	9,66E-04	1,23E-02	6,89E-03	4,79E-04	4,79E-05	1,80E-04	0,00E+00	2,95E-04	-6,81E-04
POCP	kg NMVOC eq	7,62E-03	7,83E-04	6,70E-04	9,07E-03	2,26E-03	1,30E-04	1,54E-05	7,44E-05	0,00E+00	1,07E-04	-4,61E-04
ADP-minerals&metals ²	kg Sb eq	1,17E-06	5,42E-07	6,26E-07	2,33E-06	8,54E-07	1,50E-07	1,37E-08	4,92E-08	0,00E+00	1,64E-08	-4,26E-07
ADP-fossil ²	MJ	2,96E+01	1,79E-01	4,68E-01	3,03E+01	3,31E-01	2,04E-01	1,10E-01	2,23E-02	0,00E+00	1,42E-02	-2,93E-01
WDP ²	m ³ depriv.	3,59E-01	8,84E-03	8,76E-02	4,56E-01	1,51E-02	1,60E-02	1,40E-03	9,80E-04	0,00E+00	-1,28E-01	-6,08E-02
Acronyms	GWP-fossil = Global Warming Potential of fossil fuels; GWP-biogenic = Global Warming Potential of biogenic sources; GWP-luluc = Global Warming Potential of land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential, Accumulated Exceedance; EP-freshwater = Eutrophication Potential, fraction of nutrients reaching the freshwater end compartment; EP-marine = Eutrophication Potential, fraction of nutrients reaching the marine end compartment; EP-terrestrial = Eutrophication Potential, Accumulated Exceedance; POCP = Potential for Ozone Formation in the Troposphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption											

Disclaimer 2 – “The results of this environmental impact indicator should be used with caution as the uncertainties surrounding these results are high or as there is limited experience with the indicator.

Table7Resource use results – ACQUASHIELD READY 10 kg packaging

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,21E-01	3,59E-02	4,19E-01	5,76E-01	5,60E-02	1,44E-01	3,31E-02	3,26E-03	0,00E+00	4,29E-03	-5,49E-01
PERM	MJ	1,78E-01	0,00E+00	6,98E-01	8,75E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,99E-01	3,59E-02	1,12E+00	1,45E+00	5,60E-02	1,44E-01	3,31E-02	3,26E-03	0,00E+00	4,29E-03	-5,49E-01
PENRE	MJ	2,46E+00	2,28E+00	2,28E+00	7,02E+00	4,00E+00	4,25E-01	1,49E-01	2,17E-01	0,00E+00	2,30E-01	-2,77E+00
PENRM	MJ	9,05E-01	0,00E+00	1,47E+00	2,37E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,36E+00	2,28E+00	3,75E+00	9,39E+00	4,00E+00	4,25E-01	1,49E-01	2,17E-01	0,00E+00	2,30E-01	-2,77E+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
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
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
FW	m³	2,93E-03	2,65E-04	1,56E-03	4,75E-03	4,39E-04	3,68E-04	9,16E-05	2,76E-05	0,00E+00	-2,75E-03	-3,16E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water											

Table8Waste generation and output flows – ACQUASHIELD READY packaging 10 kg

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	5,36E-05	1,55E-05	6,81E-05	1,37E-04	2,62E-05	2,48E-06	3,05E-07	1,46E-06	0,00E+00	1,56E-06	-4,74E-05
NHWD	kg	4,41E-02	1,09E-01	9,10E-03	1,63E-01	1,62E-01	3,18E-02	3,29E-04	1,35E-02	0,00E+00	1,00E+00	-5,36E-03
RWD	kg	4,20E-06	6,71E-07	3,74E-06	8,62E-06	9,86E-07	1,25E-06	1,08E-06	5,61E-08	0,00E+00	7,00E-08	-1,96E-06
CRU	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
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,81E-02	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
EEE	MJ	0,00E+00	0,00E+00	2,68E-03	2,68E-03	0,00E+00	1,12E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	1,99E-04	1,99E-04	0,00E+00	2,13E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	HWD = hazardous waste disposed of; NHWD = non-hazardous waste disposed of; RWD = radioactive waste disposed of; CRU = components for reuse; MFR = materials for recycling; MER = materials for energy recovery; EEE = electricity exported; EET = thermal energy exported											

Table9 Results of potential environmental impacts – ACQUASHIELD READY 20 kg packaging

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ e	1,37E+00	1,60E-01	1,93E-01	1,72E+00	3,63E-01	1,44E-01	6,40E-03	1,46E-02	0,00E+00	4,31E-02	-1,05E-01
GWP-fossil	kg CO ₂ e	1,36E+00	1,60E-01	2,11E-01	1,73E+00	3,63E-01	9,89E-02	6,37E-03	1,46E-02	0,00E+00	9,74E-03	-1,05E-01
GWP-biogenic	kg CO ₂ e	-1,79E-02	3,37E-05	-1,83E-02	-3,62E-02	8,55E-05	4,49E-02	1,47E-05	3,22E-06	0,00E+00	3,33E-02	-6,25E-05
GWP-luluc	kg CO ₂ e	2,34E-02	5,30E-05	1,66E-04	2,36E-02	1,48E-04	6,46E-05	1,90E-05	5,07E-06	0,00E+00	2,45E-06	-7,56E-05
ODP	kg CFC11 eq	7,80E-08	7,90E-11	2,64E-10	7,84E-08	1,92E-10	1,08E-10	5,45E-12	7,11E-12	0,00E+00	6,46E-12	-1,34E-10
AP	mol H ⁺ eq	4,72E-03	5,14E-04	5,58E-04	5,79E-03	1,22E-03	1,89E-04	3,16E-05	4,71E-05	0,00E+00	1,10E-04	-2,96E-04
EP-freshwater	kg P eq	2,16E-04	1,17E-06	4,49E-06	2,22E-04	3,86E-06	2,12E-06	6,24E-07	1,11E-07	0,00E+00	3,07E-07	-2,17E-06
EP-marine	kg N eq	1,07E-03	1,71E-04	1,18E-04	1,36E-03	3,89E-04	5,20E-05	4,24E-06	1,57E-05	0,00E+00	2,72E-05	-6,31E-05
EP-terrestrial	mol N eq	9,46E-03	1,88E-03	1,28E-03	1,26E-02	4,30E-03	5,28E-04	4,79E-05	1,72E-04	0,00E+00	2,95E-04	-6,89E-04
POCP	kg NMVOC eq	7,62E-03	7,80E-04	9,68E-04	9,37E-03	1,72E-03	1,46E-04	1,54E-05	7,28E-05	0,00E+00	1,07E-04	-4,95E-04
ADP-minerals&metals ²	kg Sb eq	1,16E-06	5,40E-07	8,56E-07	2,56E-06	1,20E-06	1,76E-07	1,37E-08	4,70E-08	0,00E+00	1,64E-08	-4,72E-07
ADP-fossil ²	MJ	2,96E+01	1,79E-01	6,60E-01	3,05E+01	5,60E-01	2,27E-01	1,10E-01	1,68E-02	0,00E+00	1,42E-02	-3,08E-01
WDP ²	m ³ depriv.	3,59E-01	8,80E-03	1,29E-01	4,97E-01	2,21E-02	1,71E-02	1,40E-03	8,77E-04	0,00E+00	-1,28E-01	-6,98E-02
Acronyms	GWP-fossil = Global Warming Potential of fossil fuels; GWP-biogenic = Global Warming Potential of biogenic sources; GWP-luluc = Global Warming Potential of land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential, Accumulated Exceedance; EP-freshwater = Eutrophication Potential, fraction of nutrients reaching the freshwater end compartment; EP-marine = Eutrophication Potential, fraction of nutrients reaching the marine end compartment; EP-terrestrial = Eutrophication Potential, Accumulated Exceedance; POCP = Potential for Ozone Formation in the Troposphere; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption											

Disclaimer 2 – “The results of this environmental impact indicator should be used with caution as the uncertainties surrounding these results are high or as there is limited experience with the indicator.

Table10Resource use results – ACQUASHIELD READY 20 kg packaging

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,21E-01	3,58E-02	3,71E-01	5,28E-01	7,20E-02	1,44E-01	3,31E-02	3,35E-03	0,00E+00	4,29E-03	-3,28E-01
PERM	MJ	1,78E-01	0,00E+00	3,41E-01	5,19E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,99E-01	3,58E-02	7,13E-01	1,05E+00	7,20E-02	1,44E-01	3,31E-02	3,35E-03	0,00E+00	4,29E-03	-3,28E-01
PENRE	MJ	2,46E+00	2,27E+00	3,69E+00	8,42E+00	5,07E+00	4,69E-01	1,49E-01	2,09E-01	0,00E+00	2,30E-01	-3,08E+00
PENRM	MJ	9,05E-01	0,00E+00	2,16E+00	3,07E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,36E+00	2,27E+00	5,85E+00	1,15E+01	5,07E+00	4,69E-01	1,49E-01	2,09E-01	0,00E+00	2,30E-01	-3,08E+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
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
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
FW	m³	2,93E-03	2,64E-04	2,19E-03	5,39E-03	6,17E-04	3,97E-04	9,16E-05	2,59E-05	0,00E+00	-2,75E-03	-3,70E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water											

Table11Waste generation and output flows – ACQUASHIELD READY 20 kg packaging

Impact category	Unit	A1	A2	A3	A1–A3	A4	A5*	C1	C2	C3	C4	D
HWD	kg	5,36E-05	1,55E-05	9,90E-05	1,68E-04	3,43E-05	2,77E-06	3,05E-07	1,41E-06	0,00E+00	1,56E-06	-5,52E-05
NHWD	kg	4,41E-02	1,09E-01	1,05E-02	1,64E-01	2,38E-01	2,91E-02	3,29E-04	1,34E-02	0,00E+00	1,00E+00	-5,07E-03
RWD	kg	4,20E-06	6,68E-07	5,43E-06	1,03E-05	1,17E-06	1,28E-06	1,08E-06	6,31E-08	0,00E+00	7,00E-08	-2,16E-06
CRU	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
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,61E-02	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
EEE	MJ	0,00E+00	0,00E+00	2,68E-03	2,68E-03	0,00E+00	1,24E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	1,99E-04	1,99E-04	0,00E+00	2,37E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	HWD = hazardous waste disposed of; NHWD = non-hazardous waste disposed of; RWD = radioactive waste disposed of; CRU = components for reuse; MFR = materials for recycling; MER = materials for energy recovery; EEE = electricity exported; EET = thermal energy exported											

The values for the additional environmental impact categories were calculated in the LCA report but not included in the EPD.

The results show that the main contribution to the total impact is associated with:

- raw materials, for all impact categories except for the categories *Climate change – Biogenic and ADP-minerals&metals*;
- distribution of the finished product, particularly for the impact categories *Resource use, minerals and metals* and *Eutrophication, terrestrial*;
- Installation, particularly for the *Climate change – Biogenic* impact category.

Less significant, however, are other contributions such as transport of raw materials, factory and electricity consumption, and waste.

References

The following standards and/or guidelines were used in conducting this study:

- ISO 14044:2006+A1:2020 Environmental management – Life Cycle Assessment – Principles and framework
- ISO 14044:2006+A1:2017+A2:2020 Environmental management – Life Cycle Assessment – Requirements and guidelines
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction works
- EPD Italy Programme Regulations rev 7.1 dated 05/09/2025
- PCR ICMQ-001/15 – Construction products and services rev3.2 (compliant with EN 15804+A2) dated 03/11/2025
- DIMOVA, Silvia. "Model for life cycle assessment (LCA) of buildings." (2018).
- João, P. A. C. H. E. C. O., DE BRITO Jorge, and LAMPERTI TORNAGHI Marco. "Use of recycled aggregates in concrete: opportunities for upscaling in Europe." (2023).
- LCA Report: Report LCA: Studio di Life Cycle Assessment finalizzato all'ottenimento di EPD per il prodotto HYDRO BAN® - ACQUASHIELD READY of Latricrete Europe – Rev.03 of 25/05/2026