100% Recycled Synthetic Fibres Re-Poly RF47

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2013+A2:2019

Programme	**The International EPD® System www.environdec.com**
Programme operator	**EPD Australasia Limited**
EPD registration number	**The International EPD® System S-P-10247**
Publication date	**2023-07-31**
Valid until	**2028-07-28**
Geographic Scope	**Australia**

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

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CEN standard	EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR)	Construction Products and Services (PCR) 2019:14, version 1.11, date 2021 – 02 – 05 Product Group Classification: UN CPC 355
PCR review was conducted by	The Technical Committee of the International EPD® System. Review chair: Claudia A. Peña. Contact via info@environdec.com
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Procedure for follow-up of data during EPD validity involves third party verifier: ☐ **Yes** ☒ **No**	

The EPD owner has the sole ownership, liability and responsibility for the EPD.

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Danbar plastics was established in 1987 and has grown to become the leading plastic manufacturer in fibre technology in Australia.
The philosophy of “no problem is too hard to solve” enables a solution driven approach to the development of innovative and sustainable products.
Danbar has been partnered with McCallums Industries for 15 years creating over 20 000 hours of NDIS employment packing Danbar manufactured products.
At Danbar we don’t just make products we create solutions for our clients. We aim high, to not just satisfy our clients needs but to exceed them along with their expectations, providing solutions for projects using the latest technology and systems available.
At Danbar we have been manufacturing products with recycled plastic for over 30+ years, this experience is utilized and has recently been translated into new products like Macro Synthetic Fibre (MSF).

Sustainability at Danbar

With over 36 years in plastic manufacture, our high experience staff can tailor solutions for our clients and combining that with our Fibre division staff’s concrete construction experience of over 80 years, we provide a full turn key solution for Macro Synthetic Fibre Reinforced Concrete (MSFRC) from product manufacture complete to on-site concrete construction support.

Our focus on the development of sustainable solutions for the construction and mining industries has aligned our solution approach. This approach has seen the introduction and development of 100% recycled macro synthetic fibres for the reinforcing of concrete, a world first. We understand industry must play a role in developing sustainable infrastructure and as the premier synthetic fibre manufacturer in Australia we are proud of the role we play.

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1. Product Description

The Re-Poly range of MSF is the culmination of many years of combining fibre manufacturing, recycled plastic technology, engineering and concrete construction and manufacture knowledge.

Terms and Definitions

MSF (Macro Synthetic Fibre)

MSFRC (Macro Synthetic Fibre Reinforced Concrete)

RF47 (Recycled Fibre 47mm length)

General Features

- Re-Poly RF47 is made from 100% recycled polypropylene.
- Re-Poly MSF is used for the control of shrinkage cracking in concrete.
- Re-Poly RF47 MSF will provide concrete with enhanced Fatigue, Impact, and Flexural performance.
- Re-Poly RF47 MSF will provide post crack residual flexural strength.
- Re-Poly RF47 MSFRC is fast, simple, and safer to use on site.
- Re-Poly RF47 MSF will provide the user with an economical and efficient reinforcing solution for concrete.
- Re-Poly RF47 is suitable for concrete strengths from 20-60 MPA.
- Re-Poly RF47 provides a more sustainable concrete reinforcing alternative to Steel mesh for infrastructure projects.
- Re-Poly RF47 is added to concrete to replace conventional steel reinforcing mesh.
- Re-Poly RF47 provides concrete with enhanced durability.
- Re-Poly RF47 turns a brittle material into a ductile material.

Table 1 | Technical information for Re-Poly FR47

Technical data	
Material	100% Recycled Polyolefin Polymer
Specific Gravity	0.91
Description	Macro Synthetic Fibre (MSF)
Fibre Length	47mm
Equivalent Thickness	<0.5 mm
Aspect Ratio	> 100
Tensile Strength	500+ MPa
Modulus	>8 GPa
Conforming standards	ASTMC1116, Type III. BS EN14889 - Fibres for concrete – Part 2 VIC ROADS 703 & DTMR MRTS273
Alkali Resistance	Excellent
Fibre Anchorage	Embossed Surface
Packaging	4kg boxes 120 boxes/pallet (480kg)
Minimum Mixing Time	mixing for 5 minutes

Technical data	
Colour	Grey
Electrical Conductivity	Low
Moisture Content	0.0%
Standard Dosage	4 - 8 kg/m^3
Handling	It is recommended when handling or adding Re-Poly fibres to concrete that gloves and eye protection be worn.
Storage	Store under cover in a dry place
Health and Safety Information	For information and advice on the safe handling and use refer to the Material Safety Data Sheet

Applications

Re-Poly RF47 is commonly used for, but not limited to, the following applications.

Table 2 | Re-Poly RF47 applications

Re-Poly RF47 Applications	
ATL (Active Transport Links)	SUP (Shared User Paths)
Bikeways	Footpaths
Traffic Medians	Pavements and Carparks
Hardstands	Shotcrete
Drainage Channels	Precast elements
Toppings	Mining

Industry classification

UN CPC Group: 355 – Man-made fibres

UN CPC Class: 3551 (Synthetic filament tow and staple fibres, not carded or combed) and 3554 (Artificial filament tow and staple fibres, not carded or combed)

2. Product life cycle overview

This EPD is for specific product (recycled synthetic fibres Re-Poly RF47). The scope of this LCA is Cradle to gate module (A1-A3). The geographical scope of this EPD is Australia. The following life cycle stages have not been declared, as they are deemed not applicable for Re-Poly RF47 in this study: construction stage (A4-A5), use stage (module B1-B7), end-of-life (C1-C4), and recyclability potentials (module D).

The declared unit is 1 kg of recycled synthetic fibres Re-Poly RF47.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	AU	AU	AU	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not applicable					-	-	-	-	-	-	-	-	-	-	-	-

ND=Module not declared

Life cycle diagram of Re-Poly RF47 production

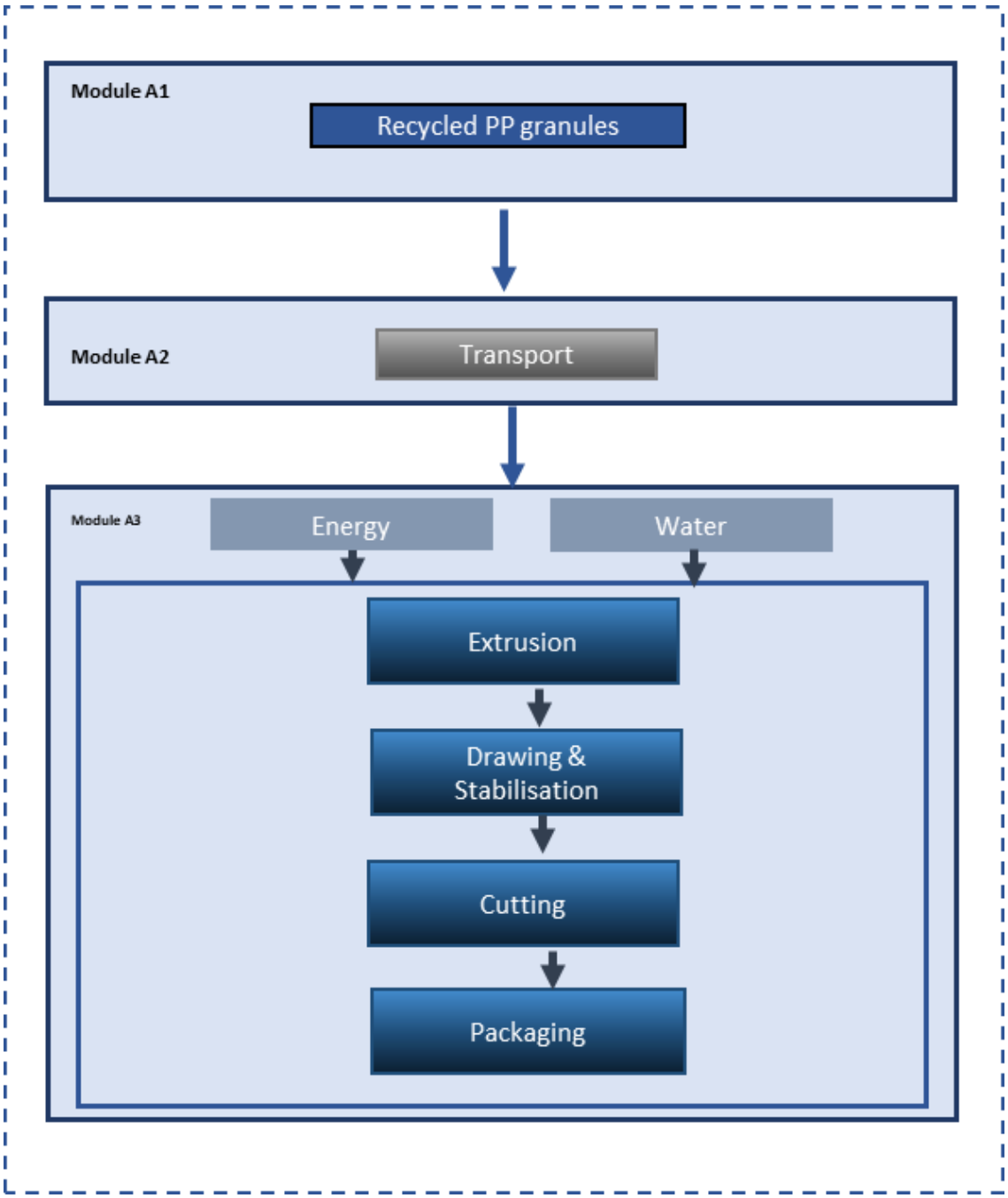

Figure 1 | Danbar Re-Poly RF47 EPD system boundary

Manufacture of Re-Poly RF47

The industrial polypropylene (PP) waste was transported at a distance of 75 km to the reprocessing plant (Martogg Group) by truck. The PP waste is then shredded and re-compounded with an efficiency of 95%. The processed PP is transported 156 km from Martogg's processing plant to Danbar's fibre production plant by truck. The manufacturing process includes PP granules extrusion, fibre drawing and stabilization, fibre cutting and then packaging. After the cutting process, Re-Poly RF 47 fibre is 30-70 mm long, and most of the waste is generated during this process. Re-Poly RF47 is packed and transported to the site in a carton box of 4 kg.

Content declaration

Table 3 | Material for manufacturing of Re-Poly RF47

Item	Mass (%)	Post-consumer material	Renewable material
Recycled Polypropylene	100%	100%	0

The electricity used for manufacturing includes brown coal-based power, photovoltaic power, hydropower, natural gas and wind power generation systems, with contributions of 66.2%, 3.08%, 6.72%, 3.96% and 19.75%, respectively.

Packaging information

Table 4 | Material for packaging

Packaging material	Weight (kg)	Weight (%) versus the product
Cardboard	0.04375	4.4%

Biogenic carbon content

There's no biogenic carbon in the product. The biogenic carbon content is reported here for packaging purposes.

Table 5 | Biogenic carbon content for packaging

Description	Biogenic Carbon Content (kg C)
Packaging for Re-Poly RF47	1.17E-01

3. Life cycle assessment methodology

LCA information

Table 6 | LCA information

FUNCTIONAL UNIT	1 kg Re-Poly RF47
GEOGRAPHIC COVERAGE	Australia
LCA SCOPE	Cradle to gate
TIME REPRESENTATIVENESS	Foreground data on material input and manufacture was provided by Danbar for financial year 2021-2022
MODEL & DATABASE	The Australian Life Cycle Inventory (AusLCI) v1.36, 2021 and ecoinvent v3.8 are used to model on SimaPro 9.4.0.2

Methodology

The following methodologies have been applied for this EPD:

- Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804+A2 and applicable PCRs. The methodology and report format has been modified to comply with:
- ISO 14040:2006 and ISO14044:2006+A1:2018 which describe the principles, framework, requirements and provides guidelines for life cycle assessment (LCA) (ISO 14040, 2006) (ISO 14044, 2006).
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations -- Principles and procedures, which establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations (ISO 14025, 2006).
- ISO 14020:2000 Environmental labels and declarations — General principles, which describes the guiding principles for the development and use of environmental labels and declarations (ISO 14020, 2000).
- EN 15804+A2:2019: Sustainability of construction works – Environmental product declarations - Core rules for the product category of construction products- hereafter referred to as EN15804+A2 (BS EN 15804+A2, 2020).
- EN 15804+A2:2019: Sustainability of construction works – Environmental product declarations - Core rules for the product category of construction products- hereafter referred to as EN15804+A1 (EN15804+A1, 2013)
- Product Category Rules (PCR) 2019:14, v1.11, 2021 – 02 – 05 for construction products – hereafter referred to as PCR 2019:14 (PCR 2019:14, 2019).
- General Programme Instructions (GPI) for the International EPD System version 3.01 – containing instructions regarding methodology and the content that must be included in EPDs registered under the International EPD System (Environdec, 2021).

Cut-off rules

It is common practice in LCA/LCI protocols to propose exclusion limits for inputs and outputs that fall below a threshold % of the total, but with the exception that where the input/output has a “significant” impact it should be included. According to the PCR 2019:14, the Life Cycle Inventory data for a minimum of 95% of total inflows (mass and energy) per module to the upstream and core module shall be included, accounted as global warming potential (GWP) or energy consumption. Inflows not included in the LCA shall be documented in the EPD. Data gaps in included stages in the downstream modules shall be reported in the EPD, including an evaluation of their significance. In accordance with the PCR 2019:14 v1.11, the following system boundaries are applied to manufacturing equipment and employees:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI. Capital equipment and buildings typically account for less than a few percent of nearly all LCIs and this is usually smaller than the error in the inventory data itself. For this project, it is assumed that capital equipment makes a negligible contribution to the impacts as per Frischknecht et al. (Frischknecht, 2007) with no further investigation.
- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. For this project, the impacts of employees are excluded.
- In addition, if less than 100% of the inflows are accounted for, proxy data or extrapolation should be used to achieve 100% completeness.
- The transport distance of packaging material was excluded as it accounts for less than 1% of the main product’s weight.

Allocation

According to EN 15804+A2:2019, in a process step where more than one type of product is generated, it is necessary to allocate the environmental stressors (inputs and outputs) from the process to the different products (functional outputs) in order to get product-based inventory data instead of process-based data. An allocation problem also occurs for multi-input processes.

In an allocation procedure, the sum of the allocated inputs and outputs to the products shall be equal to the unallocated inputs and outputs of the unit process.

The allocation approach for the background LCA databases utilised in this report is also compliant with the PCR. More specifically, the burden of primary production of materials is always allocated to the primary user of a material, while secondary (recycled) materials bear only the impacts of the recycling processes.

4. Environmental performance of Re-Poly RF47

The potential environmental impacts, use of resources and waste categories included in this EPD were calculated using the SimaPro v9.4.0.2 tool and are listed in Table 7.

Table 7 | Life Cycle Impact, Resource and Waste Assessment Categories, Measurements and Methods in accordance with EN15804+A2

Impact Category	Abbreviation	Measurement Unit	Assessment Method and Implementation
Potential Environmental Impacts			
Global warming potential (fossil)	GWPF	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Global warming potential (biogenic)	GWPB	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Land use/ land transformation	GWPL	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Total global warming potential	GWPT	kg CO2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Acidification potential	AP	mol H+ eq.	Accumulated Exceedance, Seppälä et al. 2006, Posch et al., 2008
Eutrophication – aquatic freshwater	EP - freshwater	kg P equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication – aquatic marine	EP - marine	kg N equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication – terrestrial	EP – terrestrial	mol N equivalent	Accumulated Exceedance, Seppälä et al. 2006, Posch et al.
Photochemical ozone creation potential	POCP	kg NMVOC equivalents	LOTOS-EUROS, Van Zelm et al., 2008, as applied in ReCiPe
Abiotic depletion potential (elements)*	ADPE	kg Sb equivalents	CML (v4.1)
Abiotic depletion potential (fossil fuels)*	ADPF	MJ net calorific value	CML (v4.1)
Ozone depletion potential	ODP	kg CFC 11 equivalents	Steady-state ODPs, WMO 2014
Water Depletion Potential*	WDP	m^3 equivalent deprived	Available Water Remaining (AWARE) Boulay et al., 2016

Impact Category	Abbreviation	Measurement Unit	Assessment Method and Implementation
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	kg CO_2 equivalents (GWP100)	CML (v4.1)
Resource use			
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value	ecoinvent version 3.6 and expanded by PRé Consultants[1]
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value	Manual for direct inputs[2]
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value	ecoinvent version 3.6 and expanded by PRé Consultants
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ, net calorific value	Manual for direct inputs[3]
Use of non- renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value	ecoinvent version 3.6 and expanded by PRé Consultants
Total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value	ecoinvent version 3.6 and expanded by PRé Consultants [4]
Use of secondary material	SM	kg	Manual for direct inputs
Use of renewable secondary fuels	RSF	MJ, net calorific value	Manual for direct inputs
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value	Manual for direct inputs
Use of net fresh water	FW	m^3	ReCiPe 2016
Waste categories			
Hazardous waste disposed	HWD	kg	EDIP 2003 (v1.05)
Non-hazardous waste disposed	NHWD	kg	EDIP 2003 (v1.05) [5]
Radioactive waste disposed/stored	RWD	kg	EDIP 2003 (v1.05)

[1] Method to calculate Cumulative Energy Demand (CED), based on the method published by Ecoinvent version 2.0 and expanded by PRé Consultants for raw materials available in the SimaPro database.
[2] Calculated based on the lower heating value of renewable raw materials.
[3] Calculated based on the lower heating value of non-renewable raw materials.
[4] Calculated as sum of *Non-renewable, fossil*, *Non-renewable, nuclear* and *Non-renewable, biomass*.
[5] Calculated as sum of *Bulk waste* and *Slags/ash*.

Impact Category	Abbreviation	Measurement Unit	Assessment Method and Implementation
Additional environmental impact indicators			
Particulate matter	Potential incidence of disease due to PM emissions (PM)	Disease incidence	SETAC-UNEP, Fantke et al. 2016
Ionising radiation - human health**	Potential Human exposure efficiency relative to U235 (IRP)	kBq U-235 eq	Human Health Effect model
Eco-toxicity (freshwater)*	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	CTUe	USEtox version 2
Human toxicity potential - cancer effects*	Potential Comparative Toxic Unit for humans (HTP-c)	CTUh	USEtox version 2
Human toxicity potential - non cancer effects*	Potential Comparative Toxic Unit for humans (HTP-nc)	CTUh	USEtox version 2
Soil quality*	Potential soil quality index (SQP)	dimensionless	Soil quality index (LANCA®)

**Disclaimer – 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 experience with the indicator.*

***Disclaimer – 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.*

Table 8 | Environmental impact indicators in accordance with EN15804+A1

Impact Category	Abbreviation	Measurement Unit (eq. = equivalence)	Assessment Method and Implementation
Global warming potential (GWP100)	GWP	kg CO_2 eq.	CML (v4.02) based on IPCC AR4
Ozone depletion potential	ODP	kg CFC 11 eq.	CML (v4.02) based on WMO 1999
Acidification potential	AP	kg SO_2 e eq.	CML (v4.02)
Eutrophication potential	EP	kg PO_4^{3-} eq.	CML (v4.02)
Photochemical ozone creation potential	POCP	kg C_2H_4 eq.	CML (v4.2)
Abiotic depletion potential for non-fossil resources	ADPE	kg Sb eq.	CML (v4.2)
Abiotic depletion potential for fossil resources	ADPF	MJ net calorific value	CML (v4.2)

Environmental information

Table 9 | Environmental impact for 1 kg Re-Poly RF47 in accordance with EN15804+A2:2019

Environmental impacts	Unit	A1	A2	A3	A1-A3
Global warming potential - Fossil (GWP-F)	kg CO_2 eq.	3.57E-01	5.93E-02	9.99E-01	1.41E+00
Global warming potential - Biogenic (GWP - B)	kg CO_2 eq.	1.15E-04	1.76E-05	-5.56E-02	-5.55E-02
Global warming potential - Land use and Land use change (GWP - LULUC)	kg CO_2 eq.	2.62E-06	5.71E-07	4.89E-04	4.92E-04
Global warming potential - Total (GWP - T)	**kg CO_2 eq.**	**3.57E-01**	**5.93E-02**	**9.44E-01**	**1.36E+00**
Ozone depletion potential (ODP)	kg CFC 11 eq.	4.71E-09	8.02E-09	6.92E-09	1.96E-08
Acidification potential (AP)	mol H^+ eq.	2.51E-03	4.51E-04	8.28E-03	1.12E-02
Eutrophication, freshwater (EP - F)	kg P eq.	2.54E-06	2.52E-06	3.70E-05	4.21E-05
Eutrophication, marine (EP - M)	kg N eq.	2.64E-04	1.20E-04	6.97E-04	1.08E-03
Eutrophication, terrestrial (EP - T)	mol N eq.	2.53E-03	1.31E-03	7.13E-03	1.10E-02
Photochemical ozone formation (POCP)	kg NMVOC eq.	7.68E-04	3.26E-04	2.14E-03	3.23E-03
Abiotic depletion potential - minerals and metals (ADP)	kg Sb eq.	2.51E-07	3.19E-07	7.43E-07	1.31E-06
Abiotic depletion potential - Fossil (ADP - F)	MJ	6.17E-01	7.43E-01	2.01E+00	3.37E+00
Water depletion Potential (WDP)	m^3	2.01E-01	8.50E-02	6.08E-01	8.94E-01
Resource use	**Unit**	A1	A2	A3	**A1-A3**
PERE	MJ	3.95E-01	1.44E-02	2.65E+00	3.06E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	**MJ**	**3.95E-01**	**1.44E-02**	**2.65E+00**	**3.06E+00**
PENRE	MJ	6.17E-01	7.43E-01	2.01E+00	3.37E+00
PENRM	MJ.	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	**MJ**	**6.17E-01**	**7.43E-01**	**2.01E+00**	**3.37E+00**
SM	kg	1.04E+00	0.00E+00	0.00E+00	1.04E+00
RSF	MJ	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
FW	m3	2.83E-02	1.19E-02	7.92E-02	1.19E-01
Waste production	**Unit**	A1	A2	A3	**A1-A3**
Hazardous waste disposed	kg	1.35E-06	1.21E-06	4.12E-06	6.68E-06
Non-hazardous waste disposed	kg	1.30E-02	6.59E-03	3.64E-02	5.60E-02
Radioactive waste disposed	kg	3.69E-07	5.21E-09	3.16E-06	3.54E-06
Output flow	**Unit**	A1	A2	A3	**A1-A3**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional impacts	**Unit**	A1	A2	A3	**A1-A3**
GWP-GHG	kg CO_2 eq.	3.50E-01	5.82E-02	9.94E-01	1.40E+00
Particulate matter	disease incidence	6.37E-08	3.16E-09	1.16E-07	1.82E-07
Ionising radiation - human health	kBq U-235 eq	3.25E-04	3.73E-05	8.31E-03	8.67E-03
Eco-toxicity (freshwater)	CTUe	1.38E+00	4.46E-01	4.05E+00	5.87E+00
Human toxicity potential - cancer effects	CTUh	1.66E-10	1.91E-11	1.58E-10	3.43E-10
Human toxicity potential - non cancer effects	CTUh	2.23E-09	6.82E-10	5.80E-09	8.71E-09
Soil quality	dimensionless	2.52E-01	3.62E-01	4.38E+00	5.00E+00

Table 10 | Potential environmental impacts according to EN15804+A1:2013

Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	kg CO_2 eq	3.51E-01	5.83E-02	9.95E-01	1.40E+00
Ozone layer depletion	kg CFC-11 eq	3.77E-09	6.35E-09	5.82E-09	1.59E-08
Acidification potential	kg SO_2 eq	3.46E-04	2.25E-04	1.16E-03	1.73E-03
Eutrophication potential	kg PO_4^{3-} eq	1.36E-03	4.81E-05	8.58E-04	2.27E-03
Photochemical ozone creation potential	kg C2H4 eq	3.69E-05	1.48E-05	4.80E-05	9.97E-05
Abiotic depletion potential for non-fossil resources	kg Sb eq	2.51E-07	3.19E-07	7.50E-07	1.32E-06
Abiotic depletion potential for fossil resources	MJ	6.15E-01	7.42E-01	1.87E+00	3.23E+00

Interpretation of results

- A3 is the main contributor in most of the environmental impact categories in both EN15804+A1 and EN15804+A2 methods.
- A3 accounts for approximately 70% of the GWP potential impact.
- Apart from GWP, the highest percentage of contribution of A3 is 95.8% of the ionizing radiation – human health impact.
- A1 shows its significant impact on eutrophication potential according to EN15804 A1 method.
- A2 is the dominant on ozone depletion when assessed in both EN15804 methods.

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