IMPER ITALIA
MEMBER OF TECHNONICOL CORPORATION

Environmental Product Declaration



SINTOFOIL® ST - SINTOFOIL® RG - SINTOFOIL® RG/FR
SINTOFOIL® RT - SINTOFOIL® RT/FR - SINTOFOIL® RC
SINTOFOIL® RC/FR - SINTOFOIL® FB

SINTOFOIL®

Environmental Product Declaration in accordance with ISO 14025 and EN 15804:2012+A2:2019

UN CPC code
5453
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S-P-00670
ECO EPD reference number:
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Reference year:
2019
Programme
The International EPD® System, www.environdec.com
Programme operator
EPD International AB

EPD® ENVIRONMENTAL PRODUCT DECLARATION

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.

ECO PLATFORM EPD EN 15804 VERIFIED

PROGRAMME INFORMATION

PROGRAMME OPERATOR ADDRESS
EPD international AB,
Box 210 60, SE-100 31 Stockholm, Sweden, e-mail: info@environdec.com

According to ISO 14025 "*EPDs within the same product category but from different programmes may not be comparable*".

According to EN 15804 "*EPDs of construction products may not be comparable if they do not comply with EN 15804*".

The EPD owner (Imper Italia s.r.l.) has the sole ownership, liability and responsibility of the EPD.

REFERENCE
CEN standard EN 15804 serves as the core Product Category Rules (PCR)

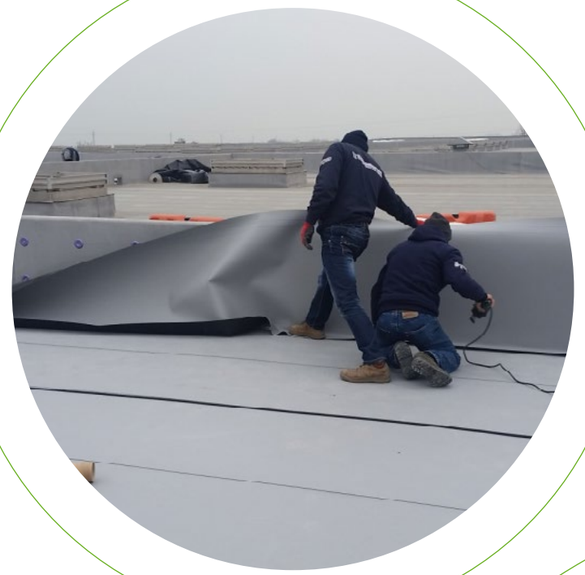
PRODUCT CATEGORY RULES (PCR)
PCR 2019:14 Construction products, version 1.1

PCR REVIEW
Conducted by the Technical Committee of the International EPD® System.
See www.environdec.com/TC for a list of members.
Review chair: Claudia A. Peña, University of Concepción, Chile.
The review panel may be contacted via the Secretariat
www.environdec.com/contact.

INDEPENDENT THIRD-PARTY VERIFICATION OF THE DECLARATION AND DATA, ACCORDING TO ISO 14025:2006
☐ EPD process certification ☑ EPD verification

THIRD PARTY VERIFIER
Ugo Pretato
Approved by: The International EPD® System

PROCEDURE FOR FOLLOW-UP DURING EPD VALIDITY INVOLVES THIRD PARTY VERIFIER
☐ Yes ☑ No



COMPANY INFORMATION

EPD OWNER

Imper Italia s.r.l., Via Rita Atria 8, 10079 Mappano (TO), Italy, laboratorio@imper.it

PRODUCTION SITE

IMPER ITALIA s.r.l., Via Sempione 8, 28040 Marano Ticino (NO), Italy

IMPER ITALIA was established in Torino in 1936, producing waterproof cements, sealants and bituminous emulsions for waterproofing roofs, foundations, reservoirs, dikes, canals and other types of construction.

From the end of the Second World War to the late Nineties several innovative products and systems were created. IMPER ITALIA became the first Italian manufacturer to receive Technical Approval certification from the Italian National Research Council's Central Institute of Construction Technologies (ICITE, now known as ITC), for its PARALONNT4 membrane. Moreover, in 1996 Imper Italia was the first Italian manufacturer to receive ICITE Agreement certification for an APP membrane – PARALON NT4 PLUS – which remains flexible at temperatures down to-20°C.

In the late Nineties IMPER ITALIA develops "SINTOFOIL": a synthetic membrane based on an elastomerized flexible polypropylene alloy (FPA = Flexible Polypropylene Alloy).

In 2003, IMPER ITALIA. also decided to invest in acquiring a majority stake in EURODUE s.r.l., a manufacturer of synthetic sheeting, thus rounding out its lineup of highly specialized water proofing products.

In 2007, IMPER ITALIA. embarked on producing renewable photovoltaic power with synthetic TPO/FPA waterproofing. Thus, the IMPER ITALIA, RUBBERFUSE Division, which produces environmentally-friendly synthetic thermoplastic olefin and elastomerized flexible polypropylene alloy (TPO/FPA) waterproofing sheets under the SINTOFOIL® tradename, joined forces with United Solar Ovonic, who with its UNI SOLAR® product line is the world leader in triple-junction flexible amorphous silicon (a-Si) photovoltaics, entering into an agreement to use silicon cells on SINTOFOIL membranes.

At the end of 2014, the Group companies, IMPER ITALIA and EURODUE Srl, became part of the TECHNONICOL industrial Group. In 2015 IMPER ITALIA became a Srl (Limited Liability Company), incorporating the Spa (Public Limited Company) and Eurodue. The two manufacturing plants of Marano and Mappano were added to the manufacturing sites of the Technonicol Group, consolidating the worldwide industrial leadership in the production of bitumen polymer membranes, synthetic membranes, thermal and acoustic insulators, bitumen roofing tiles, liquid waterproofing.

CERTIFICATIONS AND SUSTAINABILITY COMMITMENT

IMPER ITALIA has always been committed to optimizing its process in order to ensure proper management according to the criteria of efficiency, effectiveness' and affordability.
In 1995 production site, based in Marano Ticino (Novara, Italy) has been certified ISO 9001, focusing on customer satisfaction. In 2009 Imper Italia spa implemented a system certified for managing health and safety in the workplace, in accordance with the standard OHASS 18001.
Moreover Imper Italia spa headquarter, based in Mappano (Torino, Italy) has been equipped with an Environmental Management system certified since 2012 in accordance with the International Standard ISO 14001.

The Imper Italia environmental policy demonstrates its commitment to boost the quality of life and environment.

IMPER ITALIA has joined the **GREEN BUILDING COUNCIL ITALIA:** an association that aims to promote and accelerate the dissemination of a sustainable construction culture, to raise awareness among public opinion and Institutions on the impact that the building design and construction methods have on the quality of life of citizens, providing clear reference parameters to sector operators.

GBC ITALIA has the task of promoting and developing the characteristics and standards of **LEED** (Leadership in Energy and Environmental Design) in Italy. These are parameters for sustainable construction developed in the USA and already applied in 41 countries around the world, for the development and promotion of "green" buildings.

PRODUCT INFORMATION

SINTOFOIL® SYNTHETIC MEMBRANES

Synthetic waterproofing membrane produced by co-extruding a UV resistant elastomerized TPO/FPA thermoplastic olefin and flexible polypropylene alloy with or without any reinforcing mat in order to stabilize it dimensionally.

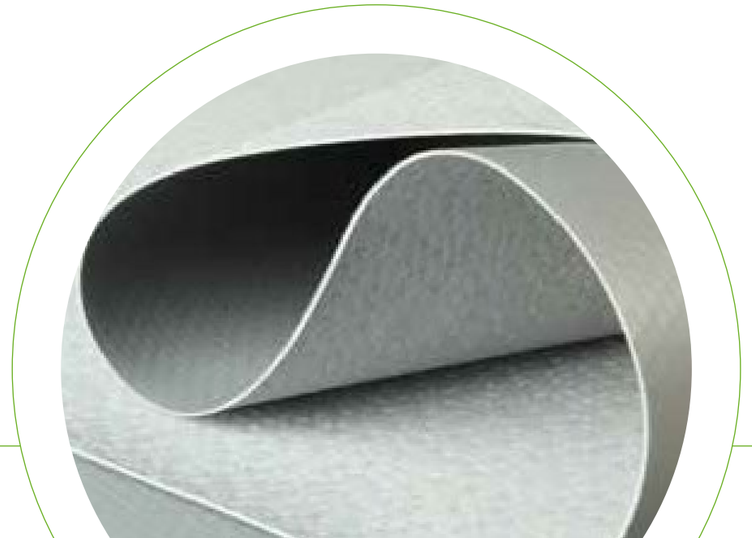
SINTOFOIL® synthetic membranes have got a range of properties which provide outstanding waterproofing performance:

- Freedom from chlorine and other potential pollutants;
- Outstanding resistance to weathering agents and UV radiation;
- Root resistance;
- Mechanical strength and puncture resistance;
- Softness and flexibility, even at low temperatures;
- Excellent weldability and ease of repair throughout service life;
- Welded seams are easily inspected;
- Total recyclability and environmental compatibility.

SINTOFOIL® TPO/FPA synthetic waterproofing membranes are certified by Factory Mutual, BBA, Bureau Veritas, ITC, CSTB, UBAtc, and other prestigious institutes of certification and control worldwide. As correct application of this innovative material calls for specific skills, and experience in this area is not yet widespread, the Business Unit recommends that SINTOFOIL membranes be installed only by qualified contractors, whom it provides with all necessary technical support.
Moreover, the Business Unit has set up a fully equipped Training Center for installers wishing to learn correct application techniques.

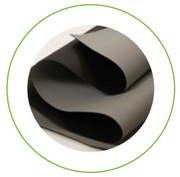
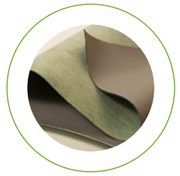
SINTOFOIL® membrane are designed specifically for:

- Adhesive bonded waterproofing on exposed roofing (can be bonded with bitumen)
- Renewing and rejuvenating waterproof bitumen covering materials
- Waterproofing layers applied for roofing exposed to foot and vehicular traffic and roof gardens
- Mechanically retained waterproofing on exposed roofs



The EPD covers the Sintofoil® Family products for waterproofing manufactured in Marano Ticino plant (Novara, Italy).

Eight SINTOFOIL® products are object of this environmental declaration.
Besides the composition, they can differ from the installation method

		INSTALLATION METHOD
 **SINTOFOIL® ST**	Synthetic waterproofing membrane produced by co-extruding a uniform UV resistant elastomerised TPO/FPA thermoplastic olefin and flexible polypropylene alloy. The membrane features contrasting colours on its upper and lower faces, providing a signal layer so that any damage occurring during or after installation will be immediately apparent.	LOOSE LAID
 **SINTOFOIL® RG** **SINTOFOIL® RG/FR**	Synthetic waterproofing membrane produced by co-extruding a UV resistant elastomerised TPO/FPA thermoplastic olefin and flexible polypropylene alloy with a fibreglass reinforcing mat that makes it dimensionally stable. Available with flame retardant (RG/FR) as well.	MECHANICALLY FIXED
 **SINTOFOIL® RT** **SINTOFOIL® RT/FR**	Synthetic waterproofing membrane produced by co-extruding a UV resistant elastomerised TPO/FPA thermoplastic olefin and flexible polypropylene alloy with a polyester reinforcement mesh. Available with flame retardant (RT/FR) as well.	
 **SINTOFOIL® RC** **SINTOFOIL® RC/FR**	Synthetic waterproofing membrane produced by co-extruding a UV resistant elastomerised TPO/FPA thermoplastic olefin and flexible polypropylene alloy with a synthetic inorganic composite reinforcing mat. Available with flame retardant (RC/FR) as well.	
 **SINTOFOIL® FB**	Synthetic waterproofing membrane produced by co-extruding a uniform UV resistant elastomerised TPO/FPA thermoplastic olefin and flexible polypropylene alloy, bonded on the lower face to a nonwoven polyester fabric reinforcing mesh.	FULLY ADHERED

SINTOFOIL® are available in the following thickness: 1.2, 1.5, 1.8 and 2.0 mm. In the present EPD results will be shown only for the 2.0 mm thickness (worst case scenario). The main compounds used for the Sintofoil production and the laying down information are listed below.

No Substances of Very High Concern (SVHC) are present in the products studied.

	SINTOFOIL PRODUCTS*							
	ST	RG	RG/FR	RT	RT/FR	RC	RC/FR	FB
PP ALLOY	85%	84%	61%	83%	60%	80%	58%	78%
OF WHICH, RECYCLED	3%	3%	3%	3%	3%	3%	3%	3%
MASTER BATCH	5%	5%	5%	5%	5%	5%	5%	5%
VELOVETRO MAT	-	2%	2%	-	-	-	-	-
POLYESTER NET	-	-	-	3%	3%	-	-	-
POLYESTER FLEECE	-	-	-	-	-	-	-	8%
VELOVETRO MAT + POLYESTER NET	-	-	-	-	-	5%	5%	-
ADDITIVE	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
FLAME RETARDANT	-	-	32%	-	32%	-	31%	-
COMPOUND $CaCO_3$	10%	10%	-	10%	-	10%	-	10%
SPECIFIC WEIGHT (kg/m²)	1,99	2,01	2,12	2,05	2,13	2,08	2,16	2,19
THICKNESS LAYER (mm)	1,2÷2,0	1,2÷2,0	1,2÷2,0	1,2÷2,0	-	1,2÷2,0	-	1,2÷2,0
LAYING DOWN SYSTEM	Loose-laid	Mechanically	Mechanically	Mechanically	Mechanically	Mechanically	Mechanically	Fully-adherd

* Results may differ from 100% due to rounding

PACKAGING MATERIALS	LDPE FILM	CARDBOARD	PALLET	TOTAL WEIGHT (VS. THE PRODUCT)
SINTOFOIL	4%	92%	4%	2%

BIOGENIC CARBON CONTENT	kg C/m²
In product	-
In packaging	0,0086

PRODUCTION PROCESS

Sintofoil® production takes place in Marano Ticino (Italy) and it can be divided into three main process:

- **BLENDING AND EXTRUSION**
- **CALENDERING**
- **TRIMMING AND WINDING**

Sintofoil® is obtained by co-extrusion of TPO (Thermoplastic PolyOlefin) and other compounds, for example flame retardant.

The following process is calendering that is aimed at the inclusion of supporting or reinforcing material into the sheets.

Eventually the product is refined through the trimming process. The by-products of this process could be either recycled internally or sent to the bitumen waterproofing sheet production, that takes place in Mappano plant.

TECHNICAL SPECIFICATIONS OF EPD

GEOGRAPHICAL SCOPE

World

DECLARED UNIT

In accordance to EN 15804, the declared unit is 1 m² roof waterproofing installed with flexible sheets for roofing. The table below shows the conversion factors from m² to mass per each product, namely the specific weight in kg/m²

TYPE OF EPD

Cradle to gate with options, modules C1-C4, module D (additional modules: A4 and A5)
The list of life-cycle stages is indicated in the table below, according to EN 15804

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
	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
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	✓	✓	✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	ND	✓	✓	✓	✓
Geography	EU	EU	IT	GLO	GLO	-	-	-	-	-	-	-		GLO	GLO	GLO	GLO
Specific Data Used	>90%	>90%	>90%	>90%	>90%	-	-	-	-	-	-	-	-	-	-	-	-

✓ = Module assessed; **ND** = Module not declared; EU = European Union; IT = Italy ; GLO = World

REPRESENTATIVE YEAR FOR MANUFACTURING DATA

2019

SOFTWARE

Simapro 9

DATABASE

Ecoinvent 3.6, Plastics Europe

LIST OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

The following table shows the core and additional environmental impact indicators evaluated per each product studied, along with the disclaimer to be considered for part of them.

ILCD classification	INDICATOR	DISCLAIMER
ILCD Type 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD Type 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater) *	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD Type 3	Abiotic depletion potential for non-fossil resources (ADP-m&m)	2
	Abiotic depletion potential for fossil resources (ADP-f)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 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.

Disclaimer 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.

* Due to a typographical error, EN 15804:2012+A2:2019 specifies that the unit for Eutrophication aquatic freshwater shall be kg PO4 eq, although the reference given ("EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe") uses the unit kg P eq. PCR 2019:14 v 1.1 indicates that results shall be given in both kg PO4 eq and kg P eq. in the EPD. The results are here presented only as kg P eq. To obtain the value in kg PO4 eq, divide by 0.33 (the ratio between P and PO4 atomic weight)

SINTOFOIL® ST
ENVIRONMENTAL IMPACTS

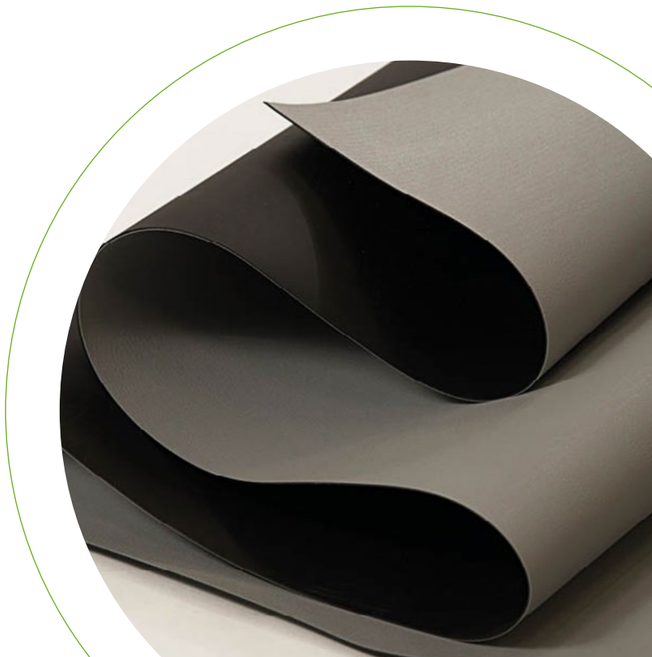
IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
GWP-total	kg CO_2 eq	3.95E+00	1.87E-01	4.37E-02	1.84E-01	3.97E-01	ND	2.66E+00	1.55E+00	0.00E+00	-2.45E+00
GWP-fossil	kg CO_2 eq	3.95E+00	1.87E-01	4.62E-02	1.84E-01	3.61E-01	ND	2.66E+00	1.55E+00	0.00E+00	-2.32E+00
GWP-biogenic	kg CO_2 eq	6.33E-03	7.74E-05	-2.79E-03	7.67E-05	3.56E-02	ND	1.10E-03	5.89E-05	0.00E+00	-1.22E-01
GWP-luluc	kg CO_2 eq	3.27E-04	1.49E-06	2.24E-04	1.49E-06	9.62E-05	ND	2.12E-05	1.78E-06	0.00E+00	7.15E-04
GWP-GHG	kg CO_2 eq	3.95E+00	1.87E-01	4.76E-02	1.84E-01	3.62E-01	ND	2.66E+00	1.55E+00	0.00E+00	-2.33E+00
ODP	kg CFC-11 eq	2.03E-07	4.38E-08	5.16E-09	4.26E-08	8.53E-08	ND	6.20E-07	9.87E-10	0.00E+00	-1.39E-07
AP	mol H^+ eq	1.64E-02	1.08E-03	2.58E-04	1.11E-03	2.29E-03	ND	1.59E-02	1.91E-04	0.00E+00	-6.91E-03
EP-freshwater	kg P eq	1.19E-04	1.12E-07	2.58E-06	1.12E-07	4.94E-06	ND	1.59E-06	7.60E-08	0.00E+00	-5.41E-05
EP-marine	kg N eq	2.68E-03	4.35E-04	1.00E-04	3.56E-04	8.08E-04	ND	6.49E-03	8.95E-05	0.00E+00	-1.43E-03
EP-terrestrial	mol N eq	2.90E-02	4.78E-03	9.89E-04	3.92E-03	8.99E-03	ND	7.12E-02	1.02E-03	0.00E+00	-1.71E-02
POFP	kg NMVOC eq	1.20E-02	1.24E-03	2.42E-04	1.03E-03	1.09E-02	ND	1.84E-02	2.71E-04	0.00E+00	-7.02E-03
ADP-m&m	kg Sb eq	1.35E-06	1.11E-08	8.81E-08	1.06E-08	5.27E-07	ND	1.58E-07	7.13E-09	0.00E+00	1.78E-07
ADP-f	MJ	1.36E+02	2.67E+00	6.72E-01	2.60E+00	7.51E+00	ND	3.78E+01	4.64E-02	0.00E+00	-9.39E+01
WDP	m^3 world eq deprived	4.62E-01	-5.88E-04	3.57E-02	-5.74E-04	7.76E-02	ND	-8.33E-03	2.40E-03	0.00E+00	7.50E-02

GWP-total Global Warming Potential total
GWP-fossil Global Warming Potential fossil fuels
GWP-biogenic Global Warming Potential biogenic
GWP-luluc Global Warming Potential land use and land use change
GWP-GHG Additional PCR 2019:14 indicator (includes all greenhouse gases (included in GWP-total but excludes biogenic carbon dioxide and biogenic carbon stored in the product.)
ODP Depletion potential of the stratospheric ozone layer
AP Acidification potential, Accumulated exceedance
EP-freshwater Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial Eutrophication potential, Accumulated exceedance
POCP Formation potential of tropospheric ozone
ADP-m&m Abiotic depletion Potential for non fossil resources
ADP-f Abiotic Depletion Potential for fossil resources
WDP Water (user) deprivation potential, deprivation-weighted water consumption

SINTOFOIL® ST
ADDITIONAL ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PM	Disease incidence	1.37E-07	1.73E-08	4.96E-09	1.31E-08	4.23E-08	ND	2.20E-07	1.42E-09	0.00E+00	-6.63E-08
IRP	kBq U^{235} eq	1.30E-01	1.18E-02	1.97E-03	1.14E-02	4.59E-02	ND	1.67E-01	1.18E-04	0.00E+00	-6.52E-02
ETP-fw	CTUe	2.28E+01	1.07E+00	4.93E+00	1.03E+00	3.12E+00	ND	1.47E+01	3.12E-01	0.00E+00	-3.49E+00
HTP-c	CTUh	1.12E-09	5.44E-11	4.64E-11	2.78E-11	1.89E-10	ND	7.70E-10	2.06E-10	0.00E+00	-1.41E-10
HTTP-nc	CTUh	2.56E-08	2.22E-09	4.57E-10	1.81E-09	4.14E-09	ND	2.84E-08	1.41E-09	0.00E+00	-7.72E-09
SQP	dimensionless	5.96E+00	6.63E-03	1.81E+00	6.51E-03	4.36E+00	ND	9.40E-02	5.41E-03	0.00E+00	4.46E+00

PM Potential incidence of disease due to PM emissions (PM)
IRP Potential human exposure efficiency relative to U235
ETP-fw Potential comparative toxic unit for ecosystems
HTP-c Potential comparative toxic unit for humans
HTP-nc Potential comparative toxic unit for humans
SQP Potential soil quality index



SINTOFOIL® ST
RESOURCES USE

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PERE	MJ	2.91E+00	3.74E-03	2.15E-01	3.63E-03	9.53E-01	ND	5.29E-02	2.28E-03	0.00E+00	-2.37E+00
PERM	MJ	0.00E+00	0.00E+00	1.68E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.91E+00	3.74E-03	3.83E-01	3.63E-03	9.53E-01	ND	5.29E-02	2.28E-03	0.00E+00	-2.37E+00
PENRE	MJ	5.72E+01	2.61E+00	6.47E-01	2.54E+00	7.72E+00	ND	3.70E+01	5.39E-02	0.00E+00	-9.45E+01
PENRM	MJ	8.23E+01	0.00E+00	9.84E-02	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.40E+02	2.61E+00	7.45E-01	2.54E+00	7.72E+00	ND	3.70E+01	5.39E-02	0.00E+00	-9.45E+01
SM	kg	5.46E-02	0.00E+00	2.78E-02	0.00E+00	0.00E+00	ND	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	ND	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	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.24E-02	5.29E-05	1.02E-03	5.08E-05	2.45E-02	ND	7.49E-04	2.97E-04	0.00E+00	2.41E-03

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PERM Use of renewable primary energy resources used as raw materials (feedstock)
PERT Total use of renewable primary energy resources (total)
PENRE Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PENRM Use of non-renewable primary energy resources used as raw materials (feedstock)
PENRT Total use of non-renewable primary energy resources (total)
SM Use of secondary materials
RSF Use of renewable secondary fuels
NSRF Use of non-renewable secondary fuels
FW Net use of fresh water

SINTOFOIL® ST
WASTE PRODUCTION AND OUTPUT FLOWS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
HWV	kg	1.86E-14	0.00E+00	1.01E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-1.35E-14
NHWD	kg	3.94E-14	0.00E+00	2.14E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-2.86E-14
RWD	kg	1.06E-04	7.77E-05	5.58E-06	7.56E-05	1.69E-04	ND	1.10E-03	3.80E-07	0.00E+00	-1.24E-05

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	3.28E-02	0.00E+00	0.00E+00	ND	0.00E+00	1.43E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	6.15E-01	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PM Hazardous waste disposed
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed

CRU Components for re-use
MFR Material for recycling
MER Materials for energy recovery
EE Exported energy

SINTOFOIL® RG
ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
GWP-total	kg CO_2 eq	4.23E+00	2.00E-01	4.62E-02	1.95E-01	1.46E-01	ND	8.38E-02	1.65E+00	0.00E+00	-2.55E+00
GWP-fossil	kg CO_2 eq	4.22E+00	2.00E-01	4.90E-02	1.95E-01	1.14E-01	ND	8.38E-02	1.65E+00	0.00E+00	-2.42E+00
GWP-biogenic	kg CO_2 eq	8.34E-03	8.29E-05	-2.95E-03	8.12E-05	3.24E-02	ND	3.45E-05	6.24E-05	0.00E+00	-1.27E-01
GWP-luluc	kg CO_2 eq	4.99E-04	1.60E-06	2.37E-04	1.58E-06	3.83E-05	ND	6.66E-07	1.88E-06	0.00E+00	7.44E-04
GWP-GHG	kg CO_2 eq	4.22E+00	2.00E-01	5.04E-02	1.95E-01	1.14E-01	ND	8.38E-02	1.65E+00	0.00E+00	-2.43E+00
ODP	kg CFC-11 eq	2.21E-07	4.69E-08	5.46E-09	4.51E-08	2.55E-08	ND	1.95E-08	1.04E-09	0.00E+00	-1.45E-07
AP	mol H^+ eq	1.79E-02	1.16E-03	2.73E-04	1.18E-03	5.52E-04	ND	5.02E-04	2.02E-04	0.00E+00	-7.19E-03
EP-freshwater	kg P eq	1.28E-04	1.20E-07	2.73E-06	1.18E-07	3.55E-06	ND	5.00E-08	8.05E-08	0.00E+00	-5.63E-05
EP-marine	kg N eq	2.93E-03	4.66E-04	1.06E-04	3.77E-04	9.91E-05	ND	2.04E-04	9.47E-05	0.00E+00	-1.49E-03
EP-terrestrial	mol N eq	3.25E-02	5.12E-03	1.05E-03	4.16E-03	1.14E-03	ND	2.24E-03	1.08E-03	0.00E+00	-1.78E-02
POFP	kg NMVOC eq	1.29E-02	1.33E-03	2.57E-04	1.09E-03	9.24E-03	ND	5.80E-04	2.87E-04	0.00E+00	-7.31E-03
ADP-m&m	kg Sb eq	1.92E-06	1.19E-08	9.33E-08	1.13E-08	4.20E-07	ND	4.96E-09	7.55E-09	0.00E+00	1.85E-07
ADP-f	MJ	1.43E+02	2.86E+00	7.11E-01	2.75E+00	3.15E+00	ND	1.19E+00	4.92E-02	0.00E+00	-9.78E+01
WDP	m^3 world eq deprived	5.26E-01	-6.30E-04	3.78E-02	-6.08E-04	4.47E-02	ND	-2.62E-04	2.54E-03	0.00E+00	7.80E-02

GWP-total Global Warming Potential total
GWP-fossil Global Warming Potential fossil fuels
GWP-biogenic Global Warming Potential biogenic
GWP-luluc Global Warming Potential land use and land use change
GWP-GHG Additional PCR 2019:14 indicator (includes all greenhouse gases (included in GWP-total but excludes biogenic carbon dioxide and biogenic carbon stored in the product.)
ODP Depletion potential of the stratospheric ozone layer
AP Acidification potential, Accumulated exceedance
EP-freshwater Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial Eutrophication potential, Accumulated exceedance
POCP Formation potential of tropospheric ozone
ADP-m&m Abiotic depletion Potential for non fossil resources
ADP-f Abiotic Depletion Potential for fossil resources
WDP Water (user) deprivation potential, deprivation-weighted water consumption

SINTOFOIL® RG
ADDITIONAL ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PM	Disease incidence	1.48E-07	1.86E-08	5.26E-09	1.39E-08	5.55E-09	ND	6.93E-09	1.51E-09	0.00E+00	-6.90E-08
IRP	kBq U^{235} eq	1.40E-01	1.26E-02	2.09E-03	1.21E-02	6.29E-03	ND	5.24E-03	1.25E-04	0.00E+00	-6.78E-02
ETP-fw	CTUe	2.57E+01	1.15E+00	5.22E+00	1.09E+00	2.17E+00	ND	4.62E-01	3.31E-01	0.00E+00	-3.64E+00
HTP-c	CTUh	1.47E-09	5.83E-11	4.92E-11	2.95E-11	3.38E-10	ND	2.42E-11	2.18E-10	0.00E+00	-1.47E-10
HTTP-nc	CTUh	2.75E-08	2.38E-09	4.84E-10	1.92E-09	3.97E-09	ND	8.95E-10	1.49E-09	0.00E+00	-8.03E-09
SQP	dimensionless	6.43E+00	7.11E-03	1.92E+00	6.89E-03	1.09E-01	ND	2.96E-03	5.72E-03	0.00E+00	4.64E+00

PM Potential incidence of disease due to PM emissions (PM)
IRP Potential human exposure efficiency relative to U235
ETP-fw Potential comparative toxic unit for ecosystems
HTP-c Potential comparative toxic unit for humans
HTP-nc Potential comparative toxic unit for humans
SQP Potential soil quality index

SINTOFOIL® RG
RESOURCES USE

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PERE	MJ	3.17E+00	4.01E-03	2.28E-01	3.84E-03	6.26E-02	ND	1.67E-03	2.42E-03	0.00E+00	-2.47E+00
PERM	MJ	0.00E+00	0.00E+00	1.78E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.17E+00	4.01E-03	4.06E-01	3.84E-03	6.26E-02	ND	1.67E-03	2.42E-03	0.00E+00	-2.47E+00
PENRE	MJ	6.16E+01	2.80E+00	6.85E-01	2.69E+00	3.45E+00	ND	1.16E+00	5.71E-02	0.00E+00	-9.84E+01
PENRM	MJ	8.56E+01	0.00E+00	1.04E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.47E+02	2.80E+00	7.89E-01	2.69E+00	3.45E+00	ND	1.16E+00	5.71E-02	0.00E+00	-9.84E+01
SM	kg	5.62E-02	0.00E+00	2.94E-02	0.00E+00	0.00E+00	ND	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	ND	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	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.42E-02	5.67E-05	1.08E-03	5.38E-05	1.18E-03	ND	2.36E-05	3.15E-04	0.00E+00	2.51E-03

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PERM Use of renewable primary energy resources used as raw materials (feedstock)
PERT Total use of renewable primary energy resources (total)
PENRE Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PENRM Use of non-renewable primary energy resources used as raw materials (feedstock)
PENRT Total use of non-renewable primary energy resources (total)
SM Use of secondary materials
RSF Use of renewable secondary fuels
NSRF Use of non-renewable secondary fuels
FW Net use of fresh water

SINTOFOIL® RG
WASTE PRODUCTION AND OUTPUT FLOWS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
HWV	kg	1.93E-14	0.00E+00	1.07E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-1.40E-14
NHWD	kg	4.09E-14	0.00E+00	2.27E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-2.98E-14
RWD	kg	1.22E-04	8.33E-05	5.91E-06	8.01E-05	3.43E-05	ND	3.46E-05	4.02E-07	0.00E+00	-1.29E-05

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	3.47E-02	0.00E+00	0.00E+00	ND	0.00E+00	1.52E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	6.51E-01	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PM Hazardous waste disposed
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed

CRU Components for re-use
MFR Material for recycling
MER Materials for energy recovery
EE Exported energy

SINTOFOIL® RG/FR
ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
GWP-total	kg CO_2 eq	4.23E+00	2.82E-01	4.88E-02	2.06E-01	1.48E-01	ND	8.84E-02	1.74E+00	0.00E+00	-2.43E+00
GWP-fossil	kg CO_2 eq	4.22E+00	2.81E-01	5.16E-02	2.06E-01	1.14E-01	ND	8.84E-02	1.74E+00	0.00E+00	-2.31E+00
GWP-biogenic	kg CO_2 eq	6.82E-03	1.16E-04	-3.11E-03	8.57E-05	3.42E-02	ND	3.64E-05	6.58E-05	0.00E+00	-1.22E-01
GWP-luluc	kg CO_2 eq	4.68E-04	2.25E-06	2.50E-04	1.66E-06	3.83E-05	ND	7.02E-07	1.99E-06	0.00E+00	7.10E-04
GWP-GHG	kg CO_2 eq	4.23E+00	2.81E-01	5.32E-02	2.06E-01	1.14E-01	ND	8.84E-02	1.74E+00	0.00E+00	-2.32E+00
ODP	kg CFC-11 eq	2.12E-07	6.59E-08	5.76E-09	4.76E-08	2.55E-08	ND	2.06E-08	1.10E-09	0.00E+00	-1.38E-07
AP	mol H^+ eq	1.87E-02	1.63E-03	2.88E-04	1.24E-03	5.53E-04	ND	5.29E-04	2.13E-04	0.00E+00	-6.86E-03
EP-freshwater	kg P eq	1.24E-04	1.69E-07	2.88E-06	1.25E-07	3.56E-06	ND	5.27E-08	8.49E-08	0.00E+00	-5.38E-05
EP-marine	kg N eq	2.99E-03	6.55E-04	1.12E-04	3.97E-04	9.93E-05	ND	2.15E-04	9.99E-05	0.00E+00	-1.42E-03
EP-terrestrial	mol N eq	3.33E-02	7.20E-03	1.11E-03	4.38E-03	1.14E-03	ND	2.36E-03	1.14E-03	0.00E+00	-1.70E-02
POFP	kg NMVOC eq	1.31E-02	1.87E-03	2.71E-04	1.15E-03	9.24E-03	ND	6.12E-04	3.03E-04	0.00E+00	-6.97E-03
ADP-m&m	kg Sb eq	2.06E-06	1.67E-08	9.84E-08	1.19E-08	4.20E-07	ND	5.23E-09	7.97E-09	0.00E+00	1.77E-07
ADP-f	MJ	1.38E+02	4.02E+00	7.50E-01	2.91E+00	3.15E+00	ND	1.26E+00	5.19E-02	0.00E+00	-9.33E+01
WDP	m^3 world eq deprived	5.59E-01	-8.86E-04	3.99E-02	-6.42E-04	4.47E-02	ND	-2.77E-04	2.68E-03	0.00E+00	7.45E-02

GWP-total Global Warming Potential total
GWP-fossil Global Warming Potential fossil fuels
GWP-biogenic Global Warming Potential biogenic
GWP-luluc Global Warming Potential land use and land use change
GWP-GHG Additional PCR 2019:14 indicator (includes all greenhouse gases (included in GWP-total but excludes biogenic carbon dioxide and biogenic carbon stored in the product.)
ODP Depletion potential of the stratospheric ozone layer
AP Acidification potential, Accumulated exceedance
EP-freshwater Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial Eutrophication potential, Accumulated exceedance
POCP Formation potential of tropospheric ozone
ADP-m&m Abiotic depletion Potential for non fossil resources
ADP-f Abiotic Depletion Potential for fossil resources
WDP Water (user) deprivation potential, deprivation-weighted water consumption

SINTOFOIL® RG/FR
ADDITIONAL ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PM	Disease incidence	1.71E-07	2.61E-08	5.54E-09	1.47E-08	5.55E-09	ND	7.31E-09	1.59E-09	0.00E+00	-6.58E-08
IRP	kBq U^{235} eq	1.29E-01	1.77E-02	2.20E-03	1.28E-02	6.30E-03	ND	5.53E-03	1.31E-04	0.00E+00	-6.48E-02
ETP-fw	CTUe	3.66E+01	1.61E+00	5.51E+00	1.15E+00	2.17E+00	ND	4.88E-01	3.49E-01	0.00E+00	-3.47E+00
HTP-c	CTUh	2.60E-09	8.19E-11	5.18E-11	3.11E-11	3.38E-10	ND	2.55E-11	2.30E-10	0.00E+00	-1.41E-10
HTTP-nc	CTUh	4.38E-08	3.34E-09	5.10E-10	2.02E-09	3.97E-09	ND	9.44E-10	1.57E-09	0.00E+00	-7.67E-09
SQP	dimensionless	6.42E+00	9.99E-03	2.02E+00	7.27E-03	1.09E-01	ND	3.12E-03	6.04E-03	0.00E+00	4.43E+00

PM Potential incidence of disease due to PM emissions (PM)
IRP Potential human exposure efficiency relative to U235
ETP-fw Potential comparative toxic unit for ecosystems
HTP-c Potential comparative toxic unit for humans
HTP-nc Potential comparative toxic unit for humans
SQP Potential soil quality index

SINTOFOIL® RG/FR
RESOURCES USE

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PERE	MJ	3.01E+00	5.63E-03	2.40E-01	4.05E-03	6.26E-02	ND	1.76E-03	2.55E-03	0.00E+00	-2.35E+00
PERM	MJ	0.00E+00	0.00E+00	1.88E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.01E+00	5.63E-03	4.28E-01	4.05E-03	6.26E-02	ND	1.76E-03	2.55E-03	0.00E+00	-2.35E+00
PENRE	MJ	5.94E+01	3.93E+00	7.22E-01	2.84E+00	3.45E+00	ND	1.23E+00	6.02E-02	0.00E+00	-9.39E+01
PENRM	MJ	8.26E+01	0.00E+00	1.10E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.42E+02	3.93E+00	8.32E-01	2.84E+00	3.45E+00	ND	1.23E+00	6.02E-02	0.00E+00	-9.39E+01
SM	kg	4.32E-02	0.00E+00	3.10E-02	0.00E+00	0.00E+00	ND	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	ND	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	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.44E-02	7.97E-05	1.14E-03	5.68E-05	1.19E-03	ND	2.49E-05	3.32E-04	0.00E+00	2.40E-03

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PERM Use of renewable primary energy resources used as raw materials (feedstock)
PERT Total use of renewable primary energy resources (total)
PENRE Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PENRM Use of non-renewable primary energy resources used as raw materials (feedstock)
PENRT Total use of non-renewable primary energy resources (total)
SM Use of secondary materials
RSF Use of renewable secondary fuels
NSRF Use of non-renewable secondary fuels
FW Net use of fresh water

SINTOFOIL® RG/FR
WASTE PRODUCTION AND OUTPUT FLOWS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
HWV	kg	1.86E-14	0.00E+00	1.13E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-1.34E-14
NHWD	kg	3.95E-14	0.00E+00	2.39E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-2.84E-14
RWD	kg	1.00E-04	1.17E-04	6.24E-06	8.45E-05	3.43E-05	ND	3.65E-05	4.24E-07	0.00E+00	-1.24E-05

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	3.66E-02	0.00E+00	0.00E+00	ND	0.00E+00	1.60E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	6.87E-01	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PM Hazardous waste disposed
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed

CRU Components for re-use
MFR Material for recycling
MER Materials for energy recovery
EE Exported energy

SINTOFOIL® RT
ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
GWP-total	kg CO_2 eq	4.57E+00	1.97E-01	4.72E-02	1.99E-01	1.47E-01	ND	8.55E-02	1.68E+00	0.00E+00	-2.56E+00
GWP-fossil	kg CO_2 eq	4.56E+00	1.97E-01	4.99E-02	1.99E-01	1.14E-01	ND	8.54E-02	1.68E+00	0.00E+00	-2.43E+00
GWP-biogenic	kg CO_2 eq	1.42E-02	8.16E-05	-3.01E-03	8.29E-05	3.31E-02	ND	3.52E-05	6.36E-05	0.00E+00	-1.28E-01
GWP-luluc	kg CO_2 eq	8.61E-04	1.58E-06	2.42E-04	1.61E-06	3.83E-05	ND	6.79E-07	1.92E-06	0.00E+00	7.47E-04
GWP-GHG	kg CO_2 eq	4.56E+00	1.97E-01	5.14E-02	1.99E-01	1.14E-01	ND	8.54E-02	1.68E+00	0.00E+00	-2.44E+00
ODP	kg CFC-11 eq	1.25E-06	4.61E-08	5.57E-09	4.60E-08	2.55E-08	ND	1.99E-08	1.07E-09	0.00E+00	-1.45E-07
AP	mol H^+ eq	1.95E-02	1.14E-03	2.78E-04	1.20E-03	5.53E-04	ND	5.12E-04	2.06E-04	0.00E+00	-7.22E-03
EP-freshwater	kg P eq	1.54E-04	1.18E-07	2.79E-06	1.20E-07	3.56E-06	ND	5.10E-08	8.21E-08	0.00E+00	-5.66E-05
EP-marine	kg N eq	3.12E-03	4.59E-04	1.08E-04	3.84E-04	9.92E-05	ND	2.08E-04	9.66E-05	0.00E+00	-1.50E-03
EP-terrestrial	mol N eq	3.41E-02	5.04E-03	1.07E-03	4.24E-03	1.14E-03	ND	2.29E-03	1.11E-03	0.00E+00	-1.78E-02
POFP	kg NMVOC eq	1.37E-02	1.31E-03	2.62E-04	1.12E-03	9.24E-03	ND	5.91E-04	2.93E-04	0.00E+00	-7.34E-03
ADP-m&m	kg Sb eq	1.69E-06	1.17E-08	9.51E-08	1.15E-08	4.20E-07	ND	5.05E-09	7.70E-09	0.00E+00	1.86E-07
ADP-f	MJ	1.52E+02	2.82E+00	7.26E-01	2.81E+00	3.15E+00	ND	1.21E+00	5.02E-02	0.00E+00	-9.82E+01
WDP	m^3 world eq deprived	7.02E-01	-6.20E-04	3.86E-02	-6.20E-04	4.47E-02	ND	-2.67E-04	2.59E-03	0.00E+00	7.83E-02

GWP-total Global Warming Potential total
GWP-fossil Global Warming Potential fossil fuels
GWP-biogenic Global Warming Potential biogenic
GWP-luluc Global Warming Potential land use and land use change
GWP-GHG Additional PCR 2019:14 indicator (includes all greenhouse gases (included in GWP-total but excludes biogenic carbon dioxide and biogenic carbon stored in the product.)
ODP Depletion potential of the stratospheric ozone layer
AP Acidification potential, Accumulated exceedance
EP-freshwater Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial Eutrophication potential, Accumulated exceedance
POCP Formation potential of tropospheric ozone
ADP-m&m Abiotic depletion Potential for non fossil resources
ADP-f Abiotic Depletion Potential for fossil resources
WDP Water (user) deprivation potential, deprivation-weighted water consumption

SINTOFOIL® RT
ADDITIONAL ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PM	Disease incidence	1.54E-07	1.83E-08	5.36E-09	1.42E-08	5.55E-09	ND	7.06E-09	1.54E-09	0.00E+00	-6.93E-08
IRP	kBq U^{235} eq	2.38E-01	1.24E-02	2.13E-03	1.24E-02	6.29E-03	ND	5.35E-03	1.27E-04	0.00E+00	-6.81E-02
ETP-fw	CTUe	2.69E+01	1.13E+00	5.32E+00	1.12E+00	2.17E+00	ND	4.72E-01	3.37E-01	0.00E+00	-3.65E+00
HTP-c	CTUh	1.26E-09	5.74E-11	5.01E-11	3.01E-11	3.38E-10	ND	2.47E-11	2.22E-10	0.00E+00	-1.48E-10
HTP-nc	CTUh	3.02E-08	2.34E-09	4.93E-10	1.95E-09	3.97E-09	ND	9.12E-10	1.52E-09	0.00E+00	-8.07E-09
SQP	dimensionless	8.04E+00	7.00E-03	1.96E+00	7.03E-03	1.09E-01	ND	3.02E-03	5.84E-03	0.00E+00	4.66E+00

PM Potential incidence of disease due to PM emissions (PM)
IRP Potential human exposure efficiency relative to U235
ETP-fw Potential comparative toxic unit for ecosystems
HTP-c Potential comparative toxic unit for humans
HTP-nc Potential comparative toxic unit for humans
SQP Potential soil quality index

SINTOFOIL® RT
RESOURCES USE

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PERE	MJ	4.02E+00	3.94E-03	2.33E-01	3.92E-03	6.26E-02	ND	1.70E-03	2.47E-03	0.00E+00	-2.48E+00
PERM	MJ	0.00E+00	0.00E+00	1.81E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	4.02E+00	3.94E-03	4.14E-01	3.92E-03	6.26E-02	ND	1.70E-03	2.47E-03	0.00E+00	-2.48E+00
PENRE	MJ	6.81E+01	2.75E+00	6.99E-01	2.74E+00	3.45E+00	ND	1.19E+00	5.82E-02	0.00E+00	-9.88E+01
PENRM	MJ	8.83E+01	0.00E+00	1.06E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.56E+02	2.75E+00	8.05E-01	2.74E+00	3.45E+00	ND	1.19E+00	5.82E-02	0.00E+00	-9.88E+01
SM	kg	5.62E-02	0.00E+00	3.00E-02	0.00E+00	0.00E+00	ND	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	ND	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	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.10E-02	5.58E-05	1.10E-03	5.49E-05	1.19E-03	ND	2.40E-05	3.21E-04	0.00E+00	2.52E-03

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PERM Use of renewable primary energy resources used as raw materials (feedstock)
PERT Total use of renewable primary energy resources (total)
PENRE Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PENRM Use of non-renewable primary energy resources used as raw materials (feedstock)
PENRT Total use of non-renewable primary energy resources (total)
SM Use of secondary materials
RSF Use of renewable secondary fuels
NSRF Use of non-renewable secondary fuels
FW Net use of fresh water

SINTOFOIL® RT
WASTE PRODUCTION AND OUTPUT FLOWS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
HWV	kg	2.63E-04	0.00E+00	1.09E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-1.41E-14
NHWD	kg	3.56E-02	0.00E+00	2.31E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-2.99E-14
RWD	kg	1.97E-04	8.19E-05	6.03E-06	8.17E-05	3.43E-05	ND	3.53E-05	4.10E-07	0.00E+00	-1.30E-05

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	3.54E-02	0.00E+00	0.00E+00	ND	0.00E+00	1.55E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	6.64E-01	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PM Hazardous waste disposed
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed

CRU Components for re-use
MFR Material for recycling
MER Materials for energy recovery
EE Exported energy

SINTOFOIL® RT/FR
ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
GWP-total	kg CO_2 eq	4.51E+00	2.75E-01	4.88E-02	2.06E-01	1.48E-01	ND	8.84E-02	1.74E+00	0.00E+00	-2.40E+00
GWP-fossil	kg CO_2 eq	4.50E+00	2.75E-01	5.16E-02	2.06E-01	1.14E-01	ND	8.84E-02	1.74E+00	0.00E+00	-2.28E+00
GWP-biogenic	kg CO_2 eq	1.26E-02	1.14E-04	-3.11E-03	8.57E-05	3.42E-02	ND	3.64E-05	6.58E-05	0.00E+00	-1.20E-01
GWP-luluc	kg CO_2 eq	8.26E-04	2.20E-06	2.50E-04	1.66E-06	3.83E-05	ND	7.02E-07	1.99E-06	0.00E+00	7.00E-04
GWP-GHG	kg CO_2 eq	4.50E+00	2.75E-01	5.32E-02	2.06E-01	1.14E-01	ND	8.84E-02	1.74E+00	0.00E+00	-2.29E+00
ODP	kg CFC-11 eq	1.24E-06	6.43E-08	5.76E-09	4.76E-08	2.55E-08	ND	2.06E-08	1.10E-09	0.00E+00	-1.36E-07
AP	mol H^+ eq	2.02E-02	1.59E-03	2.88E-04	1.24E-03	5.53E-04	ND	5.29E-04	2.13E-04	0.00E+00	-6.76E-03
EP-freshwater	kg P eq	1.48E-04	1.65E-07	2.88E-06	1.25E-07	3.56E-06	ND	5.27E-08	8.49E-08	0.00E+00	-5.30E-05
EP-marine	kg N eq	3.14E-03	6.40E-04	1.12E-04	3.97E-04	9.93E-05	ND	2.15E-04	9.99E-05	0.00E+00	-1.40E-03
EP-terrestrial	mol N eq	3.44E-02	7.03E-03	1.11E-03	4.38E-03	1.14E-03	ND	2.36E-03	1.14E-03	0.00E+00	-1.67E-02
POFP	kg NMVOC eq	1.37E-02	1.83E-03	2.71E-04	1.15E-03	9.24E-03	ND	6.12E-04	3.03E-04	0.00E+00	-6.88E-03
ADP-m&m	kg Sb eq	1.82E-06	1.63E-08	9.84E-08	1.19E-08	4.20E-07	ND	5.23E-09	7.97E-09	0.00E+00	1.74E-07
ADP-f	MJ	1.44E+02	3.93E+00	7.50E-01	2.91E+00	3.15E+00	ND	1.26E+00	5.19E-02	0.00E+00	-9.20E+01
WDP	m^3 world eq deprived	7.32E-01	-8.65E-04	3.99E-02	-6.42E-04	4.47E-02	ND	-2.77E-04	2.68E-03	0.00E+00	7.35E-02

GWP-total Global Warming Potential total
GWP-fossil Global Warming Potential fossil fuels
GWP-biogenic Global Warming Potential biogenic
GWP-luluc Global Warming Potential land use and land use change
GWP-GHG Additional PCR 2019:14 indicator (includes all greenhouse gases (included in GWP-total but excludes biogenic carbon dioxide and biogenic carbon stored in the product.)
ODP Depletion potential of the stratospheric ozone layer
AP Acidification potential, Accumulated exceedance
EP-freshwater Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial Eutrophication potential, Accumulated exceedance
POCP Formation potential of tropospheric ozone
ADP-m&m Abiotic depletion Potential for non fossil resources
ADP-f Abiotic Depletion Potential for fossil resources
WDP Water (user) deprivation potential, deprivation-weighted water consumption

SINTOFOIL® RT/FR
ADDITIONAL ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PM	Disease incidence	1.75E-07	2.55E-08	5.54E-09	1.47E-08	5.55E-09	ND	7.31E-09	1.59E-09	0.00E+00	-6.49E-08
IRP	kBq U^{235} eq	2.25E-01	1.73E-02	2.20E-03	1.28E-02	6.30E-03	ND	5.53E-03	1.31E-04	0.00E+00	-6.39E-02
ETP-fw	CTUe	3.75E+01	1.58E+00	5.51E+00	1.15E+00	2.17E+00	ND	4.88E-01	3.49E-01	0.00E+00	-3.42E+00
HTP-c	CTUh	2.38E-09	8.00E-11	5.18E-11	3.11E-11	3.38E-10	ND	2.55E-11	2.30E-10	0.00E+00	-1.39E-10
HTTP-nc	CTUh	4.61E-08	3.26E-09	5.10E-10	2.02E-09	3.97E-09	ND	9.44E-10	1.57E-09	0.00E+00	-7.56E-09
SQP	dimensionless	7.94E+00	9.75E-03	2.02E+00	7.27E-03	1.09E-01	ND	3.12E-03	6.04E-03	0.00E+00	4.37E+00

PM Potential incidence of disease due to PM emissions (PM)
IRP Potential human exposure efficiency relative to U235
ETP-fw Potential comparative toxic unit for ecosystems
HTP-c Potential comparative toxic unit for humans
HTP-nc Potential comparative toxic unit for humans
SQP Potential soil quality index

SINTOFOIL® RT/FR
RESOURCES USE

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PERE	MJ	3.81E+00	5.50E-03	2.40E-01	4.05E-03	6.26E-02	ND	1.76E-03	2.55E-03	0.00E+00	-2.32E+00
PERM	MJ	0.00E+00	0.00E+00	1.88E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.81E+00	5.50E-03	4.28E-01	4.05E-03	6.26E-02	ND	1.76E-03	2.55E-03	0.00E+00	-2.32E+00
PENRE	MJ	6.50E+01	3.84E+00	7.22E-01	2.84E+00	3.45E+00	ND	1.23E+00	6.02E-02	0.00E+00	-9.26E+01
PENRM	MJ	8.38E+01	0.00E+00	1.10E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.49E+02	3.84E+00	8.32E-01	2.84E+00	3.45E+00	ND	1.23E+00	6.02E-02	0.00E+00	-9.26E+01
SM	kg	4.21E-02	0.00E+00	3.10E-02	0.00E+00	0.00E+00	ND	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	ND	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	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.11E-02	7.78E-05	1.14E-03	5.68E-05	1.19E-03	ND	2.49E-05	3.32E-04	0.00E+00	2.36E-03

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PERM Use of renewable primary energy resources used as raw materials (feedstock)
PERT Total use of renewable primary energy resources (total)
PENRE Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PENRM Use of non-renewable primary energy resources used as raw materials (feedstock)
PENRT Total use of non-renewable primary energy resources (total)
SM Use of secondary materials
RSF Use of renewable secondary fuels
NSRF Use of non-renewable secondary fuels
FW Net use of fresh water

SINTOFOIL® RT/FR
WASTE PRODUCTION AND OUTPUT FLOWS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
HWV	kg	2.63E-04	0.00E+00	1.13E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-1.32E-14
NHWD	kg	3.56E-02	0.00E+00	2.39E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-2.80E-14
RWD	kg	1.74E-04	1.14E-04	6.24E-06	8.45E-05	3.43E-05	ND	3.65E-05	4.24E-07	0.00E+00	-1.22E-05

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	3.66E-02	0.00E+00	0.00E+00	ND	0.00E+00	1.60E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	6.87E-01	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PM Hazardous waste disposed
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed

CRU Components for re-use
MFR Material for recycling
MER Materials for energy recovery
EE Exported energy

SINTOFOIL® RC
ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
GWP-total	kg CO_2 eq	4.48E+00	2.07E-01	4.78E-02	2.02E-01	1.48E-01	ND	8.67E-02	1.70E+00	0.00E+00	-2.52E+00
GWP-fossil	kg CO_2 eq	4.47E+00	2.07E-01	5.07E-02	2.02E-01	1.14E-01	ND	8.67E-02	1.70E+00	0.00E+00	-2.40E+00
GWP-biogenic	kg CO_2 eq	4.67E-03	8.58E-05	-3.06E-03	8.41E-05	3.36E-02	ND	3.57E-05	6.46E-05	0.00E+00	-1.26E-01
GWP-luluc	kg CO_2 eq	6.34E-04	1.66E-06	2.45E-04	1.63E-06	3.83E-05	ND	6.89E-07	1.95E-06	0.00E+00	7.37E-04
GWP-GHG	kg CO_2 eq	4.48E+00	2.07E-01	5.22E-02	2.02E-01	1.14E-01	ND	8.67E-02	1.70E+00	0.00E+00	-2.41E+00
ODP	kg CFC-11 eq	1.57E-06	4.85E-08	5.65E-09	4.67E-08	2.55E-08	ND	2.02E-08	1.08E-09	0.00E+00	-1.44E-07
AP	mol H^+ eq	1.90E-02	1.20E-03	2.82E-04	1.22E-03	5.53E-04	ND	5.19E-04	2.09E-04	0.00E+00	-7.12E-03
EP-freshwater	kg P eq	1.38E-04	1.24E-07	2.83E-06	1.22E-07	3.56E-06	ND	5.18E-08	8.33E-08	0.00E+00	-5.58E-05
EP-marine	kg N eq	3.12E-03	4.83E-04	1.10E-04	3.90E-04	9.93E-05	ND	2.11E-04	9.80E-05	0.00E+00	-1.48E-03
EP-terrestrial	mol N eq	3.46E-02	5.30E-03	1.08E-03	4.30E-03	1.14E-03	ND	2.32E-03	1.12E-03	0.00E+00	-1.76E-02
POFP	kg NMVOC eq	1.37E-02	1.38E-03	2.66E-04	1.13E-03	9.24E-03	ND	6.00E-04	2.97E-04	0.00E+00	-7.24E-03
ADP-m&m	kg Sb eq	1.98E-06	1.23E-08	9.65E-08	1.17E-08	4.20E-07	ND	5.13E-09	7.81E-09	0.00E+00	1.84E-07
ADP-f	MJ	1.49E+02	2.96E+00	7.36E-01	2.85E+00	3.15E+00	ND	1.23E+00	5.09E-02	0.00E+00	-9.69E+01
WDP	m^3 world eq deprived	7.84E-01	-6.52E-04	3.92E-02	-6.30E-04	4.47E-02	ND	-2.71E-04	2.63E-03	0.00E+00	7.74E-02

GWP-total Global Warming Potential total
GWP-fossil Global Warming Potential fossil fuels
GWP-biogenic Global Warming Potential biogenic
GWP-luluc Global Warming Potential land use and land use change
GWP-GHG Additional PCR 2019:14 indicator (includes all greenhouse gases (included in GWP-total but excludes biogenic carbon dioxide and biogenic carbon stored in the product.)
ODP Depletion potential of the stratospheric ozone layer
AP Acidification potential, Accumulated exceedance
EP-freshwater Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial Eutrophication potential, Accumulated exceedance
POCP Formation potential of tropospheric ozone
ADP-m&m Abiotic depletion Potential for non fossil resources
ADP-f Abiotic Depletion Potential for fossil resources
WDP Water (user) deprivation potential, deprivation-weighted water consumption

SINTOFOIL® RC
ADDITIONAL ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PM	Disease incidence	1.55E-07	1.92E-08	5.44E-09	1.44E-08	5.55E-09	ND	7.17E-09	1.56E-09	0.00E+00	-6.84E-08
IRP	kBq U^{235} eq	2.26E-01	1.30E-02	2.16E-03	1.25E-02	6.30E-03	ND	5.42E-03	1.29E-04	0.00E+00	-6.73E-02
ETP-fw	CTUe	2.68E+01	1.19E+00	5.40E+00	1.13E+00	2.17E+00	ND	4.78E-01	3.42E-01	0.00E+00	-3.61E+00
HTP-c	CTUh	1.52E-09	6.03E-11	5.09E-11	3.05E-11	3.38E-10	ND	2.51E-11	2.25E-10	0.00E+00	-1.46E-10
HTTP-nc	CTUh	2.95E-08	2.46E-09	5.01E-10	1.98E-09	3.97E-09	ND	9.26E-10	1.54E-09	0.00E+00	-7.96E-09
SQP	dimensionless	7.19E+00	7.36E-03	1.98E+00	7.13E-03	1.09E-01	ND	3.06E-03	5.92E-03	0.00E+00	4.60E+00

PM Potential incidence of disease due to PM emissions (PM)
IRP Potential human exposure efficiency relative to U235
ETP-fw Potential comparative toxic unit for ecosystems
HTP-c Potential comparative toxic unit for humans
HTP-nc Potential comparative toxic unit for humans
SQP Potential soil quality index

SINTOFOIL® RC
RESOURCES USE

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PERE	MJ	3.39E+00	4.15E-03	2.36E-01	3.98E-03	6.26E-02	ND	1.72E-03	2.50E-03	0.00E+00	-2.45E+00
PERM	MJ	0.00E+00	0.00E+00	1.84E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.39E+00	4.15E-03	4.20E-01	3.98E-03	6.26E-02	ND	1.72E-03	2.50E-03	0.00E+00	-2.45E+00
PENRE	MJ	6.53E+01	2.89E+00	7.09E-01	2.78E+00	3.45E+00	ND	1.20E+00	5.91E-02	0.00E+00	-9.75E+01
PENRM	MJ	8.80E+01	0.00E+00	1.08E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.53E+02	2.89E+00	8.17E-01	2.78E+00	3.45E+00	ND	1.20E+00	5.91E-02	0.00E+00	-9.75E+01
SM	kg	5.62E-02	0.00E+00	3.04E-02	0.00E+00	0.00E+00	ND	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	ND	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	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.06E-02	5.87E-05	1.12E-03	5.57E-05	1.19E-03	ND	2.44E-05	3.26E-04	0.00E+00	2.49E-03

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PERM Use of renewable primary energy resources used as raw materials (feedstock)
PERT Total use of renewable primary energy resources (total)
PENRE Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PENRM Use of non-renewable primary energy resources used as raw materials (feedstock)
PENRT Total use of non-renewable primary energy resources (total)
SM Use of secondary materials
RSF Use of renewable secondary fuels
NSRF Use of non-renewable secondary fuels
FW Net use of fresh water

SINTOFOIL® RC
WASTE PRODUCTION AND OUTPUT FLOWS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
HWV	kg	3.46E-04	0.00E+00	1.11E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-1.39E-14
NHWD	kg	4.68E-02	0.00E+00	2.35E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-2.95E-14
RWD	kg	1.35E-04	8.62E-05	6.12E-06	8.29E-05	3.43E-05	ND	3.58E-05	4.16E-07	0.00E+00	-1.28E-05

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	3.59E-02	0.00E+00	0.00E+00	ND	0.00E+00	1.57E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	6.74E-01	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PM Hazardous waste disposed
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed

CRU Components for re-use
MFR Material for recycling
MER Materials for energy recovery
EE Exported energy

SINTOFOIL® RC/FR
ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
GWP-total	kg CO_2 eq	4.45E+00	2.86E-01	4.99E-02	2.11E-01	1.49E-01	ND	9.05E-02	1.78E+00	0.00E+00	-2.40E+00
GWP-fossil	kg CO_2 eq	4.45E+00	2.86E-01	5.28E-02	2.11E-01	1.14E-01	ND	9.04E-02	1.78E+00	0.00E+00	-2.28E+00
GWP-biogenic	kg CO_2 eq	3.05E-03	1.18E-04	-3.19E-03	8.77E-05	3.50E-02	ND	3.72E-05	6.74E-05	0.00E+00	-1.20E-01
GWP-luluc	kg CO_2 eq	5.98E-04	2.29E-06	2.56E-04	1.70E-06	3.83E-05	ND	7.19E-07	2.03E-06	0.00E+00	7.00E-04
GWP-GHG	kg CO_2 eq	4.45E+00	2.86E-01	5.45E-02	2.11E-01	1.14E-01	ND	9.04E-02	1.78E+00	0.00E+00	-2.29E+00
ODP	kg CFC-11 eq	1.56E-06	6.70E-08	5.90E-09	4.87E-08	2.55E-08	ND	2.10E-08	1.13E-09	0.00E+00	-1.36E-07
AP	mol H^+ eq	1.98E-02	1.66E-03	2.95E-04	1.27E-03	5.53E-04	ND	5.42E-04	2.18E-04	0.00E+00	-6.76E-03
EP-freshwater	kg P eq	1.33E-04	1.72E-07	2.95E-06	1.28E-07	3.56E-06	ND	5.40E-08	8.69E-08	0.00E+00	-5.30E-05
EP-marine	kg N eq	3.16E-03	6.66E-04	1.14E-04	4.07E-04	9.94E-05	ND	2.20E-04	1.02E-04	0.00E+00	-1.40E-03
EP-terrestrial	mol N eq	3.52E-02	7.32E-03	1.13E-03	4.49E-03	1.14E-03	ND	2.42E-03	1.17E-03	0.00E+00	-1.67E-02
POFP	kg NMVOC eq	1.38E-02	1.90E-03	2.77E-04	1.18E-03	9.24E-03	ND	6.26E-04	3.10E-04	0.00E+00	-6.88E-03
ADP-m&m	kg Sb eq	2.11E-06	1.70E-08	1.01E-07	1.22E-08	4.20E-07	ND	5.35E-09	8.15E-09	0.00E+00	1.74E-07
ADP-f	MJ	1.43E+02	4.09E+00	7.68E-01	2.97E+00	3.15E+00	ND	1.29E+00	5.31E-02	0.00E+00	-9.20E+01
WDP	m^3 world eq deprived	8.14E-01	-9.01E-04	4.09E-02	-6.57E-04	4.47E-02	ND	-2.83E-04	2.74E-03	0.00E+00	7.35E-02

GWP-total Global Warming Potential total
GWP-fossil Global Warming Potential fossil fuels
GWP-biogenic Global Warming Potential biogenic
GWP-luluc Global Warming Potential land use and land use change
GWP-GHG Additional PCR 2019:14 indicator (includes all greenhouse gases (included in GWP-total but excludes biogenic carbon dioxide and biogenic carbon stored in the product.)
ODP Depletion potential of the stratospheric ozone layer
AP Acidification potential, Accumulated exceedance
EP-freshwater Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial Eutrophication potential, Accumulated exceedance
POCP Formation potential of tropospheric ozone
ADP-m&m Abiotic depletion Potential for non fossil resources
ADP-f Abiotic Depletion Potential for fossil resources
WDP Water (user) deprivation potential, deprivation-weighted water consumption

SINTOFOIL® RC/FR
ADDITIONAL ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PM	Disease incidence	1.78E-07	2.66E-08	5.67E-09	1.50E-08	5.55E-09	ND	7.48E-09	1.63E-09	0.00E+00	-6.49E-08
IRP	kBq U^{235} eq	2.14E-01	1.80E-02	2.26E-03	1.31E-02	6.30E-03	ND	5.66E-03	1.35E-04	0.00E+00	-6.39E-02
ETP-fw	CTUe	3.75E+01	1.64E+00	5.64E+00	1.18E+00	2.17E+00	ND	4.99E-01	3.57E-01	0.00E+00	-3.42E+00
HTP-c	CTUh	2.65E-09	8.33E-11	5.31E-11	3.18E-11	3.38E-10	ND	2.61E-11	2.35E-10	0.00E+00	-1.39E-10
HTP-nc	CTUh	4.56E-08	3.39E-09	5.22E-10	2.07E-09	3.97E-09	ND	9.66E-10	1.61E-09	0.00E+00	-7.56E-09
SQP	dimensionless	7.12E+00	1.02E-02	2.07E+00	7.44E-03	1.09E-01	ND	3.19E-03	6.18E-03	0.00E+00	4.37E+00

PM Potential incidence of disease due to PM emissions (PM)
IRP Potential human exposure efficiency relative to U235
ETP-fw Potential comparative toxic unit for ecosystems
HTP-c Potential comparative toxic unit for humans
HTP-nc Potential comparative toxic unit for humans
SQP Potential soil quality index

SINTOFOIL® RC/FR
RESOURCES USE

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
PERE	MJ	3.21E+00	5.72E-03	2.46E-01	4.15E-03	6.26E-02	ND	1.80E-03	2.61E-03	0.00E+00	-2.32E+00
PERM	MJ	0.00E+00	0.00E+00	1.92E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.21E+00	5.72E-03	4.38E-01	4.15E-03	6.26E-02	ND	1.80E-03	2.61E-03	0.00E+00	-2.32E+00
PENRE	MJ	6.28E+01	3.99E+00	7.40E-01	2.90E+00	3.45E+00	ND	1.26E+00	6.16E-02	0.00E+00	-9.26E+01
PENRM	MJ	8.45E+01	0.00E+00	1.12E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.47E+02	3.99E+00	8.52E-01	2.90E+00	3.45E+00	ND	1.26E+00	6.16E-02	0.00E+00	-9.26E+01
SM	kg	4.21E-02	0.00E+00	3.18E-02	0.00E+00	0.00E+00	ND	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	ND	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	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.08E-02	8.10E-05	1.17E-03	5.81E-05	1.19E-03	ND	2.55E-05	3.40E-04	0.00E+00	2.36E-03

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PERM Use of renewable primary energy resources used as raw materials (feedstock)
PERT Total use of renewable primary energy resources (total)
PENRE Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PENRM Use of non-renewable primary energy resources used as raw materials (feedstock)
PENRT Total use of non-renewable primary energy resources (total)
SM Use of secondary materials
RSF Use of renewable secondary fuels
NSRF Use of non-renewable secondary fuels
FW Net use of fresh water

SINTOFOIL® RC/FR
WASTE PRODUCTION AND OUTPUT FLOWS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
HWV	kg	3.46E-04	0.00E+00	1.15E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-1.32E-14
NHWD	kg	4.68E-02	0.00E+00	2.45E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	-2.80E-14
RWD	kg	1.12E-04	1.19E-04	6.38E-06	8.65E-05	3.43E-05	ND	3.74E-05	4.34E-07	0.00E+00	-1.22E-05

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D Benefits and loads
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	3.75E-02	0.00E+00	0.00E+00	ND	0.00E+00	1.64E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	7.03E-01	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PM Hazardous waste disposed
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed

CRU Components for re-use
MFR Material for recycling
MER Materials for energy recovery
EE Exported energy

SINTOFOIL® FB
ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	5.28E+00	1.93E-01	4.80E-02	2.03E-01	1.59E+00	ND	1.19E-02	0.00E+00	2.71E-01	0.00E+00
GWP-fossil	kg CO_2 eq	5.25E+00	1.93E-01	5.09E-02	2.03E-01	1.53E+00	ND	1.19E-02	0.00E+00	2.71E-01	0.00E+00
GWP-biogenic	kg CO_2 eq	2.87E-02	7.98E-05	-3.07E-03	8.44E-05	5.83E-02	ND	4.91E-06	0.00E+00	2.04E-04	0.00E+00
GWP-luluc	kg CO_2 eq	1.86E-03	1.54E-06	2.47E-04	1.64E-06	7.47E-04	ND	9.48E-08	0.00E+00	1.08E-06	0.00E+00
GWP-GHG	kg CO_2 eq	5.25E+00	1.93E-01	5.24E-02	2.03E-01	1.53E+00	ND	1.19E-02	0.00E+00	2.71E-01	0.00E+00
ODP	kg CFC-11 eq	3.29E-06	4.51E-08	5.68E-09	4.69E-08	2.42E-07	ND	2.78E-09	0.00E+00	2.17E-09	0.00E+00
AP	mol H^+ eq	2.33E-02	1.12E-03	2.84E-04	1.22E-03	8.60E-03	ND	7.14E-05	0.00E+00	1.02E-04	0.00E+00
EP-freshwater	kg P eq	2.07E-04	1.16E-07	2.84E-06	1.23E-07	8.75E-05	ND	7.12E-09	0.00E+00	4.47E-08	0.00E+00
EP-marine	kg N eq	3.64E-03	4.49E-04	1.10E-04	3.91E-04	2.33E-03	ND	2.90E-05	0.00E+00	9.25E-05	0.00E+00
EP-terrestrial	mol N eq	4.02E-02	4.93E-03	1.09E-03	4.32E-03	1.66E-02	ND	3.19E-04	0.00E+00	4.90E-04	0.00E+00
POFP	kg NMVOC eq	1.55E-02	1.28E-03	2.67E-04	1.14E-03	1.50E-02	ND	8.26E-05	0.00E+00	1.94E-04	0.00E+00
ADP-m&m	kg Sb eq	2.16E-06	1.15E-08	9.69E-08	1.17E-08	2.29E-06	ND	7.05E-10	0.00E+00	4.59E-09	0.00E+00
ADP-f	MJ	1.64E+02	2.76E+00	7.39E-01	2.86E+00	3.07E+01	ND	1.69E-01	0.00E+00	1.46E-01	0.00E+00
WDP	m^3 world eq deprived	1.11E+00	-6.07E-04	3.93E-02	-6.32E-04	1.25E+00	ND	-3.73E-05	0.00E+00	1.60E-04	0.00E+00

GWP-total Global Warming Potential total
GWP-fossil Global Warming Potential fossil fuels
GWP-biogenic Global Warming Potential biogenic
GWP-luluc Global Warming Potential land use and land use change
GWP-GHG Additional PCR 2019:14 indicator (includes all greenhouse gases (included in GWP-total but excludes biogenic carbon dioxide and biogenic carbon stored in the product.)
ODP Depletion potential of the stratospheric ozone layer
AP Acidification potential, Accumulated exceedance
EP-freshwater Eutrophication potential, fraction of nutrients reaching freshwater end compartment
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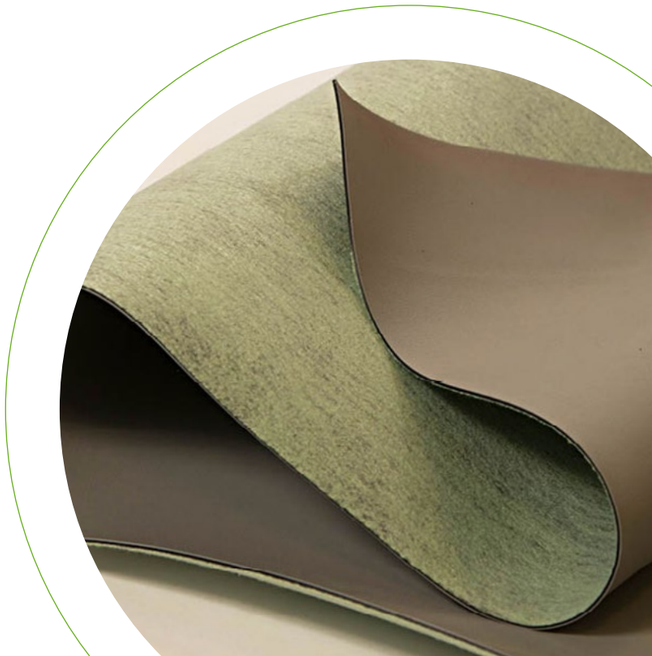
POCP Formation potential of tropospheric ozone
ADP-m&m Abiotic depletion Potential for non fossil resources
ADP-f Abiotic Depletion Potential for fossil resources
WDP Water (user) deprivation potential, deprivation-weighted water consumption

SINTOFOIL® FB
ADDITIONAL ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	1.70E-07	1.79E-08	5.46E-09	1.45E-08	9.84E-08	ND	9.86E-10	0.00E+00	2.66E-09	0.00E+00
IRP	kBq U^{235} eq	4.33E-01	1.21E-02	2.17E-03	1.26E-02	6.28E-02	ND	7.46E-04	0.00E+00	9.13E-04	0.00E+00
ETP-fw	CTUe	3.19E+01	1.11E+00	5.43E+00	1.14E+00	1.04E+02	ND	6.58E-02	0.00E+00	1.73E-01	0.00E+00
HTP-c	CTUh	1.36E-09	5.61E-11	5.11E-11	3.06E-11	1.74E-08	ND	3.45E-12	0.00E+00	1.22E-12	0.00E+00
HTTP-nc	CTUh	3.57E-08	2.29E-09	5.03E-10	1.99E-09	1.63E-07	ND	1.27E-10	0.00E+00	1.16E-10	0.00E+00
SQP	dimensionless	1.13E+01	6.84E-03	1.99E+00	7.16E-03	1.41E+00	ND	4.21E-04	0.00E+00	3.96E-01	0.00E+00

PM Potential incidence of disease due to PM emissions (PM)
IRP Potential human exposure efficiency relative to U235
ETP-fw Potential comparative toxic unit for ecosystems
HTP-c Potential comparative toxic unit for humans
HTP-nc Potential comparative toxic unit for humans
SQP Potential soil quality index



SINTOFOIL® FB
RESOURCES USE

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	5.80E+00	3.86E-03	2.37E-01	3.99E-03	1.44E+00	ND	2.37E-04	0.00E+00	1.20E-02	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	1.85E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	5.80E+00	3.86E-03	4.22E-01	3.99E-03	1.44E+00	ND	2.37E-04	0.00E+00	1.20E-02	0.00E+00
PENRE	MJ	8.19E+01	2.69E+00	7.12E-01	2.80E+00	3.46E+01	ND	1.65E-01	0.00E+00	1.45E-01	0.00E+00
PENRM	MJ	8.93E+01	0.00E+00	1.08E-01	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.71E+02	2.69E+00	8.20E-01	2.80E+00	3.46E+01	ND	1.65E-01	0.00E+00	1.45E-01	0.00E+00
SM	kg	5.46E-02	0.00E+00	3.06E-02	0.00E+00	0.00E+00	ND	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	ND	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	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	3.62E-02	5.46E-05	1.13E-03	5.60E-05	3.25E-02	ND	3.36E-06	0.00E+00	4.07E-05	0.00E+00

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PERM Use of renewable primary energy resources used as raw materials (feedstock)
PERT Total use of renewable primary energy resources (total)
PENRE Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials (carrier)
PENRM Use of non-renewable primary energy resources used as raw materials (feedstock)
PENRT Total use of non-renewable primary energy resources (total)
SM Use of secondary materials
RSF Use of renewable secondary fuels
NSRF Use of non-renewable secondary fuels
FW Net use of fresh water

SINTOFOIL® FB
WASTE PRODUCTION AND OUTPUT FLOWS

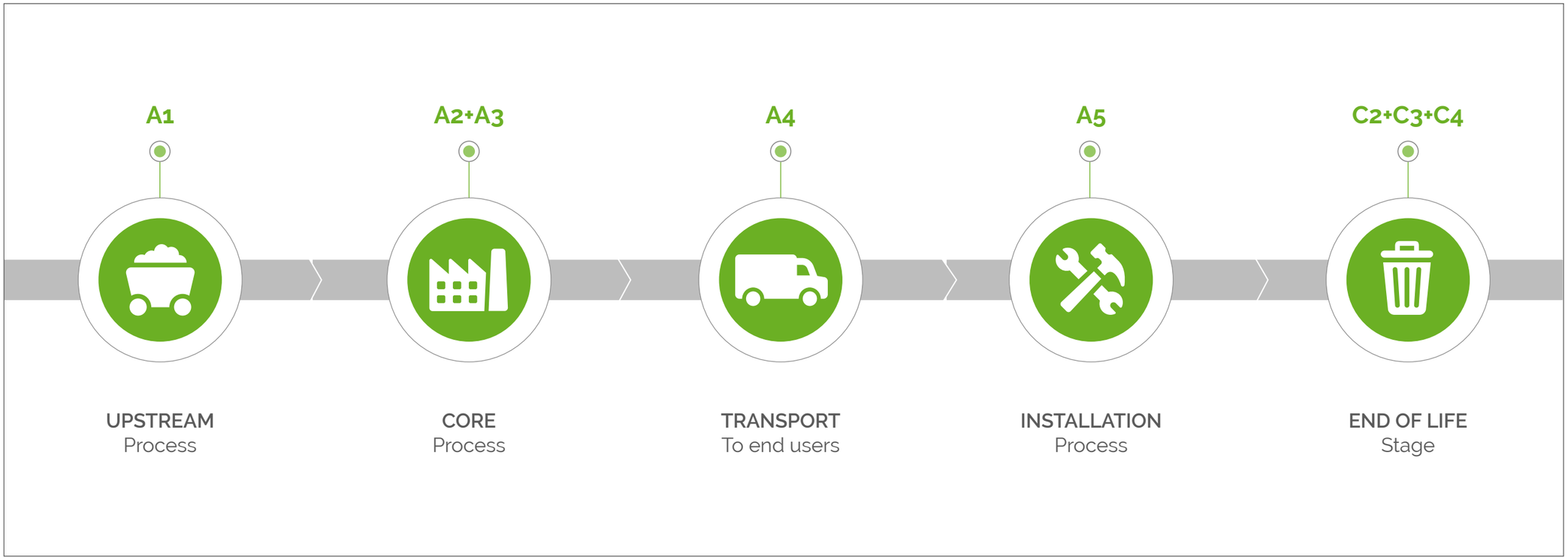
IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
HWV	kg	7.79E-04	0.00E+00	1.11E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.05E-01	0.00E+00	2.36E-18	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RWD	kg	3.59E-04	8.01E-05	6.14E-06	8.32E-05	1.92E-04	ND	4.93E-06	0.00E+00	4.21E-06	0.00E+00

IMPACT CATEGORY	UNIT	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	3.61E-02	0.00E+00	0.00E+00	ND	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	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PM Hazardous waste disposed
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed

CRU Components for re-use
MFR Material for recycling
MER Materials for energy recovery
EE Exported energy

CALCULATION RULES



CUT-OFF RULES

LCA model has been processed considering all main input/output associated with core process in accordance with the threshold valued stated in EN 15804 (§ 6.3.6), namely the sum of the excluded material flows to the core module shall not exceed 1% of mass and energy.

Hence, the following aspects were considered negligible:

- Production of packaging for the raw materials input process
- Machinery production
- Deconstruction, demolition life cycle stage

ALLOCATION

Allocation occurs anytime a system is producing more than a single output. In this case it is necessary to choose a technique to proper split the environmental burdens among the output flows; international standards ISO 14044 and PCR 2019:14 v 1.1 provide guidelines about how to deal with this issue, that have been implemented in this project as well.

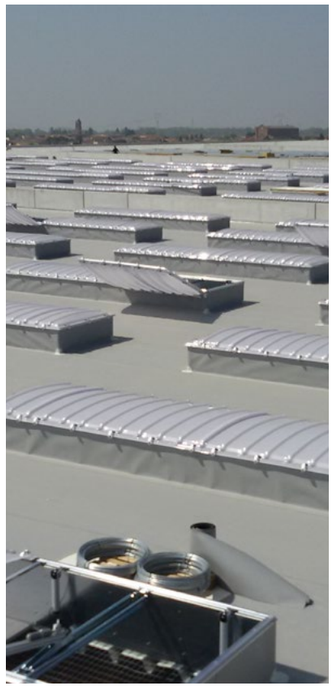
Imper Italia s.r.l. produces several product types that are not object of the study. Therefore, it is important to establish an allocation method based on physical variables to split input and output flows to the multi-products: allocation by weight of membrane produced has been chosen as most representative tool for the system understudy.

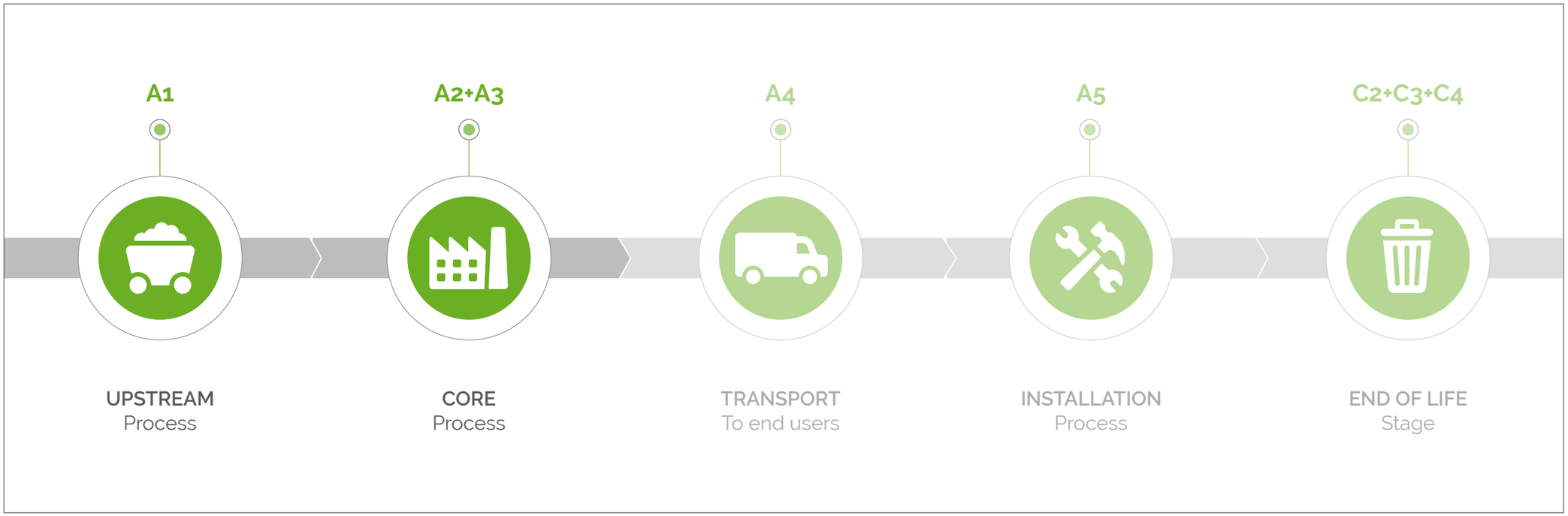
TRANSPORTATIONS

Impacts calculations related to transports in SimaPro are performed according to the EcoInvent model. All transports are assumed by truck or by ship.

For module A2, specific data for raw materials transportation from suppliers are available.

For module A4, average distances are considered for the main markets (400 km for Italy – truck , 1000 km for Europe - truck, 6000 km worldwide - ship).





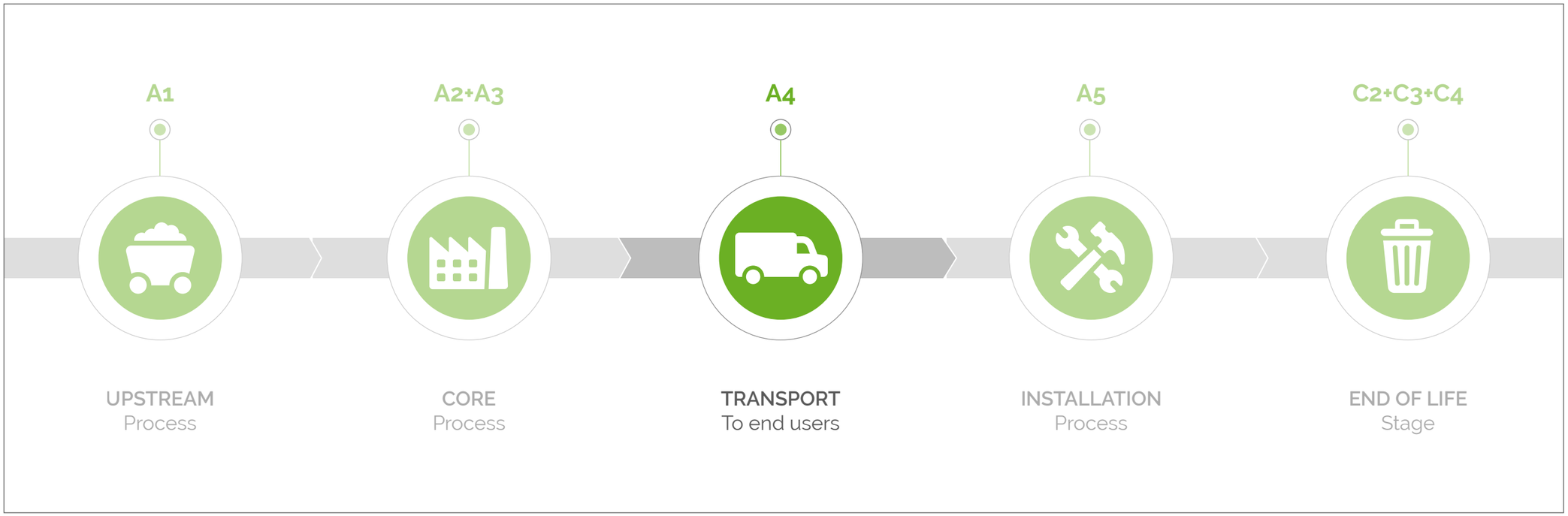
PRODUCT STAGE

A1

- Raw materials supply;
- Generation of electricity from national grid (GWP-GHG = 0,7 kg CO_2 eq/kWh);
- NG supply for internal heat generators;
- Diesel supply for internal transportations

A2 + A3 (CORE PROCESS)

- Raw materials transport to plant by truck (A2);
- Manufacturing process;
- Heat production from internal generators;
- Water usage; emissions to air;
- Manufacturing process waste treatment, considering also waste transport (50 km by truck)



CONSTRUCTION
PROCESS STAGE

A4

Membranes transportation to end users, by truck or ship.

ITALIAN MARKET

400 km

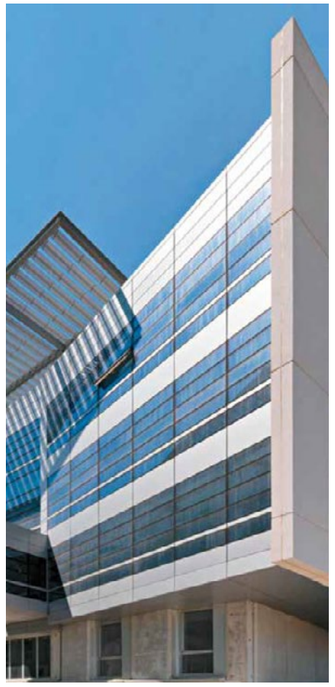
EUROPEAN MARKET

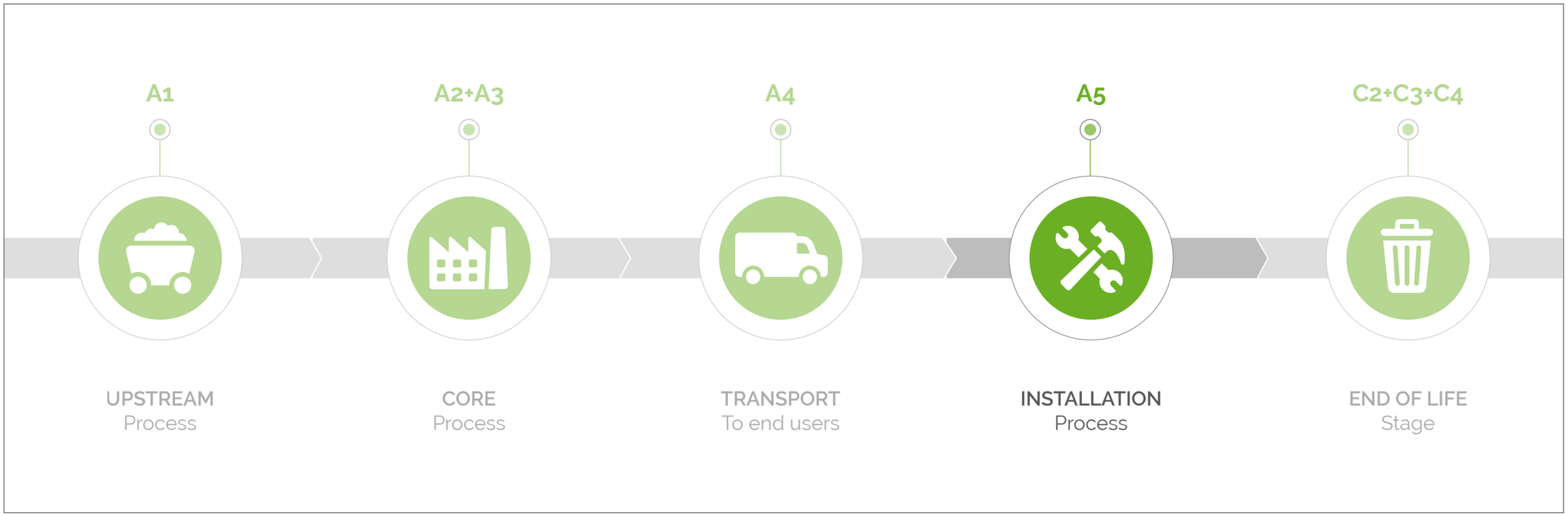
1000 km

GLOBAL MARKET

6000 km

The same average scenario is used for the eight products studied





CONSTRUCTION PROCESS STAGE

A5 (INSTALLATION PROCESS)

Each installation method is characterised by specific material consumptions.. However, they share the rubberfuse flashing substrate adhesive consumption of 0.035 kg/m².

Each installation method is suitable for different purposes:

- **MECHANICALLY-FIXED**: exposed layers installed using nails, for flat or sloped roofing systems.
- **FULLY-ADHERED**: exposed layers installed using rubberfuse adhesive, for flat or sloped roofing systems.
- **LOOSE-LAID**: protected layers fixed using different materials (e.g. gravel), for flat roofing systems suitable for green roofs, foot and/or vehicular traffic.

MECHANICALLY-FIXED

SINTOFOIL® RG-RG/FR-RT-RT/FR-RC-RC/FR

0.015 kg/m² nails	**120** mm overlap	**0.025** kWh/m² electricity

FULLY-ADHERED

SINTOFOIL® FB

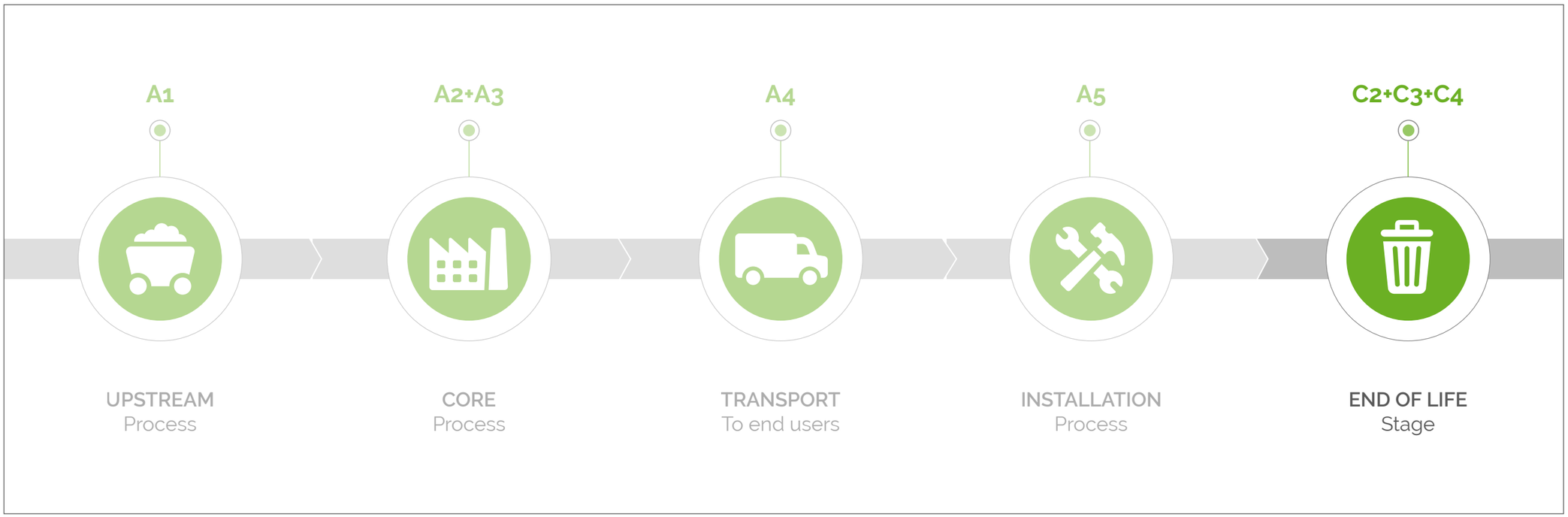
0.25 kg/m² rubberfuse FB-SF adhesive	**70** mm overlap	**0.018** kWh/m² electricity

LOOSE-LAID

SINTOFOIL® ST

60 kg/m² gravel	**70** mm overlap	**0.018** kWh/m² electricity

The 2019 Italian Residual Mix was used in SimaPro as dataset for electricity, being Italy the main market for Sintofoil® membranes



END OF LIFE STAGE

C2 + C3 + C4

Out-of-service membranes transportation to treatment sites by truck (30 km to incineration/landfill, 300 km to recycling).

MECHANICALLY-FIXED AND LOOSE-LAID MEMBRANES

70% recycling*

30% incineration with energy recovery

FULLY-ADHERED MEMBRANES

100% sanitary landfill

MAIN DIFFERENCES FROM PREVIOUS VERSION EPD

- **Two additional products included**: SINTOFOIL® RT/FR and RC/FR.
- **System boundaries**: cradle to grave for the former EPD, cradle to gate with options for the new one. Refurbiushment phase (B5) is no more taken into account.
- **Functional unit**: the previous EPD considered also a reference service life RSL of 90 years, with the functional unit being 1 m² per year. The new one refers to declared unit that is 1 m².
- **Calculation methodologies for several environmental indicators**. A comparison of results can be still performed on the GWP-GHG indicator, unvaried.
- **Database used**: EcoInvent 2.2 in the previous version.

For A1-A3 modules, dividing by 90 years (RSL), the GWP-GHG results of the two EPDs are similar and coherent, The products studied are indeed the same and no significant modifications were adopted in the new model. Minor deviations in the results are to be attributed mainly to the different database,

REFERENCES

- **SINTOFOIL® 2 mm LCA Report 2020**
- **G.L. Baldo, M. Marino, S. Rossi**
  «Analisi del ciclo di vita LCA – nuova edizione aggiornata», Edizioni Ambiente, 2008
- **General Programme Instructions**
  for the International EPD® System v 3.1, 2019
- **EN 15804:2012+A2:2019**
- **Product Category Rules PCR 2019:14 v 1.1**
  for «Construction Products»
- **ISO 14040:2006**
- **ISO 14044:2017**
- **ISO 14025:2010**

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