

This is a translation of Validation Statement N. IT17/0057
VALIDATION STATEMENT OF EPD



It states that the **Environmental Product Declaration**
(rev.4 del 22.02.2022) operated by

JVP SRL

Registered office
Viale dell'industria 16/20 35028 Piove di Sacco (PD)- Italy



In conformity with

**GENERAL PROGRAMME INSTRUCTIONS v.3.01, IES
and PCR 2019:14 Construction Products v.1.11 and
EN 15804:2012+A2:2019**

is valid for the following product

JVP 4X4

**STEEL ENCAPSULATED PANELS FOR RAISED ACCESS FLOOR,
WITH PARTICLEBOARD CORE:**

C3TTL MM 600X600X23 (LIGHT GRADE)

C4TTL MM 600X600X29 (LIGHT GRADE)

C4TTM MM 600X600X29 (MEDIUM GRADE)

C5TTM MM 600X600X29 (EUROGRADE)

Manufactory office

Viale dell'industria 16/20 35028 Piove di Sacco (PD) - Italy

This certificate is valid from 17/09/2024 until 07/03/2027
and remains valid subject to satisfactory surveillance audit.
Issue n.4, certified since 23/01/2017

Updated information about any changes in the status of the certification may be obtained by sending a fax
to the number shown on the certificate

Authorized by
Paola Santarelli

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

DAP N° 006H

Membro di MLA EA per gli schemi di accreditamento SGQ, SGA, PRD, PRS, ISP, GHG, LAB, LAT e PTP e RMT, di MLA IAF per gli schemi di accreditamento SGQ, SGA, SSI, FSM, PRD e PRS e di MRA ILAC per gli schemi di accreditamento LAB, MED, LAT e ISP e PTP.

Signatory of EA MLA for the accreditation schemes QMS, EMS, PRD, PRS, INSP, GHG, TL, CL, PTP and RMT, of IAF, MLA for the accreditation schemes QMS, EMS, ISMS, FSMS, PRD and PRS and of ILAC MRA for the accreditation schemes TL, ML, CL, INSP and PTP.

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Environmental Product Declaration



In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

JVP 4X4

Raised Access Floor Particleboard Core Panels

JVP S.r.l.

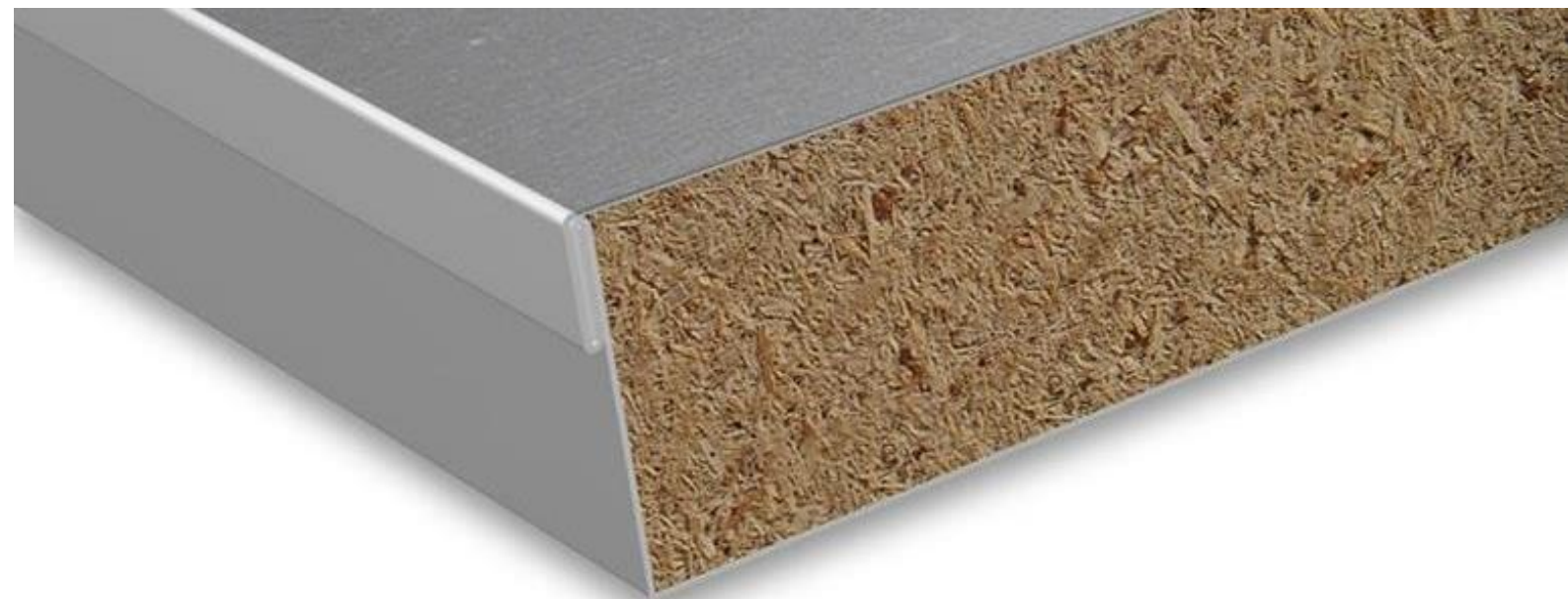


JVP

Raised access floor
Pavimento **sopraelevato** accessibile

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-01016
Publication date:	2017-02-09
Revision date:	2024-09-17
Valid until:	2027-03-07

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



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): Construction Products, 2019:14, version 1.11, CPC undefined
PCR review was conducted by: the Technical Committee of the International EPD® System. 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: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier: SGS Italia S.p.A. via Caldera, 21 20153 – Milano, Tel. +39 02.73931 - Fax +39 02.70124630, www.it.sgs.com Accredited by: ACCREDIA, certificate n. 006H Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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

Owner of the EPD: JVP S.r.l., Main Office & Registered address: Via dell'Industria 16/20, 35028 Piove di Sacco PD Italia – Phone: +39 049.5840597 Fax: +093 049.5817319 Web site: www.jvph.net

Contact: jvp@jvph.net

Description of the organisation: JVP S.r.l, initially called Joint Venture Production, is a fully Italian company, able to express in the best way the typical Made in Italy innovative spirit. It was founded in 1998 in Piove di Sacco, in Padua province, as the successful completion of the initiative of a group of people already working in the field of raised floor, united by the will to tackle the world market with an innovative high-performance product, which would have the functions of a level accessible for facilities, possibly inspected and immediately usable. Thus, the construction project of the JVP 4x4 panel was developed, based on steel as a key element of the whole, with a sealing system as simple and effective, called "knurling", which characterizes the final product. In 1999, the first robotized production line set out with a 400 panels hourly production capacity, more than doubled today.

Thanks to the current third-generation production line, capable of over 1.000 pieces per hour, JVP S.r.l is the first Italian company for raised floors panels potential production capacity. JVP 4x4 systems are distributed worldwide through an extensive sales network and strategically placed in the heart of the most important economic realities. The constant growth of the company has naturally led to the will to open also in markets with differentiated technical maturity, accustomed to different raised floor types from those so far proposed.

Product-related or management system-related certifications: UNI EN ISO 9001:2015, UNI EN ISO 14001:2015, FSC Forest Stewardship Council® - Chain of Custody, C2C Cradle to Cradle for steel encapsulated panels for raised access floor, with gypsum fibreboard or particleboard. The raised floor, as an integral art of the building as a whole, can contribute to the acquisition of scores for the LEED® system.

Name and location of production site(s): Viale dell'industria 16/20 35028 Piove di Sacco (PD)

Product information

Product name: JVP 4X4 Steel encapsulated panels for raised access floor, with particleboard core

Product identification: C3TTL mm 600x600x23 (light grade), C4TTL mm 600x600x29 (light grade), C4TTM mm 600x600x29 (medium grade), C5TTM mm 600x600x29 (eurograde)

Product description: panels for raised floor, consisting of inner particle board core completely encapsulated in a galvanized sheet steel suitably glued. Panels object of the present Declaration are intended to constitute a raised floor, which should have a space between the proper floor and the one on which machines stay and people walk, to be used to lay out all the necessary cables and installations. The raised floor must withstand the toughest conditions of the realization of the construction site and for everyday use, so its main quality should be strongly robustness. The outer shell ensures the best resistance to abuses in the construction site, hence the choice of galvanized sheet while the panel body is made from chipboard.

UN CPC code: undefined

Warranty: JVP 4x4 systems are protected for at least 50 years of technical life by the JVP SL50 warranty, according to the methods defined therein.

LCA information

Declared unit: one unit panel of raised steel floor with particleboard core; weight for declared unit: C3TTL 7,82 kg, C4TTL 8,95 kg, C4TTM 9,91 kg, C5TTM 9,59 kg

Time representativeness: 2023

Database(s) and LCA software used: Ecoinvent 3.9.1, Simapro 9.5.0.1

Description of system boundaries: Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D)

More information: info@greenwichsrl.it Greenwich S.r.l. <https://greenwichsrl.it>

EPD objectives: The aims of this EPD are:

- understand and quantify the environmental performance of typical products,
- communicate their environmental performance

This EPD reports and describes results of the LCA study, which can be used for publicity purposes. This study is not intended to support any kind of comparative analysis.

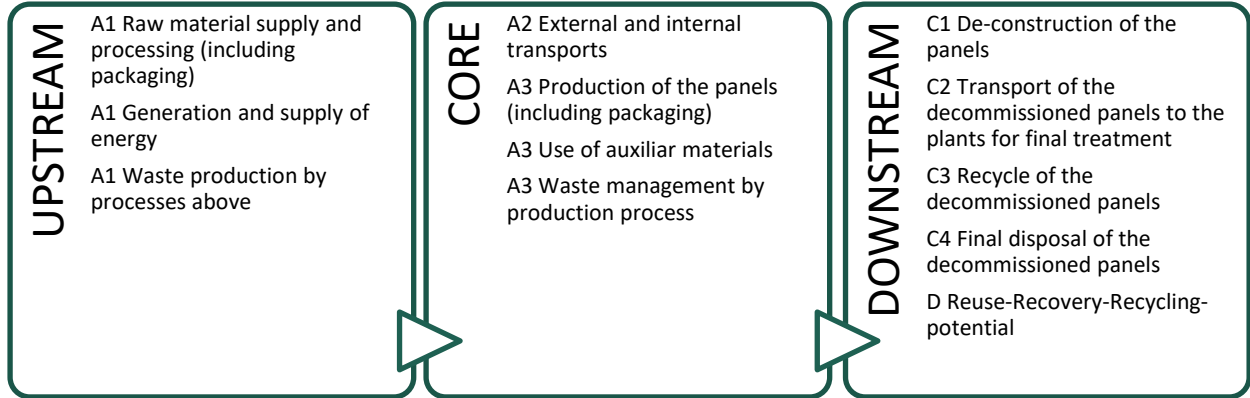
Cut-off & Allocation rules: Data collection was carried out for 100% of the input flows in terms of mass and energy, relative to upstream and core modules. According to PCR, it was applied a cut-off of 5% for total flows of the system (mass and energy) and of max 1% for each elementary flow. All flows provided by JVP Srl has been considered through documentation available related to the other corporate certifications and dedicated questionnaires. The allocation established for the raised floor panel system mass balance, in accordance with the reference PCR, is the following: the calculation is done taking as temporal reference the year and as quantity reference the number of panels produced. Depending on data supply, the number of produced panels is referred, in some cases, to total production and, in other cases, to the production of single panel type.

Data quality: Upstream data are general, derived from the Ecoinvent 3.9.1 database. Core data are site-specific and they are derived from the environmental management system of JVP S.r.l. for characterization and quantification. Regarding the quality of energy data, JVP S.r.l. supplies through the national energy system, for which the European Residual Mix is adopted and photovoltaic of own property, for which processed from Ecoinvent 3.9.1 database were used. Site specific data refer to the 2023 production year.

Check to the validity and accuracy of specific data provided by JVP srl was carried out through the consultation of other critical EPD studies produced in conformity with the reference PCR, the international database Ecoinvent 3.9.1 and literature data. It was also attempted a cross-check and review of data provided by the company.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation: this EPD is of the type “from cradle to gate with modules C1-C4 and module D”, taking into account the phases of extraction and processing of raw materials (UPSTREAM), transportation and core production (CORE PROCESS), disposal (DOWNSTREAM) e benefits beyond the system boundaries, not considering phases of distribution and use. For the DOWNSTREAM phase, it was assumed the manual de-construction of the panels in the construction site and their subsequent shredding on site; on the basis of European statistics, it is assumed that 82,8% of panels is recycled, 11,0% go into landfills, 5,60% is used in backfilling and 0,60% is used for energy recovery. The module D assesses the benefits of using steel scrap and wood chips instead of vergin materials. Geographic scope: Europe.

It is specified that the impact results relating to the products under examination have been analysed with the characterisation factors relating to Environmental Footprint 3.1



	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	
Moduls declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X	
Geographic scope	EU27	EU27	IT	ND	ND	ND	ND	ND	ND	ND	ND	ND	IT	IT	IT	IT	GLO	
Specific data	>90%	>90%	>90%	ND	ND	ND	ND	ND	ND	ND	ND	ND	>90%	>90%	>90%	>90%	>90%	
Variations – products	-					-	-	-	-	-	-	-	-	-	-	-	-	-
Variations – sites	-					-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Dimensional and technical characteristics of the various models:

	C3TTL	C4TTL	C4TTM	C5TTM	U.M.
Length	600	600	600	600	mm
Width	600	600	600	600	mm
Thickness	23	29	29	29	mm
Weight (technical sheet)	8,10±0,5	9,25±0,5	10,15±0,5	9,90±0,5	kg
Weight for declared unit	7,82	8,95	9,91	9,59	kg
Density for declared unit	670	670	735	735	Kg/m ³
Squaring Rectangularity	±0,3	±0,3	±0,3	±0,3	mm
Concavity and Convexity	<0,4	<0,4	<0,4	<0,4	mm
Offplan Buckling	<0,3	<0,3	<0,3	<0,3	mm

Panels composition:

Panel component	C3TTL			C4TTL			C4TTM			C5TTM		
	Weight [kg]	Post-consumer material	Renewable material	Weight [kg]	Post-consumer material	Renewable material	Weight [kg]	Post-consumer material	Renewable material	Weight [kg]	Post-consumer material	Renewable material
Particleboard	5,20	100	100,00	6,62	100	100,00	7,26	100	100,00	7,26	100	100,00
Steel capsule	2,56	0,00	0,00	2,28	0,00	0,00	2,60	0,00	0,00	2,28	0,00	0,00
Adhesive	0,12	0,00	0,00	0,12	0,00	0,00	0,12	0,00	0,00	0,12	0,00	0,00
Catalyst	0,006	0,00	0,00	0,006	0,00	0,00	0,006	0,00	0,00	0,006	0,00	0,00
Packaging materials	Weight [kg]	Weight versus the product [kg]		Weight [kg]	Peso sul prodotto finito [%]		Weight [kg]	Peso sul prodotto finito [%]		Weight [kg]	Peso sul prodotto finito [%]	
Pallet	0,109	1,38%		0,136	1,51%		0,136	1,36%		0,136	1,41%	
Strapping	0,003	0,03%		0,003	0,04%		0,003	0,03%		0,003	0,03%	
Board box	0,030	0,38%		0,038	0,42%		0,038	0,38%		0,038	0,39%	

No substance included in the Candidate List of Substances of Very High Concern for authorisation under the REACH Regulations is present in the panels, either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per declared unit

Acronyms GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

C3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	GWP	Kg CO2eq	3,17E+00	2,14E-01	-6,54E-02	3,32E+00	8,06E-04	3,65E-02	3,70E-02	5,76E-02	2,21E+00
GWP-GHG ¹	kg CO2 eq.	8,47E+00	2,12E-01	8,28E-02	8,77E+00	7,78E-04	3,62E-02	3,75E-04	4,64E-02	-3,75E+00	
GWP-fossil	Kg CO2eq	-6,01E+00	1,94E-04	-1,49E-01	-6,16E+00	2,86E-05	2,83E-05	3,66E-02	4,74E-02	-3,75E+00	
GWP-biogenic	Kg CO2eq	6,56E-03	1,04E-04	7,21E-04	7,38E-03	1,94E-06	1,68E-05	1,02E-07	7,63E-06	5,96E+00	
GWP-luluc	Kg CO2eq	2,67E-07	4,68E-09	7,22E-07	9,94E-07	1,39E-11	7,99E-10	6,63E-12	2,39E-10	-2,28E-03	
ODP	Kg CFC11 eq	1,76E-01	8,84E-04	3,62E-04	1,77E-01	3,89E-06	1,43E-04	4,04E-06	7,29E-05	-8,79E-08	
AP	Mol H+ eq.	3,70E-03	1,50E-05	3,01E-05	3,75E-03	7,08E-07	2,53E-06	1,70E-07	2,25E-06	-1,50E-02	
EP-freshwater	Kg P eq.	1,48E-02	3,37E-04	1,46E-04	1,53E-02	6,92E-07	5,43E-05	2,15E-06	2,21E-04	-1,39E-03	
EP-marine	Kg N eq.	7,01E-01	3,60E-03	1,10E-03	7,05E-01	6,11E-06	5,79E-04	2,07E-05	2,90E-04	-3,65E-03	
EP-terrestrial	Mol N eq.	5,06E-02	1,29E-03	4,47E-04	5,24E-02	1,97E-06	2,10E-04	5,26E-06	1,11E-04	-3,90E-02	
POCP	Kg NMVOC eq.	1,28E+02	3,05E+00	1,23E+00	1,33E+02	1,79E-02	5,16E-01	3,25E-03	2,20E-01	-2,05E-02	
ADP-fossil*	MJ	1,81E-04	6,90E-07	3,59E-07	1,82E-04	1,54E-09	1,17E-07	6,55E-10	2,11E-08	-3,94E+01	
ADP-mineral&metals*	Kg Sb eq.	3,43E+00	1,24E-02	3,41E-02	3,47E+00	1,84E-04	1,96E-03	-2,92E-04	9,26E-03	-2,98E-06	
WDP	m3 world eq deprived	-6,01E+00	1,94E-04	-1,49E-01	-6,16E+00	2,86E-05	2,83E-05	3,66E-02	4,74E-02	-3,29E-01	

C4TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	GWP	Kg CO2eq	1,51E+00	2,14E-01	-8,95E-02	1,63E+00	8,06E-04	4,18E-02	3,70E-02	7,26E-02	4,17E+00
GWP-GHG ¹	kg CO2 eq.	8,50E+00	2,12E-01	9,64E-02	8,81E+00	7,78E-04	4,15E-02	3,75E-04	5,82E-02	-3,40E+00	
GWP-fossil	Kg CO2eq	9,13E+00	2,14E-01	9,57E-02	9,44E+00	7,76E-04	4,17E-02	3,79E-04	1,17E-02	-3,42E+00	
GWP-biogenic	Kg CO2eq	-7,62E+00	1,94E-04	-1,86E-01	-7,81E+00	2,86E-05	3,24E-05	3,66E-02	6,09E-02	7,59E+00	
GWP-luluc	Kg CO2eq	6,41E-03	1,04E-04	8,91E-04	7,40E-03	1,94E-06	1,92E-05	1,02E-07	8,73E-06	-2,55E-03	
ODP	Kg CFC11 eq	2,76E-07	4,68E-09	7,23E-07	1,00E-06	1,39E-11	9,14E-10	6,63E-12	2,72E-10	-8,01E-08	
AP	Mol H+ eq.	1,79E-01	8,84E-04	4,31E-04	1,80E-01	3,89E-06	1,64E-04	4,04E-06	8,32E-05	-1,39E-02	
EP-freshwater	Kg P eq.	3,53E-03	1,50E-05	3,65E-05	3,58E-03	7,08E-07	2,89E-06	1,70E-07	2,50E-06	-1,28E-03	
EP-marine	Kg N eq.	1,52E-02	3,37E-04	1,78E-04	1,57E-02	6,92E-07	6,21E-05	2,15E-06	2,80E-04	-3,44E-03	
EP-terrestrial	Mol N eq.	7,17E-01	3,60E-03	1,32E-03	7,21E-01	6,11E-06	6,62E-04	2,07E-05	3,30E-04	-3,68E-02	
POCP	Kg NMVOC eq.	5,24E-02	1,29E-03	5,27E-04	5,42E-02	1,97E-06	2,41E-04	5,26E-06	1,28E-04	-1,90E-02	
ADP-fossil*	MJ	1,33E+02	3,05E+00	1,43E+00	1,37E+02	1,79E-02	5,91E-01	3,25E-03	2,51E-01	-3,64E+01	
ADP-mineral&metals*	Kg Sb eq.	1,83E-04	6,90E-07	4,19E-07	1,84E-04	1,54E-09	1,34E-07	6,55E-10	2,41E-08	-2,97E-06	
WDP	m3 world eq deprived	3,92E+00	1,24E-02	4,10E-02	3,97E+00	1,84E-04	2,24E-03	-2,92E-04	1,06E-02	-3,41E-01	

C4TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	GWP	Kg CO2eq	1,78E+00	2,79E-01	-8,95E-02	1,97E+00	8,06E-04	4,62E-02	4,43E-02	7,98E-02	4,46E+00
GWP-GHG ¹	kg CO2 eq.	9,40E+00	2,78E-01	9,64E-02	9,78E+00	7,78E-04	4,59E-02	4,50E-04	6,41E-02	-3,85E+00	
GWP-fossil	Kg CO2eq	-8,35E+00	2,54E-04	-1,86E-01	-8,54E+00	2,86E-05	3,58E-05	4,39E-02	6,68E-02	-3,87E+00	
GWP-biogenic	Kg CO2eq	7,02E-03	1,36E-04	8,91E-04	8,05E-03	1,94E-06	2,13E-05	1,22E-07	9,71E-06	8,33E+00	
GWP-luluc	Kg CO2eq	2,98E-07	6,11E-09	7,23E-07	1,03E-06	1,39E-11	1,01E-09	7,96E-12	3,03E-10	-2,83E-03	
ODP	Kg CFC11 eq	1,84E-01	1,16E-03	4,31E-04	1,86E-01	3,89E-06	1,81E-04	4,85E-06	9,25E-05	-9,07E-08	
AP	Mol H+ eq.	3,94E-03	1,97E-05	3,65E-05	3,99E-03	7,08E-07	3,20E-06	2,04E-07	2,79E-06	-1,57E-02	
EP-freshwater	Kg P eq.	1,64E-02	4,41E-04	1,78E-04	1,70E-02	6,92E-07	6,88E-05	2,58E-06	3,07E-04	-1,45E-03	
EP-marine	Kg N eq.	7,29E-01	4,70E-03	1,32E-03	7,35E-01	6,11E-06	7,33E-04	2,48E-05	3,68E-04	-3,88E-03	
EP-terrestrial	Mol N eq.	5,81E-02	1,69E-03	5,27E-04	6,03E-02	1,97E-06	2,66E-04	6,31E-06	1,42E-04	-4,16E-02	
POCP	Kg NMVOC eq.	1,46E+02	3,98E+00	1,43E+00	1,51E+02	1,79E-02	6,54E-01	3,90E-03	2,79E-01	-2,14E-02	
ADP-fossil*	MJ	1,91E-04	9,02E-07	4,19E-07	1,92E-04	1,54E-09	1,48E-07	7,86E-10	2,68E-08	-4,12E+01	
ADP-mineral&metals*	Kg Sb eq.	4,23E+00	1,62E-02	4,10E-02	4,29E+00	1,84E-04	2,48E-03	-3,50E-04	1,17E-02	-3,34E-06	
WDP	m3 world eq deprived	-8,35E+00	2,54E-04	-1,86E-01	-8,54E+00	2,86E-05	3,58E-05	4,39E-02	6,68E-02	-3,81E-01	

C5TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	GWP	Kg CO2eq	1,04E+00	2,74E-01	-8,95E-02	1,22E+00	8,06E-04	4,47E-02	4,43E-02	7,93E-02	4,89E+00
	GWP-GHG ¹	kg CO2 eq.	8,75E+00	2,72E-01	9,64E-02	9,12E+00	7,78E-04	4,44E-02	4,50E-04	6,36E-02	-3,42E+00
	GWP-fossil	Kg CO2eq	9,38E+00	2,73E-01	9,57E-02	9,75E+00	7,76E-04	4,47E-02	4,54E-04	1,25E-02	-3,44E+00
	GWP-biogenic	Kg CO2eq	-8,35E+00	2,49E-04	-1,86E-01	-8,54E+00	2,86E-05	3,47E-05	4,39E-02	6,68E-02	8,33E+00
	GWP-luluc	Kg CO2eq	6,52E-03	1,34E-04	8,91E-04	7,54E-03	1,94E-06	2,06E-05	1,22E-07	9,36E-06	-2,72E-03
	ODP	Kg CFC11 eq	2,85E-07	5,99E-09	7,23E-07	1,01E-06	1,39E-11	9,79E-10	7,96E-12	2,92E-10	-8,06E-08
	AP	Mol H+ eq.	1,81E-01	1,13E-03	4,31E-04	1,82E-01	3,89E-06	1,75E-04	4,85E-06	8,92E-05	-1,40E-02
	EP-freshwater	Kg P eq.	3,59E-03	1,93E-05	3,65E-05	3,64E-03	7,08E-07	3,10E-06	2,04E-07	2,67E-06	-1,29E-03
	EP-marine	Kg N eq.	1,57E-02	4,32E-04	1,78E-04	1,63E-02	6,92E-07	6,65E-05	2,58E-06	3,06E-04	-3,50E-03
	EP-terrestrial	Mol N eq.	7,22E-01	4,61E-03	1,32E-03	7,28E-01	6,11E-06	7,09E-04	2,48E-05	3,54E-04	-3,75E-02
	POCP	Kg NMVOC eq.	5,45E-02	1,66E-03	5,27E-04	5,67E-02	1,97E-06	2,58E-04	6,31E-06	1,38E-04	-1,92E-02
	ADP-fossil*	MJ	1,38E+02	3,90E+00	1,43E+00	1,43E+02	1,79E-02	6,33E-01	3,90E-03	2,69E-01	-3,69E+01
	ADP-mineral&metals*	Kg Sb eq.	1,85E-04	8,84E-07	4,19E-07	1,86E-04	1,54E-09	1,43E-07	7,86E-10	2,59E-08	-3,08E-06
WDP	m3 world eq deprived	4,16E+00	1,59E-02	4,10E-02	4,22E+00	1,84E-04	2,40E-03	-3,50E-04	1,13E-02	-3,57E-01	

¹ The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product.

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Potential environmental impact – additional voluntary indicators

Results per declared unit

C3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PM	disease inc.	1,99E-06	1,75E-08	5,38E-09	2,01E-06	1,32E-11	2,57E-09	4,41E-11	1,57E-09	-3,45E-07
	IRP	kBq U235 eq.	5,88E-01	4,08E-03	6,95E-03	5,99E-01	5,07E-04	8,34E-04	3,90E-06	2,97E-04	-7,43E-02
	ETP-fw	CTUe	9,25E+01	1,50E+00	5,86E-01	9,46E+01	2,22E-03	2,61E-01	2,86E-03	1,24E-01	-1,18E+01
	HTP-nc	CTUh	1,81E-07	2,15E-09	8,04E-10	1,84E-07	6,76E-12	3,43E-10	4,94E-11	1,37E-10	-1,45E-08
	HTP-c	CTUh	6,94E-08	9,76E-11	2,18E-10	6,97E-08	2,43E-13	1,54E-11	1,04E-12	5,90E-12	-1,99E-08
SQP	Pt	3,89E+01	1,81E+00	1,38E+01	5,46E+01	2,69E-03	2,65E-01	9,25E-04	4,99E-01	-1,16E+02	

C4TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PM	disease inc.	2,02E-06	1,75E-08	6,46E-09	2,05E-06	1,32E-11	2,94E-09	4,41E-11	1,80E-09	-3,29E-07
	IRP	kBq U235 eq.	6,06E-01	4,08E-03	8,38E-03	6,18E-01	5,07E-04	9,54E-04	3,90E-06	3,41E-04	-8,22E-02
	ETP-fw	CTUe	9,43E+01	1,50E+00	6,92E-01	9,65E+01	2,22E-03	2,99E-01	2,86E-03	1,45E-01	-1,10E+01
	HTP-nc	CTUh	1,78E-07	2,15E-09	9,49E-10	1,81E-07	6,76E-12	3,92E-10	4,94E-11	1,67E-10	-1,40E-08
	HTP-c	CTUh	7,27E-08	9,76E-11	2,67E-10	7,31E-08	2,43E-13	1,76E-11	1,04E-12	6,75E-12	-1,81E-08
SQP	Pt	3,93E+01	1,81E+00	1,73E+01	5,84E+01	2,69E-03	3,03E-01	9,25E-04	5,68E-01	-1,45E+02	

C4TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PM	disease inc.	2,11E-06	2,29E-08	6,46E-09	2,14E-06	1,32E-11	3,25E-09	5,29E-11	2,00E-09	-3,71E-07
	IRP	kBq U235 eq.	6,55E-01	5,33E-03	8,38E-03	6,68E-01	5,07E-04	1,06E-03	4,68E-06	3,79E-04	-9,13E-02
	ETP-fw	CTUe	9,97E+01	1,96E+00	6,92E-01	1,02E+02	2,22E-03	3,31E-01	3,43E-03	1,61E-01	-1,24E+01
	HTP-nc	CTUh	1,96E-07	2,80E-09	9,49E-10	1,99E-07	6,76E-12	4,34E-10	5,93E-11	1,84E-10	-1,58E-08
	HTP-c	CTUh	8,12E-08	1,28E-10	2,67E-10	8,16E-08	2,43E-13	1,95E-11	1,25E-12	7,50E-12	-2,05E-08
SQP	Pt	4,26E+01	2,37E+00	1,73E+01	6,22E+01	2,69E-03	3,36E-01	1,11E-03	6,32E-01	-1,59E+02	

C5TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PM	disease inc.	2,05E-06	2,24E-08	6,46E-09	2,08E-06	1,32E-11	3,15E-09	5,29E-11	1,92E-09	-3,36E-07
	IRP	kBq U235 eq.	6,24E-01	5,22E-03	8,38E-03	6,38E-01	5,07E-04	1,02E-03	4,68E-06	3,66E-04	-8,74E-02
	ETP-fw	CTUe	9,61E+01	1,92E+00	6,92E-01	9,87E+01	2,22E-03	3,20E-01	3,43E-03	1,57E-01	-1,12E+01
	HTP-nc	CTUh	1,82E-07	2,75E-09	9,49E-10	1,85E-07	6,76E-12	4,20E-10	5,93E-11	1,81E-10	-1,44E-08
	HTP-c	CTUh	7,61E-08	1,25E-10	2,67E-10	7,65E-08	2,43E-13	1,88E-11	1,25E-12	7,23E-12	-1,82E-08
SQP	Pt	4,04E+01	2,32E+00	1,73E+01	6,00E+01	2,69E-03	3,25E-01	1,11E-03	6,09E-01	-1,58E+02	

Use of resources

Results per declared unit

Acronyms

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

C3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D	
	PERE	MJ	-3,76E+01	4,73E-02	2,24E-01	-	3,73E+01	3,43E-03	9,00E-03	8,13E-05	3,94E-03	-2,06E+01
	PERM	MJ	5,01E+01	0,00E+00	2,36E+00	5,24E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,25E+01	4,73E-02	2,59E+00	1,51E+01	3,43E-03	9,00E-03	8,13E-05	3,94E-03	-2,06E+01	
	PENRE	MJ	1,29E+02	3,05E+00	1,09E+00	1,33E+02	1,78E-02	5,16E-01	3,25E-03	2,20E-01	-3,94E+01	
	PENRM	MJ	3,09E-01	0,00E+00	1,38E-01	4,47E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
	PENRT	MJ	1,30E+02	3,05E+00	1,23E+00	1,34E+02	1,78E-02	5,16E-01	3,25E-03	2,20E-01	-3,94E+01	
	SM	Kg	5,82E+00	0,00E+00	0,00E+00	5,82E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,10E-01	4,34E-04	0,00E+00	1,10E-01	1,40E-05	7,46E-05	-5,51E-06	2,26E-04	-9,87E-03		

C4TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PERE	MJ	-5,06E+01	4,73E-02	2,71E-01	-5,03E+01	3,43E-03	1,03E-02	8,13E-05	4,52E-03	-2,60E+01
	PERM	MJ	6,32E+01	0,00E+00	2,96E+00	6,62E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,26E+01	4,73E-02	3,23E+00	1,58E+01	3,43E-03	1,03E-02	8,13E-05	4,52E-03	-2,60E+01
	PENRE	MJ	1,33E+02	3,05E+00	1,29E+00	1,38E+02	1,78E-02	5,91E-01	3,25E-03	2,51E-01	-3,64E+01
	PENRM	MJ	3,09E-01	0,00E+00	1,38E-01	4,47E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	1,34E+02	3,05E+00	1,43E+00	1,38E+02	1,78E-02	5,91E-01	3,25E-03	2,51E-01	-3,64E+01
	SM	Kg	7,03E+00	0,00E+00	0,00E+00	7,03E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,21E-01	4,34E-04	0,00E+00	1,21E-01	1,40E-05	8,54E-05	-5,51E-06	2,58E-04	-1,03E-02	

C4TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PERE	MJ	-5,55E+01	6,18E-02	2,71E-01	-5,52E+01	3,43E-03	1,14E-02	9,75E-05	5,02E-03	-2,86E+01
	PERM	MJ	6,91E+01	0,00E+00	2,96E+00	7,21E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,36E+01	6,18E-02	3,23E+00	1,69E+01	3,43E-03	1,14E-02	9,75E-05	5,02E-03	-2,86E+01
	PENRE	MJ	1,47E+02	3,98E+00	1,29E+00	1,52E+02	1,78E-02	6,54E-01	3,90E-03	2,79E-01	-4,12E+01
	PENRM	MJ	3,09E-01	0,00E+00	1,38E-01	4,47E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	1,47E+02	3,98E+00	1,43E+00	1,52E+02	1,78E-02	6,54E-01	3,90E-03	2,79E-01	-4,12E+01
	SM	Kg	5,82E+00	0,00E+00	0,00E+00	5,82E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,31E-01	5,67E-04	0,00E+00	1,32E-01	1,40E-05	9,45E-05	-6,61E-06	2,87E-04	-1,15E-02	

C5TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PERE	MJ	-5,63E+01	6,05E-02	2,71E-01	-5,59E+01	3,43E-03	1,10E-02	9,75E-05	4,85E-03	-2,85E+01
	PERM	MJ	6,91E+01	0,00E+00	2,96E+00	7,21E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,29E+01	6,05E-02	3,23E+00	1,62E+01	3,43E-03	1,10E-02	9,75E-05	4,85E-03	-2,85E+01
	PENRE	MJ	1,38E+02	3,90E+00	1,29E+00	1,43E+02	1,78E-02	6,33E-01	3,90E-03	2,69E-01	-3,69E+01
	PENRM	MJ	3,09E-01	0,00E+00	1,38E-01	4,47E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	1,39E+02	3,90E+00	1,43E+00	1,44E+02	1,78E-02	6,33E-01	3,90E-03	2,69E-01	-3,69E+01
	SM	Kg	5,82E+00	0,00E+00	0,00E+00	5,82E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,27E-01	5,56E-04	0,00E+00	1,28E-01	1,40E-05	9,14E-05	-6,61E-06	2,76E-04	-1,07E-02	

Waste production and output flows

Waste production

Results per declared unit

Acronyms HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed

C3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	HWD	kg	2,36E-02	1,94E-05	5,26E-06	2,36E-02	2,26E-08	3,28E-06	1,63E-08	1,09E-06	-6,78E-04
NHWD	kg	2,75E+00	1,49E-01	1,92E-02	2,92E+00	4,90E-05	2,13E-02	2,93E-04	8,62E-01	-1,98E-01	
RWD	kg	1,77E-04	9,90E-07	1,77E-06	1,80E-04	1,30E-07	2,04E-07	9,67E-10	7,14E-08	-1,86E-05	

C4TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	HWD	kg	2,12E-02	1,94E-05	6,07E-06	2,12E-02	2,26E-08	3,75E-06	1,63E-08	1,24E-06	-6,10E-04
NHWD	kg	2,59E+00	1,49E-01	2,29E-02	2,76E+00	4,90E-05	2,43E-02	2,93E-04	9,82E-01	-2,02E-01	
RWD	kg	1,79E-04	9,90E-07	2,14E-06	1,82E-04	1,30E-07	2,34E-07	9,67E-10	8,20E-08	-2,06E-05	

C4TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	HWD	kg	2,41E-02	2,53E-05	6,07E-06	2,41E-02	2,26E-08	4,16E-06	1,95E-08	1,38E-06	-6,92E-04
NHWD	kg	2,93E+00	1,95E-01	2,29E-02	3,15E+00	4,90E-05	2,70E-02	3,52E-04	1,09E+00	-2,26E-01	
RWD	kg	1,95E-04	1,29E-06	2,14E-06	1,98E-04	1,30E-07	2,59E-07	1,16E-09	9,11E-08	-2,29E-05	

C5TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	HWD	kg	2,12E-02	2,48E-05	6,07E-06	2,12E-02	2,26E-08	4,02E-06	1,95E-08	1,33E-06	-6,11E-04
NHWD	kg	2,63E+00	1,91E-01	2,29E-02	2,85E+00	4,90E-05	2,61E-02	3,52E-04	1,05E+00	-2,10E-01	
RWD	kg	1,84E-04	1,27E-06	2,14E-06	1,87E-04	1,30E-07	2,51E-07	1,16E-09	8,80E-08	-2,19E-05	

Output flows

Results per declared unit

Acronyms CRU = Components for re-use; MFR = Material for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal

C3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	4,59E-02	4,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	5,80E-04	5,80E-04	0,00E+00	0,00E+00	6,53E+00	0,00E+00	0,00E+00	
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

C4TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	4,59E-02	4,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	5,80E-04	5,80E-04	0,00E+00	0,00E+00	7,46E+00	0,00E+00	0,00E+00	
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

C4TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	4,59E-02	4,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	5,80E-04	5,80E-04	0,00E+00	0,00E+00	8,27E+00	0,00E+00	0,00E+00	
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

C5TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	4,59E-02	4,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	5,80E-04	5,80E-04	0,00E+00	0,00E+00	8,00E+00	0,00E+00	0,00E+00	
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

Information on biogenic carbon content

Results per declared unit					
BIOGENIC CARBON CONTENT	Unit	C3TTL	C4TTL	C4TTM	C5TTM
Biogenic carbon content in product	kg C	8,77	11,17	12,17	12,17
Biogenic carbon content in packaging	kg C	0,23	0,28	0,28	0,28

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

Additional information

Technical specifications

C3TTL			
Reference standard	Reference class	Request	Result
UNI EN 12825	Maximum Load class 2	Maximum load equal to or greater than kN 6	Breaking center side kN 7,57 Breaking center panel kN 13,69 Breaking diagonal kN 6,10
UNI EN 12825	Bending Class A	Maximum allowable deflection mm2,50	Arrow 2,5 mm center side with kN 2,14 Arrow 2,5mm center panel with kN 2,53 Arrow 2,5mm in diagonal with kN 3,20 Remaining arrow after 30' mm 0,20
PSA MOB PF2 PS clauses T1 to T18	LIGHT GRADE	Fully Passed	Fully Passed
UNI EN 13501-1:2007	Fire reaction	Bfl-s1	Certified N. 311100/RF6188 Istituto Giordano - Italy
UNI EN 13502-1:2008	Fire resistance	REI 30r	Certified CSI 1415 FR CSI - Italy
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Airborne transmission		Dn,f,w dB 38 Test report 257394 Istituto Giordano - Italy
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Impact transmission		Ln,f,w dB 71 Test report 257394 Istituto Giordano - Italy
UNI EN 140-8:1999	Acoustic performance Interstorey footfall transmission		naked DLw 16 dB rubber+ naked DLw 20 dB rubber + naked +pvc AP DLw 22 dB rubber + naked +ceramic APB DLw 29dB rubber + naked +moquette AP DLw 28dB

C4TTL			
Reference standard	Reference class	Request	Result
UNI EN 12825	Maximum Load class 3	Maximum load equal to or greater than kN 8	Breaking center side kN 8,73 Breaking center panel kN 13,86 Breaking diagonal kN 8,06
UNI EN 12825	Bending Class A	Maximum allowable deflection mm2,50	Arrow 2,5 mm center side with kN 2,74 Arrow 2,5mm center panel with kN 3,32 Arrow 2,5mm in diagonal with kN 3,45 Remaining arrow after 30' mm 0,05
PSA MOB PF2 PS clauses T1 to T18	LIGHT GRADE	Fully Passed	Fully Passed
UNI EN 13501-1:2007	Fire reaction	Bfl-s1	Certified RFZ/EST/011G Istituto Giordano - Italy
UNI EN 13502-1:2008	Fire resistance	REI 60r	Certified CSI 2418 FR CSI - Italy
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Airborne transmission		Dn,f,w dB 42 PV n: 01/3872-GD/gd ULG-Belgique
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Impact transmission		Ln,f,w dB 68 PV n: 01/3872-GD/gd ULG-Belgique
UNI EN 140-8:1999	Acoustic performance Interstorey footfall transmission		naked DLw 17 dB rubber+ naked DLw 22 dB rubber + naked +pvc AP DLw 22 dB rubber + naked +ceramic APB DLw 29 dB rubber + naked +moquette AP DLw 28 dB

C4TTM

Reference standard	Reference class	Request	Result
UNI EN 12825	Maximum Load class 5	Maximum load equal to or greater than kN 10	Breaking center side kN 10,00 Breaking center panel kN 16,58 Breaking diagonal kN 10,25
UNI EN 12825	Bending Class A	Maximum allowable deflection mm2,50	Arrow 2,5 mm center side with kN 3,34 Arrow 2,5mm center panel with kN 3,57 Arrow 2,5mm in diagonal with kN 3,68 Remaining arrow after 30' mm 0,08
PSA MOB PF2 PS clauses T1 to T18	MEDIUM GRADE	Fully Passed	Fully Passed
UNI EN 13501-1:2007	Fire reaction	Bfl-s1	Certified N. 3000198/RF5975 Istituto Giordano - Italy
UNI EN 13502-1:2008	Fire resistance	REI 60r	Certified CSI 2418 FR CSI - Italy
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Airborne transmission		Dn,f,w dB 46 PV n. DE 631X857 BBRI-Belgique
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Impact transmission		Ln,f,w dB 69 PV n. DE 631X857 BBRI-Belgique
UNI EN 140-8:1999	Acoustic performance Interstorey footfall transmission		naked DLw 17 dB rubber+ naked DLw 21 dB rubber + naked +pvc AP DLw 22 dB rubber + naked +ceramic APB DLw 29 dB rubber + naked +moquette AP DLw 28 dB

C5TTM			
Reference standard	Reference class	Request	Result
UNI EN 12825	Maximum Load class 4	Maximum load equal to or greater than kN 9	Breaking center side kN 11,13 Breaking center panel kN 16,10 Breaking diagonal kN 9,67
UNI EN 12825	Bending Class A	Maximum allowable deflection mm2,50	Arrow 2,5 mm center side with kN 3,15 Arrow 2,5mm center panel with kN 3,31 Arrow 2,5mm in diagonal with kN 3,45 Remaining arrow after 30' mm 0,05
PSA MOB PF2 PS clauses T1 to T18	EURO GRADE	Fully Passed	Fully Passed
UNI EN 13501-1:2007	Fire reaction	Bfl-s1	Certified N. 3000198/RF5975 Istituto Giordano - Italy
UNI EN 13502-1:2008	Fire resistance	REI 60r	Certified CSI 2418 FR CSI - Italy
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Airborne transmission		Dn,f,w dB 46 PV n. DE 631X857 BBRI-Belgique
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Impact transmission		Ln,f,w dB 69 PV n. DE 631X857 BBRI-Belgique
UNI EN 140-8:1999	Acoustic performance Interstorey footfall transmission		naked DLw 17 dB rubber+ naked DLw 21 dB rubber + naked +pvc AP DLw 22 dB rubber + naked +ceramic APB DLw 29 dB rubber + naked +moquette AP DLw 28 dB

Environmental characteristics

	C3TTL	C4TTL	C4TTM	C5TTM
VOC ISO 16000 ISO 16200	Air Comfort Gold Eurofins 392-2018- 00137302AEN	Air Comfort Gold Eurofins 392-2018- 00137302AEN	Air Comfort Gold Eurofins 392-2018- 00137302AEN	Air Comfort Gold Eurofins 392-2018- 00137302AEN
FSC	INT-COC 001121 FSC-C 023271	INT-COC 001121 FSC-C 023271	INT-COC 001121 FSC-C 023271	INT-COC 001121 FSC-C 023271
Other certifications	Cradle to Cradle Certified - Bronze	Cradle to Cradle Certified - Bronze	Cradle to Cradle Certified - Bronze	Cradle to Cradle Certified - Bronze

Differences versus previous versions

Compared to the previous version of this EPD, the SimaPro program and the Ecoinvent database have been updated to versions 9.5.0.1 and 3.9.1 respectively; all collected data, environmental impacts and end-of-life scenarios have also been updated to the new reference year (2023).

In addition, the modeling of the steel share received from the supplier Marcegaglia has been partially changed through the use of a specific EPD and also the modeling of the chipboard panel which has been considered as coming from 100% post-consumer recycled raw material.

References

UNI EN ISO 14040: 2021, Gestione ambientale – Valutazione del ciclo di vita – Principi e quadro di riferimento.

UNI EN ISO 14044: 2021, Gestione ambientale – Valutazione del ciclo di vita – Requisiti e linee guida.

UNI EN ISO 14025:2010, Etichette e dichiarazioni ambientali - Dichiarazioni ambientali di Tipo III - Principi e procedure.

EN 15804:2012 + A2:2019, Sostenibilità delle costruzioni – Dichiarazioni ambientali di prodotto – Regole chiave di sviluppo per categoria di prodotto.

PCR 2019:14 Construction products (EN 15804:A2) (1.11), sviluppata da IVL Swedish Environmental Research Institute, EPD International Secretariat .

Paleari M., Campioli A. 2015, I rifiuti da costruzione e demolizione: LCA della demolizione di 51 edifici residenziali. Ingegneria dell’Ambiente Vol. 2 n. 4/2015.

Wahlström M., Bergmans J., Teittinen T., Bachér J., Smeets A., Paduart A., 2020. Eionet Report - ETC/WMGE 2020/1 Construction and Demolition Waste: challenges and opportunities in a circular economy. January 2020.

Association of Issuing Bodies – European Residual Mixes. Results of the calculation of Residual Mixes for the calendar year 2020. Version 1.0, 2021-05-31.

Analisi del ciclo di vita di pannelli per pavimento tecnico sopraelevato con anima interna in truciolare di legno o gessofibra e capsula in lamiera d’acciaio zincato. Report LCA Revisione n. 03 del 22/02/2022.

Mantanis G., Athanassiadou E., Nakos P., Coutinho A., 2014. A New Process for Recycling Waste Fiberboards. 38th International Wood Composites Symposium.

Istruzioni generali del programma del sistema® internazionale EPD. Versione 3.01.

This is a translation of Validation Statement N. IT17/0056
VALIDATION STATEMENT OF EPD

It states that the Environmental Product Declaration
(rev.4 del 22.02.2022) operated by

JVP SRL

Registered office
Viale dell'industria 16/20 35028 Piove di Sacco (PD)- Italy

In conformity with

**GENERAL PROGRAMME INSTRUCTIONS v.3.01, IES
and PCR 2019:14 Construction Products v.1.11 and
EN 15804:2012+A2:2019**

is valid for the following product

JVP 4X4

**STEEL ENCAPSULATED PANELS FOR RAISED ACCESS FLOOR,
WITH GYPSUM FIBREBOARD CORE:
P3TTL MM 600X600X23 (LIGHT GRADE)
P4TTM MM 600X600X29 (MEDIUM GRADE)
P4TTH MM 600X600X29 (HEAVY GRADE)**

Manufactory office

Viale dell'industria 16/20 35028 Piove di Sacco (PD) - Italy

This certificate is valid from 17/09/2024 until 07/03/2027
and remains valid subject to satisfactory surveillance audit
Issue n.4, certified since 23/01/2017.

Updated information about any changes in the status of the certification may be obtained by sending a fax
to the number shown on the certificate

Authorized by
Paola Santarelli



SGS ITALIA S.p.A.
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L'ENTE ITALIANO DI ACCREDITAMENTO

DAP N° 006H

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Signatory of EA MLA for the accreditation schemes QMS, EMS, PRD, PRS, INSP, GHG, TL, CL, PTP and RMT, of IAF MLA for the accreditation schemes QMS, EMS, ISMS, FSMS, PRD and PRS and of ILAC MRA for the accreditation schemes TL, ML, CL, INSP and PTP.



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Environmental Product Declaration



In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

JVP 4X4

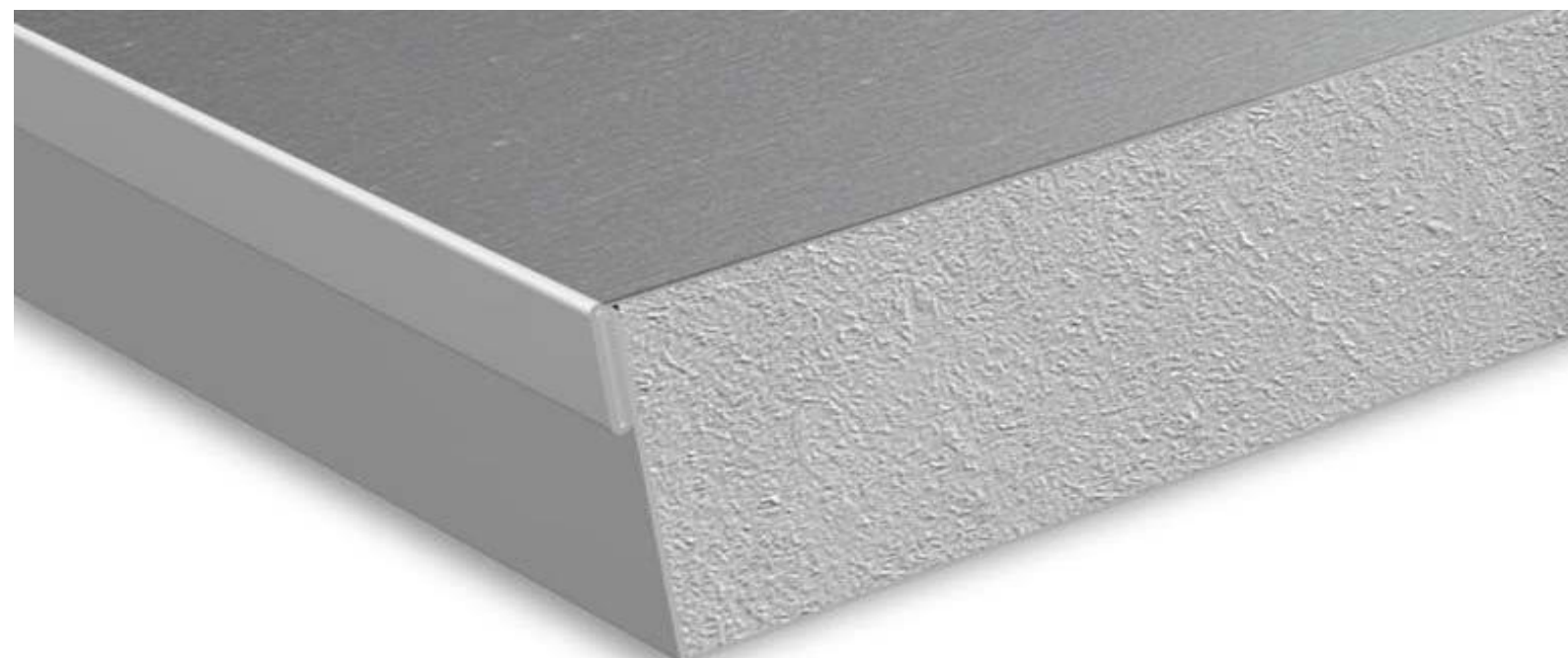
Raised Access Floor Fibreboard Core Panels

JVP S.r.l.



Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-01015 JVP 4X4
Publication date:	2017-02-09
Revision date:	2024-09-17
Valid until:	2027-03-07

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



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): Construction Products, 2019:14, version 1.11, CPC undefined
PCR review was conducted by: the Technical Committee of the International EPD® System. 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: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier: SGS Italia S.p.A. via Caldera, 21 20153 – Milano, Tel. +39 02.73931 - Fax +39 02.70124630, www.it.sgs.com Accredited by: ACCREDIA, certificate n. 006H Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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

Owner of the EPD: JVP S.r.l., Main Office & Registered address: Via dell'Industria 16/20, 35028 Piove di Sacco PD Italia – Phone: +39 049.5840597 Fax: +093 049.5817319 Web site: www.jvph.net

Contact: jvp@jvph.net

Description of the organisation: JVP S.r.l, initially called Joint Venture Production, is a fully Italian company, able to express in the best way the typical Made in Italy innovative spirit. It was founded in 1998 in Piove di Sacco, in Padua province, as the successful completion of the initiative of a group of people already working in the field of raised floor, united by the will to tackle the world market with an innovative high-performance product, which would have the functions of a level accessible for facilities, possibly inspected and immediately usable. Thus, the construction project of the JVP 4x4 panel was developed, based on steel as a key element of the whole, with a sealing system as simple and effective, called "knurling", which characterizes the final product. In 1999, the first robotized production line set out with a 400 panels hourly production capacity, more than doubled today.

Thanks to the current third-generation production line, capable of over 1.000 pieces per hour, JVP S.r.l is the first Italian company for raised floors panels potential production capacity. JVP 4x4 systems are distributed worldwide through an extensive sales network and strategically placed in the heart of the most important economic realities. The constant growth of the company has naturally led to the will to open also in markets with differentiated technical maturity, accustomed to different raised floor types from those so far proposed.

Product-related or management system-related certifications: UNI EN ISO 9001:2015, UNI EN ISO 14001:2015, FSC Forest Stewardship Council® - Chain of Custody, C2C Cradle to Cradle for steel encapsulated panels for raised access floor, with gypsum fibreboard or particleboard. The raised floor, as an integral part of the building as a whole, can contribute to the acquisition of scores for the LEED® system.

Name and location of production site(s): Viale dell'Industria 16/20 35028 Piove di Sacco (PD)

Product information

Product name: JVP 4X4 Steel encapsulated panels for raised access floor, with gypsum fibreboard core

Product identification: P3TTL mm 600x600x23 (light grade), P4TTM mm 600x600x29 (medium grade), P4TTH mm 600x600x29 (heavy grade)

Product description: Panels for raised floor, consisting of inner gypsum fibreboard core reinforced with cellulose fibres and completely encapsulated in a galvanized sheet steel suitably glued. Panels object of the present Declaration are intended to constitute a raised floor, which should have a space between the proper floor and the one on which machines stay and people walk, to be used to lay out all the necessary cables and installations.

The raised floor must withstand the toughest conditions of the realization of the construction site and for everyday use, so its main quality should be strongly robustness. The outer shell ensures the best resistance to abuses in the construction site, hence the choice of galvanized sheet. The body of the panel is made from reinforced plaster fibre cellulose.

UN CPC code: undefined

Warranty: JVP 4x4 systems are protected for at least 50 years of technical life by the JVP SL50 warranty, according to the methods defined therein.

LCA information

Declared unit: one unit panel of raised steel floor with calcium sulfate and cellulose fibre core; weight for declared unit: P3TTL 11,88 kg, P4TTM 14,46 kg, P4TTH 18,37 kg

Time representativeness: 2023

Database(s) and LCA software used: Ecoinvent 3.9.1, Simapro 9.5.0.1

Description of system boundaries: Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D)

More information: info@greenwichsrl.it Greenwich S.r.l. <https://greenwichsrl.it>

EPD objectives: The aims of this EPD are:

- understand and quantify the environmental performance of typical products,
- communicate their environmental performance

This EPD reports and describes results of the LCA study, which can be used for publicity purposes. This study is not intended to support any kind of comparative analysis.

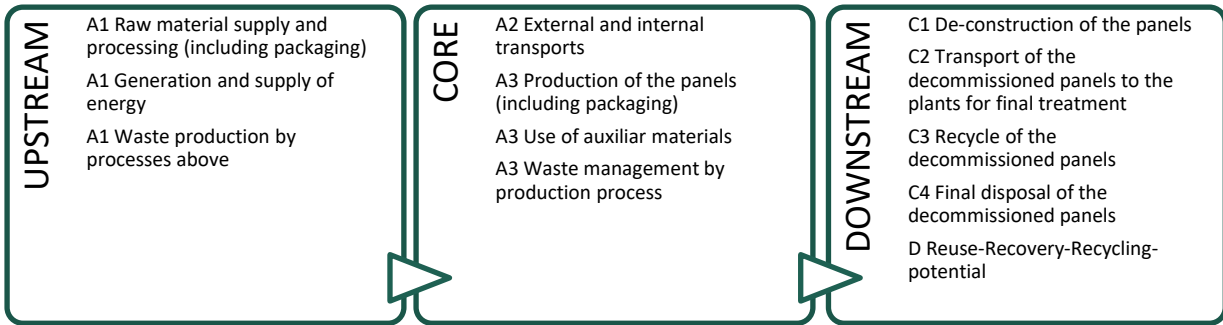
Cut-off & Allocation rules: Data collection was carried out for 100% of the input flows in terms of mass and energy, relative to upstream and core modules. According to PCR, it was applied a cut-off of 5% for total flows of the system (mass and energy) and of max 1% for each elementary flow. All flows provided by JVP Srl has been considered through documentation available related to the other corporate certifications and dedicated questionnaires. The allocation established for the raised floor panel system mass balance, in accordance with the reference PCR, is the following: the calculation is done taking as temporal reference the year and as quantity reference the number of panels produced. Depending on data supply, the number of produced panels is referred, in some cases, to total production and, in other cases, to the production of single panel type.

Data quality: Upstream data are general, derived from the Ecoinvent 3.9.1 database. Core data are site-specific and they are derived from the environmental management system of JVP S.r.l. for characterization and quantification. Regarding the quality of energy data, JVP S.r.l. supplies through the national energy system, for which the European Residual Mix is adopted and photovoltaic of own property, for which processed from Ecoinvent 3.9.1 database were used. Site specific data refer to the 2023 production year.

Check to the validity and accuracy of specific data provided by JVP srl was carried out through the consultation of other critical EPD studies produced in conformity with the reference PCR, the international database Ecoinvent 3.9.1 and literature data. It was also attempted a cross-check and review of data provided by the company.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation: this EPD is of the type “from cradle to gate with modules C1-C4 and module D”, taking into account the phases of extraction and processing of raw materials (UPSTREAM), transportation and core production (CORE PROCESS), disposal (DOWNSTREAM) e benefits beyond the system boundaries, not considering phases of distribution and use. For the DOWNSTREAM phase, it was assumed the manual de-construction of the panels in the construction site and their subsequent shredding on site; on the basis of European statistics, it is assumed that 82,8% of panels is recycled, 11,0% go into landfills, 5,60% is used in backfilling and 0,60% is used for energy recovery. The module D assesses the benefits of using steel scrap and gypsum dust instead of vergin materials. Geographic scope: Europe.

It is specified that the impact results relating to the products under examination have been analysed with the characterisation factors relating to Environmental Footprint 3.1



	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	
Moduls declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X	
Geographic scope	EU27	EU27	IT	ND	ND	ND	ND	ND	ND	ND	ND	ND	IT	IT	IT	IT	GLO	
Specific data	>90%	>90%	>90%	ND	ND	ND	ND	ND	ND	ND	ND	ND	>90%	>90%	>90%	>90%	>90%	
Variations – products	-					-	-	-	-	-	-	-	-	-	-	-	-	-
Variations – sites	-					-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Dimensional and technical characteristics of the panels

	P3TTL	P4TTM	P4TTH	U.M.
Length	600	600	600	mm
Width	600	600	600	mm
Thickness	23	29	29	mm
Weight (technical sheet)	12,50±0,5	15,30±0,5	18,50±0,5	kg
Weight for declared unit	11,88	14,46	18,37	kg
Density for declared unit	1.200	1.200	1.600	Kg/m ³
Squaring Rectangularity	±0,3	±0,3	±0,3	mm
Concavity and Convexity	<0,4	<0,4	<0,4	mm
Offplan Buckling	<0,3	<0,3	<0,3	mm

Panels composition

Panel component	P3TTL			P4TTM			P4TTH		
	Weight [kg]	Post-consumer material* [%]	Renewable material [%]	Weight [kg]	Post-consumer material* [%]	Renewable material [%]	Weight [kg]	Post-consumer material* [%]	Renewable material [%]
Fibreboard	9,19	0,00	0,00	11,73	0,00	0,00	15,64	0,00	0,00
Steel capsule	2,56	0,00	0,00	2,60	0,00	0,00	2,60	0,00	0,00
Adhesive	0,12	0,00	0,00	0,12	0,00	0,00	0,12	0,00	0,00
Catalyst	0,006	0,00	0,00	0,006	0,00	0,00	0,006	0,00	0,00
Packaging materials	Weight [kg]	Weight versus the product [kg]		Weight [kg]	Weight versus the product [%]		Weight [kg]	Weight versus the product [%]	
Pallet	0,145	1,21%		0,181	1,24%		0,181	0,98%	
Strapping	0,003	0,03%		0,004	0,03%		0,004	0,02%	
Board box	0,040	0,33%		0,050	0,34%		0,050	0,27%	

*The components of the products derive in part from post-consumer recycled material; data relating to the exact quantities of post-consumer material are not available for all suppliers, so cautiously they were considered equal to zero

No substance included in the Candidate List of Substances of Very High Concern for authorisation under the REACH Regulations is present in the panels, either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per declared unit

Acronyms

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

P3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	GWP	Kg CO2eq	7,06E+00	1,90E+00	-9,50E-02	8,86E+00	8,06E-04	5,54E-02	1,88E-02	1,92E-02	-3,60E+00
GWP-GHG ¹	kg CO2 eq.	6,51E+00	1,89E+00	1,03E-01	8,50E+00	7,78E-04	5,51E-02	4,03E-04	1,90E-02	-3,58E+00	
GWP-fossil	Kg CO2eq	8,87E+00	1,90E+00	1,02E-01	1,09E+01	7,76E-04	5,53E-02	4,05E-04	1,91E-02	-3,61E+00	
GWP-biogenic	Kg CO2eq	-1,82E+00	1,73E-03	-1,98E-01	-2,02E+00	2,86E-05	4,30E-05	1,84E-02	1,66E-04	1,41E-02	
GWP-luluc	Kg CO2eq	6,23E-03	9,27E-04	9,38E-04	8,10E-03	1,94E-06	2,55E-05	4,50E-07	1,59E-05	-9,76E-04	
ODP	Kg CFC11 eq	1,87E-07	4,15E-08	7,23E-07	9,52E-07	1,39E-11	1,21E-09	7,39E-12	3,82E-10	-8,47E-08	
AP	Mol H+ eq.	1,67E-01	7,85E-03	4,63E-04	1,76E-01	3,89E-06	2,17E-04	2,25E-06	3,25E-02	-1,41E-02	
EP-freshwater	Kg P eq.	3,33E-03	1,34E-04	3,85E-05	3,50E-03	7,08E-07	3,84E-06	1,93E-07	3,73E-06	-1,31E-03	
EP-marine	Kg N eq.	1,25E-02	2,99E-03	1,92E-04	1,57E-02	6,92E-07	8,24E-05	9,80E-07	4,55E-05	-3,36E-03	
EP-terrestrial	Mol N eq.	6,73E-01	3,20E-02	1,44E-03	7,06E-01	6,11E-06	8,79E-04	9,07E-06	4,87E-04	-3,63E-02	
POCP	Kg NMVOC eq.	3,70E-02	1,15E-02	5,68E-04	4,91E-02	1,97E-06	3,19E-04	2,97E-06	2,17E-03	-1,93E-02	
ADP-fossil*	MJ	1,15E+02	2,70E+01	1,53E+00	1,44E+02	1,79E-02	7,84E-01	5,37E-03	3,72E-01	-3,67E+01	
ADP-mineral&metals*	Kg Sb eq.	1,66E-04	6,13E-06	4,46E-07	1,72E-04	1,54E-09	1,78E-07	9,46E-10	3,82E-08	-2,32E-06	
WDP	m3 world eq deprived	1,59E+00	1,10E-01	4,31E-02	1,75E+00	1,84E-04	2,97E-03	-4,43E-04	1,46E-02	-2,09E-01	

P4TTH	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	GWP	Kg CO2eq	7,28E+00	2,40E+00	-1,23E-01	9,56E+00	8,06E-04	8,57E-02	2,96E-02	3,03E-02	-3,66E+00
GWP-GHG ¹	kg CO2 eq.	6,71E+00	2,39E+00	1,25E-01	9,22E+00	7,78E-04	8,51E-02	6,33E-04	2,99E-02	-3,64E+00	
GWP-fossil	Kg CO2eq	1,02E+01	2,40E+00	1,23E-01	1,28E+01	7,76E-04	8,56E-02	6,37E-04	3,00E-02	-3,67E+00	
GWP-biogenic	Kg CO2eq	-2,97E+00	2,19E-03	-2,47E-01	-3,22E+00	2,86E-05	6,64E-05	2,90E-02	2,62E-04	1,43E-02	
GWP-luluc	Kg CO2eq	6,70E-03	1,17E-03	1,16E-03	9,03E-03	1,94E-06	3,94E-05	7,07E-07	2,52E-05	-9,97E-04	
ODP	Kg CFC11 eq	1,91E-07	5,26E-08	7,39E-07	9,82E-07	1,39E-11	1,88E-09	1,16E-11	5,92E-10	-8,61E-08	
AP	Mol H+ eq.	1,73E-01	9,94E-03	5,70E-04	1,84E-01	3,89E-06	3,36E-04	3,53E-06	5,54E-02	-1,44E-02	
EP-freshwater	Kg P eq.	3,45E-03	1,69E-04	4,78E-05	3,67E-03	7,08E-07	5,94E-06	3,03E-07	5,71E-06	-1,33E-03	
EP-marine	Kg N eq.	1,36E-02	3,79E-03	2,36E-04	1,76E-02	6,92E-07	1,27E-04	1,54E-06	7,09E-05	-3,46E-03	
EP-terrestrial	Mol N eq.	6,95E-01	4,05E-02	1,76E-03	7,37E-01	6,11E-06	1,36E-03	1,43E-05	7,58E-04	-3,74E-02	
POCP	Kg NMVOC eq.	4,02E-02	1,46E-02	6,86E-04	5,54E-02	1,97E-06	4,94E-04	4,67E-06	3,67E-03	-1,97E-02	
ADP-fossil*	MJ	1,35E+02	3,43E+01	1,86E+00	1,72E+02	1,79E-02	1,21E+00	8,44E-03	5,81E-01	-3,74E+01	
ADP-mineral&metals*	Kg Sb eq.	1,69E-04	7,76E-06	5,49E-07	1,77E-04	1,54E-09	2,75E-07	1,49E-09	6,00E-08	-2,39E-06	
WDP	m3 world eq deprived	1,74E+00	1,40E-01	5,35E-02	1,93E+00	1,84E-04	4,59E-03	-6,96E-04	2,26E-02	-2,13E-01	

P4TMM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	GWP	Kg CO2eq	7,22E+00	3,19E+00	-1,23E-01	1,03E+01	8,06E-04	6,74E-02	2,42E-02	2,36E-02	-3,68E+00
GWP-GHG ¹	kg CO2 eq.	6,66E+00	3,17E+00	1,25E-01	9,95E+00	7,78E-04	6,70E-02	5,18E-04	2,33E-02	-3,67E+00	
GWP-fossil	Kg CO2eq	9,49E+00	3,18E+00	1,23E-01	1,28E+01	7,76E-04	6,74E-02	5,21E-04	2,34E-02	-3,69E+00	
GWP-biogenic	Kg CO2eq	-2,28E+00	2,90E-03	-2,47E-01	-2,52E+00	2,86E-05	5,23E-05	2,37E-02	2,04E-04	1,42E-02	
GWP-luluc	Kg CO2eq	6,48E-03	1,56E-03	1,16E-03	9,19E-03	1,94E-06	3,10E-05	5,79E-07	1,95E-05	-1,01E-03	
ODP	Kg CFC11 eq	1,91E-07	6,97E-08	7,39E-07	9,99E-07	1,39E-11	1,48E-09	9,50E-12	4,65E-10	-8,65E-08	
AP	Mol H+ eq.	1,71E-01	1,32E-02	5,70E-04	1,85E-01	3,89E-06	2,64E-04	2,89E-06	4,16E-02	-1,46E-02	
EP-freshwater	Kg P eq.	3,41E-03	2,24E-04	4,78E-05	3,69E-03	7,08E-07	4,67E-06	2,48E-07	4,51E-06	-1,33E-03	
EP-marine	Kg N eq.	1,30E-02	5,03E-03	2,36E-04	1,83E-02	6,92E-07	1,00E-04	1,26E-06	5,56E-05	-3,54E-03	
EP-terrestrial	Mol N eq.	6,89E-01	5,37E-02	1,76E-03	7,44E-01	6,11E-06	1,07E-03	1,17E-05	5,94E-04	-3,84E-02	
POCP	Kg NMVOC eq.	3,86E-02	1,93E-02	6,86E-04	5,86E-02	1,97E-06	3,89E-04	3,82E-06	2,76E-03	-2,00E-02	
ADP-fossil*	MJ	1,24E+02	4,54E+01	1,86E+00	1,71E+02	1,79E-02	9,54E-01	6,90E-03	4,55E-01	-3,77E+01	
ADP-mineral&metals*	Kg Sb eq.	1,69E-04	1,03E-05	5,49E-07	1,80E-04	1,54E-09	2,16E-07	1,22E-09	4,68E-08	-2,45E-06	
WDP	m3 world eq deprived	1,66E+00	1,85E-01	5,35E-02	1,90E+00	1,84E-04	3,62E-03	-5,70E-04	1,78E-02	-2,14E-01	

¹ The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product.

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Potential environmental impact – additional voluntary indicators

Results per declared unit

P3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PM	disease inc.	1,77E-06	1,55E-07	6,98E-09	1,93E-06	1,32E-11	3,90E-09	8,40E-11	2,72E-08	-3,01E-07
	IRP	kBq U235 eq.	4,53E-01	3,62E-02	8,86E-03	4,98E-01	5,07E-04	1,27E-03	6,69E-06	6,40E-04	-3,53E-02
	ETP-fw	CTUe	7,82E+01	1,33E+01	7,42E-01	9,23E+01	2,22E-03	3,97E-01	3,64E-03	2,94E-01	-1,10E+01
	HTP-nc	CTUh	1,54E-07	1,91E-08	1,02E-09	1,74E-07	6,76E-12	5,20E-10	2,74E-11	1,52E-09	-1,23E-08
	HTP-c	CTUh	4,16E-08	8,66E-10	2,85E-10	4,28E-08	2,43E-13	2,33E-11	1,01E-12	3,47E-11	-1,92E-08
	SQP	Pt	3,87E+01	1,61E+01	1,84E+01	7,32E+01	2,69E-03	4,02E-01	6,05E-03	7,74E-01	-7,48E+00

P4TTH	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PM	disease inc.	1,81E-06	1,97E-07	8,57E-09	2,01E-06	1,32E-11	6,03E-09	1,32E-10	4,59E-08	-3,08E-07
	IRP	kBq U235 eq.	4,72E-01	4,58E-02	1,10E-02	5,29E-01	5,07E-04	1,96E-03	1,05E-05	1,02E-03	-3,64E-02
	ETP-fw	CTUe	7,99E+01	1,69E+01	8,91E-01	9,77E+01	2,22E-03	6,14E-01	5,72E-03	4,77E-01	-1,13E+01
	HTP-nc	CTUh	1,58E-07	2,41E-08	1,24E-09	1,83E-07	6,76E-12	8,05E-10	4,30E-11	2,57E-09	-1,26E-08
	HTP-c	CTUh	4,24E-08	1,10E-09	3,51E-10	4,39E-08	2,43E-13	3,61E-11	1,59E-12	5,77E-11	-1,94E-08
	SQP	Pt	3,96E+01	2,04E+01	2,30E+01	8,30E+01	2,69E-03	6,22E-01	9,51E-03	1,20E+00	-7,64E+00

P4TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PM	disease inc.	1,80E-06	2,61E-07	8,57E-09	2,07E-06	1,32E-11	4,74E-09	1,08E-10	3,46E-08	-3,12E-07
	IRP	kBq U235 eq.	4,65E-01	6,08E-02	1,10E-02	5,37E-01	5,07E-04	1,54E-03	8,61E-06	7,90E-04	-3,75E-02
	ETP-fw	CTUe	7,97E+01	2,24E+01	8,91E-01	1,03E+02	2,22E-03	4,83E-01	4,68E-03	3,66E-01	-1,15E+01
	HTP-nc	CTUh	1,57E-07	3,20E-08	1,24E-09	1,90E-07	6,76E-12	6,33E-10	3,52E-11	1,94E-09	-1,28E-08
	HTP-c	CTUh	4,24E-08	1,46E-09	3,51E-10	4,42E-08	2,43E-13	2,84E-11	1,30E-12	4,38E-11	-1,95E-08
	SQP	Pt	3,93E+01	2,71E+01	2,30E+01	8,93E+01	2,69E-03	4,89E-01	7,78E-03	9,40E-01	-7,73E+00

Use of resources

Results per declared unit

Acronyms

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

P3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PERE	MJ	1,25E+01	4,20E-01	3,44E+00	1,64E+01	3,43E-03	1,37E-02	1,22E-04	9,97E-03	-7,85E-01
	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,25E+01	4,20E-01	3,44E+00	1,64E+01	3,43E-03	1,37E-02	1,22E-04	9,97E-03	-7,85E-01
	PENRE	MJ	1,16E+02	2,70E+01	1,53E+00	1,45E+02	1,78E-02	7,84E-01	5,37E-03	3,72E-01	-3,67E+01
	PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	1,16E+02	2,70E+01	1,53E+00	1,45E+02	1,78E-02	7,84E-01	5,37E-03	3,72E-01	-3,67E+01
	SM	Kg	5,35E-01	0,00E+00	0,00E+00	5,35E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	6,28E-02	3,85E-03	0,00E+00	6,66E-02	1,40E-05	1,13E-04	-9,38E-06	3,62E-04	-6,25E-03	

P4TTH	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PERE	MJ	-1,80E+01	5,32E-01	3,64E-01	-1,71E+01	3,43E-03	2,11E-02	1,92E-04	1,61E-02	-8,04E-01
	PERM	MJ	3,17E+01	0,00E+00	3,93E+00	3,56E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,37E+01	5,32E-01	4,29E+00	1,85E+01	3,43E-03	2,11E-02	1,92E-04	1,61E-02	-8,04E-01
	PENRE	MJ	1,36E+02	3,43E+01	1,68E+00	1,72E+02	1,78E-02	1,21E+00	8,44E-03	5,81E-01	-3,74E+01
	PENRM	MJ	2,82E-01	0,00E+00	1,84E-01	4,66E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	1,37E+02	3,43E+01	1,87E+00	1,73E+02	1,78E-02	1,21E+00	8,44E-03	5,81E-01	-3,74E+01
	SM	Kg	4,63E-01	0,00E+00	0,00E+00	4,63E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	6,83E-02	4,88E-03	0,00E+00	7,32E-02	1,40E-05	1,75E-04	-1,47E-05	5,61E-04	-6,39E-03	

P4TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	PERE	MJ	1,31E+01	7,05E-01	4,29E+00	1,81E+01	3,43E-03	1,66E-02	1,57E-04	1,24E-02	-8,18E-01
	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,31E+01	7,05E-01	4,29E+00	1,81E+01	3,43E-03	1,66E-02	1,57E-04	1,24E-02	-8,18E-01
	PENRE	MJ	1,25E+02	4,54E+01	1,87E+00	1,73E+02	1,78E-02	9,54E-01	6,90E-03	4,55E-01	-3,77E+01
	PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	1,25E+02	4,54E+01	1,87E+00	1,73E+02	1,78E-02	9,54E-01	6,90E-03	4,55E-01	-3,77E+01
	SM	Kg	2,62E+00	0,00E+00	0,00E+00	2,62E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	6,55E-02	6,48E-03	0,00E+00	7,20E-02	1,40E-05	1,38E-04	-1,21E-05	4,40E-04	-6,47E-03	

Waste production and output flows

Waste production

Results per declared unit

Acronyms HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed

P3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	HWD	kg	2,34E-02	1,72E-04	6,57E-06	2,36E-02	2,26E-08	4,98E-06	2,93E-08	1,73E-06	-6,69E-04
P4TTH	NHWD	kg	2,45E+00	1,32E+00	2,56E-02	3,80E+00	4,90E-05	3,23E-02	3,74E-04	1,31E+00	-1,62E-01
	RWD	kg	1,11E-03	8,79E-06	2,26E-06	1,13E-03	1,30E-07	3,10E-07	1,63E-09	1,54E-07	-8,55E-06
P4TTH	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	HWD	kg	2,39E-02	2,18E-04	7,80E-06	2,41E-02	2,26E-08	7,70E-06	4,61E-08	2,68E-06	-6,79E-04
P4TTH	NHWD	kg	2,52E+00	1,67E+00	3,07E-02	4,22E+00	4,90E-05	5,00E-02	5,88E-04	2,03E+00	-1,71E-01
	RWD	kg	1,79E-03	1,11E-05	2,81E-06	1,81E-03	1,30E-07	4,80E-07	2,56E-09	2,46E-07	-8,83E-06
P4TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	HWD	kg	2,39E-02	2,89E-04	7,80E-06	2,42E-02	2,26E-08	6,06E-06	3,77E-08	2,10E-06	-6,81E-04
P4TTM	NHWD	kg	2,51E+00	2,22E+00	3,07E-02	4,76E+00	4,90E-05	3,93E-02	4,81E-04	1,60E+00	-1,84E-01
	RWD	kg	1,39E-03	1,48E-05	2,81E-06	1,40E-03	1,30E-07	3,78E-07	2,10E-09	1,90E-07	-9,08E-06

Output flows

Results per declared unit

Acronyms CRU = Components for re-use; MFR = Material for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal

P3TTL	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	4,59E-02	4,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
P4TTH	MFR	kg	0,00E+00	0,00E+00	3,66E-04	3,66E-04	0,00E+00	0,00E+00	9,90E+00	0,00E+00	0,00E+00
	MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
P4TTM	EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
P4TTH	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	4,59E-02	4,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
P4TTH	MFR	kg	0,00E+00	0,00E+00	5,80E-04	5,80E-04	0,00E+00	0,00E+00	1,53E+01	0,00E+00	0,00E+00
	MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
P4TTM	EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
P4TTM	Impact	UM	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	4,59E-02	4,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
P4TTM	MFR	kg	0,00E+00	0,00E+00	5,80E-04	5,80E-04	0,00E+00	0,00E+00	1,21E+01	0,00E+00	0,00E+00
	MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
P4TTM	EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Information on biogenic carbon content

Results per declared unit

BIOTIC CARBON CONTENT	Unit	P3TTL	P4TTH	P4TTM
Biogenic carbon content in product	kg C	0,00	0,00	0,00
Biogenic carbon content in packaging	kg C	0,30	0,38	0,38

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

Additional information

Technical specifications

P3TTL			
Reference standard	Reference class	Request	Result
UNI EN 12825	Maximum Load class 2	Maximum load equal to or greater than 6 kN	Breaking center side 6,54 kN Breaking center panel 9,25 kN Breaking diagonal 6,62 kN
UNI EN 12825	Bending Class A	Maximum allowable deflection mm 2,5	Arrow 2,5 mm center side with 2,59 kN Arrow 2,5 mm center panel with 2,79 kN Arrow 2,5 mm diagonal with 3,20 kN Remaining arrow after 30' 0,14 mm
PSA MOB PF2 PS clauses T1 to T18	LIGHT GRADE	Fully Passed	Fully Passed
UNI EN 13501-1:2007	Fire reaction	A2fl-s1	Certified RZF/2008/08IG Istituto Giordano - Italy
UNI EN 13502-1:2008	Fire resistance	REI 60r	Certified CSI 2221 FR CSI - Italy
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Airborne transmission		Dn,f,w 38 dB Test report 257395 Istituto Giordano - Italy
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Impact transmission		Ln,f,w dB 70 Test report 257395 Istituto Giordano - Italy
UNI EN 140-8:1999	Acoustic performance Interstorey footfall transmission		naked DLw 16 dB rubber+ naked DLw 21 dB rubber + naked +pvc AP DLw 23 dB rubber + naked +ceramic APB DLw 29 dB rubber + naked + moquette AP DLw 29 dB

P4TTH

Reference standard	Reference class	Request	Result
UNI EN 12825	Maximum load class 6	Maximum load equal or greater than kN 12	Breaking center side kN 12,97 Breaking center panel kN 19,30 Breaking diagonal kN 13,36
UNI EN 12825	Bending Class A	Maximum allowable deflection mm2,50	Arrow 2,5mm center side with kN 6,25 Arrow 2,5mm center panel with kN 7,65 Arrow 2,5mm diagonal with kN 8,29 Remaining arrow after 30' mm 0,040
PSA MOB PF2 PS clauses T1 to T18	HEAVY GRADE	Fully Passed	Fully Passed
UNI EN 13501-1:2007	Fire reaction	A1fl	Certified N.252836 Isituto Giordano - Italia
UNI EN 13502-1:2008	Fire resistance	REI 60r	Certified CSI 2221FR CSI - Italia
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Airborne transmission		Dn,f,w dB 50 N.299456 Italia Isituto Giordano
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Impact transmission		Ln,f,w dB 67 N.299456 Isituto Giordano, Italy
UNI EN 140-8:1999	Acoustic performance Interstorey footfall transmission		naked DLw 17 dB rubber + naked DLw 23 dB rubber + naked +pvc AP DLw 23 dB rubber + naked +ceramic APB DLw 30 dB rubber + naked + moquette AP DLw 29 dB

P4TTM			
Reference standard	Reference class	Request	Result
UNI EN 12825	Maximum load class 5	Maximum load equal or greater than kN 10	Breaking center side kN 10,18 Breaking center panel kN 11,99 Breaking diagonal kN 10,79
UNI EN 12825	Bending Class A	Maximum allowable deflection mm 2,50	Arrow 2,5mm center side with kN 4,99 Arrow 2,5mm center panel with kN 6,49 Arrow 2,5mm diagonal with kN 7,26 Remaining arrow after 30' mm 0,050
PSA MOB PF2 PS clauses T1 to T18	MEDIUM GRADE	Fully Passed	Fully Passed
UNI EN 13501-1:2007	Fire reaction	A1fl	Certified N. 252836 Istituto Giordano - Italia
UNI EN 13502-1:2008	Fire resistance	REI 60r	Certified CSI 2221 FR CSI - Italia
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Airborne transmission		Dn,f,w dB 50 N.299456 Italia Istituto Giordano
UNI EN 140-12:2001 UNI EN 717-1:2007	Acoustic performance Impact transmission		Ln,f,w dB 67 N.299456 Istituto Giordano, Italy
UNI EN 140-8:1999	Acoustic performance Interstorey footfall transmission		naked DLw 17 dB rubber + naked DLw 23 dB rubber + naked +pvc AP DLw 23 dB rubber + naked +ceramic APB DLw 30 dB rubber + naked +moquette AP DLw 29 dB

Environmental characteristics

	P3TTL	P4TTM	P4TTH
VOC ISO 16000 ISO 16200	Air Comfort Gold Eurofins 392-2018-00137301AEN	Air Comfort Gold Eurofins 392-2018-00137301AEN	Air Comfort Gold Eurofins 392-2018-00137301AEN
Other certifications	Cradle to Cradle Certified - Bronze	Cradle to Cradle Certified - Bronze	Cradle to Cradle Certified - Bronze

Differences versus previous versions

Compared to the previous version of this EPD, the SimaPro program and the Ecoinvent database have been updated to versions 9.5.0.1 and 3.9.1 respectively; all collected data, environmental impacts and end-of-life scenarios have also been updated to the new reference year (2023).

In addition, the modelling of the share of steel received from the supplier Marcegaglia has been partially changed through the use of a specific EPD, the same issue for two out of three suppliers compared to the suppliers of the gypsum fiber panel.

References

UNI EN ISO 14040: 2021, Gestione ambientale – Valutazione del ciclo di vita – Principi e quadro di riferimento.

UNI EN ISO 14044: 2021, Gestione ambientale – Valutazione del ciclo di vita – Requisiti e linee guida.

UNI EN ISO 14025:2010, Etichette e dichiarazioni ambientali - Dichiarazioni ambientali di Tipo III - Principi e procedure.

EN 15804:2012 + A2:2019, Sostenibilità delle costruzioni – Dichiarazioni ambientali di prodotto – Regole chiave di sviluppo per categoria di prodotto.

PCR 2019:14 Construction products (EN 15804: A2) (1.11), sviluppata da IVL Swedish Environmental Research Institute, EPD International Secretariat .

Paleari M., Campioli A. 2015, I rifiuti da costruzione e demolizione: LCA della demolizione di 51 edifici residenziali. Ingegneria dell’Ambiente Vol. 2 n. 4/2015.

Wahlström M., Bergmans J., Teittinen T., Bachér J., Smeets A., Paduart A., 2020. Eionet Report - ETC/WMGE 2020/1 Construction and Demolition Waste: challenges and opportunities in a circular economy. January 2020.

Association of Issuing Bodies – European Residual Mixes. Results of the calculation of Residual Mixes for the calendar year 2020. Version 1.0, 2021-05-31.

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Mantanis G., Athanassiadou E., Nakos P., Coutinho A., 2014. A New Process for Recycling Waste Fiberboards. 38th International Wood Composites Symposium.

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