

Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Disposable Framework GRANCHIO

from

Project for Building S.p.A.



Programme:	The International EPD® System, www.environdec.com
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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
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <i>Construction Products, PCR 2019:14, v. 1.3.3. (2024-05-03)</i> <i>UN CPC 369 Other plastic products</i>
PCR review was conducted by: <i>The Technical Committee of the International EPD System. A full list of members is available on www.environdec.com. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat at www.environdec.com/contact.</i>
Life Cycle Assessment (LCA)
LCA Commissioner: <i>Project for Building S.p.A.</i>
LCA Practitioner: <i>Timur Musin, Sustainability Analyst, Ecosphera Srl</i>
LCA Practitioner: <i>Bresciani Cristian, Sustainability Analyst, Ecosphera Srl</i>
LCA Accountability: <i>Ing. Rudiano Testa, Head of Environmental Office, Ecosphera Srl</i>
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by accredited certification body Third-party verification: <i>TÜV Italia S.r.l.</i> is an approved certification body accountable for the third-party verification The certification body is accredited by: <i>ACCREDIA</i>

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes No

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025

Company information

Owner of the EPD:

Project for Building S.p.A., Via Fornace - Mornico al Serio 24050 (BG)

Contact Information:

Giancarlo Zanini, info@projectforbuilding.com

Angelo Zanini, angelo@projectforbuilding.com

Description of the organisation:

Project for Building S.p.A. (Pfb) is a company that operates in the market of plastic recycling and secondary use of recycled materials.

Founded in 1995, it has shortly after developed a formwork for concrete structures made from recycled plastic: Granchio. Driven by enthusiasm and inquisitiveness, the company then expanded its presence on the market offering a variety of products that contribute to the innovation in traditional construction. By embracing a circular economy approach to plastics, wherein materials are reused and recycled to prolong their life cycle, Pfb seeks to minimize the environmental impact created by plastic waste.

Pfb has always managed its activities with the fullest regard for the environment, which is why in 2001 we became a partner of BDM RIFLEX SRL, a company specialized in plastics recycling; we then completely took over the company in 2008. With this acquisition, we realized our idea of recycling materials with the quality assurance of each individual element, thanks to our complete control of the production cycle, from the waste product through to the end product.

20 years of quality, research, and a high level of professionalism have guaranteed our inevitable growth, and today, thanks to the synergies of these resources, the company is able to respond to every need with solutions and high-quality services.

Currently, PFB has a strong national presence, and the company is now expanding into European and global markets.

Product-related or management system-related certifications:

ISO 9001, ISO 14001, ISO 45001

Name and location of production site(s):

Project for Building S.p.A., 24050, Via Fornace snc, Mornico al Serio (BG), Italy

Product information

Product name:

GRANCHIO

Product identification:

GRANCHIO is a disposable formwork made of recycled polypropylene which is used, as an alternative to traditional systems, for the construction of ventilated crawl spaces in both new constructions and renovation projects.

Product description:

When installed, GRANCHIO creates a three-dimensional matrix in which concrete is poured in. The matrix is designed to reduce concrete consumption by creating structural empty spaces that act as ventilation holes in the concrete floor, without reducing the physical properties of the construction.

The formwork allows the implementation of necessary ventilation holes in the concrete floor construction and is designed to support the weight of the operators and the concrete during casting. The useful load varies depending on the capacity of the ground, the underlying lean concrete, and the thickness of the slab. GRANCHIO is equipped with an interlocking connection system which makes it fast and easy to lay the formwork net. Also, its hollow structure allows pipes, ducts, and cables to be positioned in any direction.

GRANCHIO is available in different sizes, tailored to customer needs:

GRANCHIO Size	Weight [kg]
GRA5	1,44
GRA10	1,88
GRA15	1,70
GRA20	1,77
GRA25	1,85
GRA30	1,94
GRA35	2,00
GRA40	2,16
GRA45	2,35
GRA50	2,45
GRA55	2,46

All sizes of GRANCHIO are produced with the same production process, varying only the weight of the final product due to differences in size.

UN CPC code: 369 Other plastics products

Geographical scope: Global

LCA Information

Life Cycle Assessment has been performed by Ecosphera srl on behalf of the Project for Building S.p.A.

Any question related to the assessment used in the current EPD can be sent to Ing. Rudiano Testa (testa@ecosphera.net)

The report issued on:

03/05/2024

Report framework:

LCA has been performed following the requirements of UNI EN 15804:2021, ISO 14025, ISO 14040/14044, EPD General Programme Instructions, and PCR 2019:14 Construction Products (version 1.3.3 from 01/03/2024)

Third-party verification:

LCA verifier:

TUV Italia S.r.l.

Declared unit:

1 kg of Granchio with packaging.

Chosen declared unit allows to adjust the environmental impact according to various shapes produced with the production cycle defined, based on their actual weight.

Reference service life: 50 years.

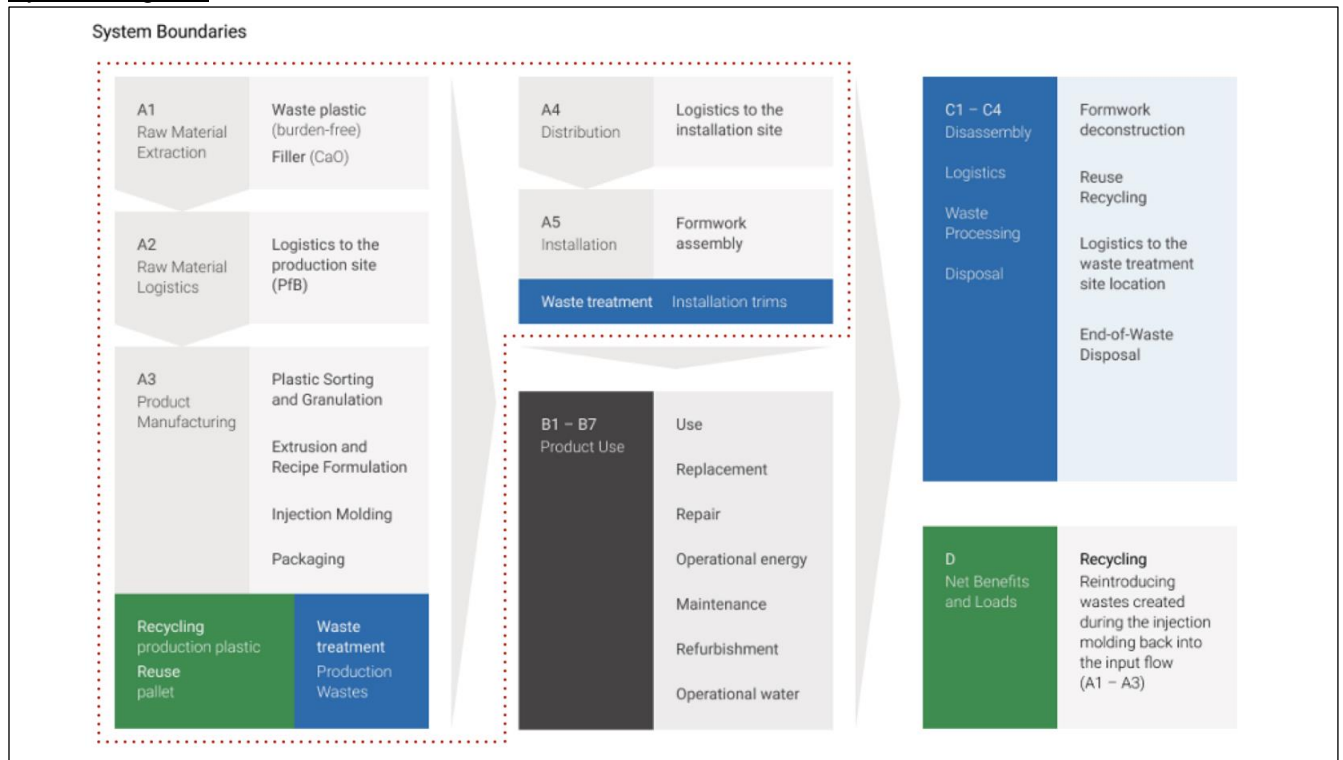
Time representativeness: Analysis utilizes the primary and auxiliary data collected in the period from January 1st, 2022 to December, 31st, 2022.

Database(s) and LCA software used: ecoinvent 3.9.1 database, SimaPro 9.5.0.2 software.

Description of system boundaries:

Cradle to gate with option (A1–A3 + A4 + A5), without module B, C and D, in accordance with the three validity indications in the chapter 2.2.2, *Construction Products, PCR 2019:14, v. 1.3.3. (2024-05-03)*, on the biogenic carbon content: Granchio is physically integrated with the structure of the building during installation so they cannot be physically separated from them at end of life, Granchio is no longer identifiable at end of life as a result of a physical transformation process like cementification and Granchio does not contain biogenic carbon.

System diagram:



More information:

<https://www.projectforbuilding.com/en/construction/granchio/>

Allocation and cut-off rules:

According to EN 15804:2021, mass allocation has been applied where necessary.

The modularity principle, as well as the principle of “polluter pays” have been followed.

The scenario assessed is modeled on the production cycle currently in use.

The next processes have not been included (low significance of impact, unavailability of specific data, and/or high uncertainty of the data available):

- Infrastructure processes (manufacture of equipment used in production, buildings, or any other capital goods);
- Transportation of personnel to and within the plant;
- R&D activities.

The raw material is sourced from the waste polypropylene, which is introduced into the system as a “burden-free” material. System boundary starts with the recycling process necessary to prepare the PP for the secondary use cycle: logistics of waste plastic to the Project for Building’s production site, followed by treatment processes to produce the raw material. During the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has not been used.

Logistics data have been provided both for domestic and EU freight. Average transport freight has been calculated by weight averaging the freight of Italian and European markets, using the mass of transported material as a weighing indicator.

Most of the primary data available has been exclusive to the Project for Building's production site in Mornico al Serio. Recycling and molding of plastic formwork are not the only operations executed at Mornico, components in other materials are also being produced there. These components are outside the scope of the current assessment, as they have no connection to the declared unit, but their impact must be accounted for as these contribute to the site's use of resources and emissions. It has been stated that recycling of plastic and molding of framework corresponds to 72% of production. Inputs and outputs not exclusive to the current system (energy, water, emissions to air, emissions to water, and waste flows) have been adjusted accordingly.

The specific electricity composition mix has been modeled with composition data provided by the supplier who released the GDO and by Project for Building co-generation. Missing points necessary for modeling (residual mix) have been sourced from Ecoinvent.

Purchased Electricity Composition:

Source:	% in the mix	GWP-GHG, kgCO ₂ eq/kWh in the mix
Renewable (GDO) - Bioliqoid	48,46	0,07
Residual mix	7,96	0,05
Co-generation - Natural gas	43,58	0,33

Waste Treatment Mix has been created using the data available from waste characterization forms and the analysis of waste streams. Documentation separates waste streams per their type and nomenclature, assigning a corresponding European Waste Code. EWC has been then matched with waste treatment processes present in the ecoinvent database to create a product-specific waste treatment process.

Following the EN15804 approach to allocation, packaging input has been considered within the A3 stage.

Packaging waste (EoL) has been allocated to A5 instead, as the packaging is shipped together with a product, and its End-of-Life stage is reached only on the construction site.

Modules declared, geographical scope, share of specific data and data variation:

	Product stage			Construction process stage			Use stage					End-of-life stage				Resource recovery stage	
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse / Recovery / Recycling potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-
Geography	EU27	EU27	Italy (IT)	EU27	Global	.	.	.	.	.	.	.	.	.	.	.	.
Share of specific data		100%		100%	100%					- %			- %	- %	- %	- %	- %
Variation – products	0%																Not Applicable
Variation – sites	0%, single production site																0%

LCA Modules

A1 Raw Material Supply

This module relates to the extraction of raw materials necessary to create the formwork (plastic collected for recycling, calcium oxide used as filler), and all the supplementary flows that are necessary to perform these activities.

Bound for recycling and secondary use, plastic is introduced to the current system as a burden-free material.

A2 Raw Materials Logistics

This module relates to the transport of raw materials to the Project for Building production site in Mornico al Serio (BG).

A3 Manufacturing

Relevant production processes for disposable formwork.

Processes include preparation of PP for molding, formulation of PP together with the filler, followed by injection molding and packaging of final products for shipping.

3% of raw material waste is recycled during the molding. It is accounted for in the A3 module as it is a part of the formwork's production process.

Treatment of production waste has been accounted for in the module, using the product-specific waste scenario.

A4 Logistics to the Construction Site

This module accounts for shipping freight from PfB to the construction sites.

All orders products are delivered by road. In the case of ex-works trade, only the destination to the designated location has been included in the inventory.

Logistics scenario:

Information	Unit
Fuel type and consumption of the vehicle or vehicle type used for transport e.g., long distance truck, boat, etc.	Lorry, 16-32 metric ton, EURO4, mixed fuel
Distance	580 km
Use capacity	37% (ecoinvent dataset)
Bulk density of transported goods	110,6 kg/m ³ (average)
Volumetric use capacity factor	<1

A5 Installation

Formwork installation does not require any input flow. However, it may generate plastic cuts that are a consequence of fitting the formwork.

Installation scenario:

Information	Unit
Auxiliary materials for installation	0 kg
Use of water	0 m ³
Use of other resources	0 kg
Quantitative description of the type of energy (location mix) and its relative consumption during the installation	0 kWh
Wastes produced in the installation phase, prior to waste treatment	0,1 kg – installation wastes (plastic). 4,15×10 ⁻⁴ kg – pallet waste, wood. 8,43×10 ⁻⁴ kg – packaging film waste.
Output material flows, that are bound for waste treatment processes, e.g. collection for recycling, energy recuperation, disposal	0,1 kg – installation wastes (plastic). Disposed with construction waste, outside of system boundaries. 4,15×10 ⁻⁴ kg – pallet waste, wood. Disposed with construction waste, outside of system boundaries. 8,43×10 ⁻⁴ kg – packaging film waste. Disposed with construction waste, outside of system boundaries.
Direct emissions to air, soil and water	0 kg

Content information

Product Components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Recycled Polypropylene	0.95–0.97	95–97	0.00
Calcium Oxide	0.03–0.05	3–5	0.00
TOTAL	1.00	100	0.00
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
EUR-EPAL pallet	4.15E-03	0,42	2.26E-03
Packaging film, PE, thickness 100 microns	1.67E-02	1,67	0.00
TOTAL	2.09E-02	2.09	2.26E-03

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per declared unit
None	None	None	None

Biogenic Carbon content	Unit	Weight-% per declared unit
Biogenic carbon content in product	Kg C	0,00E+00

Results of the Environmental Performance Indicators

Mandatory impact category indicators according to EN 15804

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Results per functional or declared unit				
Indicator	Unit	A1-A3	A4	A5
GWP-fossil	kg CO ₂ eq.	1,30E+00	1,08E-01	1,22E-02
GWP-biogenic	kg CO ₂ eq.	-1,98E-01	9,87E-05	8,74E-07
GWP-luluc	kg CO ₂ eq.	5,54E-04	5,30E-05	1,35E-07
GWP-total	kg CO ₂ eq.	1,11E+00	1,09E-01	1,22E-02
ODP	kg CFC 11 eq.	2,58E-08	2,38E-09	6,81E-12
AP	mol H ⁺ eq.	4,16E-03	4,49E-04	2,57E-06
EP-freshwater	kg P eq.	1,62E-04	7,64E-06	3,15E-08
EP-marine	kg N eq.	2,29E-03	1,71E-04	3,26E-06

EP-terrestrial	mol N eq.	1,50E-02	1,83E-03	1,22E-05
POCP	kg NMVOC eq.	4,50E-03	6,57E-04	3,83E-06
ADP-minerals&metals*	kg Sb eq.	3,68E-06	3,51E-07	7,09E-10
ADP-fossil*	MJ	1,64E+01	1,55E+00	4,05E-03
WDP*	m ³	4,72E+00	6,31E-03	6,95E-05
Acronyms	<p>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</p>			

** 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.*

Additional mandatory impact category indicators

Results per functional or declared unit				
Indicator	Unit	A1-A3	A4	A5
GWP-GHG ¹	kg CO ₂ eq.	1,32E+00	1,09E-01	1,22E-02

Additional voluntary impact category indicators

Results per functional or declared unit				
Indicator	Unit	A1-A3	A4	A5
Particulate matter	disease inc.	9,49E-08	8,89E-09	4,39E-11
Ionizing radiation	kBq U-235 eq	3,90E-02	2,07E-03	5,37E-06
Ecotoxicity, freshwater	CTUe	6,15E+00	7,64E-01	5,18E-03
Human toxicity cancer	CTUh	7,63E-10	4,96E-11	1,39E-12
Human toxicity, non-cancer	CTUh	7,90E-10	1,09E-09	2,21E-11
Land use	̑t	1,98E+01	9,22E-01	4,68E-03

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Resource use indicators

Results per functional or declared unit				
Indicator	Unit	A1-A3	A4	A5
PERE	MJ	2,89E+00	9,07E-03	9,60E-05
PERM	MJ	7,34E-03	0,00E+00	0,00E+00
PERT	MJ	2,90E+00	9,07E-03	9,60E-05
PENRE	MJ	3,08E+00	9,66E-03	1,02E-04
PENRM	MJ	1,76E-01	0,00E+00	0,00E+00
PENRT	MJ	3,26E+00	9,66E-03	1,02E-04
SM	kg	3,21E-02	0,00E+00	0,00E+00
RSF	MJ	ND	ND	ND
NRSF	MJ	ND	ND	ND
FW	m ³	7,07E-02	2,21E-04	2,34E-06
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			

Waste indicators

Results per functional or declared unit				
Indicator	Unit	A1-A3	A4	A5
Hazardous waste disposed	kg	1,09E-02	3,84E-05	8,35E-05
Non-hazardous waste disposed	kg	6,84E-02	7,56E-02	5,74E-03
Radioactive waste disposed	kg	6,27E-06	5,03E-07	1,31E-09

Output flow indicators

Results per functional or declared unit				
Indicator	Unit	A1-A3	A4	A5
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	3,23E-02	0,00E+00	2,08E-02
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00

LCA Interpretation

Life cycle assessment of the disposable formwork by Project for Building has been performed following ISO14044, UNI EN 15804, and PCR 2019:14 Construction Products (v 1.3.3.) to provide a credible base to develop an Environmental Product Declaration.

Inventory analysis has extensively used the specific data available about processes, to sustain the quality of data for a sufficiently precise assessment of environmental impacts.

Results of the impact assessment show the advantages of the secondary use of polypropylene, as energy are the main contributors in all the impact categories assessed. Deriving from fossil raw materials, the reuse of waste plastic allows for the reduction of the impacts connected to the extraction and transformation of oil and gas necessary to create a virgin polymer.

More than half of the impact in each category comes from the production phase (transformation of incoming plastic + injection molding). The main contributors to the system's climate change category are methane and coal used as energy sources. Additionally, waste treatment processes and the production of calcium oxide contribute to the emissions.

As shown by LCI and LCIA, the main hotspot in the life cycle of recycled plastic lies in the use of energy, which is extensively used in the A1–A3 stage. The climate change indicator of the A1 – A3 stage is 1,11 kg CO₂eq, which equals 90% of the indicator of the system. Processed material is responsible for 20% of the ozone depletion potential of the system, 27% of the acidification potential, 22% of marine eutrophication, and 32% of photochemical ozone formation. Energy is also responsible for 58% of the fossils resource use, 33% of the LULUC and 47% of the land use.

Disclaimers

Infrastructure/capital goods are excluded from the impact assessment.

Use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C is discouraged.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins, and/or risks associated.

Additional environmental information

Uncertainty analysis has been performed using the Monte Carlo analysis, SimaPro method 'EN 15804+A2 (adapted) V1.00 / EF 3.1 normalization and weighting set', 250 iteration cycles, confidence interval: 95%.

Overall results show less than or equal to 15% CV in mandatory indicators such as acidification, climate change, terrestrial eutrophication, ozone depletion, particulate matter, POCP, and fossil resource use. This indicates the credibility of the assessment model and good repeatability of the assessment results.

To guarantee the durability of the product and minimize installation wastes, Project for Building provides instructions on the correct laying of the formwork matrix, [available on the product's website](#).

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