4AKUSTIK SOUND-ABSORBI PANELS



BASED ON: PCR 2019:14 version 1.11, 2020-09-14

EN 15804:2012+A2:2019,

ISO 14025



S-P-04581

CPC CODE 37990



PROGRAMME: The International EPD System www.environdec.com

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fantoni

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Programme Information

EPD REFERENCES

EPD OWNER: FANTONI SPA, VIA EUROPA UNITA, 1/33010 OSOPPO

PROGRAM OPERATOR: EPD INTERNATIONAL AB, BOX 21060, SE-INFO@ENVIRONDEC.COM

INDEPENDENT VERIFICATION

The declaration has been developed referring to the International EPD v.3.01. Further information and the document itself are available at: we geographical area: Global according to sales market conditions

ISO standard ISO 21930 and CEN standard EN 15804 served as core PCR 2019:14 version 1.11 "Construction Products"

PCR review was conducted by: The Technical Committee of the Intern of members. Review chair: Claudia A. Peña, University of Concepcior www.environdec.com/contact.

Independent verification of the declaration and data, according to EN ISO 14025:2018

Third party verifier: Ugo Pretato - Recognized Individual Verifier

Approved by: The Technical Committee of the International EPD® Syst

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

Environmental declarations published within the same product categ particular, EPDs of construction products may not be comparable if th EPD owner has the sole ownership, liability and responsibility of the

CONTACTS

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Technical support to FANTONI spa was provided by Life Cycle Engine (info@studiolce.it, www.lcengineering.eu).

LM, SWEDEN;		
EPD process certificat (Internal)	tion EPD verifica (External)	tion
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FANTONI S.p.A. Dsoppo UD / Italy ACON S.p.A. Tilla Santina UD / Italy Matrinis UD / Italy Matrinis UD / Italy

Fantoni



Fantoni is a world leader in the production of MDF and chipboard panels, laminates and melamine papers, office systems and sound-absorbing systems.

Fantoni is a solid industrial organisation that looks to the future. A group of businesses with deep local roots, driven by a global vision. An integrated system that strives for quality at every step, from self-generated energy to logistics, from

design to application of the product. A considered approach to sustainability and a precise paradigm for operations: the circular economy. Constant investment in research and in the development of processes, systems and products. A passion for architectural and design culture, expressed on a constantly-growing industrial campus. A clear code of ethics, shared on all levels.

In recent decades, a precise investment policy has enabled Fantoni to grow, improving energy efficiency, reducing greenhouse gas emissions, increasing the use of recycled resources and eco-friendly processes, creating products that are durable and safe for people's health.



Scope and type of EPD

The approach used in this EPD is "cradle to gate with options" one. The life cycle phases included in the product system boundary are shown below.

TABLE OF MOD	JLES																
		RODUC STAGE	Т	CONSTRUC PROCESS S					USE STAGE				EN	D OF LII	FE STAC	3E	BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
	Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	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	С3	C4	D
Module declared	Х	Х	Х	Х	ND	ND	ND	ND	ND	ND	ND	ND	Х	Х	Х	Х	Х
Geography	WLD	WLD	IT	WLD	-	-	-	-	-	-	-	-	WLD	WLD	WLD	WLD	WLD
Specific data used		> 90%				-	-	-	-	-	-	-	-	-	-	-	-
Variation-products		< 10%				_	-	_	-	_	-	-	-	-	-	-	-
Variation-sites ¹	Not	Applica	ble			_	-	_	-	_	-	_	-	-	-	-	-

SOFTWARE: SimaPro 9.2.0.1 (www.pre.nl) MAIN DATABASE: Ecoinvent 3.6, Plastics Europe REPORT LCA: Life Cycle Assessment (LCA) for manufacturing melamine paper - faced sound-absorbing panels GEOGRAPHICAL SCOPE OF THE EPD: World according to sales market conditions TYPE OF EPD: Product EPD for sound-absorbing panels REFERENCE YEAR: 2020

1: One production facility splitted in two locations. Melamine paper - faced MDF panels are produced in the factory located in Osoppo (Udine, Italy). Drilling and milling operations are performed in the factory located in Attimis (Udine, italy).

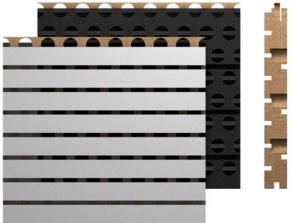
Detailed product Description



4akustik[®] is a sound-absorbing system for use on both walls and ceilings, manufactured using MDF boards as core material. MDF panels are produced from softwood beech fibers which are glued and pressed with a melamine-ureaformaldheyde resin as a synthetic binder. The MDF surface finishes can be raw, melamine, veneer or lacquered.

The rear of the panels can be covered with a sound-absorbing non-woven fabric layer.

The high performance levels are achieved The material content of the product is thanks to research into the theory of Helmholtz summarized in Table 2. Packaging materials used resonators and sound dissipation using porous for the finished product consist of wood pallet, textures. 4akustik® combines excellent soundcardboard, plastic film and straps. absorption performance with the highest health and safety standards. The panel, in its EC-certified Panels can be combined with a polyester fibre version, classed as "B-s1,d0" for its reaction or rockwool layer ensuring high level of soundto fire, also conforms to the highly exacting absorption. Panels can be easily installed using Japanese "F4 star" standard, with reference to metallic structure attached to the wall or the its extremely low formaldehyde content, in line ceiling with no use of adhesive or resins. with JIS parameters. 4akustik® contributes toward These materials are considered as optional in this satisfying prerequisites and credits under LEED[®]. EPD. Further information about material content 4akustik[®] is also available in a version without and environmental performance are reported in in reaction-to- fire certification, and with class E1 the 'Additional Information' section below. formaldehyde emissions.



The 4akustik[®] panel products are fabricated with various perforation or groove patterns and configurations.

Technical data for the sound-absorbing panel 13/3 (13 mm of flat faced surface with 3 mm milled grooving) with 12% actual perforated surface, considered as the representative product of the whole 4akustik[®] sound-absorbing system family, are summarized in Table 1, in accordance with the indicated technical standars.



Table 1 - TECHNICAL SPECIFICATIONS FOR THE 4AKUSTIK 13/3 SOUND-ABSORBING PANEL FACED WITH MELAMINE PAPER

TECHNICAL DATA	VALUE	UNITS
Bulk density	590	kg/m³
Declared thickness	16	mm
Surface weight per declared unit	9,6*	kg/m²
Reference Service Life	50 (default value from reference PCR)	years
Sound absorption class (DIN EN ISO 11654)	WSAC = 0,70 (L), SAC = C (for ceiling applications) WSAC = 0,70, SAC = C (for wall applications)	-
Reaction to fire class (UNI EN 13501:1)	B-s1, d0	-
Sound absorption coefficients (ASTM C423)	NRC = 0,75, SAA = 0,76 (for ceiling applications) NRC = 0,75, SAA = 0,74 (for walls applications)	-
Formaldehyde class	E1 (Europe) F**** (Japan)	-

General Manufacturing **Description**



MDF boards

MDF boards are formed by breaking down hardwood logs and twigs into small chips and then into wood fibres using a refiner. Wood fibers combined with additives are glued togheter using a resin binder and made into panels by high temperature pressing. The MDF boards are produced in Fantoni's plant located in Osoppo (Udine, Italy).

Melamine paper-faced MDF boards

Enobbled MDF panels are manufactured by appling one or more layers of melamine impregnated decorative paper above the MDF board surface. The melamine impregnated decorative paper is produced by Lacon Spa, company belonging to Fantoni's group located in Villa Santina (Udine, Italy).

*The value includes the non-woven fabric sound-absorbing coating

Table 2 - MATERIAL CONTENT FOR THE 4AKUSTIK 13/3 SOUND ABSORBING PANEL FACED WITH MELAMINE PAPER (information in weight % and one square meter)					
COMPONENT MATERIAL	kg/m ²	%			
PRODUCT					
Beech wood	6,56	69,1%			
Melamine-urea-formaldehyde resin	1,77	18,6%			
Ammonium polyphosphate	0,98	10,3%			
Paraffin	0,035	0,4%			
Paper melamine impregnated	0,16	1,7%			
Total Product	9,50	100%			
COVERING					
Non-woven fabric	0,075	100%			
PACKAGING					
Wood pallet	0,378	90,2%			
Polyurethane film	0,029	6,9%			
Polystyrene straps	0,008	1,9%			
Cardboard	0,004	1,0%			
Total Packaging	0,420	100%			

The product does not contain substances from the candidate list for authorization of the REACH legislation with a concentration above 0,1% by weight





Milled and drilled sound-absorbing systems

Melamine paper-faced MDF boards are customized with different types of drilling and milling according to the required sound-absorption level. Drilling and milling operations are performed in PATT, Fantoni's plant located in Attimis (Udine, Italy)

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Environmental Performance

Melamine paper-faced 4akustik 13/3 sound-absorbing panel

The detailed environmental performance (in terms of potential environmental impacts, use of resources and waste generations) is presented for the declared modules (A1-A2-A3-C1-C2-C3-C4-D). Construction installation (A5) and use phase (B1-B7) are modules not declared (ND).

DECLARED UNIT (D.U.): The declared unit is 1 square meter of melamine paper-faced sound-absorbing panel covered with a layer of non-woven fabric and packed for final shipment over a 50-year period, represented by reference product 13/3 belonging to the product's family 4akustik[®] sound-absorbing systems. This EPD covers all 4akustik[®] sound-absorbing panels as none of the declared environmental performance indicators differ by more than 10% between any of the included products.

ENVIRONMENTAL IMPACTS

ENVIRONMENTAL IMPACT INDICATORS	UNITS / D.U	UPSTREAM AND CORE PROCESS	DOM/NSTREAM PROCESS							
		A1-A3	A4	C1	C2	C3	C4	D		
GWP	kg $\rm CO_2$ eq	2,38E+01	1,24E+00	0,00E+00	5,87E-01	0,00E+00	0,00E+00	5,47E-01		
GWP,f	kg $\rm CO_2$ eq	2,30E+01	1,24E+00	0,00E+00	5,87E-01	0,00E+00	0,00E+00	5,60E-01		
GWP,b	kg $\rm CO_2$ eq	7,78E-01	6,89E-05	0,00E+00	3,15E-05	0,00E+00	0,00E+00	-9,70E-03		
GWP,Iuluc	kg $\rm CO_2$ eq	3,93E-02	1,06E-05	0,00E+00	4,45E-06	0,00E+00	0,00E+00	-3,90E-03		
GWP, ghg	kg $\rm CO_2$ eq	2,30E+01	1,24E+00	0,00E+00	5,87E-01	0,00E+00	0,00E+00	5,57E-01		
ODP	kg CFC11 eq	4,65E-06	2,87E-07	0,00E+00	1,36E-07	0,00E+00	0,00E+00	-3,20E-07		
AP	mol H+ eq	1,38E-01	6,78E-03	0,00E+00	3,36E-03	0,00E+00	0,00E+00	-9,52E-03		
EP,f	kg P eq	5,73E-04	1,01E-06	0,00E+00	3,20E-07	0,00E+00	0,00E+00	-2,00E-04		
EP,m	kg N eq	2,98E-02	2,44E-03	0,00E+00	1,35E-03	0,00E+00	0,00E+00	-4,64E-04		
EP,t	mol N eq	5,84E-01	2,68E-02	0,00E+00	1,49E-02	0,00E+00	0,00E+00	-6,43E-03		
POCP	kg NMVOC eq	9,52E-02	7,03E-03	0,00E+00	3,84E-03	0,00E+00	0,00E+00	-3,08E-03		
ADPE	kg Sb eq	3,83E-05	5,48E-08	0,00E+00	2,49E-08	0,00E+00	0,00E+00	4,85E-08		
ADPF	MJ	4,07E+02	1,76E+01	0,00E+00	8,32E+00	0,00E+00	0,00E+00	-7,31E+01		
WDP	m ³	2,26E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-6,39E-02		

GWP Global warming potential, total GWP,f Global warming potential, fossil

GWP,b Global warming potential, lossing GWP,b Global warming potential, biogenic

GWP,luluc Global warming potential, land use & land use change

GWP,ghg Global warming potential, excluding biogenic uptake, emission and storage

ODP Ozone depletion potential

AP Acidification Potential

EP,f** Eutrophication potential, freshwater

- EP,m Eutrophication potential, marine
- EP,t Eutrophication potential, terrestrial

POCP Photochemical ozone creation potential ADPE* Abiotic depletion potential minerals & metals ADPF* Abiotic depletion potential fossil fuels WDP* Water use deprivation potential

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

**1 kg of phosphorus is equivalent to 3,07 kg of phosphate.

Additional environmental impact indicators are computed in the LCA report but not reported in the EPD.

RESOURCE USE PER DECLARED UNIT

INDICATORS DESCRIBING UNITS / D.U RESOURCE USE		UPSTREAM AND CORE PROCESS								
		A1-A3	A4	C1	C2	C3	C4	D		
PERE	MJ	3,81E+02	2,53E-02	0,00E+00	1,22E-02	0,00E+00	0,00E+00	-6,27E+00		
PERM	MJ	9,46E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00		
PERT	MJ	4,76E+02	2,53E-02	0,00E+00	1,22E-02	0,00E+00	0,00E+00	-6,27E+00		
PENRE	MJ	4,64E+02	1,72E+01	0,00E+00	8,12E+00	0,00E+00	0,00E+00	-8,51E+01		
PENRM	MJ	4,93E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00		
PENRT	MJ	4,69E+02	1,72E+01	0,00E+00	8,12E+00	0,00E+00	0,00E+00	-8,51E+01		
SM	kg	4,56E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00		
RSF	MJ	2,72E-03	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		
FW	m ³	5,64E-01	3,65E-04	0,00E+00	1,65E-04	0,00E+00	0,00E+00	-2,25E-02		

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

OUTPUT FLOWS AND WASTE CATEGORIES PER DECLARED UNIT

INDICATORS UPSTREAM AND CORE DESCRIBING PROCESS WASTE UNITS / D.U CATEGORIES AND			BENEFITS AND LOADS BEYOND SYSTEM BOUNDARIES					
OUTPUT FLOWS		A1-A3	A4	C1	C2	C3	C4	D
HWD	kg	8,78E-04	4,59E-05	0,00E+00	2,20E-05	0,00E+00	0,00E+00	-2,78E-05
NHWD	kg	1,83E+00	1,52E-03	0,00E+00	4,39E-04	0,00E+00	0,00E+00	2,53E+00
RWD	kg	5,39E-04	1,27E-04	0,00E+00	6,03E-05	0,00E+00	0,00E+00	-1,77E-04
CRU	kg	5,57E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,20E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	4,71E+00	0,00E+00	0,00E+00	0,00E+00	9,60E+00	0,00E+00	0,00E+00
EE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

HWD Hazardous waste disposed NHWD Non-hazardous waste disposed RWD Radioactive waste disposed CRU Components for re-use 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 raw materials

RSF Use of renewable secondary fuels

NRSF Use of non-renewable secondary fuels

FW Use of net fresh water

MFR Materials for recycling

MER Materials for energy recovery

EE* Exported energy

*This indicator is reported as a net zero, based on the assumption that the energy efficiency of the combustion in Module D is the same for the combusted discarded product as for the substituted energyware.



Calculation Rules



Α1 **UPSTREAM** Process

A2+A3 CORE Process A4+C1+C2+C3+C4 **DOWNSTREAM** Process

According to the PCR 2019:14 v.1.11 the main activities are listed and divided in three subsystems: UPSTREAM Process, CORE Module, Downstream Process

LCA METHODOLOGY

The environmental burden of the product has been calculated according to PCR 2012:14, v.1.11. This declaration is a "cradle to gate with options" EPD type, based on the application of Life Cycle Assessment (LCA) methodology to the whole life cycle system.

In the whole LCA model, infrastructures and production equipments are not taken into account. Melamine paper - faced MDF boards at plant level were described by using specific data from Osoppo factory (Udine, Italy). Drilling and milling operations were described by using specific data from PATT, Fantoni's factory located in Attimis (Udine, Italy). Data representing material use for melamine coating paper production were provided by Lacon Spa, belonging to Fantoni Group, while secondary data from the main databases were used to characterize energy consumption flows.

Resins and glues are internally produced in Fantoni's plant located in Osoppo. However, in this EPD data describing glue and resins production are not specific from Osoppo's factory: secondary data from the main databases were used.

The use phase of the product is not considered in this EPD (B1-B7). No impacts are associated with the use of the product over the Reference Service Life (B1).

Maintainance operations are performed with no

energy or material consumption as panels can be cleaned and maintained with a soft cloth (B2). Repair/replacement/refurbishment activities are not relevant during the lifetime of the product, based on Fantoni's experience (B3-B5).

No impacts are associated to modules B6-B7 as there is no operational energy or water use during the lifetime of the product.

Customized LCA questionnaires were used to gather in-depth information about all aspects of the production system, in order to provide a complete picture of the environmental burden of the system (for example, raw materials specifications, process efficiencies, air emissions, waste management). According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results.

According to the adopted methodological approach, the carbon biogenic balance over the product lifecycle is neutral: biogenic carbon absorbed during the plant growth is released back to atmosphere at the end of life. Biogenic carbon content in the product: 3.24 kgC. Biogenic carbon content in accompaying packaging: 0,18 kgC. 1kg of biogenic carbon is equivalent to 3,67 kg of CO₂.

Upstream Process

(A1 Raw material supply)

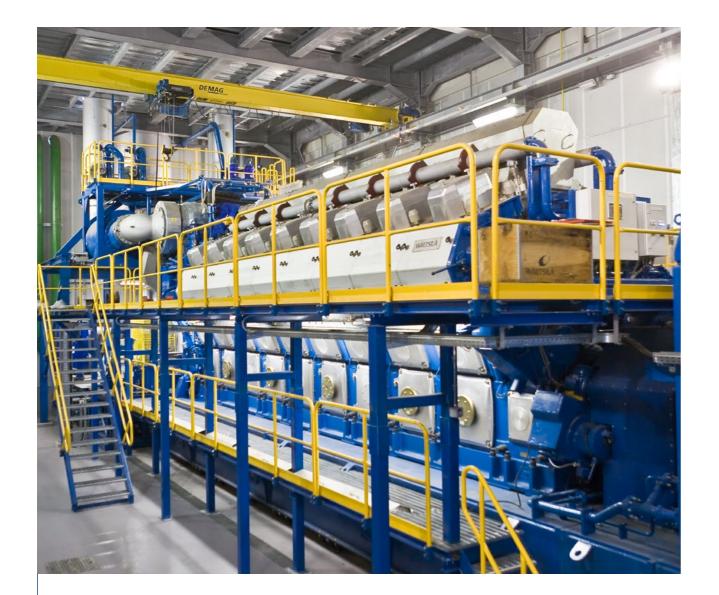


- Raw materials supplying and processing;
- Generation of electricity;
- Extraction and processing of natural gas and other fuels for module A3 energy demand.



Core Process

(A2Transportation + A3 Manufacturing)



- Transport of raw materials to the manufactuting site (distances estimated considering the transported quantities and the distances from suppliers sites to Osoppo plant); transport of the melamine-faced MDF board from Osoppo plant (Udine, Italy) to PATT (Attimis, Italy);
- Natural gas and other fuels combustion for energy production;
- Treatment process of waste generated by the manufacturing process;
- Ancillary production;
- Packaging for shipment to final destination;
- Manufacturing process including MDF boards production, application of melamine coating decors and finishing milling and drilling operations.

Downstream Process

(A4 Transport to final destination + C1 De-construction/demolition + C2 Transport + C3 Waste Processing + C4 Disposal)



- km), Central Italy (800 km) and South Italy (800 km) to calculate the environmental impacts.
- Dismantling operations required to remove the product from the place of installation. Dismantling operations are performed manually with no energy consumption. Therefore no emissions are associated to module C1.
- model a representative distance of 150 km by truck has been considered.
- Waste processing of material flows intended for reuse, recycling and energy recovery. At the end of life, the product is assumed to be incinerated with energy recovery. The adopted EoL scenario is based on EU's circular economy strategies to increase material recovery and landfill diversion of MDF boards at the end of life stage.
- impacts of the energy generation as well as impacts associated to the MDF boards combustion process are included in this module.



Transport to customers. Distances estimated considering the transported quantities from Osoppo plant to the client . The final product is delivered to many national (75% of the total sold product) and international areas. For deliveries of the finished product in Italy an average distance by truck is used for North Italy (500

Transportation of waste materials at the end-of-life (to a recycling site or to a final disposal site). In the LCA

Environmental benefits of energy recovery at the product's end of life are described in module D. Avoided



Additional Information

TRANSPORT TO CUSTOMERS

Tabella 3 - TRANSPORT TO CUSTOMERS		
PARAMETER	VALUE	UNIT
Vehicle type	Long distance lorry	-
Vehicle load capacity	16-32	t
Fuel type and consumption	0,038 kg of diesel to transport 1 tonn for 1 km	-
Average distance to site	875	km
Capacity utilisation (including empty returns)	95	%
Bulk density of transported products	1200	kg/m ³
Capacity utilisation (volumetric factor)	1	-

ENERGY CONSUMPTION

Manufacturing process electricity supply and consumption is from different sources: 67% comes from 100% renewable power certified by Guarantee of Origin, 16% from national electricity grid, 17% selfproduced by cogeneration. The weighted average emission factor used for electricity is 0,05 kg CO_/kWh (calculated using the GWP-GHG indicator).

ADDITIONAL MATERIALS

As specified above, a rockwool or polyester fibre layer can be positioned above the panel ensuring higher levels of sound absorption. Furthermore, panels can be easily installed using metallic profiles attached to the wall or the ceiling. Material content for these materials are summarized in Table 4 in order to provide clear and transparent information to Fantoni's stakeholders.

The use of a rockwool or polyester fibre layer results in higher impacts associated to the environmental indicators listed in the above section "Environmental Performance". If a sound-absorbing layer is applied, an increase in the GWP-GHG value is observed (up to 14% for the rockwool and up 16% for the fibre polyester). Similarly, the use of the metallic profiles results in higher values of GWP-GHG (between 9,2% and 14,2% depending on metallic profiles weight and composition).

(information refers to one square meter)	AYERS AND THE METALLIC STRUCTURES
COMPONENT MATERIAL	kg/m²
SOUND-ABSORBING LAYER	
Rockwool	2
Polyester fibre	0,8
STRUCTURES	
Stainless steel	
Galvanized steel	0,84 ÷ 1,22*
Prepainted steel	

*Range of values describing the weight of metallic profiles used to install the panels



MAIN REFERENCES

PCR 2019:14 version 1.11 "Construction Products" (2021)

 General Programme Instructions for The International EPD[®] System, version 3.01 (2019)

EN 15804:2012+A2:2019 "Sustainability of Construction Works - Environmental Product Declaration - Core rules for the product category of construction products" (2019)

• LCA Report "Life Cycle Assessment (LCA) for manufacturing melamine paper - faced sound-absorbing panels" (2021)

DIFFERENCES VERSUS PREVIOUS VERSIONS

• Editorial changes compared to the previous version: a typing error in the title at the cover page has been corrected, the term "acoustical panels" which was used throughout the document has been replaced by the term "sound-absorbing panels", the reference to Table 4 at page 16 has been corrected.

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