ENVIRONMENTAL PRODUCT DECLARATION

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

RECYCLED RUBBER SOUND BARRIER

HATKO

TURKEY EPD® ENVIRONMENTAL PRODUCT DECLARATIONS

EPD® THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

Programme
International EPD System
www.environdec.com

EPD Registration No
SP-04129

Programme Operator
EPD International AB

Publication Date
2022-02-15

Local Operator
EPD Turkey

Valid Until
2027-02-14

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: environdec.com

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HATKO | Recycled Rubber Sound Barrier

PROGRAMME INFORMATION

HATKO 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.**

Programme Information

Programme Information

Programme	The International EPD® System
Address	EPD International AB Box 21060 SE-100 31 Stockholm, Sweden
Website	www.environdec.com
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Information about verification and reference PCR:

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

Product category rules (PCR)
PCR 2019:14 Construction products (EN 15804:A2) Version 1.1

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

Independent third-party verification of the declaration and data, according to ISO 14025:2006

☐ EPD process verification ☑ EPD verification

Third party verifier
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Approved by
International EPD System Technical Commiee, supported by the Secretariat

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

☐ Yes ☑ No

LCA Study & EPD Design Conducted by

SEMTRIO

Semtrio Sustainability Consulting
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HATKO | Recycled Rubber Sound Barrier

COMPANY INFORMATION

OWNER OF THE EPD

Hatko Kauçuk A.Ş.
Osmaniye OSB, Turkmen
Mah. Fuat Tosyalı Cad. No:12
Toprakkale/Osmaniye

CONTACT
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COMPANY INFORMATION

Since 2016, Hatko Kauçuk has been manufacturing Sound Barriers from the recycled rubber material. Hatko is the first manufacturer in Turkey that achieved EU standards for sound barriers.

The granulated rubber used in the product comes from the post-consumer recycled tires within Turkey, which prevents consumption of virgin material use; which provides a cost efficient product.

Hatko Kauçuk has branches and manufacturing facilities in Istanbul, Ankara, İskenderun, İzmir, Antakya and Osmaniye. In the sound barrier production plant location, Hatko Kauçuk and its sister companies operate side-by-side. Thus, Hatko Kauçuk meets its own needs by using its sister companies' products as filling in the sound barrier manufacturing, minimizing the emissions caused by raw material transport.

Production Site
Hatko Kauçuk A.Ş.
Osmaniye OSB, Turkmen
Mah. Fuat Tosyalı Cad. No:12
Toprakkale/Osmaniye

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HATKO | Recycled Rubber Sound Barrier

PRODUCT INFORMATION

Post Consumer Recycled Rubber Sound Barrier

Post Consumer Recycled Rubber Sound Barrier which is manufactured in Hatko's Osmaniye production plant has the dimensions of 100 cm x 200 cm x (+-5%) and a thickness of 80 mm (+-5%) as one main product. While the reinforcement in its inner structure adds strength, the 10 cm x 10 cm sound insulation chambers on the surface ensure soundproofing. Additionally, the decorative turf on the surface adds visual aesthetics.

Intended Use of Product

Hatko Sound Barriers that allow you to reach a quality living standard, decrease the sound level at maximum level in areas such as highways with high vehicle traffic, train and tram routes, double roads, large cooling groups and chiller units increase the life quality of people living or working in those areas at a certain level.

Functional Unit

	Value	Unit
Functional Unit	1	m2
Grammage	72.6	kg/m2
Conversion factor to 1 kg	0.014	-

Geographical scope

Global

Technical Specifications

Product Group Classification

UN CPC Code: 36210 – Reclaimed rubber

Production Standards	Sub Standards	Test*
EN 1793	EN 1793-1	Highway traffic noise reduction devices - Test method for determining acoustic performance - Part 1: Specific characteristics of sound absorption in common sound field conditions
	EN 1793-2	Highway traffic noise reduction devices - Test method for determining acoustic performance - Part 2: Specific characteristics of sound insulation in common sound field conditions
	EN 1793-3	Road traffic noise reduction devices - Test method for determining acoustic performance - Part 3: Normalized traffic noise spectrum
	EN 1793-4	Road traffic noise reduction devices - Test method for determining acoustic performance - Part 4: Intrinsic properties - On-site values of sound diffraction
	EN 1793-5	Road traffic noise reduction devices - Test method for determining acoustic performance - Part 5: Intrinsic properties - In situ values of sound reflection directly in sound field conditions
EN 1794	EN 1794-1	Road traffic noise reduction devices - Non-acoustic performance - Part 1: Mechanical performance and stability requirements
	EN 1794-2	Highway traffic noise reduction devices - Non-acoustic performance - Part 2: General safety and environmental requirements
	EN 1794-3	Highway traffic noise reduction devices - Non-acoustic performance - Part 3: Reaction to fire - Combustion behavior and classification of noise reduction devices
EN 14389	EN 14389-1	Highway traffic noise reduction devices - Long-term performance evaluation procedures - Part 1: Acoustic properties
	EN 14389-2	Highway traffic noise reduction devices - Long-term performance evaluation procedures - Part 2: Non-acoustic properties
EN 16272	EN 16272-1	Railway applications. Track. Noise barriers and related devices acting on airborne sound propagation. Test method for determining the acoustic performance. Part 1: Intrinsic characteristics - Sound absorption in the laboratory under diffuse sound field conditions
	EN 16272-2	Railway applications. Track. Noise barriers and related devices acting on airborne sound propagation. Test method for determining the acoustic performance. Intrinsic characteristics. Airborne sound insulation in the laboratory under diffuse sound field conditions

*All the tests above have been applied in NANDO accredited laboratories.

Production

In the sound barrier production plant, the process starts with aggregating granulated rubber, reinforcement, and chemicals. This process takes place with a mixing machine. The raw materials and a desirable quantity of water are placed into this mixing machine and mixed until the it reaches the required consistency.

After the mixture is poured into a press machine that consumes only electricity then the pressing process is applied. As a result of this pressing process, the mixture becomes solid, and the sound barrier is created. When it cools down, synthetic turf is stapled onto the sound barrier in a square shape. The reason for this process is that the sound barrier looks visually aesthetic.

After the visual process is completed, the product is ultimately ready and packaged to be delivered to the customer.

LCA Information

Functional Unit
1 square meter of Post Consumer Recycled Rubber Sound Barrier manufactured in Osmaniye facilitate (TR).

Reference service life
Not applicable.

Time representativeness
The production data in this LCA study represents the period of 1st March 2021 and 31st March 2021.

Database(s) and LCA software used
SimaPro v9.2 and Ecoinvent v3.7.1

Description of system boundaries
Cradle to gate (A1-3) with options, modules C1-C4, module D.

Data quality and data collection
According to EN 15804:2012+A2:2019 specific data was used for module A3 (Processes the manufacturer has influence over) and was gathered from Hatko Kauçuk (Hatko Kauçuk A.Ş.) plant. Specific data includes actual product weights, amounts of raw materials used, product content, energy consumption, transport figures, water consumption and amounts of wastes. For A1 and A2 modules, according to EN 15804:2012+A2:2019, generic data was applied and was obtained from Ecoinvent v3.7.1

Allocation
Mass allocation has been applied for materials for recycling output according to EN 15804:2012+A2:2019.

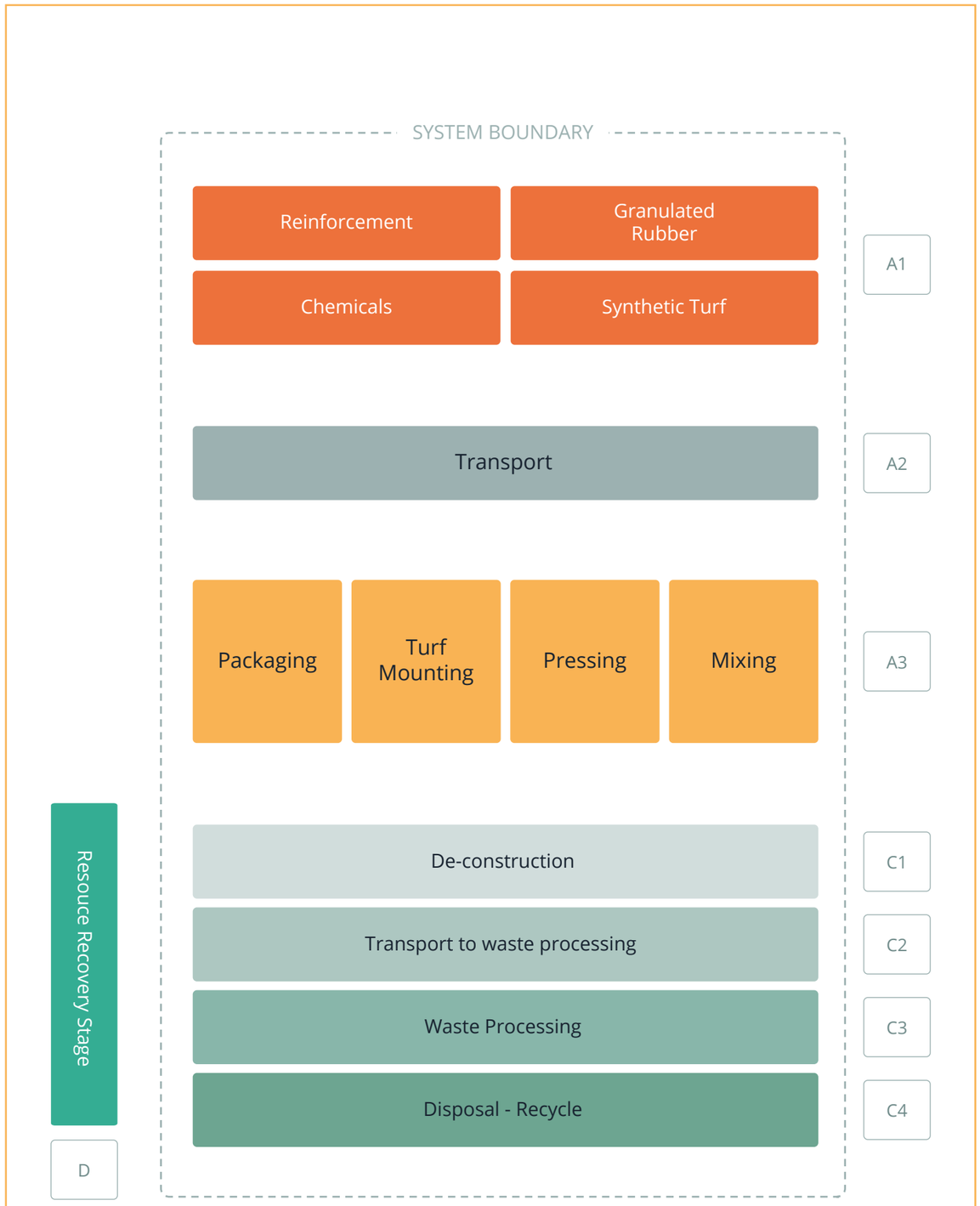
Cut-off rules
Life Cycle Inventory data for a minimum of 99% of total inflows to the three life cycle stages have been included and a cut-off rule of 1% regarding energy, mass and environmental relevance was applied. Impacts caused by treatment operations have been calculated lower than 1% environmental relevance.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation

	Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Resource Recovery Stage
	Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintanence	Repair	Replacement	Refurbishment	Operaitional energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling Potential
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	TR	-	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	>99.5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	Not Relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	Not Relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

ND: Not declared
X: Declared

System Diagram



Description Of Declared Modules

A1 - Raw Materials Supply

This module into account raw material extraction, processing and energy used in the raw material production process, handled by the raw material manufacturer.

A2 - Transport to the Manufacturer

This module include transportation of the raw materials from supplier to factory gate. Transportation types are considered as seaway and road. Internal transport in the manufacture area of the EPD owner is also considered in this module.

A3 - Manufacturing

This module includes energy and water consumption and waste generation during. Additionally, packaging materials are covered in this module. Followed production processes are as;

- Mixing
- Pressing
- Turf Mounting
- Packaging

C1 - De-construction

The dismantling of the post consumer recycled rubber sound barrier has a very low impact considering the impact throughout the life of the de-construction. C1 can be ignored according to the PCR, whereas the rest of the modules are included using national and UK scenarios.

The de-construction process is handled via electric energy; however, dismantling only 1m2 of Post Consumer Recycled Rubber Sound Barrier from the building is in need of an insignificant amount of energy, and following the cut-off rules of LCA study, the amount constitutes for <%1, therefore a cut-off rule is applied and environmental impact of the de-construction process is not considered in this study.

C2 - Transport to Waste Processing

An average distance of 100 km has been assumed for the transport to recycling facility. Transport is calculated on the basis of a scenario with the parameters described in the following table.

Parameters C2 Module	
Transport by road*	Lorry, 16-32 metric ton
Distance (km)	100
Database	Ecoinvent v3.7.1

C3 - Waste processing for reuse, recovery and/or recycling

This module includes the energy consumption required for granulated rubber product in the recycling process.

C4 - Final disposal

100% of the used product after the lifetime will be collected and recycled into the manufacturing system. It is assumed that 1% of the product is lost during de-construction and 99% reached the sorting/ recycling facility. The recycling rate of rubber products is assumed to be 95%; making up a total of 94.05% of end-of-life products recycled to be used again in construction projects or construction material manufacture process, and the remaining 4.95% end-of-life products being sent to landfill.

D - Reuse, Recovery or Recycling Potential

Post consumer Recycled rubber, reinforcement materials and synthetic turf inputs to the production stage are subtracted from the sound barrier to be recycled at end of life in order to obtain the net rubber, reinforcement materials, and synthetic turf outputs from the product system. This remaining net rubber, net reinforcement material, and net synthetic turf are then sent to recycling. Module D reports the environmental aspects of recycled scrap generated at the end of life minus that used at the production stage.

In the manufacturing system, at this LCA study period, some of the inputs are post-consumer tires that enter the manufacturing system.

HATKO | Recycled Rubber Sound Barrier Environmental Product Declaration

Information on which life cycle stages are not considered

This EPD only cover the Cradle to Gate A1-3, C1-4 and D modules because other modules are very dependent on particular scenarios and are better developed for specific building or construction works.

Content Declaration

Content Declaration of Post Consumer Recycled Rubber Sound Barrier

Product	Post Consumer Recycled Granulated Rubber	Synthetic Turf	Reinforcement	Chemicals	Renewable Material	Biogenic Carbon
Post Consumer Recycled Rubber Sound Barrier	85-90%	1-5%	5-10%	1-5%	0	0

Content Declaration of Packaging Material

Product	PE, Packaging Film	Wooden Pallet	Paper, Label	Biogenic carbon
Post Consumer Recycled Rubber Sound Barrier, Packaging Material	1-5%	1-5%	<1%	0.005-0.001

Biogenic carbon is arising from wooden pellet packaging material. No substances included into "Candidate List of Substances of Very High Concern (SVHC) for authorisation".
No recycling content included in packaging materials.

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ENVIRONMENTAL PERFORMANCE

Potential Environmental Impact Mandatory Indicators According to EN 15804

Results for 1 m2 of Post Consumer Recycled Rubber Sound Barrier							
Indicator	Unit	A1:A3	C1	C2	C3	C4	D
GWP-fossil	kg CO2 eq.	30.6	0	1.17	0.006	0.050	-9.66
GWP-biogenic	kg CO2 eq.	-1.61	0	0.003	3.27E-04	1.19E-05	5.20E-02
GWP-luluc	kg CO2 eq.	0.018	0	4.00E-04	1.16E-05	8.27E-07	-0.002
GWP-total	kg CO2 eq.	29.0	0	1.17	0.006	0.050	-9.61
ODP	kg CFC 11 eq.	3.44E-06	0	2.66E-07	2.80E-10	8.60E-10	-3.95E-07
AP	mol H+ eq.	0.174	0	0.003	2.99E-05	3.01E-05	-0.036
EP-freshwater	kg PO43- eq.	0.022	0	3.47E-04	3.31E-06	5.56E-06	-0.004
EP-freshwater	kg P eq	0.001	0	8.76E-06	5.92E-07	3.27E-08	-4.09E-04
EP-marine	kg N eq.	0.054	0	0.001	3.97E-06	1.29E-05	-0.008
EP-terrestrial	mol N eq.	0.581	0	0.007	4.55E-05	1.27E-04	-0.087
POCP	kg NMVOC eq.	0.202	0	0.003	1.24E-05	3.59E-05	-0.046
ADP-minerals&metals*	kg Sb eq.	1.11E-04	0	4.29E-06	1.29E-08	7.65E-09	-1.20E-05
ADP-fossil*	MJ	525	0	17.7	0.117	0.060	-115
WDP	m3	10.5	0	0.051	0.001	0.004	-0.443
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						

* 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 Mandatory and Voluntary Indicators

Results for 1 m^2 of Post Consumer Recycled Rubber Sound Barrier							
Indicator	Unit	A1:A3	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO2 eq.	27.9	0	1.16	0.005	0.049	-9.33
Results according to EN 15804+A2 for 1m^2 of Post Consumer Recycled Rubber Sound Barrier							
PM/RI	[disease inc.]	3.29E-06	0	7.36E-08	7.13E-11	1.26E-09	-6.48E-07
IRP	[kBq U235 eq]	0.995	0	0.078	0.001	2.30E-04	-0.079
ET-freshwater	[CTUe]	499	0	13.6	0.06	0.168	-232
HT-cancer	[CTUh]	1.09E-07	0	4.83E-10	1.60E-12	1.91E-11	-4.52E-08
HT-non-cancer	[CTUh]	3.78E-07	0	1.33E-08	4.83E-11	2.05E-10	-1.77E-07
SQP	[pt]	252	0	12.4	0.016	0.109	-36.0
Acronyms	GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology; IRP = Ionizing radiation, human health; ET-freshwater = Eco-toxicity (freshwater); HT-cancer = Human toxicity, cancer effects; HT-non-cancer = Human toxicity, non-cancer effects; SQP = Potential soil quality index (SQP)						

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. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of Resources

Results for 1m² of Post Consumer Recycled Rubber Sound Barrier							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	34.6	0	0.242	0.018	0.001	-1.93
PERM	MJ	0	0	0	0	0	0
PERT	MJ	34.6	0	0.242	0.018	0.001	-1.93
PENRE	MJ	561	0	18.8	0.123	0.064	-122
PENRM	MJ.	0	0	0	0	0	0
PENRT	MJ	561	0	18.8	0.123	0.064	-122
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	1.18	0	1.62E-02	1.05E-03	1.82E-04	-1.08E-01
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						

Waste Production

Results for 1m² of Post Consumer Recycled Rubber Sound Barrier							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0	0	0	0	0	0
Non-hazardous waste disposed	kg	0	0.726	0	0	3.59	0
Radioactive waste disposed	kg	0	0	0	0	0	0
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						

Output Flows

Results for 1m² of Post Consumer Recycled Rubber Sound Barrier							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0
Material for recycling	kg	31.1	0	0	0	68.2	0
Materials for energy recovery	kg	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0

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References

- **ISO 14020:2000** Environmental labels and declarations
  General principles
- **ISO 14040: 2006** Environmental management
  Life cycle assessment
  Principles and framework
- **ISO 14044: 2006** Environmental management
  Life cycle assessment
  Requirements and guidelines
- **ISO 14025: 2006** Environmental labels and declarations
  Type III environmental declarations
  Principles and procedures
- **EN 15804:2012+A2:2019** Sustainability of construction works
  Environmental product declarations
  Core rules for the product category of construction products
- **The International EPD® System** | www.environdec.com
  The General Programme Instructions v3.01
  PCR 2019:14 Construction products v1.1 (EN 15804:A2)
  Product Environmental Footprint Category Rules Guidance
- **Ecoinvent 3.7.1** | http://www.ecoinvent.org
- **SimaPro LCA Software** | https://simapro.com
- **Hatko Sound Barrier** | https://hatkosoundbarrier.com

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Contact

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