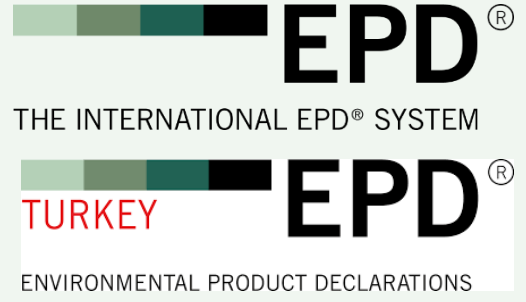


Environmental Product Declaration



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

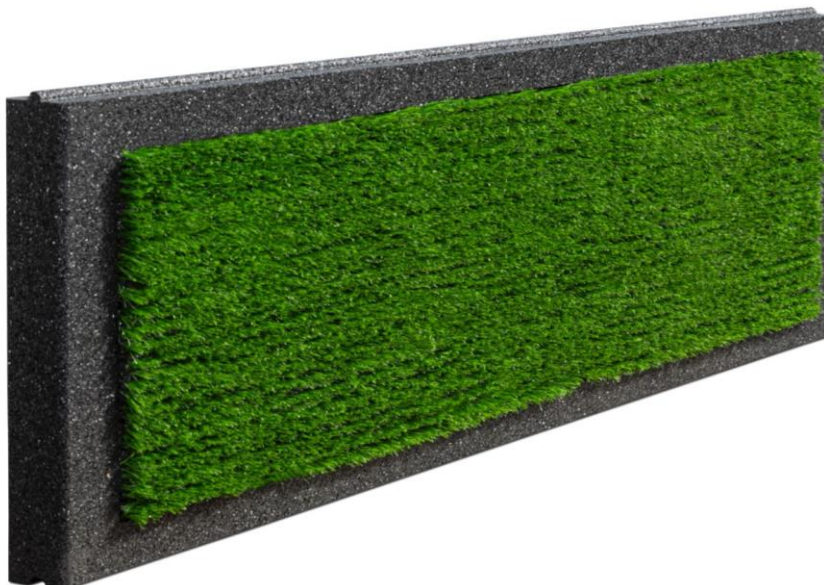
RECYCLED RUBBER SOUND BARRIER - NB2

from




Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
Local Operator:	EPD Turkey
EPD registration number:	EPD-IES-0017018
Publication date:	2024-11-23
Valid until:	2029-11-22

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



Programme information

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR: < PCR 2019:14 Construction products (EN 15804+A2) v1.3.3 >
PCR review was conducted by: < Mamoru Yanagisawa >
Life Cycle Assessment (LCA)
LCA accountability: < Arda Kasacı, HATKO Recycled Rubber Sound Barrier >
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 individual verifier
Third-party verifier: < Mamoru Yanagisawa >

OR
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
<input type="checkbox"/> EPD verification by accredited certification body
Third-party verification: <name, organisation> is an approved certification body accountable for the third-party verification
The certification body is accredited by: <name of accreditation body & accreditation number, where applicable>
OR
Independent third-party verification of the declaration and data, according to ISO 14025:2006 via:
<input type="checkbox"/> EPD verification by EPD Process Certification*
Internal auditor: <name, organisation>
Third-party verification: <name, organisation> is an approved certification body accountable for third-party verification
Third-party verifier is accredited by: <name of accreditation body & accreditation number, where applicable>
<small>*For EPD Process Certification, an accredited certification body certifies and reviews the management process and verifies EPDs published on a regular basis. For details about third-party verification procedure of the EPDs, see GPI.</small>

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

Yes No

[Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

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 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); 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 ISO 14025.

Company information

Owner of the EPD: [HATKO | Recycled Rubber Sound Barrier]

Contact: [Arda Kasacı / arda.kasaci@hatkosoundbarrier.com]

Description of the organisation

Founded in 1985, Hatko operates in several sectors such as noise barriers, synthetic turf and dairy equipments. Hatko is one of the 30 FIFA licencees worldwide as well as the first Turkish member of The ESTO. With over 110 employees, Hatko Group of Companies has offices and manufacturing facilities in Istanbul, Iskenderun and Osmaniye. Honored with multiple domestic and international awards for achievement and quality, HATKO is founded on 3 basic principles:

Technology, Innovation and Quality.



Name and location of production site:

[Hatko Kauçuk A.Ş.

Osmaniye OSB, Turkmen

Mah. Fuat Tosyalı Cad. No:12

Toprakkale/Osmaniye]

Product information

Product name: Recycled Rubber Sound Barrier (NB2)

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.

Declared Unit

Declared Unit NB2		
Name	Value	Unit
Declared Unit	1	m2
Grammage	63,02	kg/m2

Geographical scope: Global

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.

No by-products are formed during the production process of HATKO.

Technical Specifications

Product Group Classification

UN CPC code: [36210 – Reclaimed rubber]

Product	Production Standards	Sub Standards	Test
NB2 Recycled Rubber Sound Barrier	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

Product	Production Standards	Sub Standards	Test
NB2 Recycled Rubber Sound Barrier	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.

LCA Information

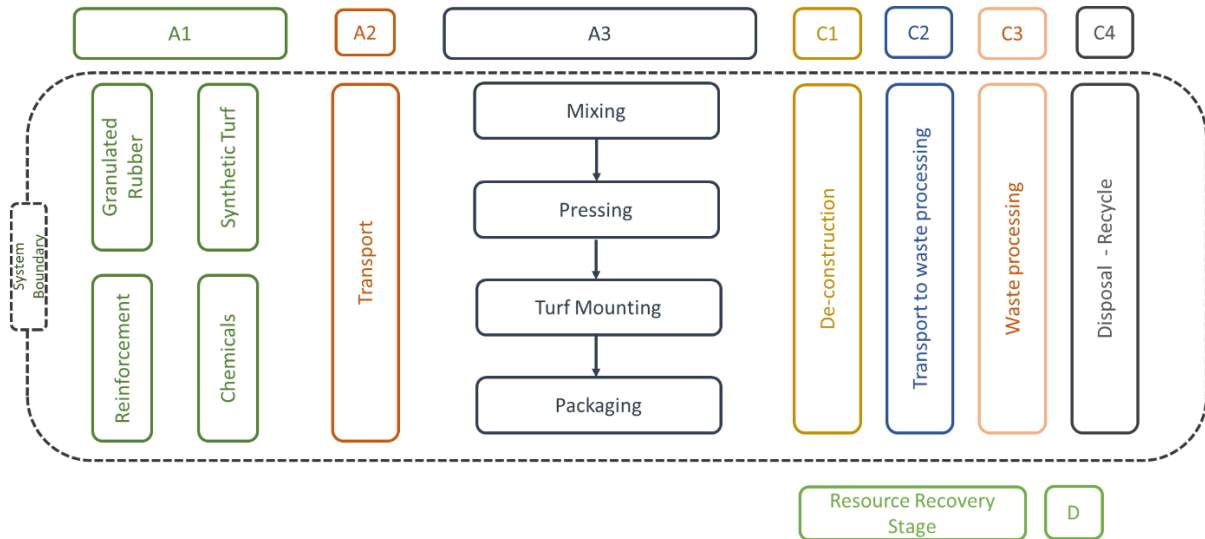
Declared unit: [1 square meter of Recycled Rubber Sound Barrier manufactured in Osmaniye facilitate (TR)]

Reference service life: [Not applicable]

Time representativeness: [The production data in this LCA study represents the period of 1st March 2024 and 31st March 2024]

Database(s) and LCA software used: SimaPro 9.4 LCA software was used in the LCA study. For the primary data used in the study, Hatko Company Primary data were obtained from Ecoinvent 3.9 database.

System Diagram



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	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	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	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		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

X: Declared;
ND: Not Declared

Description of system boundaries: [This EPD study evaluates the potential environmental impacts for 1 m² of NB2 Recycled Rubber Sound Barrier with Cradle to gate with options, modules C1–C4, module D (A1–A3 + C1-4 + D) approach.]

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 includes 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

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 v3.9

*Technology is Euro 6

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

The granulated rubber in Module A1 is 100% recycled, it is assumed that the waste processing for recycling could be in the same way so the electricity consumption of the recycled granulated rubber in Module A1 was taken.

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% of end-of-life products being sent to landfill.

D – Reuse, recovery or recycling

The Recycled rubber, 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, and synthetic turf outputs from the product system. This remaining net rubber, 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 tire that entering the manufacturing system.

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

In general, one should be conscious of the fact that the impacts reported in module D do not tell the complete story about a material's potential beyond the system boundary.

Content Declaration

NB2 Recycled Rubber Sound Barrier Content Declaration, for 1 m²

Contents of NB2 Recycled Rubber Sound Barrier	Weight	Unit
Granulated Rubber	53,5	kg
Binder	2,7	kg
Additive (Fire Retardant)	0,45	kg
Catalyst	0,015	kg
Water – 100 mL	0,02	kg
Cured Product – Mixture Only	56,77	kg
Residual Carbon Fibre Composite	2,9	kg
Front Artificial Turf	2,7	kg
Back Artificial Turf	0,75	kg
NB2 Sound Barrier – Final Product	63,02	kg

Content declaration of Packaging Material, for 1 m² final product NB2

Product	Paper, Label, kg	Wooden Pallet, p	PE, Packaging Film, kg	Biogenic carbon, kg
Recycled Rubber Sound Barrier, Packaging Material	4,17E-02	0.033	0.042	-0.003

Results of the environmental performance indicators

Impact category indicators

Results for NB2 1 m ² of Recycled Rubber Sound Barrier										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	3,97E+00	3,22E-02	1,20E-01	4,12E+00	0	3,78E-06	1,29E+01	2,71E+00	-2,46E-01
GWP-biogenic	kg CO ₂ eq.	6,07E-03	8,40E-06	5,22E-05	6,13E-03	0	2,14E-10	1,20E-02	2,37E-03	-4,18E-01
GWP-luluc	kg CO ₂ eq.	4,75E-03	1,73E-05	2,88E-05	4,79E-03	0	1,44E-10	9,44E-03	1,86E-03	-4,18E-01
GWP-total	kg CO ₂ eq.	3,98E+00	3,22E-02	1,20E-01	4,13E+00	0	3,78E-06	1,30E+01	2,71E+00	-1,08E+00
ODP	kg CFC 11 eq.	2,52E-08	4,22E-10	1,55E-09	2,71E-08	0	4,39E-14	5,12E-08	1,04E-08	-3,83E-01
AP	mol H ⁺ eq.	1,91E-02	9,50E-05	7,74E-04	2,00E-02	0	4,86E-09	3,84E-02	7,58E-03	-4,00E-01
EP-freshwater	kg P eq.	1,36E-03	2,57E-06	5,09E-06	1,37E-03	0	8,77E-12	2,70E-03	5,32E-04	-4,19E-01
EP-marine	kg N eq.	3,70E-03	2,91E-05	5,00E-04	4,23E-03	0	1,39E-09	7,50E-03	1,49E-03	-3,56E-01
EP-terrestrial	mol N eq.	3,79E-02	3,07E-04	5,43E-03	4,36E-02	0	1,40E-08	7,68E-02	1,52E-02	-3,52E-01
POCP	kg NMVOC eq.	1,19E-02	1,33E-04	1,62E-03	1,37E-02	0	8,54E-09	2,38E-02	4,71E-03	-3,62E-01
ADP-minerals&metals*	kg Sb eq.	1,24E-05	1,02E-07	6,48E-08	1,26E-05	0	5,05E-05	2,35E-05	4,64E-06	-4,38E-01
ADP-fossil*	MJ	4,40E+01	4,45E-01	1,59E+00	4,61E+01	0	2,23E-13	8,36E+01	1,65E+01	-4,24E-01
WDP	m ³	1,70E+00	6,67E-03	1,46E-02	1,72E+00	0	7,02E-08	4,09E+00	8,28E-01	-3,42E-01
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.

Additional mandatory indicator

Results for NB2 1 m ² of Recycled Rubber Sound Barrier										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq.	3,98E+00	3,22E-02	1,20E-01	4,13E+00	0	3,78E-06	1,30E+01	2,71E+00	-1,08E+00
Acronyms	GWP-GHG*= global warming potential (greenhouse gases) This indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product with characterization factors (CFs) based on IPCC (2013)									

Use of resources

Results for NB2 1 m ² of Recycled Rubber Sound Barrier										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
PERE	MJ	1,82E+00	5,94E-05	3,28E-01	2,15E+00	0	8,68E-09	3,68E+00	7,25E-01	-3,39E-01
PERM	MJ	0	0	0	0	0	0	0	0	0
PERT	MJ	1,82E+00	5,94E-05	3,28E-01	2,15E+00	0	8,68E-09	3,68E+00	7,25E-01	-3,39E-01
PENRE	MJ	4,92E+01	3,44E-01	1,52E+00	5,11E+01	0	5,05E-05	9,41E+01	1,86E+01	-4,24E-01
PENRM	MJ.	0	0	0	0	0	0	0	0	0
PENRT	MJ	4,92E+01	3,44E-01	1,52E+00	5,11E+01	0	5,05E-05	9,41E+01	1,86E+01	-4,24E-01
SM	kg	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0

NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m³	2,43E-02	1,87E-05	1,28E-04	2,44E-02	0	2,79E-09	5,24E-02	1,05E-02	-3,84E-01
Acronyms	<p>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</p>									

Waste Production

Results for NB2 1 m ² of Recycled Rubber Sound Barrier										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,81E-03	2,66E-06	1,45E-05	1,83E-03	0	3,98E-10	4,38E-02	9,85E-03	-3,35E-02
Non-hazardous waste disposed	kg	2,24E-01	8,43E-05	3,23E-04	2,25E-01	0	1,28E-08	6,32E-01	1,28E-01	-2,95E-01
Radioactive waste disposed	kg	7,38E-05	1,22E-08	1,37E-07	7,39E-05	0	1,77E-12	1,50E-04	2,95E-05	-4,11E-01

Output Flows

Results for NB2 1 m ² of Recycled Rubber Sound Barrier										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0	0	0	0

Material for recycling	kg	2,9	0	0	2,9	0	0	0	3,5	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0

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
- **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 v4.0
PCR 2019:14 Construction products v1.3.3 (EN 15804+A2)
Product Environmental Footprint Category Rules Guidance
- Ecoinvent 3.9 | <http://www.ecoinvent.org>
- SimaPro LCA Software 9.4 | <https://simapro.com>
- Hatko Sound Barrier | <https://hatkosoundbarrier.com>