Environmental Product Declaration

In accordance with ISO 14025:2006 for:

N'fera Sport AS 285/45R21

from

NEXEN TIRE

NEXEN TIRE
we got you

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-08071
Publication date:	2023-02-28
Valid until:	2028-02-28

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

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR: *TIRES, UL 10006, Version 3.04 and UNSPC code(s): 25172500 / UN CPC code(s) : 361*
PCR review was conducted by: *Dr. Thomas Gloria, Industrial Ecology Consultants, Chair, Mr. Akira Kataoka, JEMAI*
Life Cycle Assessment (LCA)
LCA accountability: *Econetwork*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by accredited certification body Third-party verification: *Noh-hyun Lim (IGSC), Certiquality Srl* is an approved certification body accountable for the third-party verification The certification body is accredited by: *Accredia*
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.
And the calculated environmental impacts are only related to tires within the scope of this PCR and shall not be used to compare to vehicle performance.
PDs within the same product category but from different programmes may not be comparable. For further information about comparability, see ISO 14025.

Company information

Owner of the EPD: NEXEN TIRE

Contact: Ye-jin LEE. +82-10-4255-6858, 10166028@nexentire.com, 355, Chungyeol-ro, Yangsan-si, Gyeongsangnam-do, Republic of Korea

Description of the organisation: Staring out as Heung-a Tire Industry in 1942, NEXEN TIRE has grown considerably with its epoch-making achievements in the domestic tire industry, starting with the production of automobile tires for the first time in South Korea in 1956. After changing its name from “Woosung Tire” to “NEXEN TIRE” in 2000, the company marked the highest sales growth rate and gained recognition for its technological leadership.To date, NEXEN TIRE has expanded its operation beyond Korea, operation four plants in China and Europe. Centering on the Magok Central Research Institute, the company has established global R&D networks in the US, China and Germany, responding rapidly to the diversifying market. NEXEN TIRE’s mission of “Creating Value for Tomorrow, Every Step of the Way” is the foundation of NEXEN’s business activities as well as the guidelines spurring the company’s continuous change and growth. Every NEXEN employee’s thoughts and behaviours, including value-creating activities, aim to contribute to the world’s prosperity by creating a better future through the realization of satisfaction and expectations of mankind.

Product-related or management system-related certifications:


IATF 16949


ISO 14001


ISO 45001


ISO 17025


KOSHA MS

Name and location of production site: Bitozeves-Průmyslová zóna Triangle, Průmyslová 1000, 438 01 Bitozeves, Czech Republic

Product information

Product name: **[N’fera Sport AS 285/45R21]**
Product description: **The tire has a function of helping the vehicle user drive safely by causing friction with the ground, and the function is expressed as the movement support of the passenger car because the available vehicle is classified according to the tire.**
Product identification: **[N’fera Sport AS 285/45R21 which is being producing by NEXEN TIRE was selected as the target about this project.]**
UN CPC code: **[25172500]**
Geographical scope: **Global**

Tire designation information

- Tire size: **21inch**
- Tire mass: **15.951kg**
- Tire Sub-Categories (Passenger Car Tire): **Passenger Car Tire**

• Nominal section width: 285mm

• Aspect ratio: 45

• Rim diameter: 794mm

• Load index: 1150kg

• Speed rating: 240km/h

• Tread mass: 5.085kg

• Tread height: 0.73cm

• Tread wear indicator: 0.19cm

• Rolling Resistance coefficient value: 6.59

• Regulated Hazardous Substance: All chemicals used in the Czech Plant are managed in accordance with the Czech Toxic Chemicals Control Act. Substances listed on the Candidate List of Substances of Very High Concern (SVHC) for authorization published by European Chemicals Agency (ECHA) are not contained in the steel in declarable quantities.

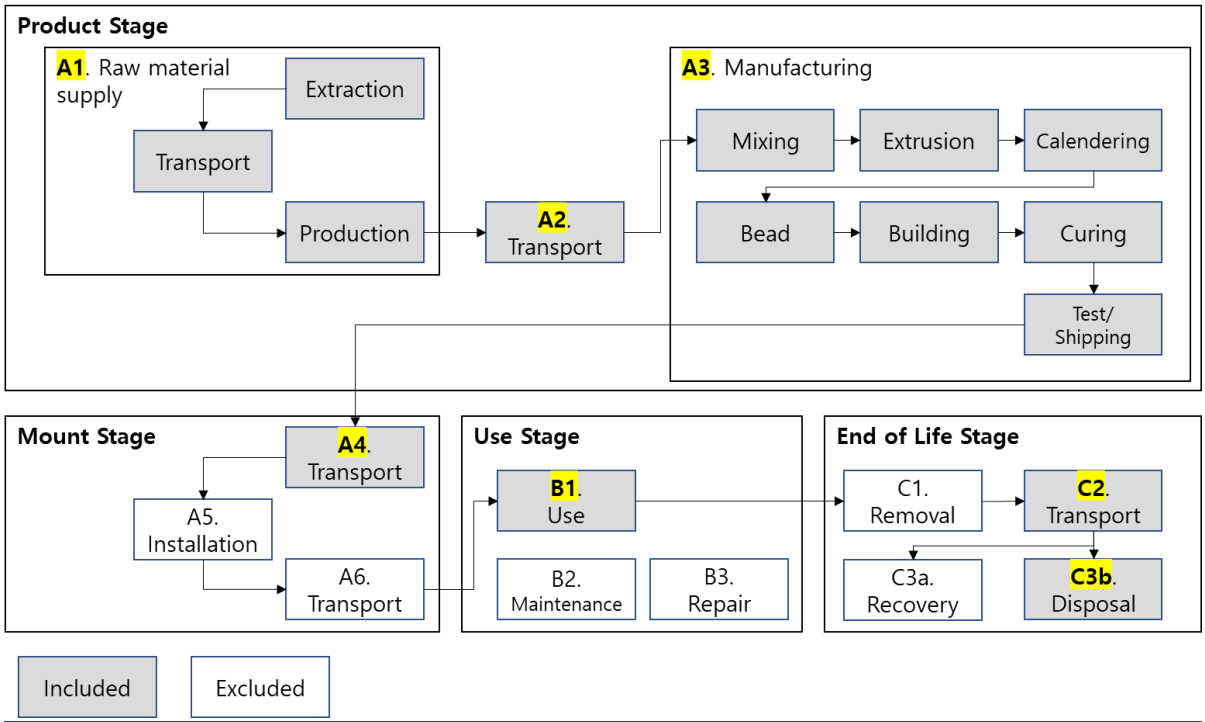
LCA information

Functional unit / declared unit: 1 Tire driven 1,000km, 0.02 / 1tire

EPD type and region of applicability: cradle to grave, Global

Time representativeness: [2021.01 ~ 2021. 12.]

System diagram:



Description of system boundaries: A1 ~ A4 / B1 / C2 / C3b
Excluded lifecycle stages: A5 / A6 / B2 / B3 / C1 / C3a

A1. Raw material supply
This module include extraction from nature about materials that is needed to produce tire like nature rubber, natural gas and manufacture after extracted.
The raw material supply module includes all materials and energy inputs, transportation stage, needed for the raw material supply stage.

A2. Transport
It means the transportation of raw materials to the manufacturing site.
According to the cut-off criteria, the transportation distance was weighted average considering the company and address listed in the MSDS for each raw material.
transportation divided with logistic way.

A3. Manufacturing
The energy and utility consumption used in the NEXEN TIRE workplace is managed through their own ERP system. All of tire produce in same process, so the consumption was distributed through allocation with production amount (EA). Especially, because natural gas make emission to air (Direct emission) during use, the amount is calculated refer from NIR (National Inventory Report for UNFCCC).

A4. Transport
The distance from Czech plant to carmaker was considered until drop-off point.
This project applied collectable primary data only because exact distance ratio to car manufacture facility is confidential.

A5. Installation
Impacts from installation of the tire onto the vehicle are considered outside the scope of EPD.

A6. Transport
Impacts from transport of the vehicle on which the tire is mounted to final customer are considered outside the scope of EPD.

B1. Use
This stage includes the information modules covering the period from the handover of the tire until it reaches its end of life. The use stage includes the use of tire product, and services in their proper function. The duration of the use stage is dependent on RSL.

B2. Maintenance
Impacts from maintenance are considered outside the scope of EPD.

B3. Repair
Impacts from repair are considered outside the scope of EPD.

C1. Removal
Impacts from removal are not relevant and considered outside the scope of EPD.

C2. Transport

This module mean impact about transport to end of life treatment facility. Applying the cut-off rules, the impacts related to the transport of tires to energy recovery or recycling facilities are excluded from the system boundaries, since they are allocated to the next product using the recycled material or the energy.

C3a. Recovery

Impacts and credits from end-of-life recovery are not accounted for in EPD.

C3b. Disposal

This module includes physical pre-treatment and management of the disposal site as well as impacts from landfilling and incineration without energy recovery. To model disposal pathway, the data presented in PCR shall be used, except for tires that have specific disposal pathways. So, this project follows ELT management data for Europe.

	Production stage			**Mounting stage**			**Use stage**			**End of life stage**			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	C1	C2	C3a	C3b
	Raw material supply	Transport	Manufacturing	Transport	Installation	Transport	Use	Maintenance	Repair	Removal	Transport	End of Life treatment – Recovery	End of Life treatment - Disposal
Modules declared	X	X	X	X	-	-	X	-	-	-	X	-	X
Geo graphy	RoW	RoW	CZ	RoW	-	-	EU	-	-	-	EU	-	EU
Specific data used	>95%				-	-	-	-	-	-	-	-	-
Variation-products	Not relevant					-	-	-	-	-	-	-	-
Variation-site	Not relevant				-	-	-	-	-	-	-	-	-

More information:

- Allocation
  All manufacturing process data such as energy and utilities are produced regardless of facility and product output (EA) was used as a physical allocation criterion.

- Assumption and Limitation

<Production stage>

- For transportation distance in Europe, the average cross-border distance based on Lotis (Global Logistics Technology Intergrated Information System) was applied, and the reason was to to consider NEXEN TIRE's supply capacity of production plants in other regions other than the Czech plant.
- When there were multiple suppliers (raw material sellers) for the same substance, a weighted average was made in consideration of the ratio of raw material use for each partner.
- As checked the LCI DB at domestic and abroad, if there is no intuitive DB such as bead wire, a similar DB was used.
- In the case of an antioxidizing agent without a similar DB, phenylenediamine production (ecoinvent 3.8, GLO) was applied in consideration of the function of the corresponding input.
- As only tires are produced at production sites, air emissions (Atmospheric Environment Conservation Act), which are difficult to distinguish by product among data managed by business units such as energy, were considered by applying the production ratio of products to all products.
- As defective products generated during the process were disposed of the actual input number of raw materials was calculated in reverse by considering the amount of waste generated (sales) by nature in the workplace.
- The frame used in the curing process had a shorter lifespan than other facilities, but also regarded as a facility for product production and excluded from the calculation.

<Mounting stage>

- Distribution is collectively referred to as the transportation distance from tire shipment to automobile assembly and final consumer, buy only the transport distance from NEXEN TIRE to RDC that can be checked was calculated due to the lack of accurate information on the distance.

<End of Life stage>

- For the LCI DB used to calculate the transport distance, the Euro 0-6 mix truck LCI DB was used in consideration of the Euro mission standard.

Database(s) and LCA software used: GaBi software(version 10.6.1.35, from Sphera

Content declaration

Product (N`fera Sport 225/55 R18 102Y XL)

Materials / chemical substances	[Unit]	%	Environmental / hazardous properties
Synthetic rubber	3.50E+00	21.96%	-
Natural rubber	3.25E+00	19.67%	-
Steel	3.04E+00	19.06%	-
Carbon black	2.69E+00	16.85%	-
Silica	1.46E+00	9.16%	-
Other materials (e.g chemicals)	2.12E-01	13.31%	-

Packaging

Not applicable

Recycled material

Not applicable

Environmental performance

Potential environmental impact

PARAMETER (ILCD)	UNIT	A1	A2	A3	A4	B1	C2	C3b	TOTAL
Global warming potential (GWP)	kg CO_2 eq.	1.58 E+01	3.77 E-01	1.97 E+00	3.89 E-01	9.15 E-01	1.18 E-01	3.98 E+00	2.36 E+01
Acidification potential (AP)	kg mol H^+ eq.	6.60 E-02	3.44 E-04	2.42 E-04	3.55 E-04	1.94 E-03	3.87 E-05	4.77 E-04	6.94 E-02
Eutrophication potential (EP)	kg P eq.	1.79 E-02	9.39 E-05	6.30 E-05	9.68 E-05	1.81 E-04	1.12 E-05	6.88 E-04	1.91 E-02
Photochemical oxidant creation potential (POCP)	kg NMVOC eq.	6.38 E-03	-1.63 E-04	1.41 E-05	-1.68 E-04	1.70 E-04	-1.50 E-05	3.49 E-05	6.26 E-03
Ozone layer depletion (ODP)	kg CFC 11 eq.	3.55 E-06	0.00 E+00	0.00 E+00	0.00 E+00	7.49 E-12	0.00 E+00	7.31 E-09	3.56 E-06
Abiotic depletion potential (ADP)	kg Sb eq.	9.00 E-05	0.00 E+00	0.00 E+00	0.00 E+00	1.29 E-07	0.00 E+00	3.63 E-07	9.05 E-05

Use of resources

PARAMETER		UNIT	A1	A2	A3	A4	B1	C2	C3b	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	6.57 E+00	0.00 E+00	9.95 E+00	0.00 E+00	2.79 E+03	0.00 E+00	2.80 E-02	2.81 E+03
	Used as raw materials	MJ, net calorific value	2.19 E-01	0.00 E+00	6.66 E-10	0.00 E+00	2.37 E-09	0.00 E+00	1.58 E-03	2.20 E-01
	TOTAL	MJ, net calorific value	6.78 E+00	0.00 E+00	9.95 E+00	0.00 E+00	2.79 E+03	0.00 E+00	2.95 E-02	2.81 E+03
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	3.48 E+02	0.00 E+00	7.58 E+01	0.00 E+00	1.48 E+04	0.00 E+00	6.52 E-01	1.52 E+04
	Used as raw materials	MJ, net calorific value	-6.55 E-08	0.00 E+00	4.58 E-08	0.00 E+00	1.57 E-05	0.00 E+00	0.00 E+00	1.57 E-05
	TOTAL	MJ, net calorific value	3.48 E+02	0.00 E+00	7.58 E+01	0.00 E+00	1.48 E+04	0.00 E+00	6.52 E-01	1.52 E+04

Secondary material (optional)	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Renewable secondary fuels (optional)	MJ, net calorific value	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Non-renewable secondary fuels (optional)	MJ, net calorific value	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Net use of fresh water (optional)	m^3	2.48 E-03	0.00 E+00	1.13 E-06	0.00 E+00	-1.30 E-04	0.00 E+00	0.00 E+00	2.35 E-03

Indicators describing Particulates emissions

PARAMETER	Unit per FU/DU	Total
Particulate Matter (Total)	kg	4.17E-01
Particulate Matter (PM10)	kg	4.17E-03
Particulate Matter (PM2.5)	kg	1.28E-03

Waste production and output flows (optional)

Waste production

PARAMETER	UNIT	A1	A2	A3	A4	B1	C2	C3b	TOTAL
Hazardous waste disposed	kg	4.25 E-10	0.00 E+00	8.78 E-09	0.00 E+00	6.57 E-07	0.00 E+00	0.00 E+00	6.66 E-07
Non-hazardous waste disposed	kg	1.28 E+00	0.00 E+00	1.87 E+01	0.00 E+00	7.99 E+03	0.00 E+00	0.00 E+00	8.01 E+03
Radioactive waste disposed	kg	1.09 E-04	0.00 E+00	5.21 E-03	0.00 E+00	2.15 E+00	0.00 E+00	0.00 E+00	2.16 E+00

Output flows

PARAMETER	UNIT	A1	A2	A3	A4	B1	C2	C3b	TOTAL
Components for reuse	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Material for recycling	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Materials for energy recovery	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Exported energy, electricity	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Exported energy, thermal	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00

The result tables shall only contain values or the letters “INA” (Indicator Not Assessed). It is not possible to specify INA for mandatory indicators. INA shall only be used for voluntary parameters that are not quantified because no data is available.

References

- General Programme Instructions of the International EPD® System. Version 3.04.
- ISO 14025: 2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 14040: 2006 Environmental management – Life cycle assessment – principles and framework
- ISO 14044: 2006 Environmental management – Life cycle assessment – Requirements and guidelines
- UL 10006, PCR for preparing an Environmnetal Product Declaration(EPD) for the Product Category(TIRES) Version 3.04

EPD®

www.environdec.com