

Environmental Product Declaration



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

TEKNICROSS® Rubber level crossing

from

Teknikum Group Ltd

TEKNIKUM

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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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products. Version 1.11. UN CPC code: 4014
PCR review was conducted by: Claudia A. Peña, International EPD® System.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier: Hannu Karppi. Ramboll Finland Oy 
<i>In case of recognised individual verifiers:</i> Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner 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.

Company information

Owner of the EPD:

Teknikum Group Ltd
Nokiankatu 1
FI-38210 Sastamala
Finland
www.teknikum.com/fi/

Contact:

Esko Mäntyharju

Description of the organisation:

Teknikum Group is a corporation with Finnish origin, specializing in design, manufacturing and services relating to demanding rubber, plastic and technical foam products. Teknikum Group serves various demanding industries internationally, such as industrial plants and OEMs.

Product-related or management system-related certifications:

Quality management system certification ISO 9001:2015
Environmental management system certifications ISO 14001:2015

Name and location of production site:

The product is produced in Teknikum Group Ltd's Vammala factory.

Teknikum Ltd, Vammala factory
Nokiankatu 1
FI-38210 Sastamala
Finland

Product information

Product name:

TEKNICROSS® Rubber level crossing

Product identification:

TEKNICROSS® is scalable, customizable rubber level crossings solution meeting European rail industry standards. The proven element system is in use around Europe, from light pedestrian to heavy vehicle traffic.

Product description:

TEKNICROSS® Rubber level crossing consist of inner and outer elements, both equipped with a male/female tongue and groove, and fitting plates to be installed on top of the sleeper.

TEKNICROSS® is suitable for the most common rail gauges, rail types and fastening systems.

TEKNICROSS® is suitable for pedestrian and heavy traffic depending on the type of supporting beams.

UN CPC code:

4014

LCA information

Functional unit / declared unit:

1 kg of TEKNICROSS® Rubber level crossing

Reference service life:

If properly installed and maintained, the service lifetime of the product is 10 years.

Time representativeness:

The production data is collected from year 2020. Data used for calculation of the allocation factor Nokian Renkaat Ltd's rubber is also from year 2020. Tire manufacturing LCI data is from year 2019. Generic data used from databases is from 2016-2019.

Databases and LCA software used:

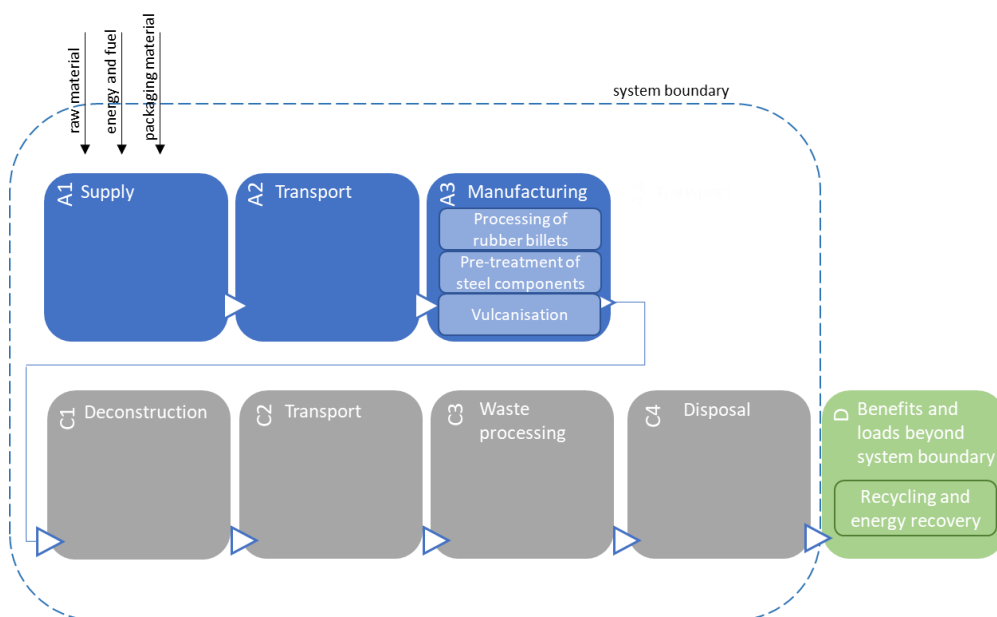
SimaPro (release 9.1.0.11). Databases ecoinvent 3.6 and Industry data 2.0.

Description of system boundaries:

Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D).

Modules A4, A5 and B1-B5 are not assessed. B6 and B7 are not relevant. In B1-B5, only minimal maintenance is required.

System diagram:



More information:

LCA practitioner:

Ecobio Oy, info@ecobio.fi

Electricity in module A3 covers more than 30 % of the total energy in modules A1-A3. Therefore, the energy sources and climate impacts as g CO₂ eq./kWh. must be informed.

Energy sources for electricity:

58 % solid wood, 18 % natural gas and 24 % peat.

Climate impact of electricity:

242 g CO2 eq./kWh.

Cut-off rule:

1% cut-off rule was applied for input flows in the inventory. The material used is as up-to-date as possible and at most five years old for producer specific data and at most ten years old for generic data.

Allocation:

No co-product allocation is applied for this study. The environmental impacts of rubber coming from tire manufacturing have been allocated based on mass-based allocation with information provided by Nokian Renkaat Ltd. Generic LCI data regarding tire manufacturing process is used together with the allocation factor to determine the environmental impacts of pre-consumer rubber used as raw material input for manufacturing of the TEKNICROSS® Rubber level crossing.

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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	EU27	EU27	EU27			-	-	-	-	-	-	-	EU27	EU27	EU27	EU27	EU27
Specific data	>90 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-

Content information

The following content information considers 1 kg of TEKNICROSS® Rubber level crossing Type B with 599,51 kg/m. There are other product variations depending on the width of the rail gauge and type of the product (A or B). The product contains rubber, steel and adhesive.

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Rubber	0,950	0	0
Steel	0,049	0	0
Adhesive	0,001	0	0
TOTAL	1,000	0	0
Packaging materials	Weight, kg	Weight-% (versus the product)	
EUR-pallet	0,03300	3,3	
Steel straps	0,00250	0,25	
Plastic film (Polyethylene)	0,00013	0,01	
TOTAL	0,03600	3,60	

The following table includes information about the different product variations and factors (Weight/meter) that can be used to multiply the results from declared unit of 1 kg to 1 m of the final product.

Product	Gauge, mm	Type	Weight/meter, kg/m	Rubber, kg	Steel, kg	Adhesive, kg
TEKNICROSS®	1524	A	519,51	491,07	28,12	0,32
TEKNICROSS®	1524	B	599,51	571,07	28,12	0,32
TEKNICROSS®	1524	A without flange groove	528,75	500,31	28,12	0,32
TEKNICROSS®	1524	B without flange groove	608,75	580,31	28,12	0,32
TEKNICROSS®	1435	A	479,51	451,07	28,12	0,32
TEKNICROSS®	1435	B	534,51	506,07	28,12	0,32
TEKNICROSS®	1435	A without flange groove	488,75	460,31	28,12	0,32
TEKNICROSS®	1435	B without flange groove	543,75	515,31	28,12	0,32

The share of rubber (m-%) varies between the different product variations while the share of steel and adhesive remain constant. The environmental impacts stated in this EPD represent average

production of TEKNICROSS[®] Rubber level crossing. The variation in the share of rubber (m-%) and its effect on the environmental impacts has been studied. The difference in environmental impacts is within the $\pm 10\%$ (PCR 2019:14 Construction products, 4.6.2) range for all of the product variations and therefore the results apply for all of them.

The product does not contain substances which exceed the limits for registration with the European Chemicals Agency regarding the “Candidate List of Substances of Very High Concern for authorization”.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per 1 kg of TEKNICROSS® Rubber level crossing

Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1,32E+00	8,75E-03	7,58E-01	2,08E+00	0,00E+00	8,33E-03	1,71E-01	1,47E-05	-9,98E-01
GWP-biogenic	kg CO ₂ eq.	1,09E-01	4,67E-06	5,10E-03	1,14E-01	0,00E+00	4,45E-06	-5,88E-03	2,92E-08	6,32E-03
GWP-luluc	kg CO ₂ eq.	1,53E-02	3,06E-06	9,04E-04	1,63E-02	0,00E+00	2,91E-06	4,33E-04	4,11E-09	-3,82E-03
GWP-total	kg CO ₂ eq.	1,44E+00	8,76E-03	7,64E-01	2,21E+00	0,00E+00	8,34E-03	1,66E-01	1,48E-05	-9,95E-01
ODP	kg CFC 11 eq.	1,27E-07	1,99E-09	5,26E-08	1,82E-07	0,00E+00	1,89E-09	1,07E-08	6,07E-12	-2,00E-07
AP	mol H ⁺ eq.	5,44E-03	3,58E-05	3,77E-03	9,25E-03	0,00E+00	3,41E-05	1,09E-03	1,40E-07	-4,87E-03
EP-freshwater	kg PO ₄ ³⁻ eq.	3,62E-04	6,41E-07	3,19E-05	3,94E-04	0,00E+00	6,10E-07	7,02E-05	1,51E-09	-3,19E-04
EP-freshwater	kg P eq.	1,11E-03	1,97E-06	9,81E-05	1,21E-03	0,00E+00	1,87E-06	2,15E-04	4,65E-09	-9,79E-04
EP-marine	kg N eq.	1,11E-03	1,07E-05	9,80E-04	2,10E-03	0,00E+00	1,02E-05	1,92E-04	4,84E-08	-8,12E-04
EP-terrestrial	mol N eq.	1,12E-02	1,17E-04	1,46E-02	2,59E-02	0,00E+00	1,12E-04	2,82E-03	5,31E-07	-8,69E-03
POCP	kg NMVOC eq.	3,78E-03	3,59E-05	2,93E-03	6,74E-03	0,00E+00	3,42E-05	5,98E-04	1,54E-07	-3,54E-03
ADP-minerals&metals*	kg Sb eq.	2,24E-05	2,37E-07	1,42E-06	2,40E-05	0,00E+00	2,26E-07	6,41E-05	1,35E-10	-2,59E-04
ADP-fossil*	MJ	2,95E+01	1,32E-01	9,80E+00	3,94E+01	0,00E+00	1,26E-01	1,51E+00	4,12E-04	-2,93E+01
WDP	m ³	6,06E-01	3,67E-04	6,47E-02	6,71E-01	0,00E+00	3,50E-04	4,39E-02	1,85E-05	-5,55E-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.

Potential environmental impact – additional mandatory and voluntary indicators

Results per 1 kg of TEKNICROSS® Rubber level crossing

Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	1,31E+00	8,68E-03	7,49E-01	2,06E+00	0,00E+00	8,26E-03	1,69E-01	1,45E-05	-9,83E-01
Particulate matter emissions	Disease incidence	5,06E-08	6,11E-10	3,74E-08	8,86E-08	0,00E+00	5,81E-10	1,10E-08	2,72E-12	-4,96E-08
Ionising radiation, human health	kBq U235 eq	6,39E-01	6,80E-04	7,87E-03	6,47E-01	0,00E+00	6,48E-04	1,01E-02	1,84E-06	-5,97E-01
Ecotoxicity (freshwater)	CTUe	1,96E+01	1,06E-01	2,48E+01	4,45E+01	0,00E+00	1,01E-01	5,93E+00	2,67E-04	-1,75E+01
Human toxicity, cancer effects	CTUh	5,38E-10	2,97E-12	3,59E-10	9,00E-10	0,00E+00	2,83E-12	3,51E-10	6,18E-15	-3,74E-12
Human toxicity, non-cancer effects	CTUh	1,55E-08	1,15E-10	1,21E-08	2,77E-08	0,00E+00	1,10E-10	6,64E-09	1,90E-13	5,67E-09
Land use related impacts / soil quality	Pt	1,44E+01	9,10E-02	9,75E+01	1,12E+02	0,00E+00	8,66E-02	5,82E+00	8,64E-04	-9,02E+00

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 per 1 kg of TEKNICROSS[®] Rubber level crossing

Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
PERE	MJ	5,07E+00	1,86E-03	2,01E+01	2,51E+01	0,00E+00	1,77E-03	2,03E-01	3,33E-06	-3,73E+00
PERM	MJ	1,75E+01	0	7,20E+01	8,95E+01	0	0	0	0	0
PERT	MJ	2,26E+01	1,86E-03	9,20E+01	1,15E+02	0,00E+00	1,77E-03	2,03E-01	3,33E-06	-3,73E+00
PENRE	MJ	3,16E+01	1,33E-01	9,96E+00	4,17E+01	0,00E+00	1,27E-01	1,86E+00	4,15E-04	-3,12E+01
PENRM	MJ.	3,57E+00	0	5,34E-03	3,57E+00	0	0	0	0	0
PENRT	MJ	3,51E+01	1,33E-01	9,96E+00	4,52E+01	0,00E+00	1,27E-01	1,86E+00	4,15E-04	-3,12E+01
SM	kg	8,94E-01	0	0	8,94E-01	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	m ³	4,44E-02	1,39E-05	3,09E-02	7,52E-02	0,00E+00	1,32E-05	1,36E-03	4,40E-07	-3,02E-02
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 and output flows

Waste production

Results per 1 kg of TEKNICROSS® Rubber level crossing										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	4,58E-02	3,46E-07	7,01E-03	5,28E-02	0,00E+00	3,29E-07	1,75E-05	6,16E-10	-1,38E-05
Non-hazardous waste disposed	kg	2,80E-01	6,31E-03	1,31E-01	4,18E-01	0,00E+00	6,01E-03	5,81E-02	2,80E-03	-7,08E-02
Radioactive waste disposed	kg	1,59E-04	9,00E-07	7,76E-06	1,67E-04	0,00E+00	8,57E-07	5,19E-06	2,71E-09	-1,88E-04

Output flows

Results per 1 kg of TEKNICROSS® Rubber level crossing										
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	0	0	0	0	0	0	0,251	0	0
Materials for energy recovery	kg	0	0	0,083	0,083	0	0	0,749	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content

Results per 1 kg of TEKNICROSS® Rubber level crossing		
BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0,0165

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

Additional information – Scenarios

End-of-life (C)

The end-of-life scenario for rubber components is based on statistics of Eurostat regarding management of rubber waste in Finland for year 2018. The end-of-life scenario for the steel components is based on recycling rate of Circular Footprint Formula (CFF) as part of Product Environmental Footprint calculation (PEF) for steel sheets used in construction. Rest of the steel components are assumed to be disposed to landfill as conservative treatment option.

Parameter	Unit
Collection process	collected separately
Transportation	50 km road
Recovery system	25,1 % of rubber components are recycled as material 74,9 % of rubber components are recycled as energy 95 % of steel components are recycled as material
Disposal	5 % of steel components are disposed to landfill

Reuse, Recovery & Recycling-potential (D)

Material recycling of rubber components substitutes primary synthetic rubber production and material recycling of steel components substitutes primary hot-dip galvanised steel production. The recovered energy substitutes average electricity and district heat production in Finland.

Differences versus previous versions

There are no previous versions of the EPD.

References

Ecobio Oy. 2021. LCA Report - Teknikum Group Ltd's TEKNICROSS® Rubber level crossing.

Eurostat. Treatment of waste by waste category, hazardousness and waste management operations.

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