Environmental Product Declaration

In accordance with ISO 14025 and 15804:2012+A1:2013 for:

QTrack®, *type QT-55G2-HP-R-Strip-32 with ELEC-L*

from

PANDROL
Partners in excellence

Programme:	The International EPD® System, www.environdec.com
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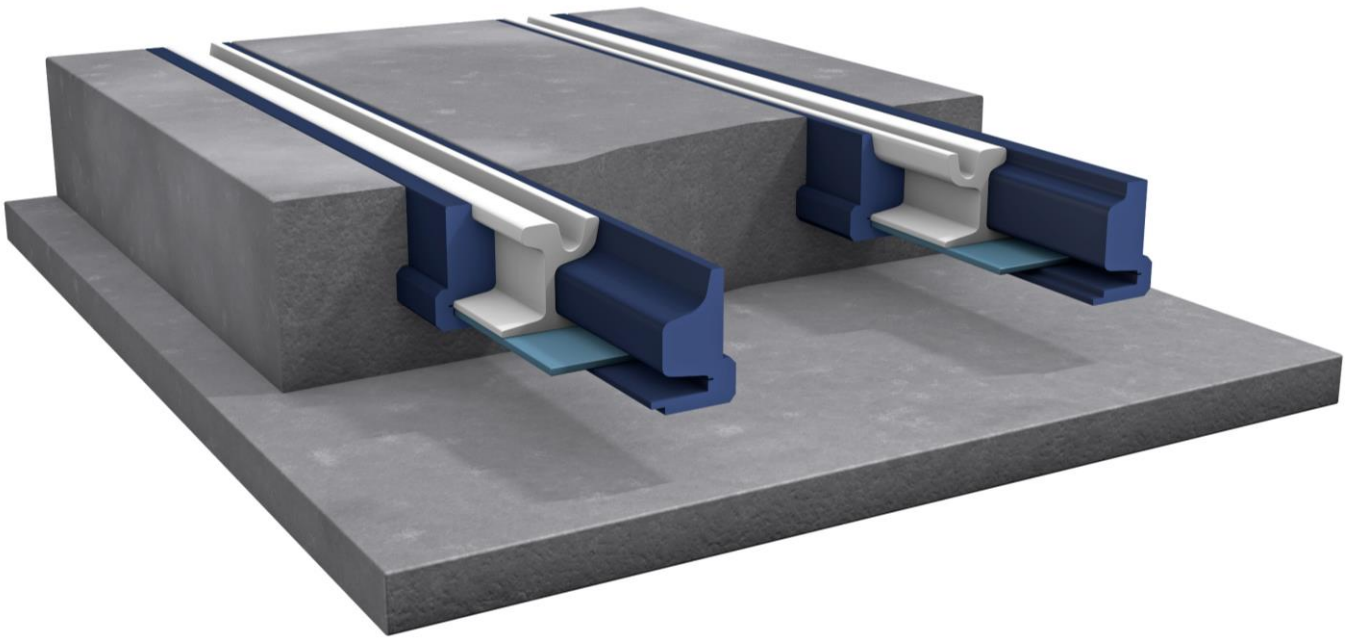
An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



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): Product Category Rules for construction products and construction services of 2012:01, version 2.33 valid: 2021-12-31
PCR review was conducted by: Technical Committee of the International EPD® System, A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Damien Prunel, Bureau Veritas LCIE Approved by: The International EPD® System
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.

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: Pandrol, Sustainable Resilient Systems
Contact: Thomas Lorent, General Manager, Sustainable Resilient Systems, Tel: +32 (0)2 658 28 00
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Description of the organisation: Part of the Delachaux Group, Pandrol is a business founded on a passion for innovation, and unique heritage is still at the heart of how we do business today. Over 100 years of product development, engineering know-how, acquisitions and growth has enabled us to become a world leader and global employer with over 1700 team members across 40 locations.

Pandrol defines the industry standard across rail fastening systems and aluminothermic welding. Pandrol has created rail infrastructure in more than 100 countries with products and services extending to designing, developing, and manufacturing equipment to make constructing and maintaining railways more efficient.

Experts in track resilience, Pandrol has developed environmentally sustainable systems to improve the life cycle of components, reduce maintenance costs and control noise and vibration for the whole spectrum of rail categories and sectors.

Product-related or management system-related certifications:

Quality	ISO 9001
System testing	EN 13481-5 Railway applications. Track. Performance requirements for fastening systems: Fastening systems for slab track with rail on the surface or rail embedded in a channel
	EN 17319 Railway applications. Infrastructure. Performance requirements of rail fastening systems for tramways
	EN 50122-2 Railway applications - Electrical safety, earthing and the return circuit: Provisions against the effects of stray currents caused by d.c. traction systems
Material testing	ISO 37 Rubber, vulcanized or thermoplastic. Determination of tensile stress-strain properties
	ISO 1856 Flexible cellular polymeric materials. Determination of compression set
	ISO 8013 Rubber, vulcanized. Determination of creep in compression or shear
	ISO 1431-1 Rubber, vulcanized or thermoplastic. Resistance to ozone cracking. Static and dynamic strain testing
	ISO 1817 Determination of the effect of liquids
	ISO 11925-2 Reaction to fire tests-Ignitability of products subjected to direct impingement of flame
	ISO 188 Rubber, vulcanized or thermoplastic. Accelerated ageing and heat resistance tests
	ISO 4892-3 Plastics. Methods of exposure to laboratory light sources. Fluorescent UV lamps

Name and location of production site(s): Pandrol, Czech Republic

Product information

Product name: Pandrol QTrack®
Product identification: Pandrol QT-55G2-HP-R-Strip-32 encapsulation with QT ELEC type ELEC-L
Product description: The Pandrol QTrack® are a family of continuously supported and fastened embedded ballast less track systems, where the rail is completely encapsulated by elastic prefabricated high-quality resin-bonded recycled rubber profiles with a unique shape and adapted stiffness features. The system, when installed in concrete, provides vertical and lateral support to the rail, while reducing vibration transmission from the rolling stock to the surrounding structures and granting control of the electrical currents flowing out of the rails (known as stray currents). The Pandrol QT-55G2-HP-R-Strip-32 profiles conforming the elastic encapsulation are made of 93% of recycled rubber granules coming from End-of-Life tyres and is designed to encapsulate grooved rails type 54G1, 54G2, 54G4, 54R1, 54R2, 55G2 and 55G3. To protect against the effect of stray currents, an electrical insulation film QT ELEC is included. QT FIX is used to glue the film and the profiles to the rail.

UN CPC code: 36220 Articles of vulcanized rubber other than hard rubber

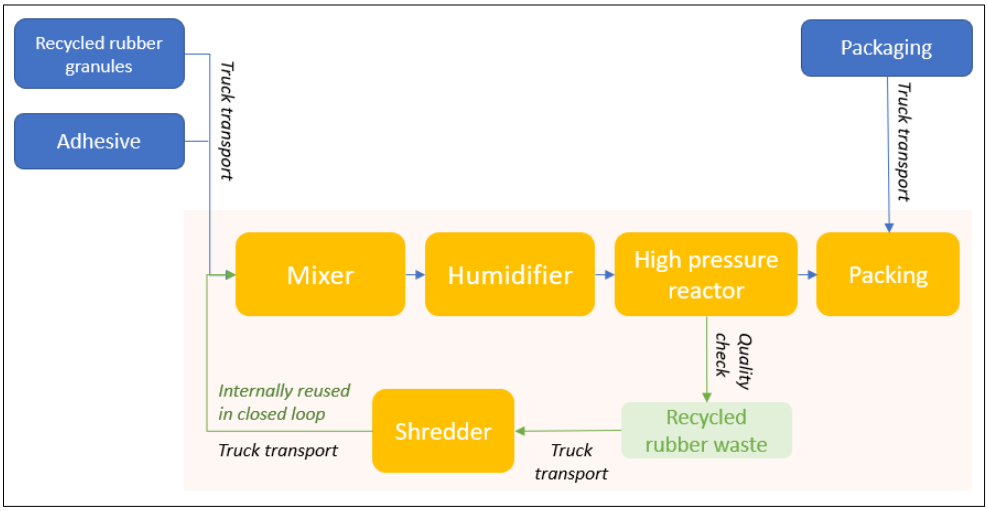
LCA information

Functional unit / declared unit: 1 linear meter of single rail of QTrack® (type QT-55G2-HP-R-Strip-32 with ELEC-L) presents a weight of 25.6 kg for the encapsulating rubber profiles and 1.584 kg of additional material (QT ELEC, QT FIX, packaging) and is designed to help rail fastening, noise and vibration control, as well as electrical rail insulation.
Reference service life: Pandrol QT-55G2-HP-R-Strip-32 with ELEC-L is intended to last at least the same time as the rail lifetime. A minimal service reference lifetime of 30 years could be assumed.
Time representativeness: Data collected covers the year 2020
Database(s) and LCA software used: GaBi ts, Service Pack 40
Description of system boundaries: Cradle to gate with options (A1–A3 +A4)

This EPD is “cradle to gate”, considering the modules A1, A2, A3 and A4.

- A1 Production of preliminary products
- A2 Transport to the plant
- A3 Production including provision of energy, production of packaging as well as auxiliaries and consumables and waste treatment
- A4 Transport to construction site (scenario)

System diagram:



More information:

Technical Features:

- ✓ The Pandrol QTrack® system is an embedded recycled rubber solution which utilises a top-down installation method
- ✓ The embedded rail system that offers continuous rail support, vibration mitigation and stray current insulation, all integrated in the fastening system
- ✓ The system is fully developed to provide full encapsulation of switches and crossings in prefabricated recycled rubber elements

Technical specifications	Standard	Pandrol QT-55G2-HP-R-Strip-32 with ELEC-L
Length (linear meter of rail)		1
Weight (kg/lm of rail)		25.6 (profiles) + 0.563 (QT ELEC + QT FIX)
Stiffness:	EN 13481-5	
Static	Category A	65 kN/mm/lm
Dynamic, 5 Hz	Category A	90 kN/mm/lm
Declaration of Performance		Rail fastening, noise and vibration control, electrical rail insulation

This EPD summarizes the results for one linear meter of single rail of Pandrol QT-55G2-HP-R-Strip-32 with ELEC-L. The profiles are manufactured in the Czech Republic. Part of recycled rubber production losses are being shredded and reinjected in production minimising furthermore the environmental impact of Pandrol products.

Cut-off criteria

All raw materials and production data have been taken into consideration. Capital goods (machinery, plant and other infrastructure) were not taken into consideration in the LCA, in accordance with the PCR.

Data quality
Specific data has been used for the manufacturing processes (A3) while life cycle modelling relies on GaBi datasets for raw materials stage (A1). Transport of raw materials to manufacturing site (A2) relies on calculated distances between supplier location and the plant. Comparison and accuracy of the data has been verified and compared with Pandrol own data for 2019, 2018 and 2017. The data is accurate and consistent.

Transport scenario (A4)
The study includes transportation to customer (A4 module). QTrack® commercialized by Pandrol from Czech Republic are shipped directly from the manufacturing site to the client. Transport is assumed to be made first by road to Hamburg (Germany) on a distance of 863 km and then transported by sea containership to Australia with a distance of 21,896 km. This scenario has been selected as the most representative based on sales for the year 2020.

Period under review
Representative data was compiled in 2020/2021 and represents the reference year 2020.

Allocation
For electricity and water use, production mass allocation has been used.

Comparability
Results presented this EPD is only comparable if they are carried out in accordance with the same product category rules, in this case EN 15804:2012+A1:2013, and if the context presented above is taken into account.

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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	X	MND	MNR	MNR	MNR	MNR	MNR	MNR	MNR	MND	MND	MND	MND	MND
Geography	EU27	EU27	CZ	AU													
Specific data						-	-	-	-	-	-	-	-	-	-	-	-
Variation – products						-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites						-	-	-	-	-	-	-	-	-	-	-	-

Content declaration

Product

Materials / chemical substances	kg per lm of rail	%	Environmental / hazardous properties
Recycled rubber granules	24.320	93.0%	Na.
Adhesive	1.280	4.9%	Na.
QT ELEC	0.158	0.6%	Na.
QT FIX	0.405	1.5%	Na.
	26.163	**100%**	

Packaging

Distribution packaging: EU flat pallet, wood frame and wrapping film
Consumer packaging: None

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: Pandrol QT-55G2-HP-R-Strip-32 profiles are made of recycled rubber granulates coming from End-of-Life tyres recycling process (post-consumer waste)

Environmental performance

Potential environmental impact

PARAMETER	UNIT	TOTAL A1-A3	A4
Global warming potential (GWP)	kg CO_2 eq.	2.65E+01	6.08E+00
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	2.72E-09	9.90E-16
Acidification potential (AP)	kg SO_2 eq.	3.60E-02	1.48E-01
Eutrophication potential (EP)	kg PO_4^{3-} eq.	5.74E-03	1.68E-02
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	2.49E-03	7.11E-03
Abiotic depletion potential – Elements	kg Sb eq.	1.45E-06	2.52E-07
Abiotic depletion potential – Fossil resources	MJ. net calorific value	2.47E+02	7.47E+01

Use of resources

PARAMETER		UNIT	TOTAL A1-A3	A4
Primary energy resources – Renewable	Use as energy carrier	MJ. net calorific value	6.99E+01	1.11E+00
	Used as raw materials	MJ. net calorific value	0.00E+00	0.00E+00
	TOTAL	MJ. net calorific value	6.99E+01	1.11E+00
Primary energy resources – Non-renewable	Use as energy carrier	MJ. net calorific value	3.04E+02	7.53E+01
	Used as raw materials	MJ. net calorific value	6.67E+02	0.00E+00
	TOTAL	MJ. net calorific value	9.71E+02	7.53E+01
Secondary material		kg	2.50E+01	0.00E+00
Renewable secondary fuels		MJ. net calorific value	0.00E+00	0.00E+00
Non-renewable secondary fuels		MJ. net calorific value	0.00E+00	0.00E+00
Net use of fresh water		m^3	1.07E-01	1.37E-03

Waste production and output flows

Waste production

PARAMETER	UNIT	TOTAL A1-A3	A4
Hazardous waste disposed	kg	7.36E-06	1.30E-09
Non-hazardous waste disposed	kg	5.36E-01	8.45E-03
Radioactive waste disposed	kg	2.15E-02	9.53E-05

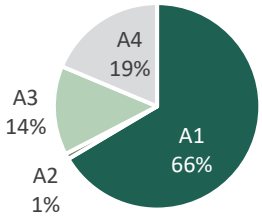
Output flows

PARAMETER	UNIT	TOTAL A1-A3	A4
Components for reuse	kg	6.51E-02	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00
Materials for energy recovery	kg	3.90E-01	0.00E+00
Exported energy. electricity	MJ	0.00E+00	0.00E+00
Exported energy. thermal	MJ	0.00E+00	0.00E+00

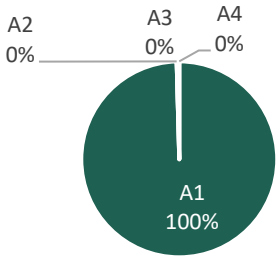
Additional information

Indicators for Pandrol QT-55G2-HP-R-Strip-32 with ELEC-L are influenced by A4 scenario where they are transported to Australia. If the A4 scenario changes the results are likely to be significantly lowered.

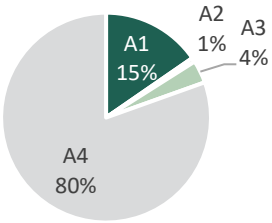
01 EN15804+A1 Global warming potential (GWP) [kg CO2 eq.]



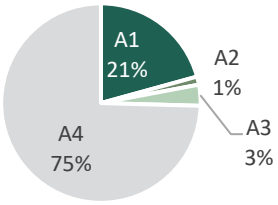
02 EN15804+A1 Ozone Depletion Potential (ODP) [kg R11 eq.]



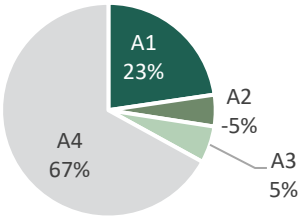
03 EN15804+A1 Acidification potential (AP) [kg SO2 eq.]



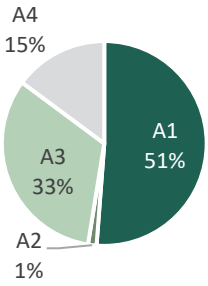
04 EN15804+A1 Eutrophication potential (EP) [kg Phosphate eq.]



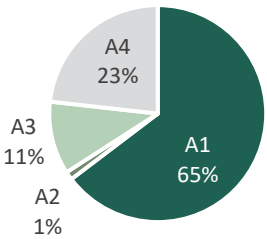
05 EN15804+A1 Photochemical Ozone Creation Potential (POCP) [kg Ethene eq.]



06 EN15804+A1 Abiotic depletion potential for non fossil resources (ADPE) [kg Sb eq.]



07 EN15804+A1 Abiotic depletion potential for fossil resources (ADPF) [MJ]



Differences versus the previous version

Since the first publication of the EPD, amendments have been made which have led to changes in the environmental performance of the QTrack®, type QT-55G2-HP-R-Strip-32 with ELEC-L. These amendments relate to the electricity consumption of the manufacturing process and to the composition of the glue used in the product.

References

General Programme Instructions of the International EPD® System. Version 3.0

Product Category Rules for construction products and construction services of 2012:01. version 2.33 valid: 2021-12-31

Product Category Rules for railways of 2013:19. version 2.11 valid: 2022-01-10

EN 15804:2012+A1:2013 (Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products)

ISO 21930 Environmental declaration of building products

ISO 14025:2006 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures

ISO/TS 14067:2013 Greenhouse gases -- Carbon footprint of products -- Requirements and guidelines for quantification and communication

ISO 14040:2006 Environmental management -- Life cycle assessment -- Principles and framework

ISO 14044:2006 Environmental management -- Life cycle assessment -- Requirements and guidelines

Genan Holding A/S. Life cycle assessment of waste tyre treatments: Material recycling vs. co-incineration in cement kilns. Project no. 118-31036. May 2020

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