

Environmental Product Declaration



In accordance with ISO 14025:2006 for:

URBOS 100 RESILIENT WHEEL

from

CAF MiiRA

MIIRA

A CAF GROUP COMPANY

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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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



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:	support@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR: Fabricated Metal Products, Except Construction Products, 2023:01, version 1.0.3
Product category classification: UN CPC 42
PCR review was conducted by: The Technical Committee of the International EPD® System. A full list of members is available at www.environdec.com . The review panel may be contacted via info@environdec.com .
Chair of the PCR review: Hüdai Kara
Life Cycle Assessment (LCA)
LCA accountability: IK-Ingenieria
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 accredited certification body
Third-party verification: <i>CERTINALIA S.L.U.</i> is an approved certification body accountable for the third-party verification
Auditor: Eva Larzabal Aperribay
info@certinalia.com
The certification body is accredited by: <i>ENAC n°125/C-PR283 accreditation</i>
Procedure for follow-up of data during EPD validity involves third-party verifier:
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

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Company information

Owner of the EPD: CAF MiiRA

CONTACT DETAILS

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Description of the organisation:

CAF MiiRA is a global reference in providing comprehensive solutions for rolling gear in the railway sector. We offer state-of-the-art engineering, manufacturing, and maintenance solutions for complete wheelsets and portal axles, including gearboxes, for all types of trains. We also provide services such as technological evaluation, inspections, and life cycle optimization analysis.

CAF MiiRA's history dates back to 1929, when it manufactured components for casting, forging, and various assemblies such as wheels, axles, wheelsets, brake blocks, crane wheels, etc. In 1990, it specialized to offer more competitive products by focusing on wheels, axles, and wheelsets. From 2006 to 2016, CAF MiiRA was established as a separate business unit of the CAF Group. New capabilities were developed to improve the product catalogue (e.g., resilient wheels).

CAF MiiRA creates solutions that provide quick and clear ad-hoc responses to each client and project. We offer high-tech products and high-quality engineering services that observe and manage "State of the art" design, manufacturing, testing, maintenance, and management processes from the perspective of innovation, cutting-edge technology, and efficiency for our clients. The company has a Technological Plan aimed at providing quality and efficiency.

The forging and heat treatment facilities assisted by computer simulations, minimize material usage and optimize costs. For the machining process, there are cutting lathes and CNC programs that use advanced dimensional simulation technologies to ensure compliance with the highest standards. For the assembly process, there is an automatic hydraulic press for wheels as well as the necessary facilities to carry out shrink fitting processes. The final quality control operations take place on an automated verification line, in order to assure that the characteristics of the products, meet customer requirements and applicable standards.

CAF MiiRA is fully committed with the environment. The company stands out as a manufacturer of complete wheelsets and axle assemblies, that covers the entire product life cycle, from conception to the end-of-life. The steel used complies with all applicable European standards.

We focus on smart design by creating lightweight, energy-efficient, low-maintenance solutions, in order to minimize the environmental impact of all products. Higher strength materials are used to reduce product volume combined with surface treatments like cold rolling to increase fatigue limits and overall safety. -100% renewable electricity is used in the manufacturing and assembly processes. Additionally, the company is part of SBTI (Science based targets initiative) and Race to Zero 2050. Several standards and recognitions obtained in this field include: ISO 14001; ISO 26000; EMAS; Ecovadis Platinum Category; CDP B rating, among others.

CAF MiiRA's quality systems are rigorously tested and currently comply with major international standards and regulations: ISO 9001; IRIS Certification; ASSOCIATION OF AMERICAN RAILROADS; RISAS...

CAF MiiRA's headquarters are in Beasain (Basque Country), Spain. In addition to its headquarters in Spain, CAF MiiRA also has a plant in Italy dedicated to integral wheelsets maintenance. If you need more information about CAF MiiRA or the CAF Group, you can visit their websites at www.cafmiira.com and www.caf.net, respectively.

Name and location of production site: Beasain, Gipuzkoa (Spain)

Product information

Product name: Urbos 100 resilient wheel

Product description: Urbos 100 resilient wheel for railway applications

The main objective of the resilient wheel is to withstand the vehicle load, ensure traction and braking force transmission and reduce noise and vibrations. It is composed by the parts listed below:

- Wheel centre: it is the inner part of the wheel, and it is made of carbon steel
- Tyre: it is the outside part of the wheel, and it is made of carbon steel
- Clamping ring: this element is screwed to the wheel centre to assembly the resilient blocks, and it is made of carbon steel
- Resilient blocks: 17 rubber blocks introduced between the tyre, wheel centre and ring
- Shunts: 4 shunts are placed around the wheel to ensure the electrical connection between tyre and wheel centre.

The wheel is made from different materials, being steel the most important material. Steel & stainless steel together represent 98% of the weight of the wheel. The most important parts by weight are the wheel centre, the ring and the tyre. These parts are made of carbon steel, and represent 97% of the wheel by weight.

Technical characteristic of the resilient wheel:

Technical characteristic	
Weight	171,86 kg
Diameter	590 ± 0,5 mm
Rim width	110 ± 0,5 mm
Tyre profile	CAF drawing X.06.00522.01

UN CPC code: UN CPC 42 – Fabricated metal products, except machinery and equipment

Geographical scope: Spain

LCA information

Declared unit: The declared unit is “1 kg of fabricated wheel”

Time representativeness: Primary data originated by CAF Miira, corresponds to the year 2024

Database(s) and LCA software used: The databases used were Ecoinvent 3.10 and the software used was SIMAPRO 9.5.0.1.

Description of system boundaries:

The system boundaries established in this study have been defined following the guidelines of the PCR 2023:01 version 1.0.3 Fabricated metal products, except construction products, applying the "cradle-to-gate" criterion.

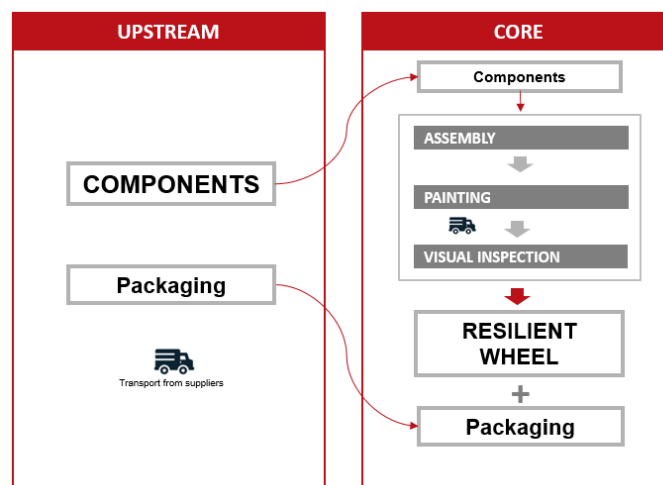
System diagram: The scope of life cycle of assessment (LCA) is cradle-to-gate, and therefore, this study includes the information from the Upstream and Core stages.

Upstream

- Extraction and production of raw material for all main parts of the product: 99,84% of the mass was included in the data inventory
- Secondary transformation of materials
- Production of consumer packaging
- Transportation of raw material to the upstream process (default information included in the indicators used)
- Generation of electricity and production of fuel (default information included in the indicators used)

Core

- Transportation of the steel and other materials and components to the core process where the final assembly takes place
- Production and use of know auxiliary materials
- Assembly process; including the inflow of auxiliary materials and energy consumptions needed
- End-of-life treatment of manufacturing waste
- Generation of electricity and production fuels, steam and other energy carries used



Excluded lifecycle stages:

The Downstream phase was not included as the scope used for the study is “cradle-to-gate”; therefore, the transportation to the retailer/consumer, the use and the end-of-life of the product have not been included.

Cut-off criteria:

For the Upstream, the following data has been included in the study:

- 99,84% of the weight of the resilient wheel
- 99,35% by weight of the transport from suppliers

For the data that was not included in the inventory, a sensitivity analysis has been performed. The contribution of the data not included in the Upstream do not contribute more than 1% for the considered impact categories.

Data quality:

All the data related to the inputs and outputs to each of the processes at the CAF MiiRA plant in Beasain were obtained during the year 2024.

In those cases, for which there were no data available concerning specific processes and/or materials, theoretical calculations have been made, estimates done or even data from internationally recognized databases of life cycle inventories have been used.

This data is valid as it represents a real manufacturing year of the product assessed.

Additional technical information:

For the electricity consumption during the assembly stage, the corresponding 2024 energy mix was obtained from the data published by the CNMC, which is a public body that oversees the Spanish economic sectors, including electricity (<https://gdo.cnmc.es/CNE/accesoEtiquetado.do>).

The assembly plant of CAF MIIRA uses energy 100% renewable, generated by wind power and certified by the CNMC with Guarantee of Origin. The electricity is supplied by the electricity company Acciona-Energía.

Content declaration

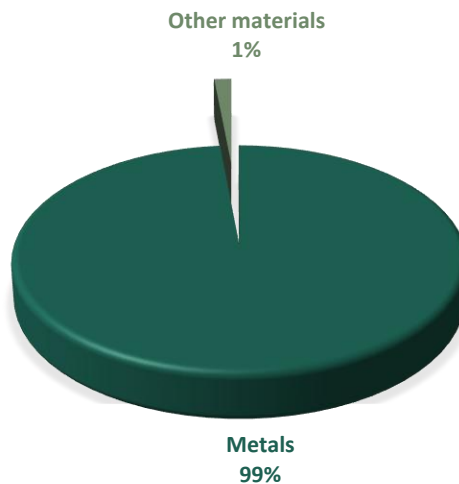
Product

For 1 kg of fabricated wheel, the composition is:

Resilient wheel composition	
Material group	%
Metals (Steel & Stainless steel)	98,51%
Elastomers	1,33%
Polymers	0,02%
Oil, grease or similar	0,13%
Other inorganic materials	0,01%
Total	100%

None of the components are classified as dangerous.

The wheel is made from different materials, with metals (steel & stainless steel) being the most abundant, 99%. Furthermore, the most important parts by weight are the wheel centre, the ring and the tyre. These parts are made of carbon steel, and represent 97% of the wheel by weight.



The chemical composition of the wheel centre, ting and tyre are:

- Wheel centre and ring: carbon steel C3, according with standard the UIC812-1 Technical specification for the supply of rolled or forged steel wheel centres for tractive and trailing stock
- Tyre: carbon steel B6, according to standard UIC810-1 Technical specification for the supply of rough rolled non-alloyed steel tyres for tractive and trailing stock

Chemical composition		
	C3	B6
C	0,58 - 0,65	0,47 - 0,65
Mn	0,75 - 0,90	0,68 - 0,90
Si	0,20 - 0,38	0,20 - 0,38
P	0,02	0,02
S	0,02	0,02
Cr	0,15 - 0,28	0,15 - 0,28
Ni	0,3	0,3
Mo	0,08	0,08
Cr+Ni+Mo	0,6	-
V	0,05	0,05
Cu	0,25	0,25
Al	0,015 - 0,030	0,015 - 0,030
Ti	0,005	0,005
Sn	0,03	0,03
B	0,0005	0,0005

Packaging

The distribution packaging of the wheel is a wooden pallet.

Packaging composition	
Material	%
Wooden pallet	100%

Results of the environmental performance indicators

Impact category indicators

Results for the life cycle assessment of 1 kg of fabricated wheel (declared unit):

ENVIRONMENTAL IMPACT 1 kg of fabricated wheel	UNIT	Upstream	Core	TOTAL
Global warming potential (GWP) - Fossil	kg CO2 eq.	2,59E+00	4,37E-01	3,03E+00
Global Warming Potential (GWP) - Biogenic	kg CO2 eq.	-6,98E-02	6,60E-04	-6,91E-02
Global warming potential (GWP) - Land use	kg CO2 eq.	2,09E-03	1,63E-04	2,25E-03
Global warming potential (GWP) - Total	kg CO2 eq.	2,52E+00	4,38E-01	2,96E+00
Ozone depletion (ODP)	kg CFC-11 eq.	1,86E-08	1,00E-08	2,86E-08
Acidification (AP)	mol H+ eq.	1,17E-02	1,33E-03	1,30E-02
Eutrophication (EP), freshwater	kg P eq.	1,30E-03	3,88E-05	1,34E-03
Eutrophication (EP), marine	kg N eq.	2,41E-03	4,29E-04	2,84E-03
Eutrophication (EP), terrestrial	mol N eq.	2,52E-02	4,63E-03	2,98E-02
Photochemical ozone creation potential (POCP)	kg NMVOC eq.	9,04E-03	2,01E-03	1,10E-02
Abiotic depletion potential (ADP) - minerals and metals*	kg Sb eq.	6,29E-05	1,60E-06	6,45E-05
Abiotic depletion potential (ADP)- fossil fuels*	MJ	2,87E+01	6,28E+00	3,50E+01
Water deprivation potential (WDP)*	m3 eq depriv.	9,15E-01	3,24E-02	9,47E-01

* 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.

The results for the Total Global Warming Potential (GWP) impact for 1 kg of fabricated wheel are:

ENVIRONMENTAL IMPACT 1 kg of fabricated wheel	UPSTREAM	CORE	TOTAL
Global warming potential (GWP) - Total (Kg CO2 eq)	2,52	0,44	2,96
Climate warming potential (GWP) - Total (%)	85,21%	14,79%	100,00%

The total Global warming potential of 1 kg of fabricated wheel is 2,96 kg CO2 eq.

Resource use indicators

RESORUCES 1 kg of fabricated wheel	UNIT	UPSTREAM	CORE	TOTAL	
Primary energy resources – Renewable	Used as energy carrier	MJ	1,64E+00	1,15E+00	2,79E+00
	Used as raw materials	MJ	1,74E+00	0,00E+00	1,74E+00
	TOTAL	MJ	3,38E+00	1,15E+00	4,53E+00
Primary energy resources – Non-renewable	Used as energy carrier	MJ	2,82E+01	6,28E+00	3,44E+01
	Used as raw materials	MJ	5,67E-01	0,00E+00	5,67E-01
	TOTAL	MJ	2,87E+01	6,28E+00	3,50E+01

Additional environmental information

Global Warming Potential of an Urbos 100 resilient wheel

As stated before, the declared unit of this study is “1 kg of fabricated wheel”. For a whole wheel, with a weight of 171,86 kg, the GWP-total is 509,20 kg CO₂ eq. This includes the materials, the transformation of the materials, the transport of materials to the manufacturing facilities, and the manufacturing/assembly processes.



References

- CAF MiiRA: <http://www.cafmiira.com/>
- 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.
- General Programme Instructions of the International EPD® System. Version 4.0
- PCR 2023:01. Fabricated Metal Products, Except Construction Products. Version 1.0.3



VERIFICATION STATEMENT CERTIFICATE CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN

Certificate No. / Certificado nº: EPD09405

CERTINALIA, S.L.U., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:

CERTINALIA, S.L.U., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:

CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES (CAF), S.A.

J.M. Iturrioz, 26

20200 Beasain (Gipuzkoa) - SPAIN

for the following products:

para los siguientes productos:

URBOS 100 RESILIENT WHEEL

Rueda elástica URBOS 100

with registration number **EPD-IES-0026884** in the International EPD® System (www.environdec.com)

*con número de registro **EPD-IES-0026884** en el Sistema Internacional EPD® (www.environdec.com)*

it's in conformity with:

es conforme con:

- **ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.**
- **General Programme Instructions for the International EPD® System v4.**
- **PCR 2023:01 Fabricated metal products, except construction products v1.0.**
- **UN CPC 42 Fabricated metal products, except machinery and equipment.**

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Serial N° / N° Serie: EPD0940500-E



Carlos Nazabal Alsua
Manager



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