

Environmental Product Declaration



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

Rail fixation component for switches of rail, tram and metros according to UNE-EN 1563:2019

from

Fundiciones de Roda SA

Roquet / FUNDICIONES
DE RODA S.A.
IRON CASTING

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



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

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product category rules (PCR): *PCR 2019:14 Construction products, version 1.1 Published on 2020.09.14, valid until: 2024.12.20.*

PCR review was conducted by the *Technical Committee of the International EPD® System*.
Chair: *Claudia A. Peña*. Contact 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:

TECNALIA R&I Certificación S.L. Auditor: Cristina Gazulla Santos
Accredited by: ENAC. Accreditation no.125/C-PR283

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.

The verifier and the programme operator do not make any claim or have any responsibility of the legality of the product.

Company information

Owner of the EPD: Fundiciones de Roda SA, +34938500127, <http://www.fundicionesderoda.es/>

Contact: For more information contact by mail: info.fr@roquetgroup.com

Description of the organisation: Fundiciones de Roda belongs to the Roquet Group, the leading Spanish manufacturer of oleo dynamic elements. Since 1966, Fundiciones de Roda has been in continuous innovation and progress. More than 50 years of industrial experience guarantee the work of Fundiciones de Roda in the specialized technology of the fusion of iron with laminar and nodular graphite.

The permanent effort in R&D, in state-of-the-art equipment and resources and the high know-how acquired in the field of industrial engineering, enable the production of high-quality, solid, and reliable products.

The current production plant was built in 1992 and is located in Roda de Ter (Barcelona) on the banks of the river Ter.

Product-related or management system-related certifications: The company holds the ISO 9001:2015

Name and location of production site: C/ Disseminats, s/n E-08510 Roda de Ter (Barcelona), España

Product information

Product name: Rail fixation component for switches of rail, tram and metros according to UNE-EN 1563:2019

Product identification: The product under study are nodular recycled iron pieces used for railway crossings and switches of rails, trams and metros, which pieces belongs to a specific family of products. Within this family of products, 16 different references can be found, which only differ on the casting shape and size, while the properties of the product, the manufacturing processes and the components remain the same for all the references.

Three sub families are identified on the study: the "Slide-Chair", the "Base-plate" and the "SCR".

Product description: The rail fixation components for switches are mainly made of recycled iron scrap. The intended use of the product is providing structural and mechanical supporting to the rail fixation components for switches for rails, tram and metros. The expected life span of the product is 25 years. The technical features can be seen on the next table.

MATERIAL: EN-GJS-400-18LT according UNE-EN 1563 (nodular iron)			
Feature	Calculation method	Value	Unit
Rm TENSILE STRENGTH	UNE-EN 1563	≥400	Mpa
Rp PROOF STRESS 0,2%	UNE-EN 1563	≥240	Mpa
Elongation (%)	UNE-EN 1563	≥18%	%
Impact energy (J) (-20±2°C)	UNE-EN 1563	Individual value ≥ 9J Average of 3 measures ≥ 12J	J

Metallographic structure of the material based on UNE-EN 1563 and UNE-EN ISO 945.

Regarding the dimensional tolerances, it is determined based on the customer supplied drawing. General tolerances are based on EN-ISO 8062-3 CT-8.

The rail fixation components for switches may be delivered by Fundiciones de Roda in many formats according the shape and size required. This EPD includes the following specific formats:

References for the family of products	Product type (sub family)	kg per piece
7708	SLIDE-CHAIR	22,29
7709	SLIDE-CHAIR	25,37
7710	SLIDE-CHAIR	19,66
7711	SLIDE-CHAIR	16,5
7712	SLIDE-CHAIR	21,9
8434	SLIDE-CHAIR	23,72
8435	SLIDE-CHAIR	27,26
8436	SLIDE-CHAIR	28,08
9046	SLIDE-CHAIR	21,2
9322	SLIDE-CHAIR	21,75
9323	SLIDE-CHAIR	18,1
7785	SCR	28,65
8526	SCR	30,1
10086	BASE-PLATE	10,37
10087	BASE-PLATE	9,53
10088	BASE-PLATE	10,81

UN CPC code: 41253 (Railway or tramway track construction of iron or steel)

Geographical scope: Global
Fabricated in Spain, this product may be used globally.

LCA information

Declared unit: 1 kg of rail fixation components for switches according to UNE-EN 1563:2019.

Time representativeness: The specific on-site data are from the year 2019 (less than one year on antiquity).

Database(s) and LCA software used: Generic data used from the Ecoinvent database V3.6, updated in 2020. Simapro v9.0 is used.

Primary data regarding the inflows and outflows of the furnace and casting has been provided by Fundiciones de Roda.

Whenever possible, allocation is avoided (e.g. primary materials used). Mass allocation is applied for the rest of inputs used (energy and auxiliary and packaging materials) and outputs generated (wastes) in the production plant.

Description of system boundaries: Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D).

Excluded lifecycle stages: A4, A5 and use phase.

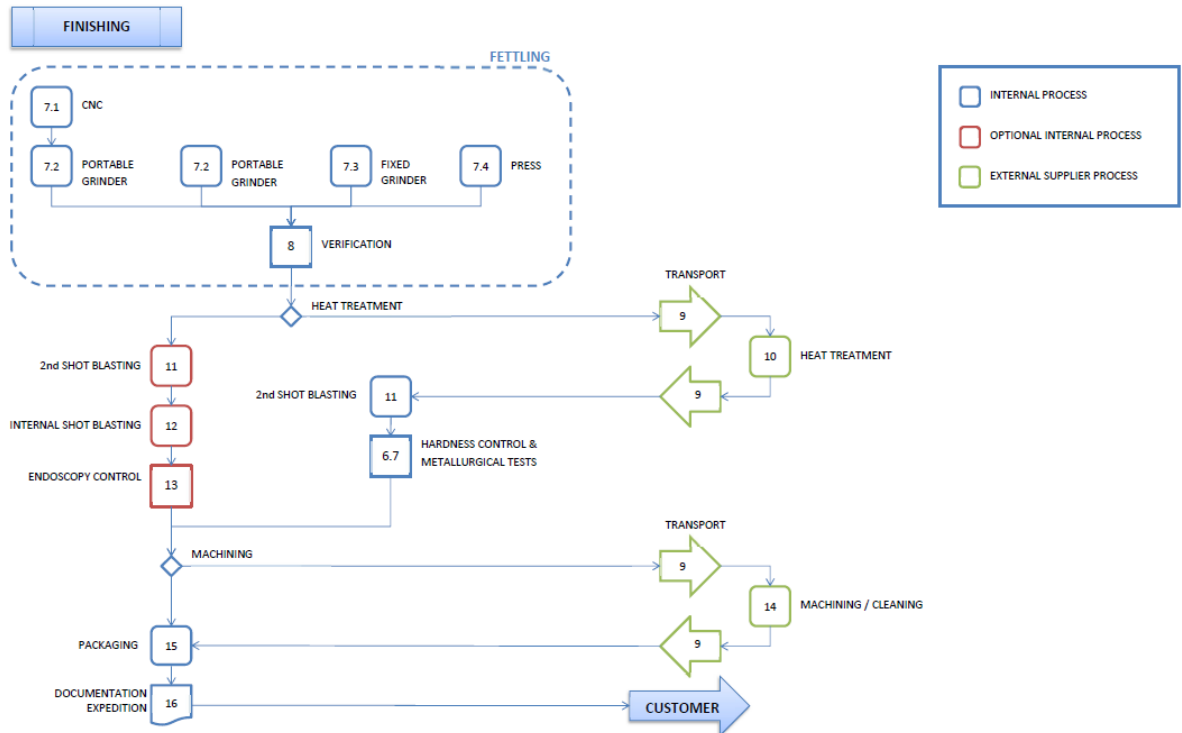
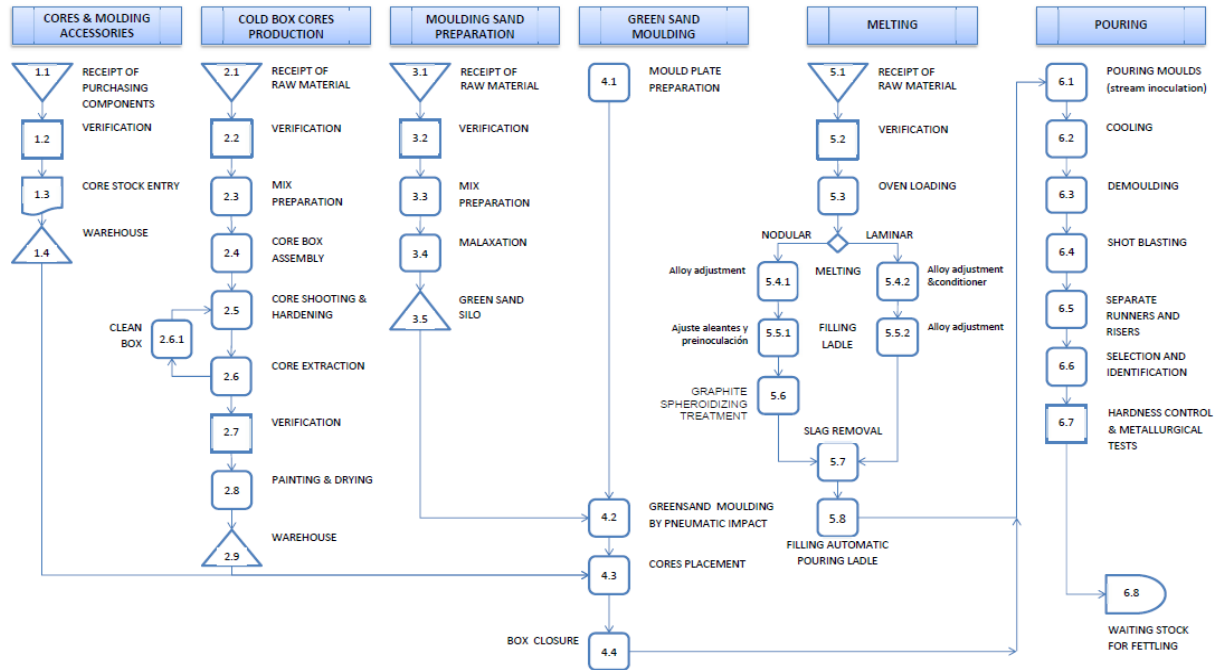
System diagram (A3 – Manufacture)

The process starts when the steel scrap arrives to the production plant of Fundiciones de Roda, this is qualified according the purity (iron content) of the scrap. The steel scrap is then charged on the refining furnace, along with the other components, until the adequate chemical composition is reached. Then the refined and melted iron is casted to obtain the desired final products.

Once the products are casted, these are sent to an external mechanical treatment and some of them also to a thermic treatment. The mechanical treatment accounts for an electricity consumption, while the thermic treatment is represented by a consumption of natural gas of the burning chambers. All the rail fixation components for switches considered in this study needs the thermic treatment, but for the mechanical one, just is needed to treat the sub family “Slide Chair”.

Once the treatments are carried, the products are sent back to the production plant of Fundiciones de Roda. After that, the products are packed and ready for the further expedition.

A generic flowchart representing the processes carried within the A3 stage are presented on the next figures.



More information of the LCA practitioner:

Lavola – Anthesis Group
Rambla de Catalunya, 6, planta 2, 08007 Barcelona
+34 938 515 055
www.lavola.com

Cut-off rules applied:

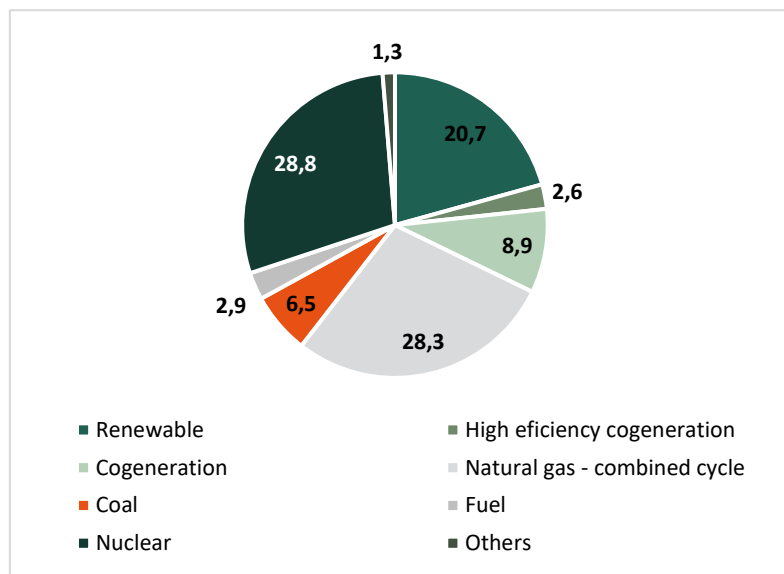
As established in the PCR of construction products and construction services, at least 95% of each input and output of the system have been included. For this study, a 100% of the weight and inputs of the declared product are considered, including packaging materials.

The PPP (Polluter pays principle) has been applied.

Moreover, the processes listed below have not been included:

- Manufacturing of production equipment, buildings and other capital goods.
- Business travel of personnel.
- Travel to and from work by personnel.
- Long term emissions.

Additional information: As established on the PCR, if the contribution of the electricity production exceeds the threshold of a 30% over the energy consumption in the modules A1-A3, the energetic mix supplied to Fundiciones de Roda must be specified. This mix, shown below, has an environmental impact of 0,272 kg CO₂ eq per kWh generated.



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		Res ourc e reco very stag e			
	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	
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	ES	ES	ES	ND	ND	ND	ND	ND	ND	ND	ND	ND	G	G		G	G	G
Specific data used	>95% GWP-GHG result in A1-A3 based on product-specific LCI					-	-	-	-	-	-	-	-	-		-	-	-
Variation – products	No variation is assessed since the composition is the same for each product of the analyzed family					-	-	-	-	-	-	-	-	-		-	-	-
Variation – sites	The product is manufactured in a single manufacturing site					-	-	-	-	-	-	-	-	-		-	-	-
X = Declared module ND = Non-Declared G = Global																		

End of life scenario for the module C4 considerations:

Parameter	Unit per declared unit	Value
Collection process, specified by type	kg collected separately	1
	kg collected with demolition wastes	0
Recovery system, specified by type	kg to reuse	0
	kg for recycling	0,85
	kg for energetic valorization	0
Disposal	kg landfilled	0,15
Transports considerations	km of distance to the waste manager	50

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Recycled iron scrap	0,936	100%	0%
Other alloying agents	0,064	1,6%	0%
TOTAL	1	93,7%	0%
Packaging materials	Weight, kg	Weight-% (versus the product)	
Wood pallet and wood covering	0,017	1,7%	
TOTAL	0,017	1,7%	

None of the final product components are included in the “Candidate list of substances of very high concern for authorisation” of the REACH regulation.

Packaging

Distribution packaging (inside the manufacturing plant): The rail fixation component for switches produced is protected and stored using pallets and wood coverings before the expedition. The biogenic carbon content of the packaging wood is assumed to be a 50%.

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: The steel scrap used for the manufacturing of this product is a post-consumer material. Main scrap origin is the automotive sector.

Environmental Information

Environmental performance has been calculated with Simapro. Characterization factors from Annex C of EN 15804:2012+A2 (EF 3.0 method adapted, in SimaPro) have been used for estimating the potential environmental impacts, as required by PCR 2019:14 Construction products, version 1.1. Results for the other parameters have been calculated using EDIP and CED (Cumulative energy Demand) methodologies.

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold valued, safety margins or risks.

Potential environmental impact – mandatory indicators according to EN 15804

Results per declared unit										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1,38E+00	1,19E-02	4,77E-01	1,87E+00	0	2,89E-03	0	1,30E-03	-8,84E-02
GWP-biogenic	kg CO ₂ eq.	9,21E-03	7,54E-07	1,19E-01	1,28E-01	0	1,88E-07	0	4,89E-06	-2,06E-05
GWP-luluc	kg CO ₂ eq.	4,21E-03	9,56E-08	2,95E-03	7,16E-03	0	2,38E-08	0	2,90E-07	-1,06E-05
GWP-total	kg CO ₂ eq.	1,40E+00	1,19E-02	6,00E-01	2,01E+00	0	2,89E-03	0	1,31E-03	-8,85E-02
ODP	kg CFC 11 eq.	1,88E-07	2,80E-09	1,84E-07	3,74E-07	0	6,98E-10	0	2,66E-10	-3,19E-09
AP	mol H ⁺ eq.	9,38E-03	2,38E-05	1,04E-03	1,04E-02	0	5,90E-06	0	8,45E-06	-3,66E-04
EP-freshwater	kg PO ₄ ³⁻ eq.	8,11E-04	2,34E-06	1,43E-04	9,56E-04	0	5,78E-07	0	1,21E-06	-3,87E-05
EP-freshwater2	kg P eq.	7,56E-05	7,19E-09	6,30E-06	8,19E-05	0	1,79E-09	0	1,05E-08	-4,45E-06
EP-marine	kg N eq.	1,37E-03	3,93E-06	2,96E-04	1,67E-03	0	9,70E-07	0	3,22E-06	-6,66E-05
EP-terrestrial	mol N eq.	1,69E-02	4,38E-05	3,10E-03	2,01E-02	0	1,08E-05	0	3,54E-05	-7,11E-04
POCP	kg NMVOC eq.	4,59E-03	1,55E-05	1,50E-03	6,11E-03	0	3,83E-06	0	9,93E-06	-4,52E-04
ADP-minerals&metals ¹	kg Sb eq.	2,10E-03	7,11E-10	4,23E-07	2,10E-03	0	1,77E-10	0	4,01E-10	-8,08E-08
ADP-fossil ¹	MJ	2,89E+01	1,71E-01	2,08E+00	3,11E+01	0	4,26E-02	0	1,81E-02	-8,62E-01
WDP ¹	m ³	9,80E-01	-3,76E-05	1,14E-01	1,09E+00	0	-9,38E-06	0	2,44E-05	2,28E-03
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; ND = Not Declared)									
Disclaimer 1: Environmental impact results shall be managed with caution since the uncertainty of the results are high and the experience with this parameter is limited.										

The table above shows that the A1 stage (extraction and processing of materials, and production of energy resources) is the life cycle stage with the highest contribution to the whole life cycle (ranging from 7,2% for GWP-biogenic and 99,9% for ADP-minerals&metals). The transportation of the raw materials has a very low contribution over the life cycle impacts due to the short distances travelled, since it contributes between 3E-05% (ADP-minerals&metals) and 1% (ODP). For the manufacturing stage, the environmental impact represents between 0,02% (AD-E) and 92,83% (GWP-biogenic).

Potential environmental impact – additional mandatory and voluntary indicators

As required on the PCR 2019:14 of construction products, a supplementary indicator for climate change impact (GWP-GHG) with characterization factors based on IPCC (2013) is reported.

Results per declared unit										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	1,36E+00	1,18E-02	5,71E-01	1,95E+00	0,00E+00	2,88E-03	0,00E+00	1,29E-03	-8,35E-02

Use of resources

Results per declared unit										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
PERE	MJ	5,86E+00	2,39E-04	4,92E+00	1,08E+01	0,00E+00	5,96E-05	0,00E+00	2,52E-04	-8,19E-03
PERM	MJ	0,00E+00	0,00E+00	2,43E-01	2,43E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	5,86E+00	2,39E-04	5,16E+00	1,10E+01	0,00E+00	5,96E-05	0,00E+00	2,52E-04	-8,19E-03
PENRE	MJ	3,06E+01	1,81E-01	2,21E+00	3,30E+01	0,00E+00	4,52E-02	0,00E+00	1,92E-02	-9,07E-01
PENRM	MJ.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,06E+01	1,81E-01	2,21E+00	3,30E+01	0,00E+00	4,52E-02	0,00E+00	1,92E-02	-9,07E-01
SM	kg	9,37E-01	0,00E+00	0,00E+00	9,37E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,44E-02
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+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.

Results per declared unit

NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m³	2,60E-02	1,16E-05	1,76E-03	2,78E-02	0,00E+00	2,90E-06	0,00E+00	1,75E-06	-4,57E-04
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; ND = Not Declared									

Waste production and output flows

Waste production

Results per declared unit

Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	6,25E-03	4,52E-07	3,15E-06	6,25E-03	0,00E+00	1,13E-07	0,00E+00	4,24E-08	-9,39E-06
Non-hazardous waste disposed	kg	1,84E-01	9,12E-06	1,20E-01	3,04E-01	0,00E+00	2,27E-06	0,00E+00	1,50E-01	-4,86E-03
Radioactive waste disposed	kg	1,49E-04	1,24E-06	9,60E-06	1,60E-04	0,00E+00	3,09E-07	0,00E+00	1,21E-07	-6,21E-07

Output flows

Results per declared unit

Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	2,94E-01	2,94E-01	0,00E+00	7,9E-01	0,00E+00	0,00E+00	-5,44E-02
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Information on biogenic carbon content

Results per declared unit		
BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	3,12E-02

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

Additional information

As additional information it is presented the life cycle environmental impacts for all the references included on the family of rail fixation components for switches. Thus, the results below are expressed per unit of rail fixation component for switches, instead of per kg. Moreover, the results presented considers the A1-A3 and the C1-C4 modules, but the benefits of recycling of the D module are not included within the following results.

Slide-chair sub family

Environm ental impact category	Unit	7708- SLIDE- CHAIR	7709- SLIDE- CHAIR	7710- SLIDE- CHAIR	7711- SLIDE- CHAIR	7712- SLIDE- CHAIR	8434- SLIDE- CHAIR	8435- SLIDE- CHAIR	8436- SLIDE- CHAIR	9046- SLIDE- CHAIR	9322- SLIDE- CHAIR	9323- SLIDE- CHAIR
GWP- total	kg CO2 eq	4,48E +01	5,10E +01	3,96E +01	3,32E +01	4,41E +01	4,77E +01	5,48E +01	5,65E +01	4,26E +01	4,38E +01	3,64E +01
GWP- fossil	kg CO2 eq	4,18E +01	4,76E +01	3,69E +01	3,10E +01	4,11E +01	4,45E +01	5,11E +01	5,27E +01	3,98E +01	4,08E +01	3,40E +01
GWP- biogenic	kg CO2 eq	2,86E +00	3,26E +00	2,53E +00	2,12E +00	2,81E +00	3,05E +00	3,50E +00	3,61E +00	2,72E +00	2,79E +00	2,33E +00
GWP- luluc	kg CO2 eq	1,60E -01	1,82E -01	1,41E -01	1,18E -01	1,57E -01	1,70E -01	1,95E -01	2,01E -01	1,52E -01	1,56E -01	1,30E -01
ODP	kg CFC11 eq	8,37E -06	9,52E -06	7,38E -06	6,19E -06	8,22E -06	8,90E -06	1,02E -05	1,05E -05	7,96E -06	8,16E -06	6,79E -06
AP	mol H+ eq	2,33E -01	2,65E -01	2,06E -01	1,73E -01	2,29E -01	2,48E -01	2,85E -01	2,94E -01	2,22E -01	2,27E -01	1,89E -01
EP- freshwat er	kg PO4--- eq	2,14E -02	2,43E -02	1,88E -02	1,58E -02	2,10E -02	2,27E -02	2,61E -02	2,69E -02	2,03E -02	2,08E -02	1,73E -02
EP- freshwat er2	kg P eq	1,83E -03	2,08E -03	1,61E -03	1,35E -03	1,79E -03	1,94E -03	2,23E -03	2,30E -03	1,74E -03	1,78E -03	1,48E -03
EP- marine	kg N eq	3,74E -02	4,26E -02	3,30E -02	2,77E -02	3,67E -02	3,98E -02	4,57E -02	4,71E -02	3,56E -02	3,65E -02	3,04E -02
EP- terrestria l	mol N eq	4,48E -01	5,10E -01	3,95E -01	3,32E -01	4,40E -01	4,77E -01	5,48E -01	5,65E -01	4,26E -01	4,37E -01	3,64E -01
POCP	kg NMVO C eq	1,36E -01	1,55E -01	1,20E -01	1,01E -01	1,34E -01	1,45E -01	1,67E -01	1,72E -01	1,30E -01	1,33E -01	1,11E -01
ADP- minerals 2	kg Sb eq	4,68E -02	5,32E -02	4,12E -02	3,46E -02	4,59E -02	4,98E -02	5,72E -02	5,89E -02	4,45E -02	4,56E -02	3,80E -02
ADP- fossil²	MJ	6,95E +02	7,91E +02	6,13E +02	5,14E +02	6,82E +02	7,39E +02	8,50E +02	8,75E +02	6,61E +02	6,78E +02	5,64E +02
WDP²	m3 depriv.	2,44E +01	2,78E +01	2,15E +01	1,81E +01	2,40E +01	2,60E +01	2,98E +01	3,07E +01	2,32E +01	2,38E +01	1,98E +01
PM	diseas e inc.	5,84E -06	6,65E -06	5,15E -06	4,32E -06	5,74E -06	6,21E -06	7,14E -06	7,36E -06	5,55E -06	5,70E -06	4,74E -06

Environmental impact category	Unit	7708-SLIDE-CHAIR	7709-SLIDE-CHAIR	7710-SLIDE-CHAIR	7711-SLIDE-CHAIR	7712-SLIDE-CHAIR	8434-SLIDE-CHAIR	8435-SLIDE-CHAIR	8436-SLIDE-CHAIR	9046-SLIDE-CHAIR	9322-SLIDE-CHAIR	9323-SLIDE-CHAIR
IRP ¹	kBq U-235 eq	4,89E+00	5,56E+00	4,31E+00	3,62E+00	4,80E+00	5,20E+00	5,98E+00	6,16E+00	4,65E+00	4,77E+00	3,97E+00
ETP-fw ²	CTUe	1,56E+03	1,77E+03	1,37E+03	1,15E+03	1,53E+03	1,65E+03	1,90E+03	1,96E+03	1,48E+03	1,52E+03	1,26E+03
HTP-c ²	CTUh	5,17E-08	5,88E-08	4,56E-08	3,82E-08	5,08E-08	5,50E-08	6,32E-08	6,51E-08	4,91E-08	5,04E-08	4,19E-08
HTP-nc ²	CTUh	1,74E-06	1,99E-06	1,54E-06	1,29E-06	1,71E-06	1,86E-06	2,13E-06	2,20E-06	1,66E-06	1,70E-06	1,42E-06
SQP ²	Pt	1,25E+03	1,42E+03	1,10E+03	9,22E+02	1,22E+03	1,33E+03	1,52E+03	1,57E+03	1,19E+03	1,22E+03	1,01E+03
PERE	MJ	2,40E+02	2,73E+02	2,12E+02	1,78E+02	2,36E+02	2,56E+02	2,94E+02	3,03E+02	2,28E+02	2,34E+02	1,95E+02
PERM	MJ	5,42E+00	6,17E+00	4,78E+00	4,01E+00	5,33E+00	5,77E+00	6,63E+00	6,83E+00	5,16E+00	5,29E+00	4,40E+00
PERT	MJ	2,46E+02	2,80E+02	2,17E+02	1,82E+02	2,41E+02	2,61E+02	3,00E+02	3,09E+02	2,34E+02	2,40E+02	1,99E+02
PENRE	MJ	7,37E+02	8,39E+02	6,50E+02	5,46E+02	7,24E+02	7,84E+02	9,02E+02	9,29E+02	7,01E+02	7,19E+02	5,99E+02
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	7,37E+02	8,39E+02	6,50E+02	5,46E+02	7,24E+02	7,84E+02	9,02E+02	9,29E+02	7,01E+02	7,19E+02	5,99E+02
SM	kg	2,09E+01	2,38E+01	1,84E+01	1,55E+01	2,05E+01	2,22E+01	2,55E+01	2,63E+01	1,99E+01	2,04E+01	1,70E+01
RSF	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	6,19E-01	7,04E-01	5,46E-01	4,58E-01	6,08E-01	6,58E-01	7,57E-01	7,79E-01	5,88E-01	6,04E-01	5,02E-01
HW	kg	1,39E-01	1,59E-01	1,23E-01	1,03E-01	1,37E-01	1,48E-01	1,70E-01	1,76E-01	1,33E-01	1,36E-01	1,13E-01
NHW	kg	1,01E+01	1,15E+01	8,93E+00	7,50E+00	9,95E+00	1,08E+01	1,24E+01	1,28E+01	9,63E+00	9,88E+00	8,22E+00
RW	kg	3,57E-03	4,06E-03	3,15E-03	2,64E-03	3,50E-03	3,80E-03	4,36E-03	4,49E-03	3,39E-03	3,48E-03	2,90E-03

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CSR and Base-Plate sub families

Environmental impact category	Unit	7785-SCR	8526-SCR	10086-BASE-PLATE	10087-BASE-PLATE	10088-BASE-PLATE
GWP-total	kg CO2 eq	5,76E+01	6,06E+01	2,09E+01	1,92E+01	2,17E+01
GWP-fossil	kg CO2 eq	5,37E+01	5,65E+01	1,95E+01	1,79E+01	2,03E+01
GWP-biogenic	kg CO2 eq	3,68E+00	3,87E+00	1,33E+00	1,22E+00	1,39E+00
GWP-luluc	kg CO2 eq	2,05E-01	2,15E-01	7,42E-02	6,82E-02	7,74E-02
ODP	kg CFC11 eq	1,08E-05	1,13E-05	3,89E-06	3,58E-06	4,06E-06
AP	mol H+ eq	3,00E-01	3,15E-01	1,08E-01	9,96E-02	1,13E-01
EP-freshwater	kg PO4--- eq	2,74E-02	2,88E-02	9,93E-03	9,13E-03	1,04E-02
EP-freshwater2	kg P eq	2,35E-03	2,46E-03	8,49E-04	7,80E-04	8,85E-04
EP-marine	kg N eq	4,81E-02	5,05E-02	1,74E-02	1,60E-02	1,81E-02
EP-terrestrial	mol N eq	5,76E-01	6,05E-01	2,08E-01	1,92E-01	2,17E-01
POCP	kg NMVOC eq	1,75E-01	1,84E-01	6,35E-02	5,83E-02	6,61E-02
ADP-minerals ²	kg Sb eq	6,01E-02	6,31E-02	2,18E-02	2,00E-02	2,27E-02
ADP-fossil ²	MJ	8,93E+02	9,38E+02	3,23E+02	2,97E+02	3,37E+02
WDP ²	m3 depriv.	3,14E+01	3,29E+01	1,13E+01	1,04E+01	1,18E+01
PM	disease inc.	7,51E-06	7,89E-06	2,72E-06	2,50E-06	2,83E-06
IRP ¹	kBq U-235 eq	6,28E+00	6,60E+00	2,27E+00	2,09E+00	2,37E+00
ETP-fw ²	CTUe	2,00E+03	2,10E+03	7,23E+02	6,65E+02	7,54E+02
HTP-c ²	CTUh	6,64E-08	6,98E-08	2,40E-08	2,21E-08	2,51E-08
HTP-nc ²	CTUh	2,24E-06	2,36E-06	8,12E-07	7,46E-07	8,46E-07
SQP ²	Pt	1,60E+03	1,68E+03	5,80E+02	5,33E+02	6,04E+02
PERE	MJ	3,09E+02	3,24E+02	1,12E+02	1,03E+02	1,16E+02
PERM	MJ	6,97E+00	7,32E+00	2,52E+00	2,32E+00	2,63E+00
PERT	MJ	3,16E+02	3,32E+02	1,14E+02	1,05E+02	1,19E+02
PENRE	MJ	9,47E+02	9,95E+02	3,43E+02	3,15E+02	3,58E+02
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	9,47E+02	9,95E+02	3,43E+02	3,15E+02	3,58E+02
SM	kg	2,68E+01	2,82E+01	9,72E+00	8,93E+00	1,01E+01
RSF	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	7,95E-01	8,35E-01	2,88E-01	2,65E-01	3,00E-01
HW	kg	1,79E-01	1,88E-01	6,48E-02	5,96E-02	6,76E-02
NHW	kg	1,30E+01	1,37E+01	4,71E+00	4,33E+00	4,91E+00
RW	kg	4,58E-03	4,82E-03	1,66E-03	1,52E-03	1,73E-03

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