ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Heyback railway steel tie plate 0126517 with rubber pad 0140340
Nordic Fastening Group AB

EPD HUB, HUB-0022
Publishing date 14 Apr. 2022, last updated date 14 Apr. 2022, valid until 14 Apr. 2027

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Nordic Fastening Group AB
Address	Rattgatan 15 47537 Kungälv Sweden
Contact details	info@nfgab.se
Website	www.nfgab.se

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4 and D
EPD author	Niklas Klippenberg - Nordic Fastening Group AB
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	Elma Avdyli, EPD Hub

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Heyback railway steel tie plate 0126517 with rubber pad 0140340
Additional labels	NFG article no 990005645 and 990005652
Product reference	0126517/990005645 and 0140340/990005652
Place of production	Sweden
Period for data	2020

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	3,57
GWP-total, A1-A3 (kgCO2e)	1,64
Secondary material, inputs (%)	38,4
Secondary material, outputs (%)	121
Total energy use, A1-A3 (kWh)	13,6
Total water use, A1-A3 (m3e)	0,0231

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

We provide you with all types of fasteners and connections – everything from basic joints with screws, bolts or nuts, to connections with threaded sleeves, threaded bars, tension rods or fasteners for steel construction. In addition to our extensive range comprising approximately 30,000 articles, we also produce customised connections, either modified or completely newly designed, for your special projects.

PRODUCT DESCRIPTION

Heyback railway steel tie plate is a steel plate to used together with the rubber pad.
Railway steelplate and rubber pad is used to fix the railway on the wooden sleepers.
This product is produced according to costumer drawings and specification.

Further information can be found at www.nfgab.se.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	98,55	China
Minerals	-	-
Fossil materials	1,45	China
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,512

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg
Mass per declared unit	1 kg

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

Rubberpad:

Densification - mixing mill - vulcanization - rolling-packaging

A wooden pallet and plastic film is used as a packaging material for transporting the product from the factory gate.

The loss of material is considered in A3.

SteelPlate:

The round steel (70mm in diameter, 9m in length) is cut to 300mm in length.

Then rough forging and fine forging, forging into the basic shape and size of the product forming.

Then drilling and milling into finished products.

And finally packaging for shipping.

Hydraulic oils, cutting emulsions and other lubrication oils are used during the process to reduce the wear of machines and to ensure stable cutting conditions.

Information from the factory, total ancillary materials are divided by the total production of products yearly.

The manufacturing process requires High voltage electricity and fuels for the different equipment as well as heating, unless district heating is used.

The steel waste produced at the plant is directed to recycling.

The loss of material is considered in A3, and the percentage of loss is 11,5% for total declared unit steel and rubber and was calculated by divided total manufacturing mass with waste.

A wooden pallet and plastic film are used as a packaging material for transporting the product from the factory gate.

Steel and rubber are produced and shipped separately.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The transportation distance is defined according to the PCR. Distance of transportation from Nordic Fastening Group AB´s factory in China to building site is assumed to be 24146km for steel plate and 24709km for the rubber pad and the transportation method is assumed to be lorry and container ship. Leg 1 in A4 are lorry transports from factory to harbour in China, and lorry from harbour in Gothenburg to Costumer. Leg 2 in A4 is container ship transport between Shanghai and Gothenburg.

Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by the transportation company to serve the needs of other clients. Transportation does not cause losses as product are packaged properly.
Steel bolts are used to assembly the plate to the wooded sleeper and are there for included in A5, 0,2154kg is for the declared unit.
Wood and plastic packaging is considered in A5, and 50km is assumed as average distance to waste management
A datapoint for CO2 emission that is used for balancing biogenic carbon have been added(A5).

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

Demolition, the source of energy is power tool and is negligible (C1).
It is assumed that 100% of the waste is collected and transported to the waste treatment centre. Transportation distance to treatment is assumed as 50 km in Sweden and the transportation method is assumed to be lorry (C2).
100% of steel is recycled at the end of life, and 100% of the rubber is incinerated according to information from Costumer. The fuel efficiency of the incinerator power plant is 73%, of which electricity accounts for 11% and heat for 62% (Eriksson, O & Finnveden, G. 2017). (C3).
There is no landfill for final disposal (C4).
Due to the recycling process, the end-of-life product is converted into recycled steel and plastic film, while the wooden pallets and Rubber pad is incinerated for energy recovery.
Benefits as heat from packaging for steel plate and electricity and heat from the rubber pad is shown in(D)

LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

For easier modelling and because of lack of accuracy in available modelling resources many constituents under 0,1% of product mass are excluded. These include some ancillary materials which are all present in the product only in very small amounts and have no serious impact on the emissions of the product.
This LCA study includes the provision of all materials, transportation, energy and emission flows, and end of life processing of product. The use phase is not covered, assuming there are no use emissions or replacements. All industrial processes from raw material acquisition and pre-processing, production, product distribution and installation, and end-of-life management are included. C1 is assumed to be negligible, due to the power tools very low output.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per the reference standard, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

In this study allocation could not be avoided for raw materials, packaging, ancillary material, energy consumption and waste production as the information was only measured on factory or production process level. The inputs were allocated to studied product based on annual production volume (mass).

The values for 1 kilogram of Steelplate and Rubber Pad are calculated by considering the total product weight per annual production.
In the factory, several kinds of steel products are produced; since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total raw materials, energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the product output fixed to 1 kg and the corresponding amount of product is used in the calculations.
Information comes from the factory regarding total ancillary materials and are divided by the total production of products yearly.
Assumption that 100% of steel is recycled at the end of life comes from Costumer and it is well known that steel is recycled.
Assumption that 100% of the rubber is incinerated due to information from Costumer.
This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs.

Allocation used in environmental data sources is aligned with the above.

AVERAGES AND VARIABILITY

This EPD is product and factory specific and does not contain average calculations.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	2,37E0	2,7E-2	-7,57E-1	1,64E0	6,13E-1	2,4E0	MND	MND	MND	MND	MND	MND	MND	0E0	5,53E-3	7,37E-2	0E0	-6,66E-1
GWP – fossil	kg CO_2e	2,43E0	2,69E-2	1,11E0	3,57E0	6,17E-1	5,25E-1	MND	MND	MND	MND	MND	MND	MND	0E0	5,52E-3	7,54E-2	0E0	-2,34E0
GWP – biogenic	kg CO_2e	-6,77E-2	1,13E-5	-1,87E0	-1,94E0	-3,66E-5	1,88E0	MND	MND	MND	MND	MND	MND	MND	0E0	4,01E-6	-1,7E-3	0E0	1,68E0
GWP – LULUC	kg CO_2e	9,73E-4	1,07E-5	2,85E-3	3,83E-3	3,66E-4	2,57E-4	MND	MND	MND	MND	MND	MND	MND	0E0	1,66E-6	3,39E-5	0E0	-1,79E-3
Ozone depletion pot.	kg $CFC_{-11}e$	1,19E-7	6,03E-9	7,89E-8	2,04E-7	1,29E-7	2,46E-8	MND	MND	MND	MND	MND	MND	MND	0E0	1,3E-9	4,36E-9	0E0	-1,43E-7
Acidification potential	mol H^+e	1,05E-2	2,94E-4	5,9E-3	1,67E-2	1,59E-2	2,66E-3	MND	MND	MND	MND	MND	MND	MND	0E0	2,32E-5	3,66E-4	0E0	-7,41E-3
EP-freshwater[3)]	kg Pe	1,07E-4	2,1E-7	6,12E-5	1,69E-4	3,3E-6	3,14E-5	MND	MND	MND	MND	MND	MND	MND	0E0	4,49E-8	2,05E-6	0E0	-7,15E-5
EP-marine	kg Ne	2,07E-3	7,7E-5	1,16E-3	3,3E-3	3,95E-3	5,21E-4	MND	MND	MND	MND	MND	MND	MND	0E0	6,99E-6	8,18E-5	0E0	-1,47E-3
EP-terrestrial	mol Ne	2,26E-2	8,54E-4	1,3E-2	3,65E-2	4,39E-2	5,94E-3	MND	MND	MND	MND	MND	MND	MND	0E0	7,72E-5	9,48E-4	0E0	-1,56E-2
POCP (“smog”)	kg NMVOCe	1,19E-2	2,39E-4	4,62E-3	1,67E-2	1,15E-2	2,55E-3	MND	MND	MND	MND	MND	MND	MND	0E0	2,48E-5	2,58E-4	0E0	-9,69E-3
ADP-minerals & metals	kg Sbe	1,86E-5	3,96E-7	7,54E-6	2,65E-5	5,98E-6	8,87E-6	MND	MND	MND	MND	MND	MND	MND	0E0	9,42E-8	1,65E-6	0E0	-2,13E-6
ADP-fossil resources	MJ	2,46E1	3,99E-1	1,66E1	4,16E1	8,29E0	5,22E0	MND	MND	MND	MND	MND	MND	MND	0E0	8,59E-2	4,17E-1	0E0	-2,54E1
Water use[2)]	m^3e depr.	9,6E-1	1,43E-3	2,72E-1	1,23E0	2,11E-2	2,55E-1	MND	MND	MND	MND	MND	MND	MND	0E0	3,2E-4	6,52E-3	0E0	-3,98E-1

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy	MJ	1,46E0	4,25E-3	5,87E0	7,33E0	6,91E-2	5,26E-1	MND	MND	MND	MND	MND	MND	MND	0E0	1,08E-3	6,48E-2	0E0	-1,28E0
Renew. PER as material	MJ	1,01E-1	0E0	1,8E1	1,81E1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	1,56E0	4,25E-3	2,39E1	2,55E1	6,91E-2	5,26E-1	MND	MND	MND	MND	MND	MND	MND	0E0	1,08E-3	6,48E-2	0E0	-1,28E0
Non-re. PER as energy	MJ	2,46E1	3,99E-1	1,65E1	4,15E1	8,29E0	5,22E0	MND	MND	MND	MND	MND	MND	MND	0E0	8,59E-2	4,17E-1	0E0	-2,53E1
Non-re. PER as material	MJ	0E0	0E0	5,31E-2	5,31E-2	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-5,43E-2
Total use of non-re. PER	MJ	2,46E1	3,99E-1	1,66E1	4,16E1	8,29E0	5,22E0	MND	MND	MND	MND	MND	MND	MND	0E0	8,59E-2	4,17E-1	0E0	-2,54E1
Secondary materials	kg	2,56E-1	0E0	1,28E-1	3,84E-1	0E0	2,86E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	8,12E-1
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	1,81E-2	7,38E-5	4,96E-3	2,31E-2	1,04E-3	3,32E-3	MND	MND	MND	MND	MND	MND	MND	0E0	1,79E-5	2,33E-4	0E0	-1,26E-2

6) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	4,09E-1	4,41E-4	8,74E-2	4,97E-1	9,23E-3	1,88E-1	MND	MND	MND	MND	MND	MND	MND	0E0	8,35E-5	0E0	0E0	-2,11E-1
Non-hazardous waste	kg	4,08E0	3,57E-2	2,42E0	6,54E0	3,33E-1	1,65E0	MND	MND	MND	MND	MND	MND	MND	0E0	9,24E-3	0E0	0E0	-1,26E0
Radioactive waste	kg	3,74E-5	2,72E-6	5,1E-5	9,12E-5	5,78E-5	8,67E-6	MND	MND	MND	MND	MND	MND	MND	0E0	5,9E-7	0E0	0E0	-3,44E-5

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	1,28E-1	1,28E-1	0E0	1,14E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	1,2E0	0E0	0E0
Materials for energy rec	kg	0E0	0E0	1,31E-3	1,31E-3	0E0	1,66E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	1,06E-2	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	2,33E0	2,67E-2	1,08E0	3,44E0	6,13E-1	5,04E-1	MND	MND	MND	MND	MND	MND	MND	0E0	5,47E-3	7,49E-2	0E0	-2,24E0
Ozone depletion Pot.	kg $CFC_{-11}e$	1,06E-7	4,79E-9	7,02E-8	1,8E-7	1,02E-7	2,18E-8	MND	MND	MND	MND	MND	MND	MND	0E0	1,03E-9	3,72E-9	0E0	-1,23E-7
Acidification	kg SO_2e	8,05E-3	2,18E-4	4,8E-3	1,31E-2	1,25E-2	2,13E-3	MND	MND	MND	MND	MND	MND	MND	0E0	1,12E-5	2,28E-4	0E0	-5,86E-3
Eutrophication	kg PO_4^3e	4,34E-3	2,97E-5	1,97E-3	6,34E-3	1,42E-3	1,39E-3	MND	MND	MND	MND	MND	MND	MND	0E0	2,27E-6	9,48E-5	0E0	-2,88E-3
POCP (“smog”)	kg C_2H_4e	1,53E-3	6,96E-6	2,65E-4	1,8E-3	3,38E-4	3,03E-4	MND	MND	MND	MND	MND	MND	MND	0E0	7,12E-7	1,06E-5	0E0	-1,4E-3
ADP-elements	kg Sbe	1,86E-5	3,96E-7	7,54E-6	2,65E-5	5,98E-6	8,87E-6	MND	MND	MND	MND	MND	MND	MND	0E0	9,42E-8	1,65E-6	0E0	-2,13E-6
ADP-fossil	MJ	2,46E1	3,99E-1	1,66E1	4,16E1	8,29E0	5,22E0	MND	MND	MND	MND	MND	MND	MND	0E0	8,59E-2	4,17E-1	0E0	-2,54E1

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the ED Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

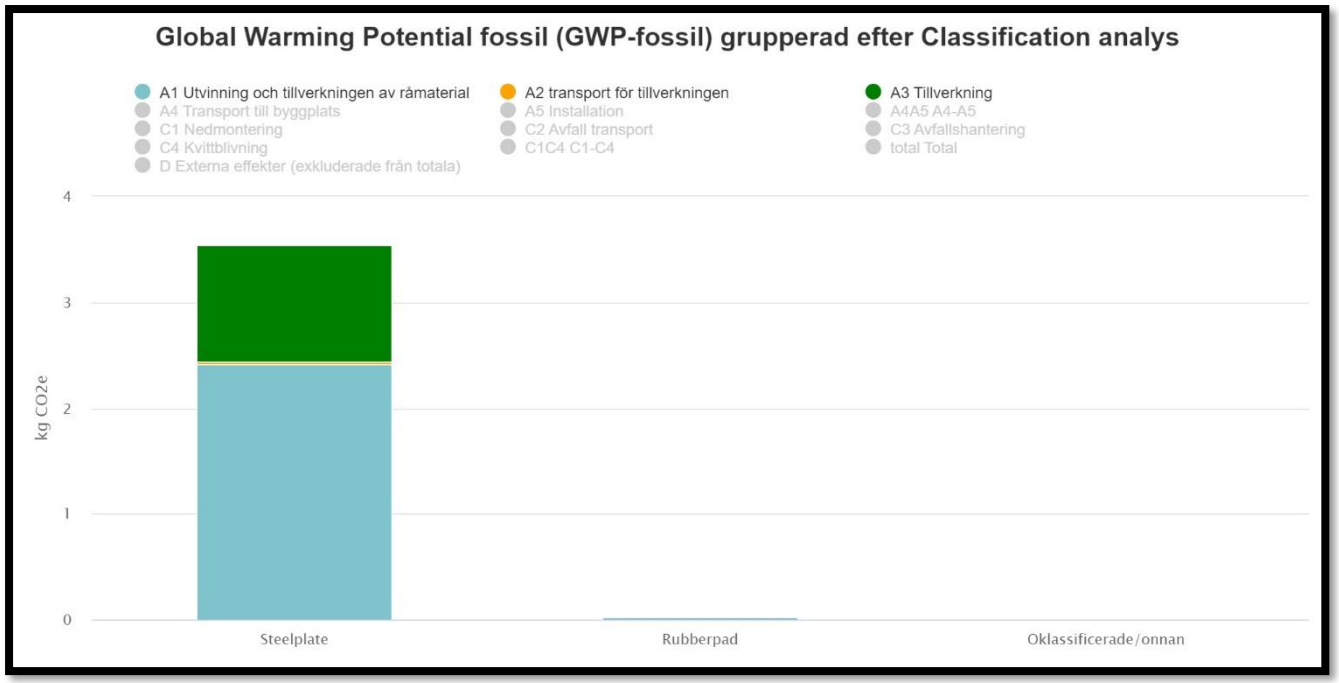
I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Elma Avdyli, approved verifier by EPD Hub, 14.04.2022

EPD Hub
VERIFIED ISO 14025

ANNEX

RESULTS A1-A3 GWP-GHG



Global Warming Potential total (GWP/GHG) Grouped by classification analysis

Category	A1 Extraction and manufacture of raw materials	A2 Transport for manufacturing	A3 Manufacturing	A1-A3 Total - kg CO2e
Steelplate	2,41	0,0270	1,10	3,54
Rubberpad	0,0231	0,00000443	0,0138	0,03