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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Ulefos AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-3176-1817-EN
Registration number:	NEPD-3176-1817-EN
ECO Platform reference number:	-
Issue date:	20.10.2021
Valid to:	20.10.2026

One tonne of ductile cast iron

Ulefos AS



www.epd-norge.no



General information

Product:

One tonne finished product of ductile cast iron

Program operator:

The Norwegian EPD Foundation
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Declaration number:

NEPD-3176-1817-EN

ECO Platform reference number:**This declaration is based on Product Category Rules:**

CEN Standard EN 15804 serves as core PCR
NPCR Construction products and services - Part A

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Declared unit:

One tonne finished product of ductile cast iron

Declared unit with option:

A1,A2, A3, A4

Functional unit:

-

Verification:

The CEN Norm EN 15804 serves as the core PCR.
Independent verification of the declaration and data,
according to ISO14025:2010

internal

external

Third party verifier:

Alexander Borg

Alexander Borg, Asplan Viak AS
(Independent verifier approved by EPD Norway)

Owner of the declaration:

Ulefos AS
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Manufacturer:

Ulefos AS
Jernværksveien 12
3830 Ulefoss
Norway

Place of production:

Ulefoss, Norway

Management system:

ISO 9001:2015, ISO 14001:2015, EN 124-2

Organisation no:

981 083 032

Issue date:

20.10.2021

Valid to:

20.10.2026

Year of study:

2021

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

The EPD has been worked out by:

Heidi Snemyr, COWI AS

Heidi Snemyr

COWI

Approved

Håkon Hauan

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Ductile iron products are mainly used as street goods and can be fully recycled. Some of the products produced from ductile iron at Ulefoss also cover other areas than just street goods, see website for more information.

Product specification:

EPD is valid for all products of ductile cast iron produced at Ulefoss in Ulefoss.

Materials	kg	%
Scrap iron	889	88,90 %
Pig iron	65,55	6,60 %
FeSiMg	9,85	1 %
FeSi	8,19	0,80 %
Graphite	17,43	1,70 %
Alloy	3,67	0,40 %
Silicon carbide	5,91	0,60 %

Packaging	Amount	Unit
EUR-pallet	1,53	p
PET-band	0,055	kg

Technical data:

The ductile cast iron is produced in compliance with EN 124-2. The product density is around 7300 kg/m³.

Market:

Mainly Norway and Nordic countries

Reference service life, product:

In general, a product of ductile cast iron is a 100% recyclable, and can always be remelted. The reference service life of street goods is estimated at approximately 4-10 years, depending on the traffic load, and over 10 years if there is no traffic load. See also the FDV-documentation at Ulefoss' website.

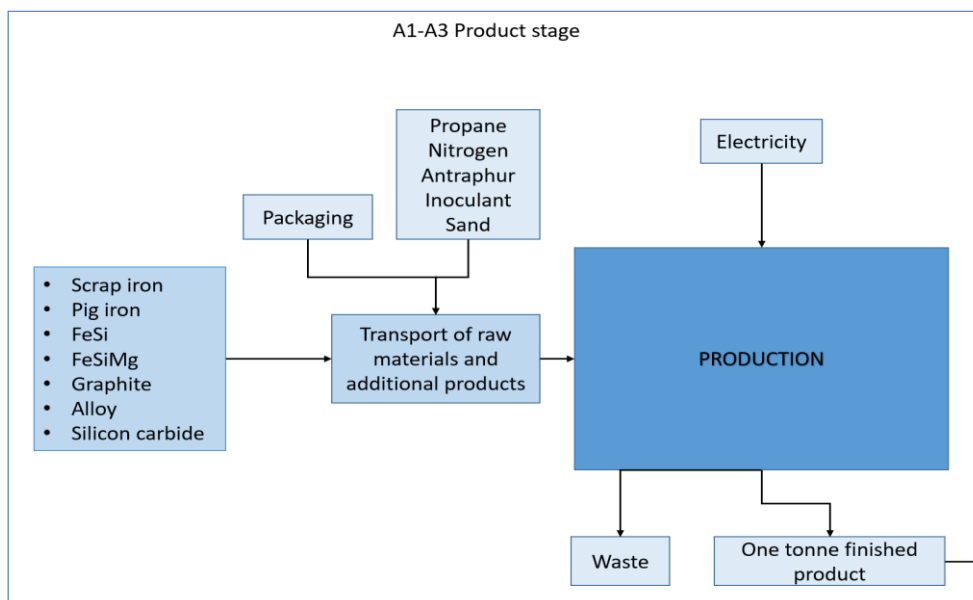
LCA: Calculation rules

Declared unit:

One tonne finished product of ductile cast iron produced at Ulefoss in Ulefoss.

System boundary:

The analysis has been performed for modules A1-A4 according to NS-EN 15804. The system limit and flow chart are illustrated below.



Data quality:

Specific data for the product composition and production are provided by the manufacturer and are based on the production year 2020. The background data is taken from ecoinvent's database v. 3.6. For transportation (A4) background data is taken from the database Agri-footprint 4.0.

Allocation:

Allocation has been made in accordance with the provisions of EN 15804. Incoming energy and water, as well as production of waste in own production are allocated to the end product, as there are no by-products. The recycling process and transport of waste materials are allocated to this analysis.

Cut-off criteria:

All major raw materials and energy use are included. Only production processes for the raw materials and energy flows that are included with very small quantities (<1%) are excluded, if lack of data. These cut-off criteria do not apply to hazardous materials and substances.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport to the user is based on an average of all deliveries in the production year 2020.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption
Truck	80 %	Truck, Euro6	364	0,0194 kg/tkm
Railway	80 %	Train, electric	159	0,0154 kWh/tkm

LCA: Results

The LCA results apply to the declared unit as specified on page 2. The LCA tool SimaPro has been used to calculate the results with specific production data from Ulefos. The database Ecoinvent v.3.6 is used for calculating the environmental indicators and is the database used for generic data.

System boundaries (X=included, MND= module not declared, MNR=module not relevant)

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

Environmental impact

Parameter	Unit	A1	A2	A3	A1- A3	A4	A1-A4		
GWP	kg CO ₂ -eqv	1,74E+02	5,75E+01	7,19E+01	3,04E+02	2,63E+01	3,30E+02		
ODP	kg CFC11-eqv	2,16E-05	1,05E-05	7,67E-06	3,98E-05	3,45E-07	4,01E-05		
POCP	kg C ₂ H ₄ -eqv	1,19E-01	7,10E-03	3,93E-01	5,19E-01	5,17E-03	5,24E-01		
AP	kg SO ₂ -eqv	1,01E+00	1,41E-01	7,63E-01	1,91E+00	1,33E-01	2,05E+00		
EP	kg PO ₄ ³⁻ -eqv	6,35E-01	3,02E-02	1,75E-01	8,41E-01	2,16E-02	8,63E-01		
ADPM	kg Sb-eqv	2,30E-03	1,60E-03	7,09E-04	4,61E-03	1,03E-06	4,61E-03		
ADPE	MJ	3,40E+03	8,59E+02	7,66E+02	5,02E+03	3,67E+02	5,39E+03		

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

Resource use

Parameter	Unit	A1	A2	A3	A1-A3	A4	A1-A4		
RPEE	MJ	7,20E+02	1,27E+01	9,23E+03	9,96E+03	2,23E+00	9,96E+03		
RPEM	MJ	1,27E+03	0,00E+00	8,98E+02	2,17E+03	0,00E+00	2,17E+03		
TPE	MJ	1,99E+03	1,99E+03	1,01E+04	1,21E+04	2,23E+00	1,21E+04		
NRPE	MJ	3,72E+03	8,86E+02	8,25E+02	5,43E+03	3,79E+02	5,81E+03		
NRPM	MJ	0,00E+00	0,00E+00	7,22E-01	7,22E-01	0,00E+00	7,22E-01		
TRPE	MJ	3,72E+03	8,86E+02	8,25E+02	5,43E+03	3,82E-04	5,43E+03		
SM	kg	8,89E+02	0,00E+00	0,00E+00	8,89E+02	0,00E+00	8,89E+02		
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00		
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00		
W	m ³	5,13E+00	9,48E-02	7,05E+01	7,57E+01	5,41E-03	7,57E+01		

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

End of life - Waste

Parameter	Unit	A1	A2	A3	A1- A3	A4	A1-A4		
HW	kg	3,43E-03	2,32E-03	1,78E-03	7,53E-03	0,00E+00	7,53E-03		
NHW	kg	3,96E+01	4,31E+01	4,13E+02	4,96E+02	2,41E-04	4,96E+02		
RW	kg	1,04E-02	6,04E-03	4,40E-03	2,08E-02	0,00E+00	2,08E-02		

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life - Output flow

Parameter	Unit	A1	A2	A3	A1- A3	A4	A1-A4		
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00		
MR	kg	0,00E+00	0,00E+00	1,00E+03	1,00E+03	0,00E+00	1,00E+03		
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00		
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00		
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00		

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: $9,0 \text{ E-03} = 9,0 \cdot 10^{-3} = 0,009$

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase

Local production, high voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Data source	Amount	Unit
Econinvent v3.6 (june 2021)	2,07	g CO ₂ -ekv/kWh

Dangerous substances

- The product contains no substances given by the REACH Candidate list or the Norwegian priority list
- The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskriften, Annex III), see table.

Name	CAS no.	Amount
Chromium	7440-47-3	<0,1%weight

Indoor environment





The product meets the requirements for low emissions (M1) according to EN15251: 2007 Appendix E.

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	<i>Environmental management - Life cycle assessment - Requirements and guidelines</i>
EN 15804:2012+A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
H. Snemyr (2021)	<i>LCA-rapport EPD for ett tonn seigjern produsert hos Ulefos</i>
NCPR	<i>NPCR Construction products and services - Part A</i>
Ulefos AS (2021)	<i>Bekreftelse innkjøp av strøm</i>
Kiwa Teknologisk Institutt Sertifisering AS (2018)	<i>Management system certificate, NS-EN ISO 14001:2015, NS-EN ISO 9001:2015</i>
Ulefos AS (2021)	<i>REACH-declaration</i>
Kontrollrådet (2020)	<i>Certificate NS-EN 124 - 2</i>

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