ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Kermi GmbH
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Valid to	28.08.2028

Steel radiator

Kermi GmbH

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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General Information

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Programme holder

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Declaration number

EPD-KER-20230254-CCB1-EN

This declaration is based on the product category rules:

Radiators, 24.07.2023
(PCR checked and approved by the SVR)

Issue date

29.08.2023

Valid to

28.08.2028

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Steel radiator

Owner of the declaration

Kermi GmbH
Pankofen-Bahnhof 1
94447 Plattling
Germany

Declared product / declared unit

The environmental product declaration refers to the declared unit of 1 kg steel radiator.

Scope:

This document relates to the manufacture, transport, installation, operation and disposal of steel radiators. The products are produced in Germany and the Czech Republic. The production data was collected at the Pankofen plant and Stříbro in 2021.

This EPD applies to the following product groups:

- Steel panel radiators/plate radiators
- Heating walls/flat tube radiators
- Convectors/flat tube radiators
- Design radiators/round tube radiators

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

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Mr Olivier Muller,
(Independent verifier)

Product

Product description/Product definition

Steel radiators are parts of heating systems in buildings. As heat exchangers, the hollow bodies made of steel release part of the thermal energy transported by the heating medium (water) to the environment in order to increase the room temperature.
The heat is mainly transferred by conduction to the surrounding air, which then distributes the heat in the room via natural convection (heat flow), as well as to varying degrees via thermal radiation.
How much heat a panel radiator gives off depends on the temperature setting of the thermostats and how much water thus flows through it.

Further information can be found in the manufacturer's documentation. Regulation (EU) No 305/2011(CPR) applies to the placing on the market of the product in the EU/EFTA (excluding Switzerland).
The required declarations of performance and CE marking have been prepared in accordance with the requirements of the harmonised standards EN 442-1:2014
'Radiators and convectors - Part 1: Technical specifications and requirements' and EN 442-2:2014 'Radiators and convectors - Part 2: Test methods and performance specification'.
The respective national regulations apply to the use.

Application

Steel radiators are used indoors for private or commercial use to increase the room temperature.

Technical Data

The products meet the requirements according to harmonised regulations for CE marking, RAL-GZ 618 quality assurance and EN 442.

Constructional Data

The following data refer to the entire steel radiator range. The exact data for each type can be found in the manufacturer's documentation.

Name	Value	Unit
Heat output at room temperature 20 °C - 75/65 °C	88 - 8017	W
Weight	2.58 - 252.3	kg
content of water	0.1 - 77.14	l
flow temperature max.	110	°C
working pressure max.	10	bar
Paint type	Powder	-

The performance values of the product according to the declaration of performance with regard to its essential characteristics in accordance with EN 442 'Radiators and convectors".

Base materials/Ancillary materials

The following table shows the percentage of basic and auxiliary materials in steel radiators from the production sites in
Plattling and Stříbro.

Name	Value	Unit
BF Steel sheet	74.48	%
Steel pipes	23.29	%
Epoxy-Polyester-Powder Coating	0.80	%
Cathodic / Anodic Dip Coating	0.68	%
Support inset	0.30	%
Korrolan	0.45	%

Reference service life

Steel radiators are durable products. When used properly, their average lifespan extends over
several decades. As a rule, steel radiators achieve a reference service life of at least 30 years, although a significantly longer service life is of course also possible.

LCA: Calculation rules

Declared Unit

The declared unit is 1 kg of Steel radiator.

Name	Value	Unit
Declared unit	1	kg

By scaling the environmental indicators with respect to 1 kg of radiator the LCA results of different product variations can be approximated.

System boundary

Type of EPD: Cradle to gate (A1-A3, C1-C4, and module D) with options (A4, A5):

Production Stage (A1-A3): The production stage includes:
- A1 Raw material supply and processing,
- A2 Transport of raw materials to the manufacturer by truck,
- A3 Production of Steel radiator (incl. energy provision, water provision, disposal of production waste, production of packaging material)

Construction Stage (A4-A5): The stage of construction includes:
- A4 Transport to the construction site 100km by truck,
- A5 Load free manual installation, loads from the treatment of packaging materials.

End of Life stage (C1-C4): The end of life (EoL) stage consists of:
- C1 Load free, manual deconstruction,
- C2 Transport of 50km to waste processing unit by truck,
- C3 Material recycling without expenses for separation and sorting
- C4 Not relevant

Benefits and loads beyond the System Boundary (D):
Module D includes: Recovery from steel recycling, energy recovery potentials from the electricity and thermal recycling of the mixed plastic waste from packaging except for plastics.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Europe

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively

the product-specific characteristics of performance, are taken into account. The background data comes from the GaBi database /*GaBi software Version CUP2022.2*

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.0571	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

Transport to the building site (A4)

Name	Value	Unit
Transport distance	100	km

Installation into the building (A5)

Module A5 includes installation of the product without machine and the treatment and disposal of the packaging material.

Name	Value	Unit
Wooden Pallets	0.1321	kg
Cardboard	0.006	kg
Polyethylene	0,002	kg

End of life (C1-C4)

Name	Value	Unit
Recycling	1	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

100% collection rate

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	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	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 kilogram Steel radiator

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	2.66E+00	7.5E-03	2.16E-01	0	3.29E-03	0	0	-1.59E+00
GWP-fossil	kg CO_2 eq	2.87E+00	7.47E-03	8.85E-03	0	3.28E-03	0	0	-1.59E+00
GWP-biogenic	kg CO_2 eq	-2.06E-01	3.74E-06	2.07E-01	0	1.64E-06	0	0	8.98E-05
GWP-luluc	kg CO_2 eq	8.83E-04	2.88E-05	8.22E-07	0	1.26E-05	0	0	-4.7E-05
ODP	kg CFC11 eq	3.16E-12	1.53E-15	3.46E-14	0	6.72E-16	0	0	-9.67E-13
AP	mol H^+ eq	6.99E-03	7.25E-06	4.65E-05	0	3.18E-06	0	0	-3.31E-03
EP-freshwater	kg P eq	2.27E-06	1.49E-08	7.9E-09	0	6.54E-09	0	0	-4.69E-07
EP-marine	kg N eq	1.62E-03	2.45E-06	1.32E-05	0	1.07E-06	0	0	-5.99E-04
EP-terrestrial	mol N eq	1.75E-02	2.89E-05	2.22E-04	0	1.27E-05	0	0	-5.32E-03
POCP	kg NMVOC eq	5.27E-03	6.49E-06	3.46E-05	0	2.85E-06	0	0	-2.38E-03
ADPE	kg Sb eq	5.34E-06	7.49E-10	8.46E-10	0	3.29E-10	0	0	-3.76E-06
ADPF	MJ	2.86E+01	9.92E-02	5.88E-02	0	4.35E-02	0	0	-1.51E+01
WDP	m^3 world eq deprived	1.83E-01	3.21E-05	2.62E-02	0	1.41E-05	0	0	-2.8E-01

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 kilogram Steel radiator

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2.27E+00	6.53E-03	2.08E+00	0	2.86E-03	0	0	4.2E-01
PERM	MJ	2.06E+00	0	-2.06E+00	0	0	0	0	0
PERT	MJ	4.33E+00	6.53E-03	1.64E-02	0	2.86E-03	0	0	4.2E-01
PENRE	MJ	2.87E+01	9.93E-02	1.44E-01	0	4.35E-02	0	0	-1.51E+01
PENRM	MJ	8.55E-02	0	-8.55E-02	0	0	0	0	0
PENRT	MJ	2.87E+01	9.93E-02	5.88E-02	0	4.35E-02	0	0	-1.51E+01
SM	kg	1.89E-01	0	0	0	0	0	0	8.66E-01
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	4.3E-03	5.06E-06	6.16E-04	0	2.22E-06	0	0	-6.48E-03

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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 kilogram Steel radiator

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	2.51E-09	4.33E-13	6.27E-12	0	1.9E-13	0	0	-3.36E-10
NHWD	kg	3.58E-02	1.62E-05	2.34E-03	0	7.08E-06	0	0	2.08E-01
RWD	kg	5.74E-04	1.25E-07	1.91E-06	0	5.47E-08	0	0	-4.78E-05
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	5.51E-02	0	0	0	0	1E+00	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	3.14E-01	0	0	0	0	0
EET	MJ	0	0	7.25E-01	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 kilogram Steel radiator

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	1.15E-07	4.61E-11	2.49E-10	0	2.02E-11	0	0	-4.62E-08
IR	kBq U235 eq	4.94E-02	1.27E-05	2.01E-04	0	5.56E-06	0	0	2.88E-02
ETP-fw	CTUe	6.58E+00	7.59E-02	2.47E-02	0	3.33E-02	0	0	-1.07E+00
HTP-c	CTUh	3.07E-09	1.52E-12	1.69E-12	0	6.68E-13	0	0	-6.27E-10
HTP-nc	CTUh	3.16E-08	7.65E-11	6.61E-11	0	3.36E-11	0	0	-2.09E-08
SQP	SQP	3.3E+01	2.97E-02	1.83E-02	0	1.3E-02	0	0	-1.38E-01

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

References

Standards

EN 442-1
DIN EN 442-1:2014, Radiators and convectors - Part 1: Technical specifications and requirements

EN 442-2
DIN EN 442-2:2014, Radiators and convectors - Part 2: Test methods and rating

ISO 14025
DIN EN ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

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

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

DIN EN 15804
EN 15804:2012+A2:2019+AC:2021, Sustainability of constructionworks — Environmental Product Declarations — Core rules for the product category of construction products

EU No 305/2011 (CPR)
REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

EWC
European Waste Catalogue

RAL-GZ 618
RAL-GZ 618:2017-08, Steel radiators - Qualitiy assessment

Further References

BNB
BBSR table (german): 'Nutzungsdauern von Bauteilen zur Lebenszyklusanalyse nach BNB', Bundesinstitut für Bau-, Stadt- und Raumforschung, Referat II Nachhaltiges Bauen; online available under https://www.nachhaltigesbauen.de/austausch/nutzungsdauern-von-bauteilen/

GaBi
Sphera Solutions GmbH GaBi Software System and Database for Life Cycle Engineering CUP Version: 2022.2 University of Stuttgart Leinfelden Echterdingen

GaBi documentation
GaBi life cycle inventory data documentation (https://www.gabisoftware.com/support/gabi/gabidatabase2020lcidocumentation/)

IBU PCR PART A
Product category rules for building- related products and services. Part A, PCR - Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, version 1.3, Institut Bauen und Umwelt e.V., www.ibu-epd.com, 2022

IBU PCR Part B
PCR – Part B: Requirements on the EPD for Radiators, version 1.0, Institut Bauen und Umwelt e.V., www.ibu-epd.com, 2023

IBU 2021
Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021

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