

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	voestalpine AG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Valid to	28.08.2028

Seamless Cored Welding Wires voestalpine Böhler Welding Fileur S.r.l.

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1. General Information

voestalpine Böhler Welding Fileur S.r.l.

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-VOE-20230215-IAC1-EN

This declaration is based on the product category rules:

Structural steels, 01.08.2021
(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.)

Seamless Cored Welding Wires

Owner of the declaration

voestalpine AG
voestalpine-Straße 3
4020 Linz
Austria

Declared product / declared unit

1 ton of average seamless cored wires

Scope:

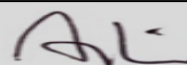
The present EPD relates to a declared unit of 1 ton of average seamless cored wire produced at the production site of voestalpine Böhler Welding Fileur S.r.l. in Cittadella (Italy).

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		
<input type="checkbox"/>	internally	<input checked="" type="checkbox"/> externally



Dr.-Ing. Andreas Ciroth,
(Independent verifier)

2. Product

2.1 Product description/Product definition

Seamless cored wires for welding applications from voestalpine Böhler Welding Fileur are widely used for joining a wide range of carbon steel alloys (diamondspark brand) and also for hardfacing applications in Maintenance and Repair fields (UTP brand). Seamless cored wires are described in numerous codes and standards worldwide with which they need to comply. There is a variety of diameters, spools and drums produced dedicated to different applications and welding processes.

For the placing on the market of the diamondspark product for joining applications in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration *EN 13479:2017, Welding consumables—General product standard for filler metals and fluxes for fusion welding of metallic materials* and the CE-marking. For the application and use the respective national provisions apply.

For the use and application of the UTP products the respective national provisions at the place of use apply.

2.2 Application

Seamless cored wires for welding applications from voestalpine Böhler Welding are available in different grades, diameters and packaging. The main application of cored wires is the arc welding processes such as FCAW (Flux-cored arc welding), MCAW (metal-cored arc welding) with the addition of shielding gas protection or without shielding gas and SAW (submerged arc welding) process with additional flux protection in joining or hardfacing. The field of applications is rather wide, from small parts and thin plates to heavy wall thicknesses (wind energy) for joining cored wires and for Maintenance and Repair of hardfacing cored wires. From fully automated processes (robot welding) to manual welding (steel construction, shipbuilding).

Typical segments are:

- Shipbuilding
- Crane and lifting
- Automotive
- Power generation
- General construction
- Yellow and green goods
- Pipe welding
- Pipeline laying
- Recycling - Shredders
- Agriculture

2.3 Technical Data

The scope of the seamless cored welding wires reaches from mild steel to middle alloyed carbon steel products. The different grades comply to the following main standards:

EN ISO 17632:2021, Welding consumables — Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of non-alloy and fine grain steels – Classification.

EN ISO 18276:2017, Welding consumables — Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high strength steels – Classification.

EN ISO 17633:2021, Welding consumables — Tubular cored electrodes for gas shielded metal arc welding of creep-resisting

steels – Classification.

EN 14700:2014, Welding consumables for hard-facing – Classification.

EN ISO 14171:2016, Welding consumables — Solid wire electrodes, tubular cored electrodes and electrode/flux combinations for submerged arc welding of non-alloy and fine grain steels – Classification.

EN ISO 26304:2017, Welding consumables — Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels – Classification.

Performance data of diamondspark products in accordance with the declaration of performance with respect to its essential characteristics according to *EN 13479:2017, Welding consumables—General product standard for filler metals and fluxes for fusion welding of metallic materials* and the CE-marking.

Performance data of the UTP products according to the harmonized standards, based on provision for harmonization. *EN 14700:2014, Welding consumables for hard-facing – Classification.*

2.4 Delivery status

Seamless cored welding wires are delivered in diameters from 0.9 to 4.0 mm. The most common diameters are 1.2, 1.4 and 1.6 mm for gas shielded products, 2.4, 3.2 and 4.0 mm for submerged arc products. Spool weight is normally 5 kg and 16 kg. Pay off packs are available from 200 to 400 kg as steel or wooden spool or various drum types.

2.5 Base materials/Ancillary materials

Main constituents of the products are unalloyed carbon hot rolled steel strip (80-90 %) and different powders grade, metallic (5-15 %) (iron, manganese, silicon manganese, nickel, chromium, molybdenum) and/or oxide as natural rutile sand (7 %) and feldspars (1%) and/or fluorides and carbonate as calcium fluoride (5 %), calcium carbonates (1 %), depending on the specific final product.

This product/article/at least one partial article contains substances listed in the *candidate list* (17.01.2023) exceeding 0.1 percentage by mass: **no**.

This product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: **no**.

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) *Ordinance on Biocide Products No. 528/2012*): **no**.

2.6 Manufacture

Seamless cored welding wires are manufactured starting from an unalloyed carbon hot rolled steel strip and a mixture of different metallic or mineral powders in a precise ratio and percentage that ensure the product properties in terms of mechanical and operative performance. The hot rolled strip has a fixed chemistry and changing the powder makes it possible to

obtain a different chemistry of the final product. At the beginning of the process, a pipe is produced from the strip and a homogenous agglomerated flux is produced from powder. The flux is then filled in the pipe with a proper filling rate via vibration technology. Then with a drawing step the diameter of the pipe filled with the flux is step by step reduced to the final wire diameter, there is a heat treatment applied to ensure a proper drawing process and a minimized level of residual moisture in the product. At the final diameter also a copper coating film is applied via a chemical process. Finally customizing is done by spooling on different spool types or bulk systems like drums.

The finished product has to comply with different standards like CE, EN ISO, AWS, or customer factory standards etc. depending on the region and/or industry where the products are used.

2.7 Environment and health during manufacturing

The production site voestalpine Böhler Welding Fileur is certified pursuant to *ISO 9001*, *ISO 14001* and *ISO 45001*. Investments are being made continually in the expansion of environmental protection in an effort to reduce air and water emission and energy consumption in line with a strategy of sustainable manufacturers. Compliance with all statutory emissions limits is verified.

2.8 Product processing/Installation

Seamless cored welding wires are made for typical wire arc processes with shielding gas (FCAW_G), without shielding gas (FCAW_S) and submerged arc process with flux or the gas welding process.

2.9 Packaging

Product packaging consists of cardboard boxes or drums. The spools bodies are made of steel wire or plastic. Delivery is made on wooden pallets, wrapped in polyethylene stretch foil.

2.10 Condition of use

There is no change of the product over life time regarding composition or environmental impact.

2.11 Environment and health during use

Welding as such is a regulated and controlled process as hazardous substances are exposed during the process. There are strict national regulations in place to protect welders and the environment by using for example fume extraction systems.

The concentration of welding fume is measured and single substances are restricted.

2.12 Reference service life

Seamless cored welding wires have a service life of a minimum of two years if stored under controlled conditions described in the company's Handling and Storage Recommendations. In practice, the service life can be nearly unlimited.

2.13 Extraordinary effects

Fire

All grades of seamless cored welding wires are fire-resistant. Cardboard packaging and polyethylene-foils may catch fire.

Water

Certain grades may get rusty when getting in contact with water. No contamination of water is to expect.

Mechanical destruction

Not relevant.

2.14 Re-use phase

Recycling of seamless cored welding wires can be done by melting for example as steel scrap addition in the steel production process.

2.15 Disposal

Disposal is recommended as steel scrap. The disposal code acc. to *European Waste Catalogue* is 17 04 05.

2.16 Further information

Product and Safety Data sheets are available through several channels like web-based

- product search
Product search voestalpine Böhler Welding (vabw-service.com)
- the digital handbook
welding-consumables-catalogue.voestalpine.com
- different web-shops
voestalpine Böhler Welding | Join!Online Germany
voestalpine Böhler Welding | Join!Online Austria
- weldNet Material Manager
www.voestalpine.com/welding/weldnet/material-manager/en/welcome

3. LCA: Calculation rules

3.1 Declared Unit

This environmental product declaration refers to a declared unit of 1 ton of seamless cored wire.

Declared unit

Name	Value	Unit
Declared unit	1	t

100 % of seamless cored wires are produced at voestalpine Böhler Welding Fileur S.r.l. in Cittadella (Italy). Various product types including metalcored joining wires, rutile joining wires, basic joining wires, hardfacing joining wires and subarc joining wires are produced at the site. All products are processed based on the same production route. The geographical, technological and temporal representativeness of the EPD results can thus be considered high.

The main differences between the different product groups result from variations in the powder mixture used. The analysis of the potential variation of the results indicates a carbon

footprint range of +10 % for hardfacing wires and -5 % for rutile joining wires.

The calculation of the weighted average is based on the production quantity of the product groups.

3.2 System boundary

The life cycle assessment of average seamless cored wires refers to a cradle-to-gate analysis. As the declared product is identified as an exemption according to *EN 15804+A2* section 5.2., modules C1–C4 and module D are not declared.

Subsequent life cycle phases are part of the analysis:

Module A1–A3 | Production stage

The production stage includes the upstream burdens of raw material supply, upstream transports and the manufacturing at voestalpine Böhler Welding Fileur located in Cittadella (IT). The production of seamless cored wires includes the slitting process, welding, filling of the tube, heat treatment, drawing,

coating and packaging. Main raw material inputs therefore represent steel strips and the powder mixture. Electricity provision at Cittadella is considered based on the supplier-specific mix (emission factor of 524 g CO₂e/kWh). Thermal energy for the production is provided based on natural gas.

The packaging of the product is considered in Modules A1–A3, declaring a representative packaging mix based on 60 % supply via metal basket spool, 30 % via plastic spool and 10 % via drum carton.

As the declared product is identified as an exemption according to *EN 15804*+A2 section 5.2., modules C1–C4 and module D are not declared.

3.3 Estimates and assumptions

All assumptions are verified through detailed documentation and correspond to the best possible representation of reality based on the available data. Regional applicability of the used background data refers to average data under European or Italian conditions taken from the *GaBi*-database. German data were used for the Italian market whenever European or Italian average data were not available.

3.4 Cut-off criteria

The LCA model covers all available input and output flows, which can be represented based on robust data. Data gaps are filled with conservative assumptions from average data (when available) or with generic data and are documented accordingly. Only data with a contribution lower than 1 % were cut off. Thus, no data were neglected, of which a substantial impact is to be expected. All relevant data were collected comprehensively. Cut-off material and energy flows were chosen carefully based on their expected quantitative contribution as well as potential environmental impacts. Thus, it can be assumed that the sum of all neglected input flows does not account for more than 5 % of the total material, water and energy flows. Environmental impacts of machines and infrastructure were not included.

3.5 Background data

This study uses generic background data for the evaluation of upstream environmental impacts from *GaBi*-database 2022.2 and is modelled in *GaBi*-software version 10.

3.6 Data quality

Data collection is based on product-specific questionnaires. It follows an iterative process clarifying questions via e-mail, telephone calls or in web-meetings. Intensive discussions between voestalpine Böhler Welding Fileur S.r.l. and Daxner & Merl results in an accurate mapping of product-related material and energy flows. This leads to a high quality of foreground data collected. Data collection relies on a consistent process according to *ISO 14044*. The technological, geographical and time-related representativeness of the data base was kept in mind when selecting background data. Whenever specific data were missing, either generic datasets or representative average

data were used instead. The applied *GaBi* background datasets are not older than ten years.

3.7 Period under review

Foreground data were collected in the fiscal year 2021/2022 (01.04.2021-31.03.2022). All data are based on the annual production quantities.

3.8 Geographic Representativeness

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

3.9 Allocation

The *GaBi* databases developed by sphera provide background data for the evaluation of supply chain-related environmental impacts. Where applicable, handling of multi-functionality situations therefore is covered in the referring process documentation.

The primary data for the upstream production of the steel coils were allocated using the partitioning approach developed by *worldsteel 2014* for calculating life cycle inventories of coproducts in steel production, which is in line with the provisions of *EN 15804*. The so called partitioning approach provides for the allocation of environmental effects on the steelmaking process and the emerging byproducts based on physical relations. Material inherent flow properties are, thus, taken into account.

Economic allocation is not considered as referring byproducts and coproducts are not directly tradable goods. Furthermore, long-term contracts for the sale of the byproducts exist, and the negotiated prices are, therefore, not subject to market dynamics.

The upstream production of copper sulphate is represented using allocation based on market value.

For energy demand, auxiliary material consumption, packaging, waste, wastewater and land occupation, annual input quantities are only available for the overall production site. Thus, the calculation of specific input quantities for the different products is based on the annual production quantity (tonnes). This approach is considered representative, as all product groups are manufactured via the same processing route.

3.10 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 *GaBi* background database was used to calculate the LCA (*GaBi* 10; 2022.2).

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The declared product does not contain any biogenic carbon.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in accompanying packaging	26	kg C

The carbon stored in the packaging was taken into account as "CO₂-neutral". Thus the storage effect of the carbon bound in the packaging is not included in the calculation but is considered as emitted immediately.

Installation into the building (A5)

The end of life of the packaging materials is not declared in Module A5.

Name	Value	Unit
Packaging (cardboard)	43	kg
Packaging (pallet)	16	kg
Packaging (polyethylene)	3	kg
Packaging (steel spool)	33	kg
Packaging (plastic spool)	40	kg

End of life (C1–C4 & D)

Seamless cored wires are developed for demanding welding applications. The wire, therefore, serves its basic purpose to create a firm connection to join two elements together. During the welding process, the two workpieces are directly joined together and the wire becomes inseparable from the new

product. As a result, modules C and D are not declared in this EPD.

End-of-life scenarios for the welding seam are dependent on the specific application and are to be found in the referring EPDs of the welded products.

5. LCA: Results

The following table contains the LCA results for a declared unit of 1 ton of average seamless cored wires.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = 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	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 ton seamless cored wires

Parameter	Unit	A1-A3
Global Warming Potential total (GWP-total)	kg CO ₂ eq	3.33E+03
Global Warming Potential fossil fuels (GWP-fossil)	kg CO ₂ eq	3.27E+03
Global Warming Potential biogenic (GWP-biogenic)	kg CO ₂ eq	5.27E+01
Global Warming Potential luluc (GWP-luluc)	kg CO ₂ eq	1.13E+00
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	9.88E-09
Acidification potential of land and water (AP)	mol H ⁺ eq	1.05E+01
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	6.28E-03
Eutrophication potential aquatic marine (EP-marine)	kg N eq	1.53E+00
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	1.66E+01
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	5.27E+00
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	2.02E-02
Abiotic depletion potential for fossil resources (ADPF)	MJ	3.45E+04
Water use (WDP)	m ³ world eq deprived	3.35E+02

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 ton seamless cored wires

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier (PERE)	MJ	5.55E+03
Renewable primary energy resources as material utilization (PERM)	MJ	8.62E-01
Total use of renewable primary energy resources (PERT)	MJ	5.55E+03
Non renewable primary energy as energy carrier (PENRE)	MJ	3.46E+04
Non renewable primary energy as material utilization (PENRM)	MJ	1.76E+00
Total use of non renewable primary energy resources (PENRT)	MJ	3.46E+04
Use of secondary material (SM)	kg	1.69E+02
Use of renewable secondary fuels (RSF)	MJ	0
Use of non renewable secondary fuels (NRSF)	MJ	0
Use of net fresh water (FW)	m ³	1.1E+01

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 ton seamless cored wires

Parameter	Unit	A1-A3
Hazardous waste disposed (HWD)	kg	2.09E-05
Non hazardous waste disposed (NHWD)	kg	9.54E+01
Radioactive waste disposed (RWD)	kg	4.65E-01
Components for re-use (CRU)	kg	0
Materials for recycling (MFR)	kg	0
Materials for energy recovery (MER)	kg	0
Exported electrical energy (EEE)	MJ	0
Exported thermal energy (EET)	MJ	0

RESULTS OF THE LCA - additional impact categories according to EN 15804+A2-optional: 1 ton seamless cored wires

Parameter	Unit	A1-A3
Incidence of disease due to PM emissions (PM)	Disease incidence	ND
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	ND
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	ND

Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	ND
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	ND
Soil quality index (SQP)	SQP	ND

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

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 nor radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from 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, eutrophication - fraction of nutrients reaching freshwater end compartment, 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 or as there is limited experience with the indicator.

6. LCA: Interpretation

This interpretation contains a summary of the LCA results of average seamless cored wires.

The major hot spot in the production phase of the seamless cored wires represents the upstream supply chain of the steel coils as well as the powder materials.

Seamless cored wires serve their basic purpose to create a firm connection to join two elements together. During the welding process, the two workpieces are directly joined together, and the wire becomes inseparable from the new product. As a result, the end of life of the products (modules C and D) is not declared in this EPD.

This EPD covers metal cored joining wires, rutile joining wires, basic joining wires, hardfacing joining wires and subarc joining wires produced at voestalpine Böhler Welding Fileur S.r.l. in Cittadella (Italy).

The declared environmental impacts represent a weighted average of all product groups based on the respective production quantities. Main differences result from variations in

the powder mixture used.

The analysis of the potential variance of the different product groups shows a good representativity of the results for the analysed core impact indicators except for ozone depletion ('outdated') and abiotic depletion of elementary resources.

The variance analysis of the LCA results indicates a carbon footprint range between +10 % for hardfacing wires and -5 % for rutile joining wires.

Hard-facing wires account for the highest deviation in all impact categories. Since this product group represents a comparably small share of the total production quantity, the majority of the products are covered with a high representativity in the declared weighted average.

As the declared average potentially underestimates abiotic depletion potential for non fossil resources (ADPE) and depletion potential of the stratospheric ozone layer (ODP) of hardfacing wires, the representativity of these indicators for this product group is strongly limited.

7. Requisite evidence

Not relevant for this EPD.

8. References

Standards

EN 14700

EN 14700:2014, Welding consumables for hard-facing– Classification.

EN 15804

DIN EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

ISO 9001

DIN EN ISO 9001:2015, Quality management systems – Requirements.

ISO 14001

ISO 14001:2015, Environmental management systems - Requirements with guidance for use.

ISO 14025

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

ISO 14044

DIN EN ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines.

ISO 14171

EN ISO 14171:2016, Welding consumables — Solid wire electrodes, tubular cored electrodes and electrode/flux combinations for submerged arc welding of non alloy and fine grain steels — Classification.

ISO 17632

EN ISO 17632:2015, Welding consumables — Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of non-alloy and fine grain steels– Classification.

ISO 17633

EN ISO 17633:2021, Welding consumables — Tubular cored electrodes for gas shielded metal arc welding of creep-resisting steels – Classification.

ISO 18276

EN ISO 18276:2017, Welding consumables — Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high strength steels – Classification.

ISO 26304

EN ISO 26304:2017, Welding consumables - Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels – Classification.

ISO 45001

ISO 45001:2018-03, Occupational health and safety management systems - Requirements with guidance for use.

Further References**Candidate List**

Candidate List of Substances of Very High Concern (ECHA Candidate List) of 17.01.2023, published in accordance with Article 59 (10) of the REACH Regulation Helsinki: European Chemicals Agency.

European Waste Catalogue

Guidance on classification of waste according to EWC Stat categories. Supplement to the Manual for the Implementation of the Regulation (EC) No 2150/2002 on Waste Statistics. Commission of the European Communities, EUROSTAT.

GaBi

GaBi 10, Software-System and Database for Life Cycle Engineering. DB 2022.2. Sphera, 1992–2023. Available at: <https://sphera.com/product-sustainability-gabi-data-search/>.

IBU 2021

Institut Bauen und Umwelt e.V.: General instructions for the EPD programme of Institut Bauen und Umwelt e.V. (IBU). Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021. www.ibuepd.com

Ordinance on Biocide Products No. 528/2012

Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products.

PCR Part A

Product category rules for building-related products and services. Part A: Calculation rules for the life cycle assessment and requirements on the project report according to EN15804+A2:2019. Version 1.3, Berlin: Institut Bauen und Umwelt e.V. (Hrsg.), 2022.

PCR: Structural steels

Product category rules for building-related products and services. Part B: Requirements of the EPD for Structural steels. Version v0, 08.03.2023.

Regulation (EU) No. 305/2011

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.

worldsteel 2014

World Steel Association, 2014. A methodology to determine the LCI of steel industry co-products. 14th February 2014.



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