

# ENVIRONMENTAL PRODUCT DECLARATION

according to ISO 14025 and EN 15804+A2

**Preliminary  
EPD – Under  
verification**

Declaration owner	Aurubis AG
Issuer Programme holder Declaration number	Institute for Construction and Environment (IBU) Institute for Construction and Environment (IBU)
Date of issue	Valid until
EPD under verification, expected to be issued in May 2026	

**Iron silicate granulate  
Aurubis AG**

[www.ibu-epd.com](http://www.ibu-epd.com) | <https://epd-online.com>



## General information

### Aurubis AG

#### Programme holder

IBU – Institute for Construction and Environment Hegelplatz 1  
10117 Berlin Germany

#### Declaration number

#### This declaration is based on the product category rules:

Lightweight aggregate / bulk granulate, 01.08.2021  
(PCR tested and approved by the independent Expert Council (SVR))

#### Date of issue

EPD in verification, expected to be issued in April 2026

#### Validuntil

#### EPD in verification

Name of the chairperson of the board (chairperson of the board of Institut Bauen und Umwelt e.V.)

#### EPD in verification

Name of the managing director (managing director of the Institute for Construction and Environment e.V.)

### Iron silicate granulate

#### Owner of the declaration

Aurubis AG  
Hovestrassse 50  
20539 Hamburg  
Germany

#### Declared product/declared unit

1 tonne of iron silicate

#### Scope of validity:

Iron silicate granules with a grain size of 0 to 6 mm from the production of the Aurubis AG / Peute Baustoff GmbH site, Hamburg. The holder of the declaration is liable for the underlying information and evidence; the IBU cannot be held liable for manufacturer information, life cycle assessment data and evidence is excluded.

The EPD was prepared in accordance with the requirements of EN 15804+A2. In the following, the standard is referred to simply as *EN 15804*.

#### Verification

The European standard EN 15804 serves as the core PCR  
Independent verification of the declaration and information in accordance with ISO 14025:2011

Internal  External

#### EPD in verification

Name of the verifier (independent verifier)

## Product

### Product description/product definition

Iron silicate is produced as a by-product of copper refining and recycling processes. It is an industrially manufactured mineral, comparable to natural minerals, but without the disadvantage of having to interfere massively with nature.

It consists mainly of iron silicate minerals as well as aluminium and calcium silicates. It may also contain traces of non-ferrous metals, which are mainly bound in the silicate phases and are characterised by high binding stability and low leachability.

Iron silicate granulate within the scope of this EPD comprises aggregate up to 6 mm in size, which is produced by sudden cooling (quenching) in water. This causes the mineral phases to solidify largely in a glass-like (amorphous) form. The abbreviations "CUG" and "CUM" are commonly used in the regulatory context and in the German Substitute Building Materials Ordinance, respectively.

In addition, iron silicate is also produced in the form of rock (outside the scope of this EPD), which is created by slow cooling in so-called pointed pots. As a result, the minerals in iron silicate rock are largely crystalline, and the amorphous content is correspondingly lower.

Iron silicate in its various forms and grain sizes is used in various applications, particularly in construction, as a substitute for primary building materials. It is produced as amorphous granulate with a grain size of up to 6 mm and as crystalline rock with edge lengths of up to 450 mm. Uses of iron silicate granulate: road construction, landfill construction, cement, concrete. Regulation (EU) No. 305/2011 (CPR) applies to the marketing of the product in the EU/EFTA (with the exception of Switzerland). The product requires CE marking and a declaration of performance in accordance with

- *DIN EN 12620:2008-07, Aggregates for concrete,*
- *DIN EN 13043:2002-12, Aggregates for asphalt and surface treatments for roads, airfields and other traffic areas,*
- *DIN EN 13242:2008-03, Aggregates for unbound and hydraulically bound mixtures for civil engineering and road construction,*

The respective national regulations apply to use.

Where applicable, the respective regulations at the place of use, in Germany for example the building regulations of the federal states, and the technical regulations based on these regulations, also apply to the use of the product.

### Application

Aggregates for road construction, landfill construction, concrete, cement

### Technical

### Construction data

Designation	Value	Unit
Bulk density	3630	kg/m <sup>3</sup>
Mohs hardness (ES granulate only)	> 7	
Fine particle content EN 13242	f3	Category
Grain size distribution EN 13242	GF85	Category
Grain size distribution EN 13043	GA85, GTC10	Category
Fine particle content EN 13043	f3	Category
Flow coefficient EN 13043	ECS 38	Category
Organic impurities EN 13043	mLPC 0.10	Category
Grain size distribution EN 12620	GF85	Category
Fine particle content CUG 0/4 EN 12620	f3	Category
Chloride content EN 12620	0.02	Category
Acid-soluble sulphates EN 12620	AS0.8	Category
Total sulphur EN 12620	<1.0	Category
Water absorption EN 12620	0.1	Category
Resistance to frost EN 12620	F4	Category
Organic impurities EN 12620	<0.01	Category
Resistance to alkali-silica reactivity EN 12620	E II-S	Category

Performance values of the product according to the declaration of performance in relation to its essential characteristics in accordance with

- *DIN EN 12620:2008-07, Aggregates for concrete,*
- *DIN EN 13043:2002-12, Aggregates for asphalt and surface treatments for roads, airfields and other traffic areas,*
- *DIN EN 13242:2008-03, Aggregates for unbound and hydraulically bound mixtures for civil engineering and road construction*

(with CE marking), or

Performance values of the product in relation to its characteristics according to the relevant national technical regulations at the place of use, in Germany, for example, the building regulations of the federal states (no CE marking).

### Raw materials/auxiliary materials

Designation	Value	Unit
Iron silicate, copper smelting and refining, associated EC number: 701-480-0	10	%

EC number valid until February 2023: 266-968-3

The product/article/at least one sub-article contains substances from *the ECHA list* of substances of very high concern (SVHC) (date 05.11.2025) above 0.1% by weight: no.

The product/article/at least one sub-article contains other CMR substances of category 1A or 1B that are not on the *candidate list*, above 0.1% by weight in at least one sub-article: no.

Biocidal products have been added to this construction product or it has been treated with biocidal products (it is therefore a treated article within the meaning of the Biocidal Products Regulation (EU) No. 528/2012): no.

### Reference service life

The service life of iron silicate depends on the intended use. As an additive in concrete structures

structures, for use in road construction, concrete and cement production, a reference service life of  $\geq 50$  years.

## LCA: Calculation rules

### Declared unit

The declared unit is 1 tonne of iron silicate. Conversion to  $m^3$  can be carried out using the specified bulk density.

### Declared unit and mass reference

Designation	Value	Unit
Declared unit	1000	kg
Bulk density (average value)	1900	kg/m <sup>3</sup>
Bulk density	3630	kg/m <sup>3</sup>

The value given as bulk density is an average value that may be subject to slight variations depending on the grain distribution.

The LCA results are based on an average value for iron silicate granulate with different grain distributions. The results are therefore subject to a certain degree of variability, as production data may vary slightly depending on the grain distribution produced.

### System boundary

Type of EPD: From cradle to factory gate with modules C1–C4 and module D (A1–A3, C and D).

### Modules A1 to A3:

Module A1–A3 covers the processing of iron silicate, a by-product of copper production. Expenses for the provision of raw materials are allocated 100% to copper production. Modules A1–A3 cover all internal transport and energy flows for plant operation. The processed iron silicate granulate is sold as bulk material without packaging.

### Modules C1 to C4:

Whether and in what form dismantling takes place depends on the intended use of the iron silicate. For module C1, dismantling is expected to be carried out using a diesel-powered hydraulic excavator. Module C2 takes into account

Truck transport (diesel, Euro 6) over 50 km to the location of the waste treatment.

Expenses for breaking up the iron silicate in the case of material processing are included in Module C3. Module C2 takes into account transport by lorry over a distance of 50 km to the waste treatment site (diesel, Euro 6). Two scenarios are declared for waste treatment:

- 100% processing (C3; C4): Representative loads for construction waste processing, breaking up the iron silicate and its use as bulk granulate or gravel
- 100% landfill (C3/1; C4/1): Landfilling of iron silicate

### Module D:

Since the unprocessed iron silicate enters the system as a by-product of copper production without any load, no recycling potential is attributed to Module D. This approach follows the specifications in *PCR Part A, Chapter 5.5.6*.

### Geographical representativeness

Country or region in which the declared product system is manufactured and, if applicable, used and treated at the end of its life: Germany

### Comparability

In principle, a comparison or evaluation of EPD data is only possible if all data sets to be compared have been created in accordance with *EN 15804* and the building context and product-specific performance characteristics are taken into account. All background data was taken from the *Sphera* MLC databases, version CUP 2025.1. The life cycle assessment was calculated using *Sphera's* LCA FE software.

## LCA: scenarios and further technical information

### Characteristic product properties of biogenic carbon

The product does not contain any biogenic carbon. As it is delivered without packaging, no biogenic carbon is declared for the packaging either.

### Information on the description of the biogenic carbon content at the factory gate

Designation	Value	Unit
Biogenic carbon in the product	-	kg C
Biogenic carbon in the associated packaging	-	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>.

The following technical information forms the basis for the declared modules and can be used to develop specific scenarios in the context of a building assessment.

### Information about the electricity mix reported in Module A3:

0.71 kg CO<sub>2</sub> e/ kWh (total GWP).

### End of life (C1–C4)

Two scenarios are declared for waste treatment:

- 100% recycling (C3; C4): Representative loads for construction waste recycling, 3% losses are taken into account in the data set.
- 100% landfill (C3/1; C4/1): Landfilling of iron silicate

<b>Designation</b>	<b>Value</b>	<b>Unit</b>
Separately collected Waste type Construction waste	1000	kg
Collected as mixed construction waste	-	kg
For reuse	-	kg
For recycling (C3)	1000	kg
For energy recovery	-	kg
For landfill (C4/1)	1000	kg

EPD in Verifizierung

## LCA: Results **Please note – EPD under verification**

The following information on environmental impacts is determined using the characterisation factors according to EF 3.1, which correspond to EN 15804+A2.

### SPECIFICATION OF SYSTEM BOUNDARIES (X = INCLUDED IN LIFE CYCLE ASSESSMENT; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Production stage			Stage of construction of the building		Use stage							Disposal stage				Credits and debits outside the system boundary
Raw material supply	Transport	Manufacturing	Transport from manufacturer to place of use	Assembly	Use/application	Maintenance	Repair	Replacement	Renewal	Energy consumption for operating the building	Water consumption for operating the building	Demolition/dismantling	Transport	Waste treatment	Disposal	Potential for reuse, recovery or recycling
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	X	X	X	X	X

### RESULTS OF THE LIFE CYCLE ASSESSMENT – ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 tonne of iron silicate

Indicator	Unit	A1-A3	C1	C2	C3	C3/1	C4	C4/1	D	D/1
Total GWP	kg CO2 eq.	2.3E+00	6.5E-01	4.16E+00	2.77E+00	0	0	1.53E+01	0	0
GWP fossil	kg CO2 eq.	2.27E+00	6.41E-01	4.11E+00	2.74E+00	0	0	1.53E+01	0	0
GWP-biogenic	kg CO2 eq.	1.17E-02	2.04E-03	7.71E-03	1.38E-03	0	0	0	0	0
GWP-luluc	kg CO2 eq.	2.56E-02	6.65E-03	4.34E-02	2.36E-02	0	0	6.27E-02	0	0
ODP	kg CFC11 eq.	2.88E-11	1.07E-13	6.99E-13	5.39E-12	0	0	4.26E-11	0	0
AP	mol H <sup>+</sup> -eq.	7.41E-03	3.26E-03	5.35E-03	1.39E-02	0	0	1.08E-01	0	0
EP-freshwater	kg P-eq.	8.98E-06	1.74E-06	1.14E-05	6.87E-06	0	0	2.27E-05	0	0
EP-marine	kg N-eq.	3.19E-03	1.59E-03	1.96E-03	6.47E-03	0	0	2.83E-02	0	0
EP-terrestrial	mol N-eq.	3.45E-02	1.72E-02	2.06E-02	7.01E-02	0	0	3.08E-01	0	0
POCP	kg NMVOC-eq.	8.28E-03	4.3E-03	4.61E-03	1.72E-02	0	0	8.46E-02	0	0
ADPE	kg Sb-eq.	2.5E-07	4.3E-08	2.8E-07	2.79E-06	0	0	9.46E-07	0	0
ADPF	MJ	2.47E+01	8.28E+00	5.4E+01	5.07E+01	0	0	2.01E+02	0	0
WDP	m <sup>3</sup> global equivalent removed	7.56E-01	2.96E-03	1.93E-02	4.88E-01	0	0	1.65E+00	0	0

GWP = global warming potential; ODP = ozone depletion potential; AP = acidification potential of soil and water; EP = eutrophication potential; POCP = tropospheric ozone formation potential; ADPE = abiotic depletion potential – non-fossil resources (ADP – substances); ADPF = Abiotic Resource Depletion Potential – fossil fuels (ADP – fossil fuels); WDP = Water Depletion Potential (users)

### RESULTS OF THE LIFE CYCLE ASSESSMENT – INDICATORS FOR DESCRIBING RESOURCE USE according to EN 15804+A2: 1 Tonnes of iron silicate

Indicator	Unit	A1-A3	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PERE	MJ	9.38E+00	6.24E-01	4.07E+00	4.97E+00	0	0	3.87E+01	0	0
PERM	MJ	0	0	0	0	0	0	0	0	0
PERT	MJ	9.38E+00	6.24E-01	4.07E+00	4.97E+00	0	0	3.87E+01	0	0
PENRE	MJ	2.47E+01	8.28E+00	5.4E+01	5.07E+01	0	0	2.01E+02	0	0
PENRM	MJ	0	0	0	0	0	0	0	0	0
PENRT	MJ	2.47E+01	8.28E+00	5.4E+01	5.07E+01	0	0	2.01E+02	0	0
SM	kg	0	0	0	0	0	0	0	9.7E+02	0
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m <sup>3</sup>	5.46E-01	3.09E-04	2.01E-03	1.33E-02	0	0	4.84E-02	0	0

PERE = Renewable primary energy as energy source; PERM = Renewable primary energy for material use; PERT = Total renewable primary energy; PENRE = Non-renewable primary energy as energy source; PENRM = Non-renewable primary energy for material use; PENRT = Total non-renewable primary energy; SM = Use of secondary materials; RSF = Renewable secondary fuels; NRSF = Non-renewable secondary fuels; FW = Net use of freshwater resources

### RESULTS OF THE LIFE CYCLE ASSESSMENT – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 tonne of iron silicate

Indicator	Unit	A1-A3	C1	C2	C3	C3/1	C4	C4/1	D	D/1
HWD	kg	7.45E-09	3.32E-10	2.17E-09	6.99E-09	0	0	4.39E-08	0	0
NHWD	kg	1.76E-01	1.16E-03	7.54E-03	1.28E-02	0	0	1E+03	0	0
RWD	kg	6.69E-05	1.56E-05	1.02E-04	6.43E-04	0	0	2.13E-03	0	0
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	1E+03	0	0	0	0	0

MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0

HWD = Hazardous waste sent to landfill; NHWD = Non-hazardous waste disposed of; RWD = Radioactive waste disposed of; CRU = Components for reuse; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy – electrical; EET = Exported energy – thermal

### RESULTS OF THE LIFE CYCLE ASSESSMENT – additional impact categories according to EN 15804+A2-optional: 1 tonne of iron silicate

Indicator	Unit	A1-A3	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PM	Cases of illness	1.23E-07	3.84E-08	5.18E-08	2.66E-07	0	0	1.35E-06	0	0
IR	kBq U235 equivalent	6.9E-03	2.24E-03	1.46E-02	1.02E-01	0	0	2.36E-01	0	0
ETP-fw	CTUe	2.17E+01	1.08E+01	7.02E+01	5.06E+01	0	0	1.55E+02	0	0
HTP-c	CTUh	4.03E-10	1.45E-10	9.47E-10	8.07E-10	0	0	2.67E-09	0	0
HTP-nc	CTUh	1.96E-08	8.13E-09	5.29E-08	3.35E-08	0	0	9.98E-08	0	0
SQP	SQP	1.72E+01	3.66E+00	2.39E+01	1.43E+01	0	0	4.95E+01	0	0

PM = Potential occurrence of diseases due to particulate matter emissions; IR = Potential effect of human exposure to U235; ETP-fw = Potential toxicity comparison unit for ecosystems; HTP-c = Potential toxicity comparison unit for humans (carcinogenic effect); HTP-nc = Potential toxicity comparison unit for humans (non-carcinogenic effect); SQP = Potential soil quality index

Restriction note 1 – applies to the indicator "Potential effect of human exposure to U235".

This effect category mainly deals with the possible effect of low-dose ionising radiation on human health in the nuclear fuel cycle. It does not take into account effects attributable to possible nuclear accidents and occupational exposure, nor to the disposal of radioactive waste in underground facilities. The potential ionising radiation emitted by the ground, radon and some building materials is also not measured by this indicator.

Limitation note 2 – applies to the indicators: "Potential for abiotic resource scarcity – non-fossil resources", "Potential for abiotic resource scarcity – fossil fuels", "Water withdrawal potential (users)", "Potential toxicity comparison unit for ecosystems", "Potential toxicity comparison unit for humans – carcinogenic effect", "Potential toxicity comparison unit for humans – non-carcinogenic effects", "Potential soil quality index".

The results of this environmental impact indicator must be used with caution, as there is a high degree of uncertainty associated with these results or because there is only limited experience with the indicator.

## References

### Standards

#### EN 12620

DIN EN 12620:2008-07 Aggregates for concrete.

#### EN

DIN EN 13043:2002-12, Aggregates for asphalt and surface treatments for roads, airfields and other traffic areas.

#### EN 13242

DIN EN 13242:2008-03, Aggregates for unbound and hydraulically bound mixtures for civil engineering and road construction.

#### EN 15804

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

#### ISO 14025

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

#### Regulation (EU) No 305/2011 (CPR)

Regulation (EU) No. 305/2011 (CPR/BauPVO) – Construction products, European Commission, 2011.

### Further reading

#### ECHA/ Candidate List

ECHA list of substances of very high concern eligible for authorisation. European Chemicals Agency (ECHA), 2024.

#### PCR – Part A

Product category rules for building-related products and services – Part A: Calculation rules for the life cycle assessment and requirements for the project report according to EN EN 15804+A2:2019, Version 1.4, Institut Bauen und Umwelt e.V., [www.ibu-epd.com](http://www.ibu-epd.com), 2024.

#### PCR - Part B

Product category rules for building-related products and services - Part B: Requirements for EPDs for lightweight aggregates/bulk granulates, version v6, 3 August 2023 (template v11, 01.08.2024), Institut Bauen und Umwelt e.V., [www.ibu-epd.com](http://www.ibu-epd.com), 2024.

#### Sphera

Sphera's software system LCA FE and MLC databases (formerly GaBi), LBP, University of Stuttgart and Sphera, Leinfelden-Echterdingen, data set documentation available online at: <https://lcadatabase.sphera.com/>



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