Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Black Iron Oxide Granules EU

from

Empower Color Globally

Programme:	The International EPD System, environdec.com
Programme operator:	EPD International AB
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An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see environdec.com

GENERAL INFORMATION

Programme Information	
Programme:	The International EPD® System
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Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products, version 2.0.1 Published on 2025.04.07 Based on CEN standard EN 15804. CEN standard EN 15804 serve as the core PCR. UN CPC Code: 3422
PCR review was conducted by: *The review panel was chaired by Rob Rouwette (Chair) and Noa Meron (Co-chair). The PCR development and review process included contributions from BIMobject, IVL Swedish Environmental Research Institute, Fundación Centro Tecnológico Miranda de Ebro (CTME), Concrete NZ, Monk Spaces, and Aquafil SpA. The process was managed by Gustav Sandin Albertsson (EPD International), with input from over 20 external stakeholders during the open consultation period. See https://www.environdec.com/about-us/theinternational-epd-system-about-the-system for a list of members. The review panel may be contacted via the Secretariat https://www.environdec.com/contact-us.*
c-PCR: N/A

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party individual verifier: Dr Matt Fishwick, Fishwick Environmental Ltd Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage

is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD: Oxerra.

Address: Liverpool Rd E, Kidsgrove, Stoke-on-Trent ST7 3AA, United Kingdom.

Contact: Mark Booth, Mark.Booth@oxerra.com

Address and contact information of the LCA practitioner commissioned by the EPD owner: Sphera Solutions GmbH, 70771 Leinfelden-Echterdingen, Germany, www.sphera.com
Ellen Newman, Sphera Solutions GmbH.

Description of the organisation: Oxerra is one of the world's leading manufacturers of synthetic inorganic pigments, granules and liquid dispersions for the construction industry, highly technological grades for coatings and plastics, as well as the highest purity iron oxides for specialties applications.

PRODUCT INFORMATION

Product name: Black Iron Oxide Granules EU.

Product identification: GRANUFIN IRON OXIDE BLACK EU.

Visual representation of the product

UN CPC code: 3422.

EINICS No.: 215-168-2, 618-349-8.

Product description: Black Iron Oxide EU Granules are a granulated form of black iron oxide pigment, created to allow for high pigment density granules suitable for a wide range of demanding colorant

applications. It is produced with strict quality tolerances and reliable performance, which offer outstanding resistance, durability and compatibility. The granular structure provides a free-flowing, low dusting pigment with high dispersing properties. Typical applications include concrete block pavers, concrete bricks, paving slabs, roof tiles, architectural masonry, ready mix concrete, mortars, walling blocks and asphalt.

Name and location of production site: Oxerra Deutschland GmbH & Co. KG, Mühlstraße 118, D-65396, Walluf, Germany.

CONTENT DECLARATION

The mass (weight) of one unit of a product, as per declared unit: 1kg black iron oxide granules, plus associated packaging

Content of the product in the form of a list of materials and substances, and their mass:

Product components	Mass, kg	Post-consumer material, mass-%	Biogenic material, mass-%	Biogenic material kg C/kg
Sodium polyacrylate	0.03	0.00	0.00	0.00
Black iron oxide pigment	0.94	0.00	0.00	0.00
Calcium carbonate	0.03	0.00	0.00	0.00
Total	**1.00**	**0.00**	**0.00**	**0.00**

The mass and the content of distribution and/or consumer packaging:

Packaging materials	Mass, kg	Mass-% (versus the product)	Mass biogenic carbon, kg C/kg
Polypropylene bag	2.88E-03	0.29%	0.00E+00
Paper bag	6.76E-04	0.07%	2.91E-04
Plastic film	1.80E-04	0.02%	0.00E+00
Wooden pallet	1.70E-02	1.70%	6.97E-03
Total	**2.07E-02**	**2.07%**	**7.26E-03**

Pre-consumer recycled content, in line with ISO14021 is declared as 37.6% and originates from the black iron oxide pigment.

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

Information on the environmental and hazardous/toxic properties of a substances contained in the product: Products do not contain any substances that can be included in “Candidate List of Substances of Very High Concern for Authorization” and raw materials used are not part of the EU REACH regulation.

Other information on substances with hazardous and toxic properties: Not Applicable.

LCA INFORMATION

Declared unit: 1kg black iron oxide granules, plus associated packaging.

Time representativeness: The collection of foreground data refers to the year 2024. Site specific data was used for the 1-year average process data, for reference year 2024. For background data the time frame was no more than four years old with a reference year of 2021-2024.

Geographical scope:
Europe (modules A1 and A2), Germany (module A3), Europe (module A5).

Database(s) and LCA software used: The background data has been taken from the latest available Sphera Managed LCA Content (MLC) 2025.1 and the LCA model was created using Sphera's LCA for Experts (LCA FE) software, version 10.7.

Description of system boundaries: The system boundaries are cradle to gate with options A1-A3, and additional modules A5. As there is a wide range of products that the granules are used in, transport module A4 is not included.

Reference Package Used: As specified in EN 15804:2012+A2:2019 and the PCR 2019:14 v2.0.1, the environmental impacts are declared and reported using the baseline characterisation factors from the EC-JRC using EN 15804 reference package based on EF 3.1.

Module A1 to A3:
The product stage includes provision of all materials, products and energy, as well as waste processing up to the end-of waste state or disposal of final residues during the product stage These modules consider the manufacturing of raw materials. All are in module A1.

The raw materials undergo transport to the production site via a diesel driven truck (module A2). From there they are processed to produce the granulated pigment.

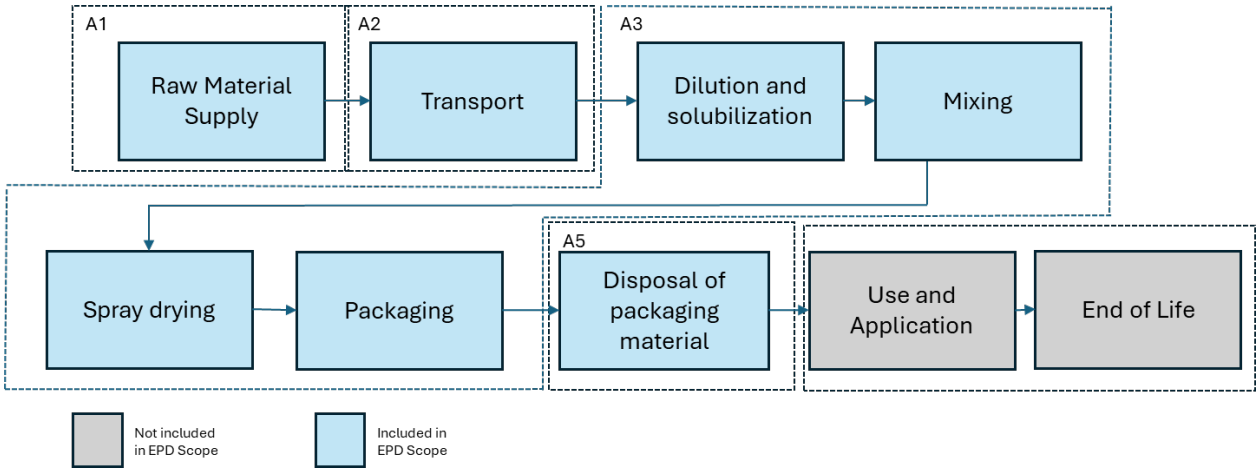
The provision and use of electrical and heat energy sources, water consumption, production waste, off-gas emissions to air and wastewater treatment are considered, along with the impact of packaging (module A3).

Granules are produced by taking the requisite pigments and granulating agent and dispersing them in water, stirring until homogeneous. The final slurry is then spray dried in order to produce the granules and once formed they are packed and stored.

The electricity source used within the Oxerra's manufacturing facility in Walluf, Germany has been modelled based on the energy sourced from the residual German electricity grid mix, for the year 2024. The corresponding emission factor for the production of electricity using the residual German grid mix is 0.879 kgCO_2-eq/ kWh.

Module A5:
Treatment and disposal of packaging material. Credits for potential avoided burdens due to energy substitution of electricity and thermal energy generation are not declared.

System Diagram



More information:

Excluded life cycle stages: End of life and use phases are excluded. In accordance with the PCR, the end-of-life treatment of the iron oxide black granules is excluded because all the following criteria are fulfilled:

- The product is physically integrated with other products in subsequent life-cycle process so they cannot be physically separated from them at end of life
- The product or material is no longer identifiable at end-of-life as a result of a physical or chemical transformation process
- The product or material does not contain biogenic carbon
- The EPD is not intended to be used for business-to-consumer communication

Disposal of packaging and recovery is included due to the biogenic carbon content of the packaging.

Cut-off criteria and exclusions
In the assessment, all available data from production process are considered, i.e., all raw materials used, utilised thermal energy, and electric power consumption using best available LCI datasets. Thus, material and energy flows contributing less than 1% of mass or energy are considered. The sum of the excluded material flows does not exceed 5% of mass, energy, or environmental relevance.

- Production of capital equipment, facilities and infrastructure required for manufacture are outside the scope of this assessment.
- All reported material and energy inputs are representative of the typical black iron oxide granules produced by Oxerra in Germany.

Data quality and sources
Data quality is compliant with ISO 14025:2006. All primary data were collected for the year 2024.

The EPD covers the production of black iron oxide granules from one factory in Walluf, Germany which provided data for the period January to December 2024. The products are used in multiple applications and are unable to be separated from the product once they have been used. The site is powered using the residual electricity grid mix in Germany. Background data was sourced from the Sphera 2025.1 MLC Database. No very poor data was found during the assessment of relevant data using EN 15804:2012+A2:2019, Annex E, Table E.2

Dataset	Criteria	Data Quality Level	Reason for level	Reason for using	Relevance
Polypropylene bag	Tech	Fair	No other appropriate material available in datasets	Best material proxy	<1% of all environmental impacts
Sodium Polyacrylate	Tech	Fair	No other appropriate material available in datasets	Best material proxy	<1% of all environmental impacts

Data quality assessment for other data sources used

Dataset	Criteria	Data Quality Level	Reason for level
Other Raw Materials	Tech, Geo, Time	Very Good	Overall score evaluated
Manufacturing Processes	Tech, Geo, Time	Very Good	Overall score evaluated
Other Packaging Materials	Tech, Geo, Time	Very Good	Overall score evaluated
Transport And Associated Datasets	Tech, Geo, Time	Very Good	Overall score evaluated
Waste Treatment	Tech, Geo, Time	Good	Overall score evaluated

Allocation Procedures

Background data:
Information about allocation procedure of single datasets is documented in:
https://lcadatabase.sphera.com/

Foreground Data:
No allocation was used as there was only one product produced within this production system. In accordance with the PCR Construction products section 4.5.1 to avoid allocation taking place, the production plant was divided into sub-units specific to the black iron oxide granules being produced, and LCI data was collected for each sub-unit. This data has been calculated and scaled based on the annual production mass of the black iron oxide granules (total tonnes) for the year 2024.

Waste materials:
Most of the production waste is sent to an incineration plant, the cut-off method was applied and no benefits from the resulting electrical and thermal energies were generated. Following a conservative allocation approach, all production burdens are assigned to the iron oxide.
The environmental burden of incinerating packaging and the product in the end-of-life scenario is assigned to the system (A5).

Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Distribution/ installation stage		Use stage							End-of-life stage				Beyond product life cycle
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	ND	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	EU-27	EU-27	DE	-	EU-27	-	-	-	-	-	-	-	-	-	-	-	--
Share of primary data	73.8%			-	-	-	-	-	-	-	-	-	-	-	-	-	
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	N/A (single site)			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = module declared, ND = module not declared

Declaration of data sources, reference years, data categories and share of primary data

Product Components	Source Type	Source	Reference Year	Data Category	Share of primary data, of GWP-GHG results for A1 – A3
Red Iron Oxide Powder	EPD	EPD-IES-0017015	2023	Primary Data	52.6%
Manufacturing of product - Electricity	Collected Data	LCA FE 2025.1. Dataset: Residual grid mix, DE	2024	Primary Data	7.1%
Manufacturing of product – Thermal Energy from Natural Gas	Collected Data	LCA FE 2025.1 Dataset: Thermal energy from natural gas, DE	2024	Primary Data	11.7%
Transport to manufacturing site	Collected Data	LCA FE 2025.1	2024	Primary Data	2.4%
Total share of primary data, of GWP-GHG results for A1-A3					73.8%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

ENVIRONMENTAL PERFORMANCE

LCA results of the product - main environmental performance results

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Mandatory impact category indicators according to EN 15804

Results per kg iron oxide black			
Indicator	**Unit**	**A1-A3**	**A5**
GWP-total	kg CO_2 eq.	2.48E+00	3.99E-02
GWP-fossil	kg CO_2 eq.	2.49E+00	8.26E-03
GWP-biogenic	kg CO_2 eq.	-1.07E-02	3.16E-02
GWP-luluc	kg CO_2 eq.	1.69E-03	1.41E-06
ODP	kg CFC 11 eq.	1.47E-04	5.59E-15
AP	mol H^+ eq.	3.31E-03	7.48E-06
EP-freshwater	kg P eq.	7.12E-05	9.03E-10
EP- marine	kg N eq.	1.79E-03	2.37E-06
EP-terrestrial	mol N eq.	1.47E-02	3.27E-05
POCP	kg NMVOC eq.	3.65E-03	6.43E-06
ADP-minerals&metals*	kg Sb eq.	1.55E+00	6.35E-11
ADP-fossil*	MJ	3.56E+01	1.20E-02
WDP*	m^3	9.49E-02	4.41E-03
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption		

** Disclaimer: 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 experienced with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per kg iron oxide black			
Indicator	**Unit**	**A1-A3**	**A5**
GWP-GHG[1]	kg CO_2 eq.	2.52E+00	8.27E-03
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017			

Resource use indicators

Results per kg iron oxide black			
Indicator	**Unit**	**A1-A3**	**A5**
PERE	MJ	3.64E+00	3.76E-01
PERM	MJ	3.80E-01	-3.73E-01
PERT	MJ	4.02E+00	3.10E-03
PENRE	MJ	3.70E+01	1.44E-01
PENRM	MJ	1.33E-01	-1.32E-01
PENRT	MJ	3.72E+01	1.20E-02
SM	kg	9.71E-01	0.00E+00
RSF	MJ	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00
FW	m^3	4.08E-03	1.04E-04
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water		

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Waste indicators

Results per kg iron oxide black			
Indicator	**Unit**	**A1-A3**	**A5**
Hazardous waste disposed	kg	6.38E-09	6.20E-12
Non-hazardous waste disposed	kg	1.39E-01	1.44E-03
Radioactive waste disposed	kg	2.85E-04	5.68E-07

Output flow indicators

Results per kg iron oxide black			
Indicator	**Unit**	**A1-A3**	**A5**
Components for re-use	kg	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	5.99E-02
Exported energy, thermal	MJ	0.00E+00	1.08E-01

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
SVHC	Substances of Very High Concern
ND	Not Declared
X	Module Declared
IES	International EPD System

MJ	Megajoule
kg	kilogram
DE	Germany
LCI	Life cycle inventory

REFERENCES

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Sphera LCA for Experts, LCA FE, software-system and databases, Managed LCA content MLC (fka GaBi database), University of Stuttgart and Sphera Solutions GmbH, 2025, CUP Version: 2025.1, MLC data set documentation under https://lcadatabase.sphera.com/ (July 2025)

Iron Oxide Black, Oxerra; https://environdec.com/ library; date of last access: 2025-07-07 EPD-IES-0017015

VERSION HISTORY

Original Version of the EPD, 2025-08-28

INTERNATIONAL EPD SYSTEM

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