Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Merit (GGBS)

from

Swecem

Programme:	The International EPD® System, www.environdec.com
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General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): *PCR 2019:14 Construction products (EN 15804:A2) (1.11), CEMENT AND BUILDING LIME (EN 16908:2017)*
PCR review was conducted by: *The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Pär Lindman, Individual verifier approved by Environdec. *In case of recognised individual verifiers:* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:
Swecem AB

Contact:
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Description of the organisation:
Swecem AB is a subsidiary of Swerock within the Peab Group. The company was established in 2013 with an import terminal of cement and fly ash in Helsingborg in South Sweden. During the autumn of 2020 the MERIT brand was acquired from SSAB, and GGBS under this name is now produced in Swecem's production facility in Oxelösund. The raw material comes from SSAB, which is located in the same port area.

Product-related or management system-related certifications:
Swecem has implemented a quality and environmental management system corresponding to ISO 9001 and ISO 14001.

Name and location of production site(s):
Oxelösunds hamn
Skeppargatan 80
613 31 Oxelösund
Sweden

Product information

Product name:
Merit

Product identification:
SS EN 15167-1

Product description:
Merit is a latent hydraulic binder, mineral admixture type II, that can be used as a replacement for OPC, Ordinary Portland Cement, in concrete, mortar or grout at different levels depending on national standards. Merit is also suitable for use in mass stabilisation, particularly if there are heavy metals in the soil or sludge or if there are other hazardous chemicals present.

Merit is produced from GBS, Granulated Blast furnace Slag, delivered from SSAB (Swedish iron producer), which is located nearby the plant. The consistent quality of GBS, is secured by verification by the producer that the product is in compliance with the demands according to SS EN 15167-1
The product is CE marked according to SS EN 15167-1.

Chemical composition and physical characteristics of Merit are presented in Table 1 and Table 2.

Table 1. Chemical composition of Merit

CaO	30-34 **%**
SiO2	30-35 %
Al2O3	10-13 %
MgO	12-15 %
TiO2	1,5-2,5 %
Mn2O3	0,3-0,6 %
Cl	< 0,1 %

Table 2. Physical characteristics of Merit

D_{50}	10/µm
Blaine	480 +/- 40
Density	2,8-3.0
Bulk Density	0,9-1,1
Glass content	97-99 %

Product manufacturing
Swecem use a VRM (Vertical Roller Mill) for the production of Merit. A VRM use less energy compared to an ordinary ball mill which contributes to less environmental impact.
The raw material is fed to the grinding table where it flows outward under the influence of centrifugal force and is ground between the grinding elements (rollers and grinding table). The flow through the grinder is adjusted so that the right quality is obtained on the finished product.
The product is then blown over to silos for further transport to the customer via truck or boat to one of our terminals.

UN CPC code:
3744, slag cement (ground granulated blast-furnace slag)

Geographical scope:
Sweden

LCA information

Functional unit / declared unit:
1 tonne of ground granulated blast furnace slag

Reference service life:
Not relevant

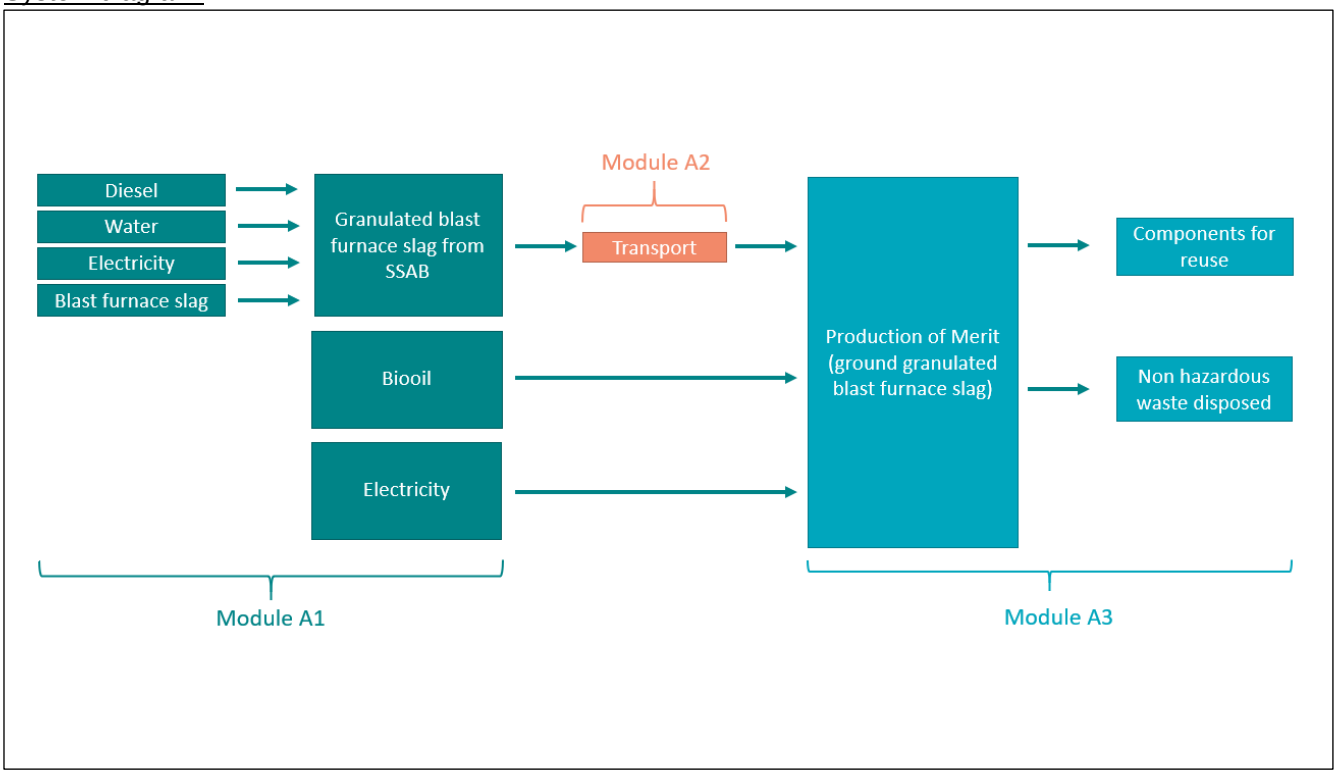
Time representativeness:
The production data are from year 2021. The database data are from 2017 – 2020. No data used is older than 10 years.

Database(s) and LCA software used:
The databases used is mainly Sphera's own database from 2021. The LCA program used is GaBi 10.

Description of system boundaries:
Cradle to gate (A1-A3)

Module C and D are not included in this study. The product fulfils all requirements for omission in section 5.2 in EN 15804.

System diagram:



More information:

The LCA study has been carried out by IVL Swedish Environmental Research Institute.

Cut-off

The study applies a cut-off of maximum 1%.

Allocation

Based on an evaluation of the revenue, GBS bares no environmental burden from the steel production. The allocation procedure is in accordance with EN 16908:2017.

Electricity

Residual Swedish electricity mix is used for modelling module A3. The GWP is 421 g CO_2 eq./kWh.

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

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	SE	SE	SE	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	-					-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Ground granulated blast furnace slag	1000	0	0
TOTAL	1000		

Packaging materials	Weight, kg	Weight-% (versus the product)
Not applicable		

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
None			

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Indicator	Unit	Tot. A1-A3
GWP-fossil	kg CO_2 eq.	3,86E+01
GWP-biogenic	kg CO_2 eq.	6,15E-01
GWP-luluc	kg CO_2 eq.	1,55E+00
GWP-total	kg CO_2 eq.	4,07E+01
ODP	kg CFC 11 eq.	4,11E-13
AP	mol H^+ eq.	2,06E-01
EP-freshwater	kg P eq.	2,39E-03
EP-marine	kg N eq.	6,55E-02
EP-terrestrial	mol N eq.	9,86E-01
POCP	kg NMVOC eq.	1,62E-01
ADP-minerals&metals*	kg Sb eq.	1,65E-05
ADP-fossil*	MJ	6,80E+02
WDP	m^3	7,92E+00
Acrynyms	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 of these results are high or as there is limited experience with the indicator.*
*"E" means exponent (10^x). For example, 3.5 E-02 means 3.5 * 10^{-2} and may be read as 0.035.*

Potential environmental impact – additional mandatory and voluntary indicators

Indicator	Unit	Tot.A1-A3
GWP-GHG[1]	kg CO_2 eq.	3,75E+01
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017		

*"E" means exponent (10^x). For example, 3.5 E-02 means 3.5 * 10^{-2} and may be read as 0.035.*

Use of resources

Indicator	Unit	Tot.A1-A3
PERE	MJ	4,02E+02
PERM	MJ	0,00E+00
PERT	MJ	4,02E+02
PENRE	MJ	6,80E+02
PENRM	MJ.	0,00E+00
PENRT	MJ	6,80E+02
SM	kg	8,51E+02
RSF	MJ	0,00E+00
NRSF	MJ	0,00E+00
FW	m^3	1,39E+00
Acrynoms	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	

*"E" means exponent (10^x). For example, 3.5 E-02 means 3.5 * 10^{-2} and may be read as 0.035.*

[1] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production and output flows

Waste production

Indicator	Unit	Tot.A1-A3
Hazardous waste disposed	kg	6,23E-08
Non-hazardous waste disposed	kg	1,54E+00
Radioactive waste disposed	kg	9,92E-02

*"E" means exponent (10^x). For example, 3.5 E-02 means 3.5 * 10^{-2} and may be read as 0.035.*

Output flows

Indicator	Unit	Tot.A1-A3
Components for re-use	kg	3,76E-02
Material for recycling	kg	0,00E+00
Materials for energy recovery	kg	0,00E+00
Exported energy, electricity	MJ	0,00E+00
Exported energy, thermal	MJ	0,00E+00

*"E" means exponent (10^x). For example, 3.5 E-02 means 3.5 * 10^{-2} and may be read as 0.035.*

Information on biogenic carbon content

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	none
Biogenic carbon content in packaging	kg C	none

*"E" means exponent (10^x). For example, 3.5 E-02 means 3.5 * 10^{-2} and may be read as 0.035.*

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

References

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