

# Environmental Product Declaration

*according to ISO 14025 and EN 15804*



This declaration is for:  
**Granulight**

Provided by:  
**K3 Delta**



program operator  
**Stichting MRPI®**  
publisher  
**Stichting MRPI®**  
[www.mrpi.nl](http://www.mrpi.nl)

MRPI® registration  
**1.1.00131.2020**  
EPD registration  
**00001236**  
date of first issue  
**03-06-2020**  
date of this issue  
**03-06-2020**  
expiry date  
**03-06-2025**



**PROGRAM OPERATOR**

Stichting MRPI®  
 Kingsfordweg 151  
 1043GR  
 Amsterdam

**COMPANY INFORMATION**

**K3 DELTA**

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 Wanraaij 2  
 6673 DN  
 Andelst  
 0031 (0)24 348 88 00  
 Sherwin Heide  
<https://www.k3delta.nl/>

**SCOPE OF DECLARATION**

This MRPI®-EPD certificate is verified by **Harry van Ewijk, SGS**.  
 The LCA study has been done by **Pieter Stadhouders, EcoReview**.  
 The certificate is based on an LCA-dossier according to ISO14025 and NEN-EN15804+A1. It is verified according to the 'EPD-MRPI® verification protocol May 2017.v3.1'. EPDs of construction products may not be comparable if they do not comply with NEN-EN15804+A1. Declaration of SVHC that are listed on the 'Candidate List of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

**VISUAL PRODUCT**



**PRODUCT**

Granulight

**MRPI® REGISTRATION**

1.1.00131.2020

**EPD REGISTRATION**

00001236

**DATE OF ISSUE**

03-06-2020

**EXPIRY DATE**

03-06-2025

**DECLARED UNIT/FUNCTIONAL UNIT**

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**DESCRIPTION OF PRODUCT**

Granulight is the environmentally friendly, lightweight embankment material for any surface where embankment, stability and drainage is required.

**MORE INFORMATION**

<https://www.k3delta.nl/granulight>

**DEMONSTRATION OF VERIFICATION**

CEN standard EN15804 serves as the core PCR[a]

Independent verification of the declaration and data,  
 according to EN ISO 14025:2010:  
 internal:            external: X

(where appropriate[b]) Third party verifier:

Harry van Ewijk, SGS Search

[a] Product Category Rules [b] Optional for B-to-B communication, mandatory for B-to-C communication (see EN ISO 14025:2010, 9.4).

## DETAILED PRODUCT DESCRIPTION

Granulight is bottom ash. Bottom ash is a byproduct of power generation using coal as fuel. It can directly be used as an intermediate product for construction materials or as embankment material. It is delivered to the customer in bulk directly from the power plants.

COMPONENT (> 1%)	[kg / %]
SiO <sub>2</sub> + Al <sub>2</sub> O <sub>3</sub> + Fe <sub>2</sub> O <sub>3</sub>	70-100%
CaO	0-10%
P <sub>2</sub> O <sub>5</sub>	0-5%

(\*) > 1% of total mass

## SCOPE AND TYPE

This product is produced in the Netherlands, Germany, France and Belgium. It is applied as an intermediate product for construction materials and as an end product as embankment material.

Ecoinvent V3.4 was used for the analysis.

This specific EPD covers phases A-D.

The production locations are at the following addresses:

Amercentrale: Amerweg 1, 4931 NC Geertruidenberg, The Netherlands

Uniper Benelux: Coloradoweg 10, Maasvlakte Rotterdam, The Netherlands

Uniper Kraftwerke Scholven GmbH: Glückaufstraße 56, 45896 Gelsenkirchen, Germany

Gemeinschaftskraftwerk Mehrum : Triftstraße 25, 31249 Hohenhameln, Germany

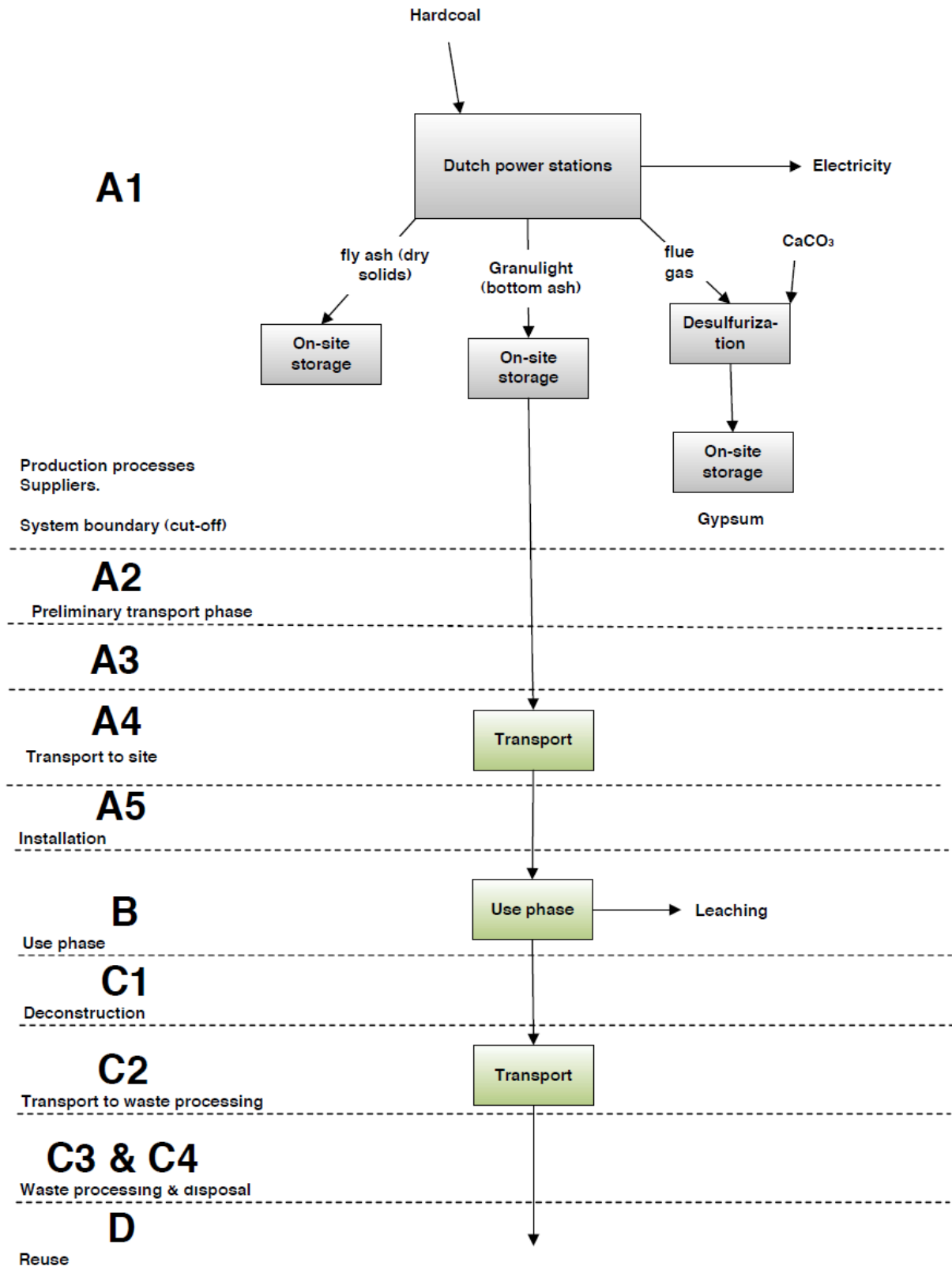
Surschiste (SA), Saint-Avoid: Centrale E. Huchet, 57500 Saint Avoid, France

VPK: Oude Baan 120, 9200 Dendermonde, Belgium

PRODUCT STAGE	CONSTRUCTION				USE STAGE							END OF LIFE			BENEFITS AND	
	PROCESS											STAGE			LOADS BEYOND THE	
	STAGE														SYSTEM BOUNDARIES	
Raw material supply	Transport	Manufacturing	Transport gate to 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	MNA	x	MNA	MNA	MNA	MNA	MNA	MNA	MNA	x	MNA	MNA	x

X = Module assessed

MNA = Module not assessed



## REPRESENTATIVENESS

The data in this EPD is representative for Granulight produced in the power plants of Geertruidenberg, Maasvakte Rotterdam, Gelsenkirchen, Hohenhameln, Saint Avold and Dendermonde.

Note to Module A4 in next tables: this is for transport by truck in 1tkm. Transport by ship in 1tkm is shown at the scenarios.

## ENVIRONMENTAL IMPACT per functional unit or declared unit

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb-eq.	0.00	0.00	0.00	0.00	3.75 E -7	INA	0.00	INA	INA	INA	INA	INA	INA	INA	1.87 E -5	INA	INA	0.00
ADPF	MJ	0.00	0.00	0.00	0.00	2.02 E +0	INA	0.00	INA	INA	INA	INA	INA	INA	INA	1.01 E +2	INA	INA	0.00
GWP	kg CO2-eq.	0.00	0.00	0.00	0.00	1.32 E -1	INA	0.00	INA	INA	INA	INA	INA	INA	INA	6.59 E +0	INA	INA	0.00
ODP	kg CFC11-eq.	0.00	0.00	0.00	0.00	2.43 E -8	INA	0.00	INA	INA	INA	INA	INA	INA	INA	1.22 E -6	INA	INA	0.00
POCP	kg ethene-eq.	0.00	0.00	0.00	0.00	7.77 E -5	INA	0.00	INA	INA	INA	INA	INA	INA	INA	3.89 E -3	INA	INA	0.00
AP	kg SO2-eq.	0.00	0.00	0.00	0.00	5.71 E -4	INA	0.00	INA	INA	INA	INA	INA	INA	INA	2.85 E -2	INA	INA	0.00
EP	kg (PO4)3--eq.	0.00	0.00	0.00	0.00	1.14 E -4	INA	0.00	INA	INA	INA	INA	INA	INA	INA	5.69 E -3	INA	INA	0.00
Toxicity indicators (Dutch market)																			
HTP	kg DCB-eq.	0.00	0.00	0.00	0.00	5.27 E -2	INA	1.11 E +0	INA	INA	INA	INA	INA	INA	INA	2.63 E +0	INA	INA	0.00
FAETP	kg DCB-eq.	0.00	0.00	0.00	0.00	1.54 E -3	INA	1.58 E +0	INA	INA	INA	INA	INA	INA	INA	7.72 E -2	INA	INA	0.00
MAETP	kg DCB-eq.	0.00	0.00	0.00	0.00	5.58 E +0	INA	1.65 E +3	INA	INA	INA	INA	INA	INA	INA	2.79 E +2	INA	INA	0.00
TETP	kg DCB-eq.	0.00	0.00	0.00	0.00	1.87 E -4	INA	4.58 E -1	INA	INA	INA	INA	INA	INA	INA	9.34 E -3	INA	INA	0.00
Environmental Cost Indicator (Dutch market)																			
ECI	Euro	0.00	0.00	0.00	0.00	1.56 E -2	INA	3.40 E -1	INA	INA	INA	INA	INA	INA	INA	7.78 E -1	INA	INA	0.00

INA = Indicator Not Assessed

ADPE = Abiotic Depletion Potential for non-fossil resources

ADPF = Abiotic Depletion Potential for fossil resources

GWP = Global Warming Potential

ODP = Depletion potential of the stratospheric ozone layer

POCP = Formation potential of tropospheric ozone photochemical oxidants

AP = Acidification Potential of land and water

EP = Eutrophication Potential

HTP = Human Toxicity Potential

FAETP = Fresh water aquatic ecotoxicity potential

MAETP = Marine aquatic ecotoxicity potential

TETP = Terrestrial ecotoxicity potential

ECI = Environmental Cost Indicator

### RESOURCE USE per functional unit or declared unit

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	0.00	0.00	0.00	0.00	2.77 E -2	INA	0.00	INA	INA	INA	INA	INA	INA	1.39 E +0	INA	INA	0.00	
PERM	MJ	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	
PERT	MJ	0.00	0.00	0.00	0.00	2.77 E -2	INA	0.00	INA	INA	INA	INA	INA	INA	1.39 E +0	INA	INA	0.00	
PENRE	MJ	0.00	0.00	0.00	0.00	2.17 E +0	INA	0.00	INA	INA	INA	INA	INA	INA	1.08 E +2	INA	INA	0.00	
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	
PENRT	MJ	0.00	0.00	0.00	0.00	2.17 E +0	INA	0.00	INA	INA	INA	INA	INA	INA	1.08 E +2	INA	INA	0.00	
SM	kg	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	
RSF	MJ	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	
NRSF	MJ	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	
FW	m3	0.00	0.00	0.00	0.00	3.90 E -4	INA	0.00	INA	INA	INA	INA	INA	INA	1.95 E -2	INA	INA	0.00	

INA = Indicator Not Assessed

PERE = Use of renewable energy excluding renewable primary energy resources

PERM = Use of renewable energy resources used as raw materials

PENRE = Use of non-renewable primary energy resources excluding non-renewable energy resources used as raw materials

PENRM = Use of non-renewable primary energy resources used as raw materials

SM = Use of secondary materials

NRSF = Use of non renewable secondary fuels

PERT = Total use of renewable primary energy resources

PENRT = Total use of non-renewable primary energy resources

RSF = Use of renewable secondary fuels

FW = Use of net fresh water

### OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	0.00	0.00	0.00	0.00	1.50 E -5	INA	0.00	INA	INA	INA	INA	INA	INA	7.49 E -4	INA	INA	0.00	
NHWD	kg	0.00	0.00	0.00	0.00	1.25 E -1	INA	0.00	INA	INA	INA	INA	INA	INA	6.23 E +0	INA	INA	0.00	
RWD	kg	0.00	0.00	0.00	0.00	1.37 E -5	INA	0.00	INA	INA	INA	INA	INA	INA	6.85 E -4	INA	INA	0.00	
CRU	kg	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	
MFR	kg	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	
MER	kg	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	
EEE	MJ	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	
ETE	MJ	0.00	0.00	0.00	0.00	0.00	INA	0.00	INA	INA	INA	INA	INA	INA	0.00	INA	INA	0.00	

INA = Indicator Not Assessed

HWD = Hazardous Waste Disposed

RWD = Radioactive Waste Disposed

MFR = Materials for recycling

EEE = Exported Electrical Energy

NHWD = Non Hazardous Waste Disposed

CRU = Components for reuse

MER = Materials for energy recovery

ETE = Exported Thermal Energy



## CALCULATION RULES

### *Data quality*

Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

### *Data collection period*

The dataset is representative for the production processes used in 2019.

### *Methodology and reproducibility*

The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented.

## SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

### *A1. Raw materials supply*

The input material is free of burden. No emissions from the power generation are allocated onto the Granulight. This approach is in accordance with CEN/TC 51 PCR for cement and building lime, 2015. There is no impact in A1.

### *A2. Transport of raw materials to manufacturer*

The material is sold directly to the customers from the factory gate. There is no impact in A2.

### *A3. Manufacturing*

No manufacturing is needed for this product. There is no impact in A3.

### *A4. Transport*

The environmental impacts listed under A4 are based on 1tkm transport by truck. To calculate the impact in A4, multiply these numbers by the distance (one way) from the beforementioned production locations to the project location and the weight in tons for each specific project. The NMD v3.0 record "0001-tra&Transport, vrachtwagen (o.b.v. Transport, freight, lorry, unspecified {GLO}) market for | Cut-off, U)" has been used as a reference.

It is also quite common to use a barge to transport Granulight. To calculate the impact of barge transport, the distance (one way) and total weight in tons can be multiplied by the values for 1tkm of barge transport provided in the additional table. The NMD v3.0 record "0103-tra&Transport, vrachtschip, binnenvaart (o.b.v. Transport, freight, inland waterways, barge {GLO}) market for | Cut-off, U)" has been used as a reference.

### *B1. Use phase*

The impacts in B1 are based on measurements done on the leaching of Granulight. Given the very low amount of leaching, Granulight is marketed with a BSB® certificate, indicating that it conforms to the norms set in the "Besluit Bodemkwaliteit" of the Dutch government. The measured values are well below the defined limits.

### *C2. Transport after demolition*

After the life cycle of Granulight, it could be transported away from the use location. Since the exact

scenario is unclear, the lump sum of 50km from the bepalingsmethode 3.0 has been used for calculating C2. The standard NMD v3.0 record "0001-tra&Transport, vrachtwagen (o.b.v. Transport, freight, lorry, unspecified {GLO}| market for | Cut-off, U)" has been used as a reference.

ENVIRONMENTAL IMPACT in A4 for barge transport (per tkm)	Abbreviation	Unit	Impact per tkm
Abiotic depletion potential for non-fossil resources	ADPE	kg Sb-eq	2.69E-8
Abiotic depletion potential for fossil resources	ADPF	MJ	6.36E-1
Global warming potential	GWP	kg CO2-eq	4.81E-2
Depletion potential of stratospheric ozone layer	ODP	kg CFC-11-eq	7.10E-9
Formation potential of tropospheric ozone photochemical oxidants	POCP	kg ethene-eq	2.79E-5
Acidification potential of land and water	AP	kg SO2-eq	3.46E-4
Eutrophication potential	EP	kg PO4 3- -eq	7.63E-5

ENVIRONMENTAL IMPACT in A4 for barge transport (per tkm)	Abbreviation	Unit	Impact per tkm
Human toxicity potential	HTTP	kg 1,4-DB-eq	1.06E-2
Freshwater aquatic ecotoxicity potential	FAETP	kg 1,4-DB-eq	2.75E-4
Marine aquatic ecotoxicity potential	MAETP	kg 1,4-DB-eq	8.52E-1
Terrestrial ecotoxicity potential	TETP	kg 1,4-DB-eq	5.49E-5
Environmental Costs Indicator	ECI	euro	5.64E-3

ENVIRONMENTAL IMPACT in A4 for barge transport (per tkm)	Abbreviation	Unit	Impact per tkm
Hazardous waste disposed	HWD	kg	4.57E-6
Non-hazardous waste disposed	NHWD	kg	1.93E-3
Radioactive waste disposed	RWD	kg	4.07E-6

### DECLARATION OF SVHC

None of the substances contained in the product are listed in the "Candidate List of Substances of Very High Concern for authorisation", or they do not exceed the threshold with the European Chemicals Agency.

### REFERENCES

KIWA, 2015. Nationale beoordelingsrichtlijn 9302 deel 2 "E-bodemas in ongebonden toepassing" d.d. 2015-05-08

### REMARKS

The impacts in the modules indicated with MNA are dependend on the application of Granulight. If Granulight is used as fill sand, no impacts are expected in modules A5 installation, C1 demolition, C3 waste treatment and C4 final waste processing.