ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

AALBORG WHITE® CEMENT

CEM I 52,5 R

SINAÏ WHITE CEMENT, CEMENTIR HOLDING

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Sinai White Cement, Cementir Holding
Address	Sinai White Portland Cement Company 604 (A) El Safa Street 11742 New Maadi, Cairo, Egypt
Contact details	h.fathy@sinaiwhitecement.com
Website	www.sinaiwhitecement.com

PRODUCT IDENTIFICATION

Product name	CEM I 52,5 R
Product number / reference	0770-CPR-2092-03-18
Place(s) of production	Al Gafagafa - Abou Owagla, Qism El-Shaikh Zayed, North Sinai Governorate, Egypt

Kai Renholm

RTS EPD Committee secretary

Laura Apilo

Managing Director

EPD INFORMATION

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	Rakennustietosäätiö RTS / Rakennustieto Oy Malminkatu 16 A, 00100 Helsinki http://cer.rts.fi
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version, 26.8.2020) is used.
EPD author	Stefan Emil Danielsson, Research and Quality Center, Cementir Holding S.p.A Aalborg, Denmark
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	12.3.2021
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD number	RTS_103_21
Publishing date	25.03.2021
EPD valid until	12.03.2026

PRODUCT INFORMATION

PRODUCT DESCRIPTION

The Sinai White Cement CEM I 52,5 R is a precast ready mix Portland cement reaching a high early strength (39 MPa in 2 days), and a 28-day strength of 68 MPa. It consists of clinker and the main raw materials chalk ($CaCO_3$) and gypsum of which most are sourced locally.

PRODUCT APPLICATION

It can be used in concrete for all purposes and in all environmental classes, and is especially recommended for:

- Architectural precast elements for facade cladding
- Reinforced concrete structures with high strength class
- Concreting in cold weather
- Terrazzo application

TECHNICAL SPECIFICATIONS AND PHYSICAL PROPERTIES OF THE PRODUCT

Product sheet can be retrieved here:
https://aalborgportland.be/data-sheets/
https://www.aalborgwhite.com/products-solutions/products/all-products

Further information can be found at www.sinaiwhitecement.com

PRODUCT STANDARDS

The SWC CEM I 52,5 R is manufactured according to the European standard EN 197-1 and correspondingly labelled with the European CE quality mark.

PRODUCT RAW MATERIAL COMPOSITION

Material	Amount %
Clinker	95 - 100
Other constituents	0 - 5

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	0	-
Minerals	100	Egypt (98,5%) EU (1,5%)
Fossil materials	0	-
Bio-based materials	0	-

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1% (1000 ppm).

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The main component of clinker, limestone, is sourced from a local quarry. A mixture of raw materials composed of limestone, sand, feldspar, kaolin, and calcium fluoride is ground. The ground raw meal mixture is led into the kiln to be calcined at 550°C and sintered at 1450°C using a pre-ground fuel mixture of petroleum coke. This process transforms the raw meal into clinker which is the main component of the Portland cement. To achieve the desired cement quality, gypsum and limestone is added and finally the mixture is grinded to form the finished cement product. Finally, the cement is packed in jumbo bags ready to be exported.

TRANSPORT AND INSTALLATION (A4-A5)

Only distribution to end customers is considered (A4). Transportation of the CEM I 52,5 R happens to BENELUX and France with truck, ship, and train, and in 1,7 tonne bulk bags. The emission and distance results are weighted average according to volume flows and distances from the plant to the destined regions (see table under "Scenario documentation"). The data quality for the realized 2020 shipping is high.

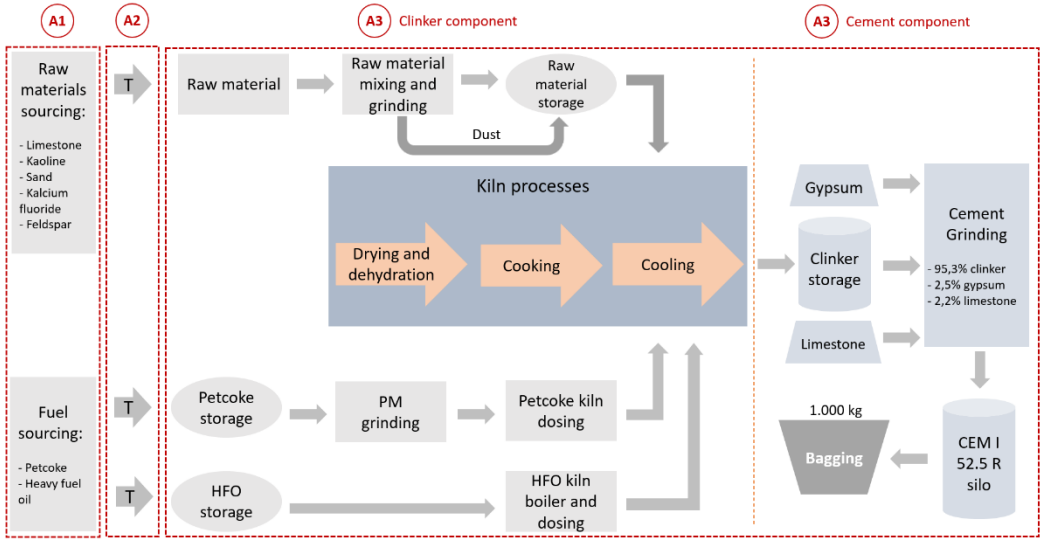
PRODUCT USE AND MAINTENANCE (B1-B7)

As cement is an intermediate product, no other lifecycle phases are relevant to cover. Air, soil and water impacts during the use phase have not been studied. As such they are marked as "Modules Not Declared"

PRODUCT END OF LIFE (C1-C4, D)

The end-of-life modules (C1-C4, and D) are omitted as the material fulfils the exemption criteria based on EN 15804+A2.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2020
Declared unit	1 tonne
Mass per declared unit	1000 kg

BIOGENIC CARBON CONTENT

The product and its packaging do not have biogenic carbon content.

SYSTEM BOUNDARY

This EPD covers cradle-to-gate with options scope with following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing). As cement is an intermediate product, no other lifecycle phases are relevant to cover. Only A4 is also included as per the recommendation in EN 15804+A2.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

CUT-OFF CRITERIA

All major raw materials and essential energy flows are included. The 1% cut-off rule does not apply for hazardous materials and substances: as such, all flows with environmental significance are included. All solid waste emissions, including those that weight less than 1% of the sum of the masses of the inputs, are reported in the end-results.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is made in accordance with the provisions of EN 15804+A2 and the PCR. The burden from clinker production process is averaged over the clinker and the burden from the cements production process is averaged over the amount of cement produced.

The data quality is generally high as most are retrieved directly from the Manufacturer and are well below the cut-off rule, and no assumptions are made in A3. Additional background processes such as transportation and electricity consumption have been modelled using Ecoinvent v.3.6 LCI database, with less than 2 years old data.

AVERAGES AND VARIABILITY

Essentially, for this EPD, minor inputs such as electricity, internal transport, and waste have been averaged over the entire cement and clinker production of Sinai White Cement.

ENVIRONMENTAL IMPACT DATA

NOTE: ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930 ARE PRESENTED IN ANNEX.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change – total	kg $CO_{2\text{-eq}}$	3,55E+01	3,98E+01	1,01E+03	1,09E+03	7,59E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Climate change – fossil	kg $CO_{2\text{-eq}}$	3,55E+01	3,98E+01	1,02E+03	1,09E+03	7,64E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Climate change – biogenic	kg $CO_{2\text{-eq}}$	2,56E-02	-9,54E-03	-2,31E+00	-2,29E+00	-3,48E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Climate change – LULUC	kg $CO_{2\text{-eq}}$	3,92E-02	2,02E-02	4,38E-02	1,03E-01	4,58E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Ozone depletion	kg $CFC11_{\text{-eq}}$	4,09E-06	8,48E-06	2,43E-05	3,68E-05	1,58E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Acidification	mol $H^{+}_{\text{-eq}}$	2,30E-01	4,64E-01	3,63E+00	4,32E+00	1,89E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication, aquatic freshwater	kg $PO_{4\text{-eq}}$	1,25E-02	2,94E-03	1,32E-01	1,47E-01	3,69E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication, aquatic marine	kg $N_{\text{-eq}}$	4,28E-02	1,18E-01	4,38E-01	5,99E-01	4,60E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication, terrestrial	mol $N_{\text{-eq}}$	5,08E-01	1,31E+00	4,52E+00	6,34E+00	5,11E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Photochemical ozone formation	kg $NMVOC_{\text{-eq}}$	1,35E-01	3,55E-01	2,30E+00	2,79E+00	1,33E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion, minerals & metals	kg $Sb_{\text{-eq}}$	3,55E-03	8,58E-04	2,59E-04	4,67E-03	9,50E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion of fossil resources	MJ	6,04E+02	5,70E+02	6,53E+03	7,70E+03	1,01E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Water use	$m^3_{\text{-eq}}$ depr.	3,84E+02	1,73E+02	5,87E+02	1,14E+03	4,25E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	3,04E−6	2,35E−6	4,52E−5	5,06E−5	3,02E−6	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Ionizing radiation, human health	kBq U235$_{eq}$	2,76E0	2,63E0	5,5E0	1,09E1	4,81E0	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eco-toxicity (freshwater)	CTU$_{eq}$	5,49E0	1,54E1	2,02E1	4,11E1	1,75E1	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Human toxicity, cancer effects	CTUh	1,46E−8	1,58E−8	2,64E−6	2,67E−6	3,68E−8	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Human toxicity, non-cancer effects	CTUh	1,53E−6	6,95E−7	5,87E−6	8,09E−6	8,07E−7	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Land use related impacts/soil quality	-	2,28E2	3,48E2	4,59E2	1,04E3	2,59E2	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

EN 15804+A2 disclaimer for Ionizing radiation, human health. 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 due to 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

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renewable PER used as energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Renewable PER used as materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Total use of renewable PER	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Non-renew. PER used as energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Non-renew. PER used as materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Total use of non-renewable PER	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of secondary materials	kg	2,49E-01	2,44E-01	6,50E-01	1,14E+00	4,39E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of non-renew. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of net fresh water	m^3	1,47E+00	8,77E-02	9,75E-01	2,53E+00	1,19E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

PER abbreviation stands for primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	2,24E+00	7,47E-01	2,90E+01	3,20E+01	1,15E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Non-hazardous waste	kg	5,77E+01	3,33E+01	6,59E+02	7,50E+02	3,12E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Radioactive waste	kg	1,34E-03	3,81E-03	5,03E-03	1,02E-02	7,12E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change – total	kg $CO_{2\text{-eq}}$	3,55E-02	3,98E-02	1,01E+00	1,09E+00	7,64E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion, minerals & metals	kg $Sb_{\text{-eq}}$	3,55E-06	8,58E-07	2,59E-07	4,67E-06	9,50E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion of fossil resources	MJ	6,04E-01	5,70E-01	6,53E+00	7,70E+00	1,01E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Water use	$m^3_{\text{-eq}}$	1,47E-03	8,77E-05	9,75E-04	2,53E-03	1,19E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Use of secondary materials	kg	2,49E-04	2,44E-04	6,50E-04	1,14E-03	4,39E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Biogenic carbon content in product	kg C	N/A	N/A	0E0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon content in packaging	kg C	N/A	N/A	0E0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Ecoinvent v.3.6 data has been applied as the only valid dataset.
Electricity $CO_{2\text{-}eq}$ / kWh	0,61
District heating data source and quality	n/a
District heating $CO_{2\text{-}e}$q / kWh	n/a

Transport scenario documentation

Scenario parameter	Value
Transport, freight, lorry 16-32 tonnes, EURO 5, kg $CO_{2\text{-}eq}$ / t-km	0,1668
Transport, freight, sea, bulk carrier for dry goods, kg $CO_{2\text{-}eq}$ / t-km	0,00939
A4 average transport $CO_{2\text{-}eq}$ emissions, kg $CO_{2\text{-}eq}$ / t-km	0,0062
A4 average transport distance, km	6.157
Transport capacity utilization, %	36%
Bulk density of transported products, kg/m^3	3050
Volume capacity utilization factor for nested package products, %	100

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	n/a
Collection process – kg collected with mixed waste	n/a
Recovery process – kg for re-use	n/a
Recovery process – kg for recycling	n/a
Recovery process – kg for energy recovery	n/a
Disposal (total) – kg for final deposition	n/a
Scenario assumptions e.g. transportation	n/a

BIBLIOGRAPHY

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

Ecoinvent database v3.6 and One Click LCA database.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

RTS PCR EN 15804:2019 RTS PCR in line with EN 15804+A2. Published by the Building Information Foundation RTS 26.8.2020.

ABOUT THE MANUFACTURER

Sinai White Portland Cement Co. is a company of World's largest white cement player, Aalborg Portland Group who is the subsidiary of Italian Cementir Holding SpA. Sinai White Cement is the main cement producer in Egypt and the world's largest white cement plant. Sinai White Cement delivers quality products where the customer's needs come first. The company ensures its customer satisfaction through consistent performance in all applications of white cement, as well as proactively involving and developing new applications for growing market.

Sinai White Cement Co. was incorporated in 1999 and established a white cement plant in the Sinai Peninsula approximately 50 km from the city of Al Arish. Sinai White Cement entered in the market with its first bag of white cement in November 2001 when the plant started production with a capacity of 410,000 MT of clinker per year.

"We transform desert's purity to architectural aesthetics and durability".

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Sinai White Cement, Cementir Holding
EPD author	Stefan Emil Danielsson, Research and Quality Center, Cementir Holding S.p.A Aalborg, Denmark
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD program operator	Rakennustietosäätiö RTS / Rakennustieto Oy Malminkatu 16 A 00100 Helsinki http://cer.rts.fi
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Cementitious Products

ANNEX

ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential	kg $CO_{2\text{-eq}}$	3,42E+01	3,95E+01	9,97E+02	1,07E+03	7,59E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Depletion of stratospheric ozone	kg CFC-$11_{\text{-eq}}$	4,06E-06	6,74E-06	2,14E-05	3,22E-05	1,26E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Acidification	kg $SO_{2\text{-eq}}$	1,97E-01	3,72E-01	3,26E+00	3,83E+00	1,52E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Eutrophication	kg $PO_{4\text{-eq}}$	5,61E-02	5,21E-02	5,81E-01	6,89E-01	1,73E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Photochemical ozone formation	kg $C_2H_{4\text{-eq}}$	8,14E-03	1,12E-02	2,11E-01	2,30E-01	4,11E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion of non-fossil res.	kg $Sb_{\text{-eq}}$	3,55E-03	8,58E-04	2,59E-04	4,67E-03	9,50E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Abiotic depletion of fossil resources	MJ	6,04E+02	5,70E+02	6,53E+03	7,70E+03	1,01E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND