Environmental
Product
Declaration

According to EN15804+A2 (+indicators A1)

This declaration is for:
Portland cement CEM I 42,5 R

Provided by:
PHOENIX Zementwerke Krogbeumker GmbH & Co. KG

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COMPANY INFORMATION

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MRPI® REGISTRATION

1.1.00849.2025

DATE OF THIS ISSUE

12-6-2025

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SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Ulbert Hofstra, SGS INTRON B.V.. The LCA study has been done by Jochen Reiners, VDZ Technology gGmbH. The certificate is based on an LCA-dossier according to EN15804+A2 (+indicators A1). It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPDs of construction products may not be comparable if they do not comply with EN15804+A2. 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.

PROGRAM OPERATOR

Stichting MRPI®

Kingsfordweg 151

1043 GR

Amsterdam

PRODUCT

Portland cement CEM I 42,5 R

DECLARED UNIT / FUNCTIONAL UNIT

1 Mass (t)

DESCRIPTION OF PRODUCT

Cement is a hydraulic binder, i.e. a finely ground inorganic material which, when mixed with water, forms a paste which sets and hardens by means of hydration reactions and processes and which, after hardening, retains its strength and stability even under water. The cement declared in this EPD is a portland cement according to EN 197-1, i.e. portland cement clinker ist the only "main constituent".

VISUAL PRODUCT

MORE INFORMATION

https://www.phoenix-zement.de/produkte/cem-i/cem-i-425-r.html

Ing. L. L. Oosterveen MSc. MBA Managing Director MRPI	DEMONSTRATION OF VERIFICATION
	CEN standard EN15804 serves as the core PCR [1]
	Independent verification of the declaration an data according to EN15804+A2 (+indicators A1) Internal: External: X
	Third party verifier: Ulbert Hofstra, SGS INTRON B.V.
	[1] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION (PART 1)

The main constituent of CEM I 42,5 R is Portland cement clinker. It is produced from limestone which is crushed and sintered in a rotary kiln at a temperature of 1450°C. Portland cement is produced by intergrinding Portland cement clinker and gypsum from flue gas desulfurisation (setting time regulator). Also, a small amount of fly ash, production dust from the clinker production process and low amounts of additives (chromate reduction agent and grinding aid) are added. Cement is delivered to customers as bulk material or in bags.

Cement is an intermediate product with many different final uses (ready-mix concrete, precast concrete, mortar, cement screed etc.). An RSL can therefore not be indicated.

Component (> 1%)	(kg / %)
Portland cement clinker	90%
Calium sulphate	6%
Minor additional constituents	4%

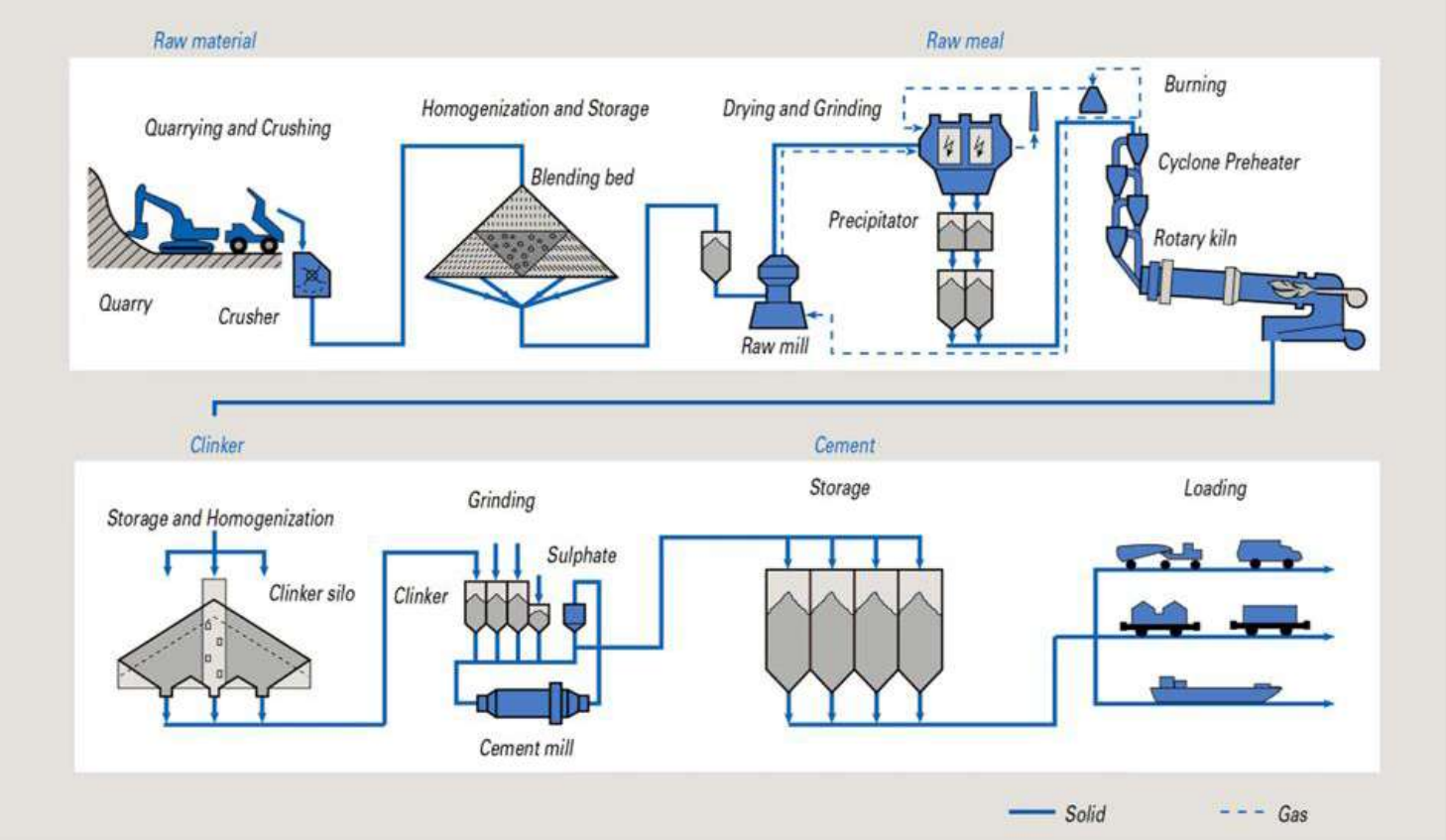
SCOPE AND TYPE

The cement in this EPD is produced at the Phoenix cement plant in Beckum, Germany. Cement is a hydraulic binder, mainly used for concrete, mortar and cement screed. Since cement is an intermediate product, only the production phase is included in the LCA. The LCA was developed using the "Environmental Performance Assessment Method for Construction Works", version 1.2 (January 2025). Ecoinvent 3.6 for background processes and the "LCA for Experts" Software (version 10.9.0.31). The environmental indicators have been calculated with the characterisation factors "SBK Bepalingsmethode 'set 1', 'set 2' & param (NMD 3.4)".

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE 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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

X = Modules Assessed

ND = Not Declared



REPRESENTATIVENESS

The cement is produced in the Phoenix cement plant in Beckum (one production site).

ENVIRONMENTAL IMPACT per functional unit or declared unit (indicators A1)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	1,58E-04	2,93E-05	0,00E+00	1,87E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADPF	MJ	4,07E+02	1,75E+01	0,00E+00	4,24E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP	kg CO2 eq.	6,85E+01	6,27E+00	5,07E+02	5,82E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11 eq.	1,37E-06	2,04E-07	0,00E+00	1,57E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
POCP	kg ethene eq.	1,68E-02	4,32E-03	7,06E-02	9,17E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP	kg SO2 eq.	1,77E-01	2,66E-02	9,92E-01	1,19E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP	kg (PO4) 3 eq.	4,60E-02	4,25E-03	5,93E-02	1,10E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	1,34E+01	2,80E+00	8,70E+01	1,03E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FAETP	kg DCB eq.	2,26E-01	5,86E-02	1,12E-01	3,97E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MAETP	kg DCB eq.	1,27E+03	3,43E+02	4,40E+03	6,01E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETP	kg DCB eq.	2,82E-01	1,96E-02	2,87E-01	5,89E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ECI	euro	5,96E+00	7,58E-01	3,83E+01	4,50E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADPF	kg Sb eq.	1,88E-01	8,08E-03	0,00E+00	1,96E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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
ADPF = Abiotic Depletion Potential for fossil resources

ENVIRONMENTAL IMPACT per functional unit or declared unit (core indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	7,19E+01	6,34E+00	5,13E+02	5,91E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-fossil	kg CO2 eq.	6,87E+01	6,33E+00	5,13E+02	5,88E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-biogenic	kg CO2 eq.	3,23E+00	6,17E-03	0,00E+00	3,24E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-luluc	kg CO2 eq.	3,45E-02	4,42E-04	0,00E+00	3,49E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11 eq.	1,10E-06	2,56E-07	0,00E+00	1,36E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP	mol H+ eq.	2,32E-01	3,49E-02	1,15E+00	1,41E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-fresh water	kg PO4 eq.	4,07E-02	1,06E-04	0,00E+00	4,08E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-marine	kg N eq.	5,75E-02	1,07E-02	1,13E-01	1,81E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-terrestrial	mol N eq.	6,10E-01	1,19E-01	1,38E+00	2,11E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
POCP	kg NMVOC eq.	1,28E-01	3,57E-02	4,14E-01	5,78E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADP-minerals & metals	kg Sb eq.	1,58E-04	2,93E-05	0,00E+00	1,88E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADP-fossil	MJ, net calorific value	5,08E+02	1,78E+01	0,00E+00	5,26E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WDP	m3 world eq. Deprived	7,59E+00	9,14E-02	0,00E+00	7,68E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

GWP-total = Global Warming Potential total

GWP-fossil = Global Warming Potential fossil fuels

GWP-biogenic = Global Warming Potential biogenictotal

GWP-luluc = Global Warming Potential land use and land use change

ODP = Depletion potential of the stratospheric ozone layer

AP = Acidification Potential, Accumulated Exceedence

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 Exceedence

POCP = Formation potential of tropospheric ozone photochemical oxidants

ADP-minerals & metals = Abiotic Depletion Potential for non-fossil resources [1]

ADP-fossil = Abiotic Depletion for fossil resources potential [1]

WDP = Water (user) deprivation potential, deprivation-weighted water consumption [1]

Disclaimer [1]:

- 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 experience with the indicator.

ENVIRONMENTAL IMPACT per functional unit or declared unit (additional indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease inci-dence	1,23E-06	5,13E-07	5,62E-06	7,37E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IRP	kBq U235 eq.	5,18E+00	8,39E-02	0,00E+00	5,26E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	3,25E+02	1,64E+01	4,66E-03	3,42E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	1,97E-08	2,94E-09	1,36E-06	1,38E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	7,35E-07	7,75E-08	2,43E-06	3,25E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	-	7,91E+01	1,51E+01	0,00E+00	9,42E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

PM = Potential incidence of disease due to PM emissions

IRP = Potential Human exposure efficiency relative to U235 [1]

ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]

HTP-c = Potential Comparative Toxic Unit for humans [2]

HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]

SQP = Potential soil quality index [2]

Disclaimer [1]:

- 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.

Disclaimer [2]:

- 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 experience with the indicator.

OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 en A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	1,36E-04	0,00E+00	0,00E+00	1,36E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NHWD	kg	3,00E+00	0,00E+00	0,00E+00	3,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RWD	kg	7,27E-02	0,00E+00	0,00E+00	7,27E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

HWD = Hazardous Waste Disposed
NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

RESOURCE USE per functional unit or declared unit (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	5,12E+01	2,19E-01	0,00E+00	5,14E+01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PERT	MJ	5,12E+01	2,19E-01	0,00E+00	5,14E+01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PENRE	MJ	5,08E+02	1,78E+01	0,00E+00	5,26E+02	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
PENRT	MJ	5,08E+02	1,78E+01	0,00E+00	5,26E+02	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
RSF	MJ	1,39E+03	0,00E+00	0,00E+00	1,39E+03	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
NSRF	MJ	1,85E+03	0,00E+00	0,00E+00	1,85E+03	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
FW	m3	1,80E-01	0,00E+00	0,00E+00	1,80E-01	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
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
PENRT = Total use of non-renewable primary energy resources
SM = Use of secondary materials
RSF = Use of renewable secondary fuels
NSRF = Use of non-renewable secondary fuels
FW = Use of net fresh water

BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
BBCpr	kg C	0,00E+00	0,00E+00	0,00E+00	0,00E+00	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
BCCpa	kg C	0,00E+00	0,00E+00	0,00E+00	0,00E+00	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

CALCULATION RULES (PART 1)

Virtually no materials or processes have been excluded from the study.
The data was collected for the year 2023.
The NL-PCR cement has been followed. For granulated blast furnace slag and fly ash, economic allocation has been applied.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 1)

Module A1 (Raw material input): For upstream materials and fuels, relevant EcoInvent records were selected. The module comprises all impacts of raw material and fuels supply as well as the generation of electricity used for the cement production.

Module A2 (Transport to the manufacturer): All transports of raw materials and fuels to the plant in Beckum are done by truck.

Module A3 (Manufacturing): This module comprises the environental impacts of the processes in the cement plant, mainly those related to the emissions at the kiln.

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

EN 15804:2012+A2:2019 + AC:2021 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products;

EN 16908:2017+A1:2022 - Cement and building lime - Environmental product declarations - Product category rules complementary to EN 15804;

Product Category Rules voor cement en grondstoffen voor cementproductie (“NL-PCR”), Version 5 April 2023