Environmental
Product
Declaration
According to ISO14025 and EN15804+A2
(+indicators A1)

This declaration is for:
Drill tip

Provided by:
Proferro NV

program operator
Stichting MRPI®
publisher
Stichting MRPI®
www.mrpi.nl

MRPI® registration
1.1.00659.2024
date of first issue
11-04-2024
date of this issue
11-04-2024
expiry date
11-4-2029

COMPANY INFORMATION

Proferro NV
Steverlyncklaan 15, B
8900 IEPER
Belgium
Phone: +32 57 22 26 53
https://www.proferro.be/en

MRPI® REGISTRATION

1.1.00659.2024

DATE OF ISSUE

11-04-2024

EXPIRY DATE

11-04-2029

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Martijn van Hövell, SGS Search Consultancy. The LCA study has been done by Bastien Muyldermans, CO2logic part of South Pole.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'. EPD's 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

Ing. L. L. Oosterveen MSc. MBA
Managing Director MRPI

PRODUCT

Drill tip

DECLARED UNIT/FUNCTIONAL UNIT

1 kg

DESCRIPTION OF PRODUCT

Drill tips for drilled displacement piles

VISUAL PRODUCT

MORE INFORMATION

https://www.profounddrilltips.com/en

DEMONSTRATION OF VERIFICATION
CEN standard EN15804 serves as the core PCR(a)
Independent verification of the declaration an data according to ISO14025 and EN15804+A2 (+indicators A1) internal: external: x
Third party verifier: Martijn van Hövell, SGS Search Consultancy
[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

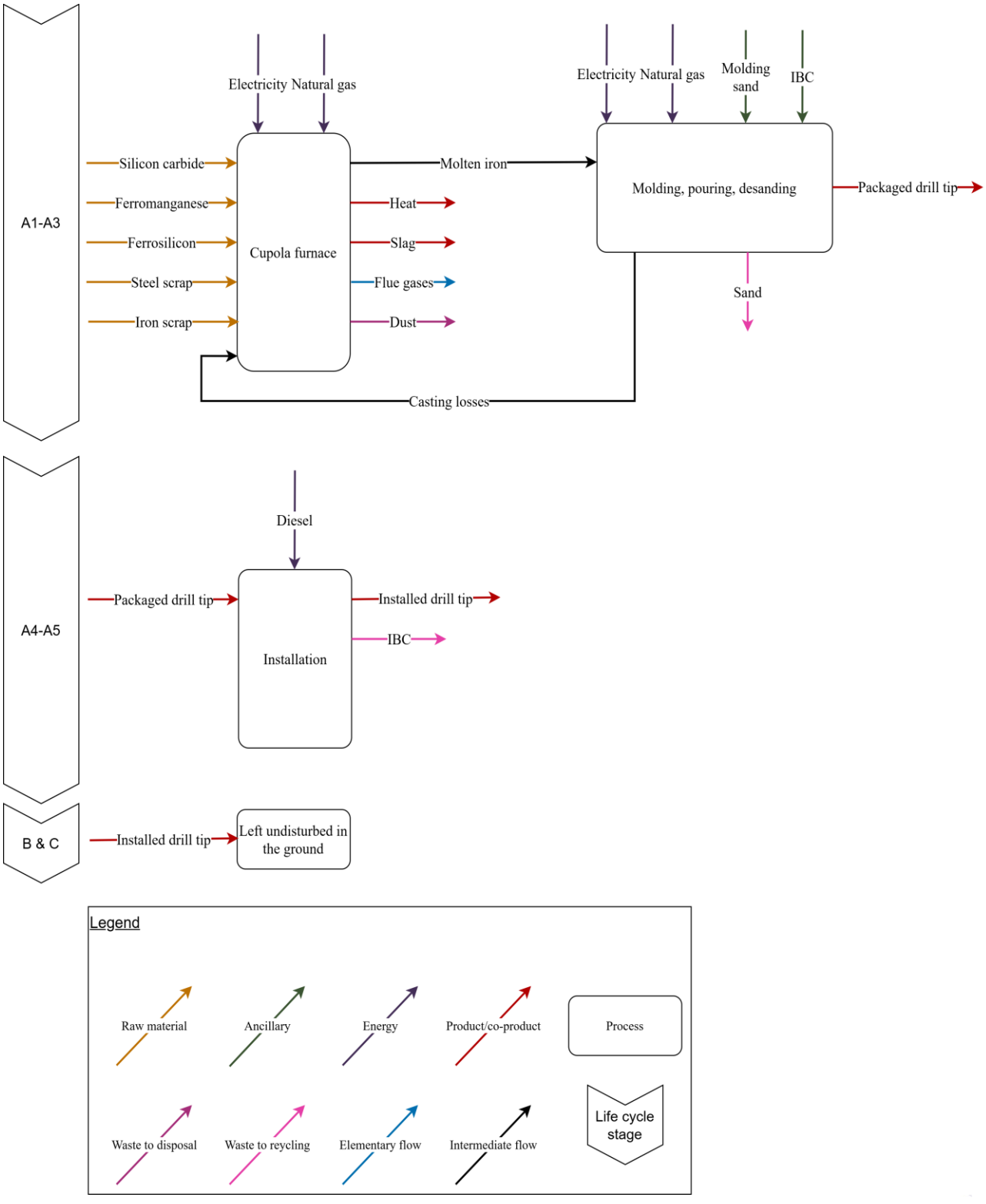
Profound® Drill Tips are innovative engineered drill tips for drilled displacement piles. They are the preferred choice for displacement pile contractors and top displacement drill rig manufacturers around the world, Profound® Drill Tips are Engineered, designed, and manufactured to the highest quality standards. The broad product offering includes a range of standard and customized drill tips to meet your specific drill rig and project needs. The drill tips are left in the ground and by consequence the RSL is considered indefinite (999 years).

Component (> 1%)	(kg / %)
Scrap iron	61%
Scrap steel	33%
Ferrosilicon	3%
Ferromanganese	2%
Silicon carbide	1%
IBC	0,05 kg/kg

SCOPE AND TYPE

The LCA study is a cradle-to-grave (A-D) in accordance with the EN15804+A2 and the Dutch Determination method (Bepalingsmethode "Milieuprestatie Bouwwerken" versie 1.1 march 2022). The product is produced in Belgium. Simapro 9.6.0.1 software was used, using NMD 3.7 and Ecoinvent 3.6 databases.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USER 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	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X= Modules Assessed ND= Not Declared																


A1-A3
Electricity Natural gas
Silicon carbide
Ferromanganese
Ferrosilicon
Steel scrap
Iron scrap
Cupola furnace
Heat
Slag
Flue gases
Dust
Molten iron
Electricity Natural gas
Molding sand
IBC
Molding, pouring, desanding
Packaged drill tip
Sand
Casting losses
A4-A5
Diesel
Packaged drill tip
Installation
Installed drill tip
IBC
B & C
Installed drill tip
Left undisturbed in the ground
Legend
Raw material
Ancillary
Energy
Product/co-product
Process
Waste to disposal
Waste to reycling
Elementary flow
Intermediate flow
Life cycle stage

ENVIRONMENT IMPACT per functional unit or declared unit (core 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.	1,39 E-06	1,33 E-07	1,41 E-05	1,56 E-05	3,98 E-07	2,26 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,02 E-07
ADPF	MJ	3,56 E+00	1,20 E-01	8,14 E+00	1,18 E+01	3,59 E-01	1,37 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,60 E+01
GWP	kg CO2 eq.	1,70 E-01	7,74 E-03	6,03 E-01	7,81 E-01	2,32 E-02	9,94 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,25 E+00
ODP	Kg CFC11 eq.	4,60 E-08	1,46 E-09	4,70 E-08	9,44 E-08	4,38 E-09	1,73 E-09	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,34 E-08
POCP	Kg ethene eq.	2,30 E-04	4,85 E-06	1,18 E-04	3,53 E-04	1,45 E-05	9,94 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,71 E-03
AP	kg SO2 eq.	7,47 E-04	2,54 E-05	7,49 E-04	1,52 E-03	7,60 E-05	7,30 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,21 E-03
EP	kg (PO4) 3- eq.	1,08 E-04	4,69 E-06	1,80 E-04	2,93 E-04	1,40 E-05	1,65 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,00 E-04
Toxicity indicators for Dutch market																			
HTP	kg DCB-Eq	1,23 E-01	3,67 E-03	5,33 E-02	1,80 E-01	1,10 E-02	3,73 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,78 E-01
FAETP	kg DCB-Eq	2,63 E-03	1,00 E-04	1,63 E-03	4,37 E-03	2,99 E-04	5,48 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-9,66 E-03
MAETP	kg DCB-Eq	4,84 E+00	3,92 E-01	4,77 E+00	1,00 E+01	1,17 E+00	1,93 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-8,07 E+00
TETP	kg DCB-Eq	1,03 E-03	1,18 E-05	4,80 E-04	1,52 E-03	3,54 E-05	6,48 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-6,51 E-02
ECI	euro	2,49 E-02	9,23 E-04	4,10 E-02	6,68 E-02	2,76 E-03	1,33 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,55 E-01
ADPF	kg Sb eq.	1,71 E-03	5,76 E-05	3,91 E-03	5,68 E-03	1,72 E-04	6,60 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,69 E-03

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 expressed in [kg Sb-eq.]

ENVIRONMENT 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.	1,76 E-01	7,81 E-03	6,12 E-01	7,97 E-01	2,34 E-02	1,00 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,32 E+00
GWP-fossil	kg CO2 eq.	1,76 E-01	7,81 E-03	6,12 E-01	7,95 E-01	2,34 E-02	1,00 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,34 E+00
GWP-biogenic	kg CO2 eq.	5,67 E-04	5,67 E-06	4,09 E-04	9,82 E-04	1,70 E-05	3,00 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
GWP-luluc)	kg CO2 eq.	6,22 E-05	2,28 E-06	3,12 E-04	3,77 E-04	6,82 E-06	8,90 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-9,86 E-04
ODP	kg CFC11 eq.	3,46 E-08	1,84 E-09	3,91 E-08	7,55 E-08	5,49 E-09	2,18 E-09	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,26 E-08
AP	mol H+ eq.	9,25 E-04	3,28 E-05	1,36 E-03	2,32 E-03	9,81 E-05	1,02 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,15 E-03
EP-freshwater	kg PO4 eq.	1,00 E-05	5,95 E-08	2,51 E-05	3,52 E-05	1,78 E-07	3,84 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,71 E-05
EP-marine	kg N eq.	1,89 E-04	9,87 E-06	3,48 E-04	5,47 E-04	2,95 E-05	4,48 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,56 E-04
EP-terrestrial	mol N eq.	2,19 E-03	1,09 E-04	3,67 E-03	5,98 E-03	3,26 E-04	4,92 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,12 E-02
POCP	kg NMVOC eq.	9,32 E-04	3,51 E-05	1,10 E-03	2,06 E-03	1,05 E-04	1,36 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,59 E-03
ADP-minerals & metals	kg Sb eq.	1,39 E-06	1,33 E-07	1,41 E-05	1,56 E-05	3,98 E-07	2,26 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,02 E-07
ADP-fossil	MJ, net calorific value	6,44 E+00	1,21 E-01	9,19 E+00	1,58 E+01	3,63 E-01	1,39 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,32 E+00
WDP	m3 world eq. Deprived	3,75 E-02	3,94 E-04	7,87 E-02	1,17 E-01	1,18 E-03	2,00 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,55 E-01

GWP-total = Global Warming Potential total
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 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 [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

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.

ENVIRONMENT 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 incidence	2,31 E-07	7,05 E-10	8,52 E-09	2,40 E-07	2,11 E-09	2,69 E-09	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,72 E-08
IRP	kBq U235 eq.	4,45 E-02	5,31 E-04	5,30 E-02	9,81 E-02	1,59 E-03	5,97 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-2,28 E-02
ETP-fw	CTUe	5,92 E+00	9,67 E-02	8,85 E+00	1,49 E+01	2,89 E-01	8,52 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,48 E+01
HTP-c	CTUh	2,93 E-09	2,38 E-12	1,87 E-10	3,12 E-09	7,13 E-12	2,92 E-12	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,71 E-10
HTP-nc	CTUh	2,50 E-09	1,10 E-10	3,31 E-09	5,93 E-09	3,29 E-10	7,48 E-11	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-2,59 E-07
SQP	----	1,06 E+00	1,39 E-01	2,05 E+00	3,25 E+00	4,16 E-01	2,51 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,06 E+00

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 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	3,31 E-06	2,94 E-07	7,12 E-06	1,07 E-05	8,81 E-07	3,59 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,60 E-04
NHWD	kg	7,95 E-02	1,06 E-02	3,78 E-02	1,28 E-01	3,16 E-02	1,56 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,31 E-01
RWD	kg	5,80 E-05	8,29 E-07	4,68 E-05	1,06 E-04	2,48 E-06	9,16 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-7,90 E-06
CRU	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,83 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MFR	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,54 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MER	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
EEE	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
ETE	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

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 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	4,01 E-01	1,53 E-03	4,36 E-01	8,38 E-01	4,57 E-03	8,04 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-2,71 E-01
PERM	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PERT	MJ	4,01 E-01	1,53 E-03	4,36 E-01	8,38 E-01	4,57 E-03	8,04 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-2,71 E-01
PENRE	MJ	6,62 E+00	1,29 E-01	9,60 E+00	1,64 E+01	3,86 E-01	1,48 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,68 E+00
PENRM	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PENRT	MJ	6,62 E+00	1,29 E-01	9,60 E+00	1,64 E+01	3,86 E-01	1,48 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,68 E+00
SM	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,54 E-03
RSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
NRSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m3	2,05 E-03	1,38 E-05	2,89 E-03	4,96 E-03	4,14 E-05	7,61 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,83 E-03

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
NRSF = Use of non-renewable secondary fuels
FW = Use of net fresh water

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

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

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

CALCULATION RULES

Drill tips are always custom made to match the real estate project foundation drilling requirements. Consequently, every drill tip is different. This customisation impacts the shape of the drill tips and thus impacts the drill tip mould requirements as well as the moulding losses. These data have been averaged as yearly measured values (consumption, losses etc) divided by the yearly drill tips production. On the LCA methodology side, the EN 15804+A2 calculation rules have been applied. The cut-off recycled content methodology is used for cross life cycle allocation of recycled material burdens. The pollutter pays principle is applied to co-products from the end of life disposal. A couple of flows have been excluded from the study based on the cut-off criteria, see below.

Cut-off flows
Production and disposal of infrastructures.
Packaging of the material flows (except the drill tips packaging). This includes the packaging of input raw materials and ancillaries at each module.
The heat recovered from the cupola furnace heat exchanger.
Losses at the installation of the drill tips. Currently no drill tip failure has ever been reported.

In terms of allocation, no co-product allocation has been performed and the drill tips bear the full burdens of the manufacturing process. The recovered heat is cut-off, the furnace slag and the recovered moulding sand are allocated as a zero value co-products. At the installation, the fuel consumption to install the foundation piles has been allocated to the drill tips and the foundation pile based on displaced earth volume.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Specific data has been used to quantify the impacts of module A1 to A3. Scenarios have been used for the rest of the life cycle. For module A4, the default NMD scenario of transport from the manufacturing site to Utrecht has been used.

A4 - Scenario information	Value
Transport distance	257
Truck type	>32 metric tons gross vehicle weight (GVW) and Euro 5 emissions class

For module A5, the fuel consumption for the installation of the drill tips is considered. No installation losses are assumed as none have happened yet.

A5 - Scenario information	Value	Unit
Installation diesel consumption	0,113	liter

Once the drill tips have been used at the building construction phase they are left in the ground, undisturbed. No use, maintenance repairs are applied to the drill tips. The only phenomenon that the drill tips are subject to is corrosion. However, the oxygen available for the corrosion reaction is very limited in undisturbed soil as stated in a study by the US national bureau of standards: “no appreciable corrosion of steel piling was found in undisturbed soil below the water table regardless of the soil types or soil properties encountered” (Romanoff, 1962).The impacts of the use phase have thus been declared as null. The same reasoning is applied to the end of life.

DECLARATION OF SVHC

Analysis show no SVHC present in the product.

REFERENCES

E Delft. (2010). Handboek Schaduwprijzen. Opgehaald van https://ce.nl/publicaties/handboekschaduwprijzenwaardering-en-weging-van-emissies-en-milieueffecten/

ISO. (2006). 'ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Prin-ciples and procedures', International Organization for Standardization, ISO14025:2006.

ISO. (2006). 'ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006.

ISO. (2006). 'ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.

NEN. (2013). 'NEN-EN 15804: Duurzaamheid van bouwwerken - Milieuverklaringen van producten - Basisregels voor de productgroep bouwproducten', NEN-EN 15804:2012+A1:2013.

NEN. (2019). 'NEN-EN 15804: Duurzaamheid van bouwwerken - Milieuverklaringen van producten - Basisregels voor de productgroep bouwproducten', NEN-EN 15804:2012+A2:2019.

NMD. (2022). Bepalingsmethode 'Milieuprestatie Bouwwerken' versie 1.1 inclusief de bijbehorende wijzigingsbladen.

NMD. (2022, March). Environmental Performance Assessment Method for Construction Works. Opgehaald van https://milieudatabase.nl/wpcontent/uploads/2022/05/Bepalingsmethode_Milieuprestatie_Bouwwerken_maart_2022_Engels.pdf

Romanoff, M. (1962). Corrosion of Steel Pilings in Soils. Journal of Research of the National Bureau of Standards —C. Engineering and Instrumentation, Vol. 66C, No. 3.

REMARKS

None.