epddanmark

ECO PLATFORM EPD VERIFIED

Owner: Milford P/S
No.: MD-23061-EN
Issued: 23-06-2023
Valid to: 23-06-2028

3rd PARTY **VERIFIED**

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | **ISO 14025 & EN 15804**

Owner of declaration
Milford P/S
Walgerholm 13-15,
3500 Værløse, DK
CVR: 25617231

Programme
EPD Danmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

Declared product
Steel products within the CONTRAST FREESTYLE™ products group.

- CF Corten steel
- CF Mild steel
- CF HDG steel
- CF Coated steel

Number of declared datasets/product variations: 4

Production site
Borzym 49, 74-100 Borzym in Poland

Product use
The CONTRAST FREESTYLE™ product group is variations of thin, bendable steel products which can be used for many outdoor purposes, for example for leveling differences in the terrain, retaining wall structures, or raised plant beds.

Declared unit
1 kg of CF steel

Year of production site data (A3)
2021

EPD version
First version – version 1.0

Issued: 23-06-2023
Valid to: 23-06-2028

Basis of calculation
This EPD is developed in accordance with the European standard EN 15804+A2.

Comparability
EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

Validity
This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

Use
The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

EPD type
☒Cradle-to-gate with modules C1-C4 and D
☐Cradle-to-gate with options, modules C1-C4 and D
☐Cradle-to-grave and module D
☐Cradle-to-gate
☐Cradle-to-gate with options

CEN standard EN 15804 serves as the core PCR

Independent verification of the declaration and data, according to EN ISO 14025

☐ internal ☒ external

Third party verifier:

Charlotte B. Merlin

Martha Katrine Sørensen
EPD Danmark

Life cycle stages and modules (MND = module not declared)																
Product			Construction process		Use							End of life				Beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Product information

Product description

The CF structures are manufactured in four different steel variations by Milford P/S, on their production site in Poland.

The Corten steel is simply made of corten steel, which is also known as weathering steel. This steel form does not need painting or coating, but while it is left outside and exposed to natural elements such as rain, it will develop a natural rusty appearance.

Another product in the CF product group is the mild steel. The same mild steel is also the foundation for the HDG steel and the coated steel, as it can be combined with coating materials (this is what is called the CF coated product) or it can be hot dip galvanized (this is what is called the CF HDG product). The galvanizing of the mild steel reforms it into a silver color, while the powder coating of the mild steel becomes any color preferred.

The product components are shown in the table below.

Material	Weight-% of declared product			
	CF Corten	CF Mild	CF HDG	CF Coated
Steel	98.8	97.7	98.2	99.0
Welding material	0.4	0.7	0.6	0.5
Fastener	0.8	1.6	1.2	0.5

Product packaging:

The composition of the sales- and transport packaging of the product is shown in the table below.

Material	Weight-% of packaging			
	CF Corten	CF Mild	CF HDG	CF Coated
Plastic	42.9	43.6	33.3	4.8
Pallet	57.1	56.4	66.7	95.2

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of a CF steel product on the production site located in Borzym, Poland. Product specific data are based on average values collected for the period of the year 2021. Background data are based on GaBi databases version 2022.2 and are less than 10 years old. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

Hazardous substances

The CF steel does not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation"

(http://echa.europa.eu/candidate-list-table)

Essential characteristics

The CF steel is not covered by harmonised technical specification. Declaration of performance according to EU regulation 305/2011 is available for all declared product variations.

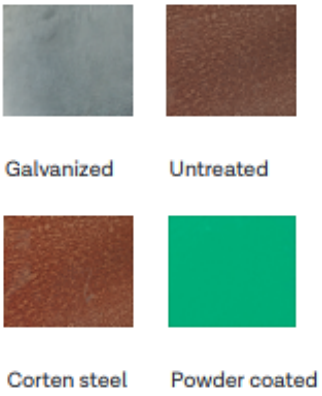
Further technical information can be obtained by contacting the manufacturer or on the manufacturer's website:

https://uploads-ssl.webflow.com/624d76b90f27f414fc4ede4a/624d76b90f27f406574edf9b_Contrast_Freestyle_2021_uk.pdf

Reference Service Life (RSL)

60 years

Picture of product(s)



LCA background

Declared unit

The LCI and LCIA results in this EPD relates to the production of 1 kg of CF steel.

The actual CF products vary in weight depending on the design and customer choice. The results in this EPD are scaled from the total sold mass down to one kilogram.

Name	Value	Unit
Declared unit	1	kg
Density	n/a	n/a
Conversion factor to 1 kg.	-	-

Functional unit

Not defined

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804+A2:2019.

Guarantee of Origin – certificates

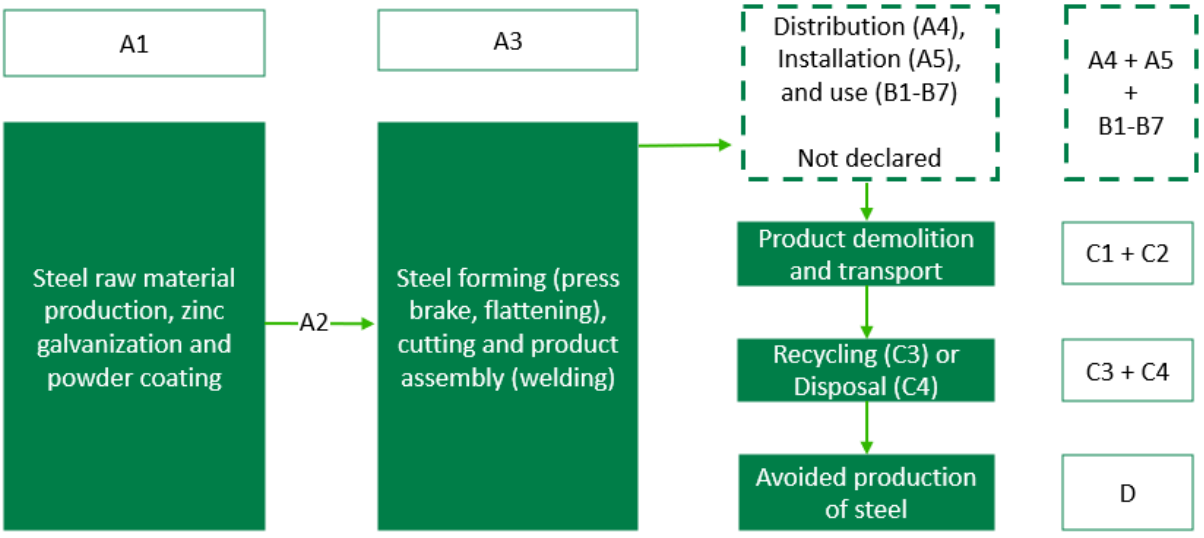
Foreground system: The product is produced without the use of energy covered by GO. Instead, the energy processes are modelled using the electricity residual grid mix for Poland with data from 2020.

Background system: Upstream and downstream processes are modelled using the electricity sources, which the

applied datasets are based on. This information is rarely specified in the background documentation of the Sphera and eco-invent datasets. However, it is typically based on national electricity grid mix.

Processes with several inputs of materials and/or energy sources – such as plastic extrusions – are modelled with data for the geographical scenario where the manufacturing takes place.

Flowdiagram



System boundary

This EPD is based on a cradle-to-gate LCA with modules C1-C4 and D included in which 100 weight-% has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

In accordance with this, the contribution from transportation of ingoing packaging has been deemed to be insignificant and is excluded from the EPD.

Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

A3 – Manufacturing processes

The product stage comprises the acquisition of all components present in the CF steel products, along with raw materials, other products and energy, transport to the production site, packaging and waste processing up to the ”end-of-waste” state or final disposal.

The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

The CF steel products are manufactured using primarily pre-manufactured components, such as steel components both coated or galvanized and then cut with a mechanical metal shear or a laser cutter and bent with a press brake.

Manufacturing of components in the upstream are modelled using database processes that are representative of the full production of the component, including the extraction and processing of raw materials, transport, and manufacturing.

The CF steel products are sold to Scandinavia, which is the set geographical boundary.

End of Life (C1-C4) includes:

The end of life of the CF steel products starts with an excavator using a mini excavator, which is modelled with a standard excavator process with 100 kW power in GaBi.

After deconstruction the complete product is sent to a metal recycler where it is shredded and sorted.

Any processes required to reach end-of-waste criteria for the materials are included in module C3.

~5% is assumed to be sent to a local landfill as inert material.

Re-use, recovery, and recycling potential (D) includes:

Recycling potentials of steel and other metals are included in module D. Materials that entered the system as secondary materials are not credited in the next system.

LCA results

The tables below cover the environmental impacts from 1 kg of the Milford CF CONTRAST FREESTYLE™ products group: CF Corten steel, CF Mild steel, CF HDG steel, CF Coated steel.

ENVIRONMENTAL IMPACTS PER KG OF CF CORTEN STEEL							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	3,19E+00	2,69E-04	1,70E-03	2,35E-02	7,29E-04	-1,36E+00
GWP-fossil	kg CO_2 eq.	3,16E+00	2,67E-04	1,68E-03	2,34E-02	7,51E-04	-1,37E+00
GWP-biogenic	kg CO_2 eq.	2,71E-02	-2,96E-07	4,97E-06	1,17E-05	-2,49E-05	2,67E-03
GWP-luluc	kg CO_2 eq.	8,76E-04	2,45E-06	1,56E-05	2,14E-06	2,33E-06	-5,67E-04
ODP	kg CFC 11 eq.	3,08E-12	3,44E-17	2,19E-16	2,30E-13	1,91E-15	4,01E-12
AP	mol H^+ eq.	1,70E-02	3,66E-06	2,48E-06	3,57E-05	5,33E-06	-3,08E-03
EP-freshwater	kg P eq.	1,63E-06	9,66E-10	6,15E-09	2,32E-08	1,51E-09	-1,01E-07
EP-marine	kg N eq.	1,62E-03	1,66E-06	8,99E-07	1,01E-05	1,38E-06	-7,39E-04
EP-terrestrial	mol N eq.	1,72E-02	1,82E-05	1,06E-05	1,06E-04	1,51E-05	-8,00E-03
POCP	kg NMVOC eq.	6,21E-03	4,95E-06	2,17E-06	2,78E-05	4,15E-06	-2,46E-03
ADPm[1]	kg Sb eq.	3,99E-05	1,74E-11	1,11E-10	1,14E-09	3,46E-11	-1,42E-08
ADPf[1]	MJ	3,37E+01	3,60E-03	2,29E-02	5,15E-01	1,00E-02	-1,01E+01
WDP[1]	m^3	3,02E-01	3,19E-06	2,03E-05	1,97E-03	8,25E-05	-1,94E-02
Caption	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 = Ozone Depletion; AP = Acidification;						
	EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use						
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						

ADDITIONAL ENVIRONMENTAL IMPACTS PER KG OF CF CORTEN STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	1,76E-07	1,93E-10	2,14E-11	3,23E-10	6,55E-11	-4,50E-08
IRP[2]	[kBq U235 eq.]	3,72E-02	1,01E-06	6,42E-06	1,20E-02	1,31E-05	1,98E-02
ETP-fw[1]	[CTUe]	3,03E+02	2,56E-03	1,63E-02	1,47E-01	5,51E-03	-1,75E+00
HTP-c[1]	[CTUh]	2,70E-08	5,23E-14	3,33E-13	2,66E-12	8,40E-13	-2,10E-09
HTP-nc[1]	[CTUh]	3,32E-06	4,14E-12	1,77E-11	1,36E-10	9,24E-11	-8,15E-09
SQP[1]	-	3,65E+01	1,50E-03	9,57E-03	6,97E-02	2,43E-03	9,51E-01
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality						
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						
	[2] 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.						

RESOURCE USE PER KG OF CF CORTEN STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	3,84E+00	2,62E-04	1,67E-03	7,05E-02	1,63E-03	1,68E+00
PERM	[MJ]	2,93E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	4,14E+00	2,62E-04	1,67E-03	7,05E-02	1,63E-03	1,68E+00
PENRE	[MJ]	3,31E+01	3,61E-03	2,30E-02	5,15E-01	1,00E-02	-1,02E+01
PENRM	[MJ]	6,07E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	3,37E+01	3,61E-03	2,30E-02	5,15E-01	1,00E-02	-1,02E+01
SM	[kg]	1,10E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	9,09E-03	2,87E-07	1,83E-06	1,18E-04	2,53E-06	-8,72E-04
Caption	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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water						

WASTE CATEGORIES AND OUTPUT FLOWS PER KG OF CF CORTEN STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	1,12E-07	1,12E-14	7,12E-14	2,98E-11	2,18E-13	-2,58E-11
NHWD	[kg]	2,00E-01	5,51E-07	3,51E-06	1,14E-04	5,00E-02	-2,03E-02
RWD	[kg]	2,12E-04	6,76E-09	4,30E-08	8,02E-05	1,14E-07	1,79E-04
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	2,18E-02	0,00E+00	0,00E+00	9,50E-01	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy						

BIOGENIC CARBON CONTENT PER KG OF CF CORTEN STEEL		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	7,40E-03
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

ENVIRONMENTAL IMPACTS PER KG OF CF MILD STEEL							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	3,10E+00	2,69E-04	1,70E-03	2,35E-02	7,29E-04	-1,35E+00
GWP-fossil	kg CO_2 eq.	3,07E+00	2,67E-04	1,68E-03	2,34E-02	7,51E-04	-1,35E+00
GWP-biogenic	kg CO_2 eq.	2,65E-02	-2,96E-07	4,97E-06	1,17E-05	-2,49E-05	2,63E-03
GWP-luluc	kg CO_2 eq.	7,64E-04	2,45E-06	1,56E-05	2,14E-06	2,33E-06	-5,59E-04
ODP	kg CFC 11 eq.	2,81E-12	3,44E-17	2,19E-16	2,30E-13	1,91E-15	3,96E-12
AP	mol H^+ eq.	7,20E-03	3,66E-06	2,48E-06	3,57E-05	5,33E-06	-3,04E-03
EP-freshwater	kg P eq.	1,49E-06	9,66E-10	6,15E-09	2,32E-08	1,51E-09	-9,97E-08
EP-marine	kg N eq.	1,49E-03	1,66E-06	8,99E-07	1,01E-05	1,38E-06	-7,29E-04
EP-terrestrial	mol N eq.	1,59E-02	1,82E-05	1,06E-05	1,06E-04	1,51E-05	-7,89E-03
POCP	kg NMVOC eq.	5,32E-03	4,95E-06	2,17E-06	2,78E-05	4,15E-06	-2,43E-03
ADPm[1]	kg Sb eq.	2,51E-05	1,74E-11	1,11E-10	1,14E-09	3,46E-11	-1,40E-08
ADPf[1]	MJ	3,27E+01	3,60E-03	2,29E-02	5,15E-01	1,00E-02	-9,97E+00
WDP[1]	m^3	2,69E-01	3,19E-06	2,03E-05	1,97E-03	8,25E-05	-1,92E-02
Caption	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 = Ozone Depletion; AP = Acidification;						
	EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use						
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						

ADDITIONAL ENVIRONMENTAL IMPACTS PER KG OF CF MILD STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	1,08E-07	1,93E-10	2,14E-11	3,23E-10	6,55E-11	-4,44E-08
IRP[2]	[kBq U235 eq.]	3,05E-02	1,01E-06	6,42E-06	1,20E-02	1,31E-05	1,96E-02
ETP-fw[1]	[CTUe]	2,05E+01	2,56E-03	1,63E-02	1,47E-01	5,51E-03	-1,73E+00
HTP-c[1]	[CTUh]	2,34E-08	5,23E-14	3,33E-13	2,66E-12	8,40E-13	-2,08E-09
HTP-nc[1]	[CTUh]	2,85E-06	4,14E-12	1,77E-11	1,36E-10	9,24E-11	-8,04E-09
SQP[1]	-	3,79E+01	1,50E-03	9,57E-03	6,97E-02	2,43E-03	9,39E-01
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality						
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						
	[2] 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.						

RESOURCE USE PER KG OF CF MILD STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	3,28E+00	2,62E-04	1,67E-03	7,05E-02	1,63E-03	1,64E+00
PERM	[MJ]	4,78E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	3,76E+00	2,62E-04	1,67E-03	7,05E-02	1,63E-03	1,66E+00
PENRE	[MJ]	3,16E+01	3,61E-03	2,30E-02	5,15E-01	1,00E-02	-1,01E+01
PENRM	[MJ]	1,02E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	3,27E+01	3,61E-03	2,30E-02	5,15E-01	1,00E-02	-1,01E+01
SM	[kg]	1,16E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	7,94E-03	2,87E-07	1,83E-06	1,18E-04	2,53E-06	-8,61E-04
Caption	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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water						

WASTE CATEGORIES AND OUTPUT FLOWS PER KG OF CF MILD STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	1,01E-07	1,12E-14	7,12E-14	2,98E-11	2,18E-13	-2,54E-11
NHWD	[kg]	1,32E-01	5,51E-07	3,51E-06	1,14E-04	5,00E-02	-2,00E-02
RWD	[kg]	1,35E-04	6,76E-09	4,30E-08	8,02E-05	1,14E-07	1,77E-04
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	4,85E-02	0,00E+00	0,00E+00	9,50E-01	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy						

BIOGENIC CARBON CONTENT PER KG OF CF MILD STEEL		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	1,21E-02
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

ENVIRONMENTAL IMPACTS PER KG OF CF HDG STEEL							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	3,22E+00	2,69E-04	1,70E-03	2,35E-02	7,29E-04	-1,43E+00
GWP-fossil	kg CO_2 eq.	3,19E+00	2,67E-04	1,68E-03	2,34E-02	7,51E-04	-1,43E+00
GWP-biogenic	kg CO_2 eq.	2,81E-02	-2,96E-07	4,97E-06	1,17E-05	-2,49E-05	2,80E-03
GWP-luluc	kg CO_2 eq.	1,38E-03	2,45E-06	1,56E-05	2,14E-06	2,33E-06	-5,93E-04
ODP	kg CFC 11 eq.	4,82E-12	3,44E-17	2,19E-16	2,30E-13	1,91E-15	4,20E-12
AP	mol H^+ eq.	8,46E-03	3,66E-06	2,48E-06	3,57E-05	5,33E-06	-3,22E-03
EP-freshwater	kg P eq.	2,63E-06	9,66E-10	6,15E-09	2,32E-08	1,51E-09	-1,06E-07
EP-marine	kg N eq.	1,93E-03	1,66E-06	8,99E-07	1,01E-05	1,38E-06	-7,73E-04
EP-terrestrial	mol N eq.	2,08E-02	1,82E-05	1,06E-05	1,06E-04	1,51E-05	-8,37E-03
POCP	kg NMVOC eq.	6,14E-03	4,95E-06	2,17E-06	2,78E-05	4,15E-06	-2,58E-03
ADPm[1]	kg Sb eq.	9,60E-05	1,74E-11	1,11E-10	1,14E-09	3,46E-11	-1,48E-08
ADPf[1]	MJ	3,15E+01	3,60E-03	2,29E-02	5,15E-01	1,00E-02	-1,06E+01
WDP[1]	m^3	1,38E-01	3,19E-06	2,03E-05	1,97E-03	8,25E-05	-2,03E-02
Caption	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 = Ozone Depletion; AP = Acidification;						
	EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use						
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						

ADDITIONAL ENVIRONMENTAL IMPACTS PER KG OF CF HDG STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	1,32E-07	1,93E-10	2,14E-11	3,23E-10	6,55E-11	-4,71E-08
IRP[2]	[kBq U235 eq.]	4,27E-02	1,01E-06	6,42E-06	1,20E-02	1,31E-05	2,08E-02
ETP-fw[1]	[CTUe]	2,57E+01	2,56E-03	1,63E-02	1,47E-01	5,51E-03	-1,83E+00
HTP-c[1]	[CTUh]	3,25E-08	5,23E-14	3,33E-13	2,66E-12	8,40E-13	-2,20E-09
HTP-nc[1]	[CTUh]	3,79E-06	4,14E-12	1,77E-11	1,36E-10	9,24E-11	-8,53E-09
SQP[1]	-	3,87E+01	1,50E-03	9,57E-03	6,97E-02	2,43E-03	9,96E-01
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality						
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						
	[2] 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.						

RESOURCE USE PER KG OF CF HDG STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	4,89E+00	2,62E-04	1,67E-03	7,05E-02	1,63E-03	1,76E+00
PERM	[MJ]	4,16E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	5,31E+00	2,62E-04	1,67E-03	7,05E-02	1,63E-03	1,76E+00
PENRE	[MJ]	3,11E+01	3,61E-03	2,30E-02	5,15E-01	1,00E-02	-1,07E+01
PENRM	[MJ]	5,75E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	3,16E+01	3,61E-03	2,30E-02	5,15E-01	1,00E-02	-1,07E+01
SM	[kg]	1,81E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	5,33E-03	2,87E-07	1,83E-06	1,18E-04	2,53E-06	-9,13E-04
Caption	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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water						

WASTE CATEGORIES AND OUTPUT FLOWS PER KG OF CF HDG STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	9,49E-07	1,12E-14	7,12E-14	2,98E-11	2,18E-13	-2,70E-11
NHWD	[kg]	1,58E-01	5,51E-07	3,51E-06	1,14E-04	5,00E-02	-2,12E-02
RWD	[kg]	3,87E-04	6,76E-09	4,30E-08	8,02E-05	1,14E-07	1,88E-04
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	4,94E-02	0,00E+00	0,00E+00	9,50E-01	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy						

BIOGENIC CARBON CONTENT PER KG OF CF HDG STEEL		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	1,04E-02
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

ENVIRONMENTAL IMPACTS PER KG OF CF COATED STEEL							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	3,24E+00	2,69E-04	1,70E-03	2,35E-02	7,29E-04	-1,39E+00
GWP-fossil	kg CO_2 eq.	3,21E+00	2,67E-04	1,68E-03	2,34E-02	7,51E-04	-1,39E+00
GWP-biogenic	kg CO_2 eq.	3,07E-02	-2,96E-07	4,97E-06	1,17E-05	-2,49E-05	2,72E-03
GWP-luluc	kg CO_2 eq.	9,24E-04	2,45E-06	1,56E-05	2,14E-06	2,33E-06	-5,78E-04
ODP	kg CFC 11 eq.	5,75E-12	3,44E-17	2,19E-16	2,30E-13	1,91E-15	4,09E-12
AP	mol H^+ eq.	8,24E-03	3,66E-06	2,48E-06	3,57E-05	5,33E-06	-3,14E-03
EP-freshwater	kg P eq.	1,75E-06	9,66E-10	6,15E-09	2,32E-08	1,51E-09	-1,03E-07
EP-marine	kg N eq.	1,91E-03	1,66E-06	8,99E-07	1,01E-05	1,38E-06	-7,53E-04
EP-terrestrial	mol N eq.	2,03E-02	1,82E-05	1,06E-05	1,06E-04	1,51E-05	-8,15E-03
POCP	kg NMVOC eq.	6,44E-03	4,95E-06	2,17E-06	2,78E-05	4,15E-06	-2,51E-03
ADPm[1]	kg Sb eq.	4,63E-05	1,74E-11	1,11E-10	1,14E-09	3,46E-11	-1,45E-08
ADPf[1]	MJ	3,52E+01	3,60E-03	2,29E-02	5,15E-01	1,00E-02	-1,03E+01
WDP[1]	m^3	7,63E-01	3,19E-06	2,03E-05	1,97E-03	8,25E-05	-1,98E-02
Caption	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 = Ozone Depletion; AP = Acidification;						
	EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use						
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						

ADDITIONAL ENVIRONMENTAL IMPACTS PER KG OF CF COATED STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	1,23E-07	1,93E-10	2,14E-11	3,23E-10	6,55E-11	-4,58E-08
IRP[2]	[kBq U235 eq.]	7,94E-02	1,01E-06	6,42E-06	1,20E-02	1,31E-05	2,02E-02
ETP-fw[1]	[CTUe]	2,44E+01	2,56E-03	1,63E-02	1,47E-01	5,51E-03	-1,79E+00
HTP-c[1]	[CTUh]	2,68E-08	5,23E-14	3,33E-13	2,66E-12	8,40E-13	-2,14E-09
HTP-nc[1]	[CTUh]	3,33E-06	4,14E-12	1,77E-11	1,36E-10	9,24E-11	-8,31E-09
SQP[1]	-	4,59E+01	1,50E-03	9,57E-03	6,97E-02	2,43E-03	9,70E-01
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality						
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.						
	[2] 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.						

RESOURCE USE PER KG OF CF COATED STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	3,95E+00	2,62E-04	1,67E-03	7,05E-02	1,63E-03	1,71E+00
PERM	[MJ]	8,60E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	4,81E+00	2,62E-04	1,67E-03	7,05E-02	1,63E-03	1,71E+00
PENRE	[MJ]	3,51E+01	3,61E-03	2,30E-02	5,15E-01	1,00E-02	-1,04E+01
PENRM	[MJ]	1,19E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	3,53E+01	3,61E-03	2,30E-02	5,15E-01	1,00E-02	-1,04E+01
SM	[kg]	9,82E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	2,00E-02	2,87E-07	1,83E-06	1,18E-04	2,53E-06	-8,89E-04
Caption	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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water						

WASTE CATEGORIES AND OUTPUT FLOWS PER KG OF CF COATED STEEL							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	1,34E-07	1,12E-14	7,12E-14	2,98E-11	2,18E-13	-2,63E-11
NHWD	[kg]	1,50E-01	5,51E-07	3,51E-06	1,14E-04	5,00E-02	-2,07E-02
RWD	[kg]	1,30E-04	6,76E-09	4,30E-08	8,02E-05	1,14E-07	1,83E-04
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	2,18E-02	0,00E+00	0,00E+00	9,50E-01	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy						

BIOGENIC CARBON CONTENT PER KG OF CF COATED STEEL		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	2,11E-02
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Additional information

LCA interpretation

The components in the CF steel products is steel in the shape of sheets and fasteners. LCIA are relative expressions and do not predict impacts category endpoints, the exceeding of thresholds, safety margins or risks. The table below therefore shows the processes contributing the most to the specific impact categories, and how much they contribute to the given impact category.

Impact Category	Unit	Total	Dominant	% Of category	Process
GWP-total	[kg CO2 eq.]	3,12 - 3,27	2,39 - 2,69	74% - 82%	A1: Steel
GWP-fossil	[kg CO2 eq.]	3,09 - 3,24	2,39 - 2,68	75% - 83%	
GWP-bio emission	[kg CO2 eq.]	0,03 - 0,03	0,02 - 0,02	80% - 93%	A3: Pallet packaging
GWP-bio uptake	[kg CO2 eq.]	0,03 - 0,03	0,00 - 0,00	-1% - -1%	A1: Welding material and C2: Fuel mix
GWP-luluc	[kg CO2 eq.]	0,00 - 0,00	0,00 - 0,00	40% - 68%	A1: Steel
ODP	[kg CFC 11 eq.]	0,00 - 0,00	0,00 - 0,00	34% - 53%	A1: Steel and A3: Electricity consumption
AP	[mol H+ eq.]	0,01 - 0,02	0,01 - 0,01	58% - 75%	A1: Steel
EP-fw	[kg P eq.]	0,00 - 0,00	0,00 - 0,00	49% - 75%	
EP-mar	[kg N eq.]	0,00 - 0,00	0,00 - 0,00	65% - 80%	
EP-ter	[mol N eq.]	0,02 - 0,02	0,01 - 0,02	65% - 79%	
POCP	[kg NMVOC eq.]	0,01 - 0,01	0,00 - 0,01	63% - 81%	
ADP-mm	[kg Sb eq.]	0,00 - 0,00	0,00 - 0,00	47% - 75%	A1: steel and A1: Welding material
ADP-fos	[MJ]	32,02 - 35,80	24 - 29	70% - 81%	A1: Steel
WDP	[m3]	0,14 - 0,76	0,08 - 0,71	56% - 93%	
Impact Category	**Unit**	**Total**	**Dominant**	**% Of category**	**Process**
PM	[Disease incidence]	0,00 - 0,00	0,00 - 0,00	41% - 66%	A1: Steel
IRP2	[kBq U235 eq.]	0,04 - 0,09	0,01 - 0,06	25% - 67%	
ETP-fw1	[CTUe]	20,64 - 304	13,91 - 281	66% - 93%	A1: Welding material
HTP-c1	[CTUh]	0,00 - 0,00	0,00 - 0,00	90% - 95%	
HTP-nc1	[CTUh]	0,00 - 0,00	0,00 - 0,00	99% - 99%	
SQP1	[CTUh]	36,60 - 46,01	23,32 - 23,32	51% - 64%	A3: Packaging
Impact Category	**Unit**	**Total**	**Dominant**	**% Of category**	**Process**
PERE	[MJ]	3,36 - 4,96	1,37 - 1,94	34% - 41%	A1: Ingoing packaging
PERM	[MJ]	0,29 - 0,86	0,29 - 0,86	100% - 100%	A3: Pallet packaging
PERT	[MJ]	3,84 - 5,38	1,37 - 1,94	28% - 36%	A1: Ingoing packaging
PENRE	[MJ]	31,61 - 35,69	23,91 - 28,99	71% - 81%	A1: Steel
PENRM	[MJ]	0,12 - 1,02	0,12 - 1,02	100% - 100%	A3: Foil packaging
PENRT	[MJ]	32,19 - 35,80	23,91 - 28,99	70% - 81%	A1: Steel
SM	[kg]	0,10 - 0,18	0,10 - 0,18	96% - 100%	A1: SM of steel scrap
RSF	[MJ]	0,00 - 0,00	0,00 - 0,00	n/a - n/a	-
NRSF	[MJ]	0,00 - 0,00	0,00 - 0,00	n/a - n/a	-
FW	[m3]	0,01 - 0,02	0,00 - 0,02	54% - 89%	A1: steel
Impact Category	**Unit**	**Total**	**Dominant**	**% Of category**	**Process**
HWD	[kg]	0,00 - 0,00	0,00 - 0,00	75% - 90%	A1: Welding material
NHWD	[kg]	0,18 - 0,25	0,10 - 0,12	38% - 58%	A1: Steel
RWD	[kg]	0,00 - 0,00	0,00 - 0,00	29% - 53%	A1: Steel and A3: Electricity consumption
CRU	[kg]	0,00 - 0,00	0,00 - 0,00	n/a - n/a	-
MFR	[kg]	0,97 - 1,00	0,95 - 0,95	95% - 98%	C1: Recycling of steel
MER	[kg]	0,00 - 0,00	0,00 - 0,00	n/a - n/a	-
EEE	[MJ]	0,00 - 0,00	0,00 - 0,00	n/a - n/a	-
EET	[MJ]	0,00 - 0,00	0,00 - 0,00	n/a - n/a	-

Most of the core environmental impacts come from the production and machining of steel in module A1. The results show that the production of steel is the dominating process in most of the environmental impact categories, by contributing between 25% and 93% to the total impacts. The production of steel makes up at least 74% of the total Climate Change impacts.

The above results are relative contributions, and since some processes contribute to negative results, then some other percentages reach above 100%.

Technical information on scenarios

Reference service life

RSL information		Unit
Reference service Life	60	Years
Declared product properties	Additional information on the product may be found at the manufacturer's website: https://www.milford.dk/produkter/contrast-freestyle	As appropriate
Design application parameters		As appropriate
Assumed quality of work		As appropriate
Outdoor environment		As appropriate
Indoor environment		As appropriate
Usage conditions		As appropriate
Maintenance		As appropriate

Installation of the product in the building (A5)

Scenario information	CF Corten	CF Mild	CF HDG	CF Coated	Unit
Waste materials (total)	0.028	0.048	0.035	0.050	kg
Type of waste material	Packaging waste	Packaging waste	Packaging waste	Packaging waste	-
Pallet	0.012	0.021	0.012	0.002	kg
Plastic film	0.016	0.027	0.023	0.048	kg
Waste treatment of pallet	Incineration				-
Waste treatment of plastic film	Incineration				-

Waste materials in A5 is the sales packaging that follows the product when it leaves the factory gate.

End of life (C1-C4)

Scenario information	CF Corten	CF Mild	CF HDG	CF Coated	Unit
Collected separately	1	1	1	1	kg
Collected with mixed waste	-	-	-	-	kg
For reuse	-	-	-	-	kg
For recycling	0,95	0,95	0,95	0,95	kg
For energy recovery	-	-	-	-	kg
For final disposal	0,05	0,05	0,05	0,05	Kg
Secondary metal input	0,11	0,11	0,17	0,10	kg
Assumptions for scenario development	-	-	-	-	As appropriate

Re-use, recovery and recycling potential (D)

Scenario information/Materiel	CF Corten	CF Mild	CF HDG	CF Coated	Unit
Quantity of avoided material	0,83	0,81	0,75	0,85	kg
Energy recovery from waste incineration	-	-	-	-	MJ

Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A2 chapter 7.4.1.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A2 chapter 7.4.2.

References

Publisher	www.epddanmark.dk
Programme operator	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	Maria Preilev Hansen Teknologisk Institut Center for Bygninger og Miljø Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA software /background data	Thinkstep GaBi version 10.6.1.35, 2022 including databases www.gabi-software.com
3rd party verifier	Charlotte B. Merlin Applied Environmental Assessment FORCE Technology Park Allé 345, DK-2605 Brøndby www.forcetechnology.com

General programme instructions
General Programme Instructions, version 2.0, spring 2020
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