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The Norwegian EPD Foundation

# ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Superwood AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	ÞÓÚÖËÍ   FÉ Í   ÖÞ
Registration number:	ÞÓÚÖËÍ   FÉ Í   ÖÞ
ECO Platform reference number:	
Issue date:	ËÏ ÆÇÈ
Valid to:	ËÏ ÆÇÈ

## Exterior cladding of Superwood

Superwood AS

[www.epd-norge.no](http://www.epd-norge.no)



## General information

**Product:**

Exterior cladding of Superwood

**Program operator:**

The Norwegian EPD Foundation  
 Post Box 5250 Majorstuen, 0303 Oslo  
 Phone: +47 23 08 82 92  
 e-mail: [post@epd-norge.no](mailto:post@epd-norge.no)

**Declaration number:**

BOUØE1 | FE1 | EP

**ECO Platform reference number:**
**This declaration is based on Product Category Rules:**

CEN Standard EN 15804 serves as core PCR.  
 NPCR015 rev1 wood and wood-based products for use in construction (08/2013).

**Statement of liability:**

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data or evidence.

**Declared unit:**

1 m<sup>3</sup> produced exterior cladding of Superwood

**Declared unit with option:**
**Functional unit:**

1 m<sup>3</sup> exterior cladding of Superwood, produced, delivered, installed, used in 60 years and waste treated after end of life.

**Verification:**

The CEN Norm EN 15804 serves as the core PCR.  
 Independent verification of the declaration and data, according to ISO14025:2010

 internal

 external

Third party verifier:



Chief Market Manager Linda Høiby  
 (Independent verifier approved by EPD Norway)

**Owner of the declaration:**

Superwood AS  
 Contact person: Nis Skovholt  
 Phone: +47 62 69 99 60  
 e-mail: [post@superwood.no](mailto:post@superwood.no)

**Manufacturer:**

Superwood AS  
 Høversjøvegen 47  
 2090 Hurdal  
 Norway

**Place of production:**

Impregnation: Palsgaardvej 3, DK-7362 Hampen, Denmark  
 Planing: Høversjøvegen 47, 2090 Hurdal, Norway

**Management system:**

FSC™ (Forest Stewardship Council) Chain of Custody Certificate:  
 NC-COC-011804

**Organisation no:**

NO 913 968 565 MVA

**Issue date:**

~~FF EGF~~

**Valid to:**

~~FF EGF~~

**Year of study:**

Consumption data: 2017. Study performed spring of 2018.

**Comparability:**

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

**The EPD has been worked out by:**

Oddbjørn Dahlstrøm  
 Asplan Viak AS, Norway




Approved



Håkon Hauan  
 Managing Director of EPD-Norway

## Product

### Product description:

Impregnated, planed wood from FSC certified spruce (*Picea abies*), from Norway, Sweden and Finland, for outdoor use over the ground. The wood is impregnated without the use of heavy metals and organic solvents. The impregnation protects the wood completely into the core so that the wood is protected against rot and fungus from the inside. The process takes place without the use of water, so the wood is dry and can be used immediately after impregnation.

### Product specification:

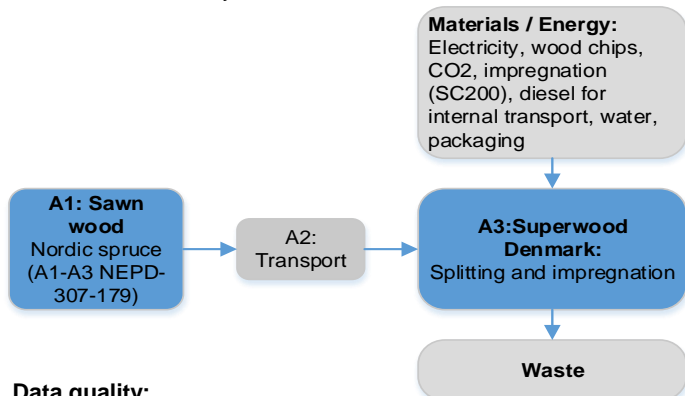
Main application area is outdoor cladding (in all known cladding profiles), but noise barriers, windscreens, railings, roofing tables and more are other natural applications. The cladding boards can be delivered with and without surface treatment from the factory. The EPD encompasses all dimensions and profiles of Superwood exterior cladding.

Materials	kg/m <sup>3</sup>	%
Wood of spruce, dry weight	370.2	84.7 %
Water, in wood, 18%	66.6	15.3 %
Impregnating, SC200	0.12	0.027 %
Total, without surface treatment	436.9	100 %
Packaging: steel ribbon	0.56	
Packaging, plastic 0.02 kg / m <sup>2</sup>	0.95	

## LCA: Calculation rules

### Functional unit:

1 m<sup>3</sup> exterior cladding of Superwood, produced, delivered, installed, used in 60 years and waste treated after end of life.



### Data quality:

Production data is based on consumption data from 2017. Wood is splitted and impregnated in Denmark, and profiled and surface treated in Norway. Data for sawn wood is based on NEPD-307-179. Data for exported energy from energy recovery is based on data from Statistics Norway and applies to for 2017 (2017a, b and c). Remaining data is based on Ecoinvent v3.2, Allocation, Recycled Content (Nov. 2015) and SimaPro v 8.2.3.0. Characterization factors have been used from EN15804: 2012 + A1: 2013.

### Allocation:

Allocation has been made according to EN 15804. For sawn wood, economic allocation has been used (value of by-products as wood chips is relatively low, NEPD-307-179-NO). For the production of Superwood, all consumption and waste are mass-allocated for the production of impregnated wood. Primary production of recycled materials is allocated to the main product where the material was used. Material and energy use in the production of different products and profiles are assumed to be similar as the products are processed in approximately the same way.

### Technical data:

Superwood has a density of 436.8 kg / m<sup>3</sup>, with moisture content of 16-20% (18% standard).

Superwood is protected from rotting, fungus and blue mould according to DS / EN 335, user class 3: Wood above ground contact.

Standard dimension is 21 mm \* 145 mm.

1 m<sup>3</sup> with Superwood covers 47.6 m<sup>2</sup> with cladding.

For Declaration of Performance (DoP), FSC certificate and complementary information, see [www.superwood.no](http://www.superwood.no)

### Market:

The EPD includes transport to and sales in Norway. Superwood is also sold from Denmark to Denmark and the rest of Europe.

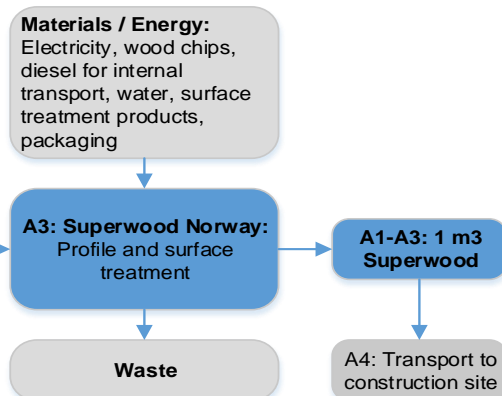
### Reference service life, product:

With normal stress and use, life expectancy is 60 years.

Surface treatment:	kg/m <sup>3</sup>	%
Untreated	0.00	0.0 %
Ferrous sulphate, 1 coating: 0,01 kg powder/m <sup>2</sup>	0.48	0.1 %
Signatur (prepatinated), 1 coating: 0.15 kg / m <sup>2</sup>	7.14	1.6 %
Paint: 2 coatings, 0.15 kg / m <sup>2</sup> per coating	14.3	3.3 %

### System boundary:

Flow sheet for manufacturing (A1-A3) and transport (A4) of Superwood is shown below.



### Cut-off criteria:

All major raw materials and all the essential energy are included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials or substances.

### Calculation of biogenic carbon content:

Sequestration and emissions of biogenic carbon is calculated according to NS-EN 16485: 2014. This approach is based on the modularity principle of EN 15804: 2012: emissions should be counted in the module in which it actually occurs. The calculation of biogenic carbon content and conversion to carbon dioxide is done according to the NS-EN 16449: 2014. The contribution to GWP from biogenic carbon is shown for each module on page 8.

370 kg / m<sup>3</sup> dry weight for Superwood has a carbon content converted to carbon dioxide of 678.6 kg CO<sub>2</sub> per m<sup>3</sup> wood. The wood is from sustainable forestry and is FSC certified.

## LCA: Scenarios and additional technical information

The following information describes the scenarios in the different modules of the EPD. All numbers are pr m<sup>3</sup> Superwood.

### Transport from production place to user (A4)

All production normally takes place directly from Hurdal to construction site or via retail. It is considered a scenario of 200 km on a truck > 32 t.

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption
Lorry	53 %	Lorry, >32t, EURO 6	200	0.017 l/tkm 3.4 l/t

### Installation in the building (A5)

It is assumed 5% loss at installation and 1 MJ energy consumption at construction site.

Waste treatment of the packaging is included in A5.

	Unit	Value
Auxiliary material	kg	0
Water consumption	m <sup>3</sup>	0
Electricity consumption	kWh	0.28
Other energy sources	MJ	0
Material loss	kg	21.8
Output materials from waste treatment	kg	1.51
Dust in the air	kg	0

### Replacement (B4)/Refurbishment (B5)

With normal stress and use, life expectancy is 60 years.

	Unit	Value
Replacement cycle*	year	60
Electricity consumption	kWh	0
Replacement of worn parts		0

### End of Life (C1, C3, C4)

The product does not contain heavy metals. The waste processing is assumed as wood waste treated with incineration with energy recovery.

	Unit	Value
Hazardous waste disposed	kg	0
Collected as mixed construction waste	kg	436.8
Reuse	kg	0
Recycling	kg	0
Energy recovery	kg	436.8
Incineration without energy recovery	kg	0
To landfill	kg	0

### Transport to waste processing (C2)

The average distance for transport of wood waste is 85 km in 2007 (Raadal et al., 2009).

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption
Lorry	Average in Europe	Lorry 16-32t, Euro 5	85	0.045 l/tkm 3.8 l/t

### Additional technical information

Conversion of the results from pr m<sup>3</sup> to pr m<sup>2</sup> can be done by multiplying the result with the thickness in meters. Standard thickness is 21 mm. Ex: 159 kg CO<sub>2</sub> e/m<sup>3</sup> \* 0,021 m = 3.35 kg CO<sub>2</sub> e/m<sup>2</sup> exterior dressing by Superwood

\* Number or reference lifetime

### Maintenance (B2)/Repair (B3)

For Superwood untreated and treated with ferrous sulphate or Signature from the factory there is no need for new surface treatment during the lifetime.

For Superwood treated with paint from the factory, 2 coatings with new paint (0.15 kg / m<sup>2</sup> per coat) every 10 years are necessary, as well as wash before painting.

It is assumed no need for repair (B3) during the lifetime.

Superwood with painted surface	Unit	Value
Maintenance cycle*	year	10
Auxiliary - detergent	kg	0.10
Other resources - 2 coats new paint/cycle	kg	14.3
Water consumption - washing/cycle	litre	2.00
Electricity consumption	MJ	0
Other energy sources	MJ	0
Material loss	kg	0

### Operational energy (B6) and water consumption (B7)

When used as an external cladding, the product has no operational energy or water consumption.

	Unit	Value
Water consumption	m <sup>3</sup>	0
Electricity consumption	kWh	0
Other energy sources	MJ	0
Power output of equipment	kWh	0

### Benefits and loads beyond the system boundaries (D)

The benefits of exported energy from energy recovery in a municipal treatment facility is calculated with substitution of Norwegian electricity market mix and Norwegian district heating mix. The electricity mix is the same as used in A1-A3 (Norway) and district heating mix is based on production in 2017 (Statistics Norway 2017c)

	Unit	Value Untreated, ferr.- sulphate, Signatur	Value Painted surface
Substitution of electrical energy	MJ	468	525
Substitution of thermal energy	MJ	4 558	5 113
Substitution of raw materials	kg	0	0

## LCA: Results

The results for global warming in the various modules make a huge contribution from the absorption and emission of biogenic carbon. Net contribution from biogenic carbon in each module is shown on page 8.

**Unt. and fe.:** Untreated surface and surface treated with ferrous sulphate. **Signatur:** Surface treated with Signatur.

LCA results for untreated surface and surface treated with ferrous sulphate are merged, as the difference for all indicators (A1-A3) is around 0.1%. For C3, the difference between unt., fe and signatur is between 1% and 3% (4% for NHW and 15% for HW).

### System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	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

### Environmental impact: Untreated surface and surface treated with ferrous sulphate / Signatur

Parameter	Unit	Unt. and fe.		Signatur		C1	C2	C3	C4	D	
		A1-A3	A1-A3	A4	A5						
GWP	kg CO <sub>2</sub> -eq	-519	-479	5.11	8.81	11.7	9.94E-03	6.23	701	2.59E-02	-36.4
ODP	kg CFC11-eq	1.97E-05	2.32E-05	8.87E-07	1.11E-06	1.29E-06	1.01E-09	1.14E-06	5.51E-07	6.65E-09	-4.47E-06
POCP	kg C <sub>2</sub> H <sub>4</sub> -eq	7.68E-02	9.87E-02	7.2E-04	4.14E-03	5.24E-03	2.24E-06	1.14E-06	4.23E-03	1.07E-05	-1.96E-02
AP	kg SO <sub>2</sub> -eq	0.91	1.13	1.06E-02	5.22E-02	6.34E-02	4.45E-05	1.05E-03	0.101	1.82E-04	-0.212
EP	kg PO <sub>4</sub> <sup>3-</sup> -eq	0.284	0.382	2.05E-03	2.10E-02	2.61E-02	2.26E-05	2.05E-02	0.132	3.90E-05	-7.84E-02
ADPM	kg Sb-eq	9.14E-04	1.14E-03	1.24E-05	4.78E-05	5.90E-05	1.26E-07	1.82E-05	1.02E-05	2.53E-08	-1.74E-04
ADPE	MJ	2 124	2 653	71.3	118	144	0.110	94.2	63.2	0.650	-507

### Environmental impact: Surface treated with paint

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
ODP	kg CFC11-eq	2.67E-05	8.87E-07	1.48E-06	3.56E-05	1.01E-09	1.14E-06	7.07E-07	1.37E-08	-5.00E-06
POCP	kg C <sub>2</sub> H <sub>4</sub> -eq	0.121	7.2E-04	6.38E-03	0.221	2.24E-06	1.14E-06	5.07E-03	2.02E-05	-2.19E-02
AP	kg SO <sub>2</sub> -eq	1.36	1.06E-02	7.55E-02	2.23	4.45E-05	1.05E-03	0.120	3.28E-04	-0.237
EP	kg PO <sub>4</sub> <sup>3-</sup> -eq	0.479	2.05E-03	3.26E-02	0.986	2.26E-05	2.05E-02	0.165	6.97E-05	-8.76E-02
ADPM	kg Sb-eq	1.36E-03	1.24E-05	7.03E-05	2.24E-03	1.26E-07	1.82E-05	1.38E-05	5.08E-08	-1.94E-04
ADPE	MJ	3 185	71.3	172	5 326	0.110	94.2	79.7	1.28	-566

**GWP** Global warming potential; **ODP** Depletion potential of the stratospheric ozone layer; **POCP** Formation potential of tropospheric photochemical oxidants; **AP** Acidification potential of land and water; **EP** Eutrophication potential; **ADPM** Abiotic depletion potential for non fossil resources; **ADPE** Abiotic depletion potential for fossil resources

### Resource use: Untreated surface and surface treated with ferrous sulphate / Signatur

Parameter	Unit	Unt. and fe.		Signatur		C1	C2	C3	C4	D	
		A1-A3	A1-A3	A4	A5						
RPEE	MJ	1 896	1 978	0.501	459	463	1.16	1.01	7 260	1.18E-02	-2 302
RPEM	MJ	7 410	7 410	0	7.55	7.55	0	0	-7 259	0	0
TPE	MJ	9 306	9 388	0.501	467	471	1.16	1.01	1.58	1.18E-02	-2 302
NRPE	MJ	1 306	1 791	73.0	76.7	101	0.135	95.8	56.7	0.659	-512
NRPM	MJ	INA	INA	0	INA	INA	0	0	INA	INA	0
TRPE	MJ	1 306	1 791	73.0	76.7	101	0.135	95.8	56.7	0.659	-512
SM	kg	INA	INA	0	INA	INA	0	0	0	0	0
RSF	MJ	INA	INA	0	INA	INA	0	0	0	0	0
NRSF	MJ	INA	INA	0	INA	INA	0	0	0	0	0
W	m <sup>3</sup>	219	220	1.21E-02	11.0	11.0	8.72E-03	2.03E-02	0.226	6.92E-04	-10.9



**Resource use: Surface treated with paint**

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
RPEE	MJ	2 060	0.501	467	839	1.16	1.007	7 261	2.43E-02	-2 574
RPEM	MJ	7 410	0	7.55	0	0	0	-7 259	0	0
TPE	MJ	9 470	0.501	475	839	1.16	1.007	2.22	2.43E-02	-2 574
NRPE	MJ	2 277	73.0	126	4 880	0.135	95.8	71.7	1.30	-572
NRPM	MJ	INA	0	INA	0	0	0	INA	INA	0
TRPE	MJ	2 277	73.0	126	4 880	0.135	95.8	71.7	1.30	-572
SM	kg	INA	0	INA	0	0	0	0	0	0
RSF	MJ	INA	0	INA	0	0	0	0	0	0
NRSF	MJ	INA	0	INA	0	0	0	0	0	0
W	m <sup>3</sup>	221	1.21E-02	11.1	11.4	8.72E-03	2.03E-02	0.274	1.46E-03	-12.2

**RPEE** Renewable primary energy resources used as energy carrier; **RPEM** Renewable primary energy resources used as raw materials; **TPE** Total use of renewable primary energy resources; **NRPE** Non renewable primary energy resources used as energy carrier; **NRPM** Non renewable primary energy resources used as raw materials; **TRPE** 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; **W** Net use of fresh water

**End of life - Waste: Untreated surface and surface treated with ferrous sulphate / Signaur**

Parameter	Unit	Unt. and fe.		Signatur			C1	C2	C3	C4	D
		A1-A3	A1-A3	A4	A5	A5					
HW	kg	3.56E-02	3.62E-02	3.75E-05	1.81E-03	1.84E-03	1.69E-07	5.76E-05	5.27E-04	4.18E-07	-5.35E-04
NHW	kg	55.5	70.2	0.07	3.48	4.24	8.33E-03	4.42	4.83	4.82	-12.5
RW	kg	8.10E-03	9.42E-03	5.02E-04	4.72E-04	5.38E-04	8.07E-07	6.46E-04	1.57E-04	3.79E-06	2.11E-03

**End of life - Waste: Surface treated with paint**

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
HW	kg	3.67E-02	3.75E-05	1.91E-05	5.55E-03	1.69E-07	5.76E-05	1.28E-03	8.59E-07	-5.98E-04
NHW	kg	85.0	0.07	5.22	148	8.33E-03	4.42	7.18	7.42	-14.0
RW	kg	1.07E-02	5.02E-04	6.07E-04	1.33E-02	8.07E-07	6.46E-04	2.07E-04	7.79E-06	-2.36E-03

**HW** Hazardous waste disposed; **NHW** Non hazardous waste disposed; **RW** Radioactive waste disposed

**End of life - Output flow: - Untreated surface and surface treated with ferrous sulphate / Signaur**

Parameter	Unit	Unt. and fe.		Signatur			C1	C2	C3	C4	D
		A1-A3	A1-A3	A4	A5	A5					
CR	kg	INA	INA	0	INA	INA	0	0	0	0	0
MR	kg	INA	INA	0	INA	INA	0	0	0	0	0
MER	kg	INA	INA	0	INA	INA	0	0	0	0	0
EEE	MJ	INA	INA	0	INA	INA	0	0	450	0	-468
ETE	MJ	INA	INA	0	INA	INA	0	0	4 387	0	-4 558

**End of life - Output flow: - Surface treated with paint**

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
CR	kg	INA	0	INA	0	0	0	0	0	0
MR	kg	INA	0	INA	0	0	0	0	0	0
MER	kg	INA	0	INA	0	0	0	0	0	0
EEE	MJ	INA	0	INA	0	0	0	502	0	-525
ETE	MJ	INA	0	INA	0	0	0	4 892	0	-5 113

**CR** Components for reuse; **MR** Materials for recycling; **MER** Materials for energy recovery; **EEE** Exported electric energy; **ETE** Exported thermal energy

INA = Indicator not assessed

Reading example:  $9.0 \text{ E-}03 = 9.0 \cdot 10^{-3} = 0.009$

## Additional Norwegian requirements

### Greenhouse gas emission from the use of electricity in the manufacturing phase

**Production Norway:** National production mix with import on low voltage (included production of transmission lines, in addition to direct emissions and losses in grid) is applied for electricity in the manufacturing process (A3). The annual market volume of imports is taken from IEA / OECD statistics and applies for year 2012 (ecoinvent 3.2 Nov. Nov. 2015).

**Production Denmark:** Danish wind power (Guarantee of Origin: KlimaEl Vind). Documentation on certificate is provided upon request to Superwood AS.

Data source	Amount	Unit
<b>Norway:</b> Ecoinvent v3.2 (November 2015)	0.0358	kg CO <sub>2</sub> -eq/kWh
<b>Denmark:</b> Ecoinvent v3.2 (November 2015), Guarantee of Origin: wind power, KlimaEl wind	0.0197	kg CO <sub>2</sub> -eq/kWh

### Dangerous substances

- The product contains no substances given by the REACH Candidate list or the Norwegian priority list
- The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiten, Annex III), see table.

Name	CAS no.	Amount

### Transport

Transport from production site Hurdal to construction site according to scenario A4: 200 km

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption
Lorry	53 %	Lorry, >32t, EURO 6	200	0.017 l/tkm 3.4 l/t

### Indoor environment

Superwood is intended for external use and will not affect indoor environment.

### Climate Declaration - Biogenic Carbon

To increase transparency in the contribution to climate impact, the GWP indicator has been divided into the following sub-indicators:

GWP-IOBC: Climate impact calculated by the principle of immediate oxidation of biogenic carbon.

GWP-BC: Climate impact from net absorption and emissions of biogenic carbon from the materials in each module.

### Climate Impact: Untreated surface and surface treated with ferrous sulphate / Signaur

Parameter	Unit	Unt. and fe.		Signatur		A4	A5	A5	C1	C2	C3	C4	D
		A1-A3	A1-A3	A1-A3	A1-A3								
GWP-IOBC	kg	159	199	5.11	8.81	11.7	9.94E-03	6.23	22.18	2.59E-02	-36.4		
GWP-BC	kg	-679	-679	0	0	0	0	0	679	0	0		
GWP	kg	-519	-479	5.11	8.81	11.7	9.94E-03	6.23	701	2.59E-02	-36.4		

### Climate Impact: Surface treatment with paint

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
GWP-BC	kg	-679	0	0	0	0	0	679	0	0
GWP	kg	-440	5.11	23.0	401	9.94E-03	6.23	888	4.62E-02	-40.7

### Climate Declaration - Production A3 without use of Guarantee of Origin

To increase transparency in the contribution to climate impact, climate impact of production (A3) in Denmark is calculated without the use of Guarantee of Origin. National market mix with low-voltage imports, including production of line transmission and net loss, is used for electricity in the production process (A3).

Data source	Amount	Unit
<b>Denmark:</b> Ecoinvent v3.2 (November 2015)	0.307	kg CO <sub>2</sub> -eq/kWh

### Climate Impact: Untreated surface and surface treated with ferrous sulphate / Signaur




Parameter	Unit	Unt. and fe.		Signatur		A4	A5	A5	C1	C2	C3	C4	D
		A1-A3	A1-A3	A1-A3	A1-A3								
GWP-IOBC	kg	210	250	5.11	11.3	14.2	9.94E-03	6.23	5.19	2.59E--02	-36.4		

### Climate Impact: Surface treatment with paint

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D

## Bibliography

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 <b>epd-norge.no</b> The Norwegian EPD Foundation	<b>Program operator</b> The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Tel: +47 23 08 82 92 e-mail: <a href="mailto:post@epd-norge.no">post@epd-norge.no</a> web: <a href="http://www.epd-norge.no">www.epd-norge.no</a>
 <b>Superwood®</b>	<b>Owner of the declaration</b> Superwood AS Høversjøvegen 47 2090 Hurdal	Tel: +47 62 69 99 60 e-mail: <a href="mailto:post@superwood.no">post@superwood.no</a> web: <a href="http://www.superwood.no/">http://www.superwood.no/</a>
 <b>asplan viak</b>	<b>Author of the Life Cycle Assessment</b> Asplan Viak AS Oddbjørn Dahlstrøm Kjørboveien 20, 1337 Sandvika, Norway	Tel: +47 417 99 417 e-mail: <a href="mailto:oddbjorn.dahlstrom@asplanviak.no">oddbjorn.dahlstrom@asplanviak.no</a> web: <a href="http://www.asplanviak.no">www.asplanviak.no</a>