ENVIRONMENTAL PRODUCT DECLARATION

ISO 14025 ISO 21930 EN 15804

Owner of the declaration	EMV Construction AS
Program holder	The Norwegian EPD Foundation
Publisher	The Norwegian EPD Foundation
Declaration number	00231E
Issue date	06.01.2014
Valid to	06.01.2019

Welded plated beams: HSQ, ISQ and HSK

Product

EMV Construction AS

Manufacturer

General information

Welded plated beams: HSQ, ISQ and HSK
Product

EMV Construction AS
Manufacturer

Program holder
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EMV Construction AS
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Declaration number:
00231E

Place of production:
2240 Magnor, Norway

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serve as core PCR
NPCR 013-Revision 1 (08 2013), on steel as a construction material

Management system:
NS-EN-ISO 9001, Certificate no 1034
EN ISO 3834-2, Certificate no 1116
NS-EN 1090–1, Certificate no 1505-CPR-CS1019

Declared unit:
per kg of steel

Org. No:
977 374 871

Declared unit with option:

Issue date
06.01.2014

Functional unit:
per kg building steel structure with an expected service life of 100 years.

Valid to
06.01.2019

The environmental product declaration has been worked out by:
Annik Magerholm Fet

GLOBAL & LOCAL environmental management

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

Year of study:
2013

Verification:
Independent verification of data and other environmental information has been carried out in accordance with ISO14025, 8.1.3.

☑ externally ☐ internally

Håvard Bergsdal, MISA AS
(Independent verifier approved by EPD Norway)

Approved according to ISO14025, 8.1.4

Sverre Fossdal

Dr. ing Sverre Fossdal
(Chairman of the Verification Group of EPD-Norway)

Declared unit:
per kg of steel

Key environmental indicators	Unit	Cradle to gate A1 - A3	Transport $A4_1$	Module D
Greenhouse gas emissions:	kg CO_2 -eqv	3,56	0	-1,39
Energy use	MJ	79,80	0	-14,56
Recycled material in	%	11	-	
Recycled material out **	%	99	-	88
Dangerous substances	*	-	-	

* The product contains no substances from the REACH Candidate list or the Norwegian priority list

The fraction of recycled steel from the mill is 11 %
$A4_1$ Central warehouse is production site, transport is 0 km
The recovery rate of steel is 99% including recoverd and reused products

** Net new recycled material output presented in Module D.

Product

Product description:
Welded plated beams: HSQ, ISQ and HSK sections made of welded hot-rolled steel plates used in building frame structures.

Product specification
Plates are made by European manufacturers. Sections are prefabricated and erected on-site by Norwegian steel contractors.

Materials	kg	%
Steel	>0,99	>99
Primer	<0,01	<1

Technical data:
Dimensions: H = 150-600, B1 = 110-600, B2 = 140-700, d = 5-12, tl/t2 = 6-60. The requirements of the EN 10025 and EN 1090-2 standards are applied. The standard steel grade is ≤ S355.

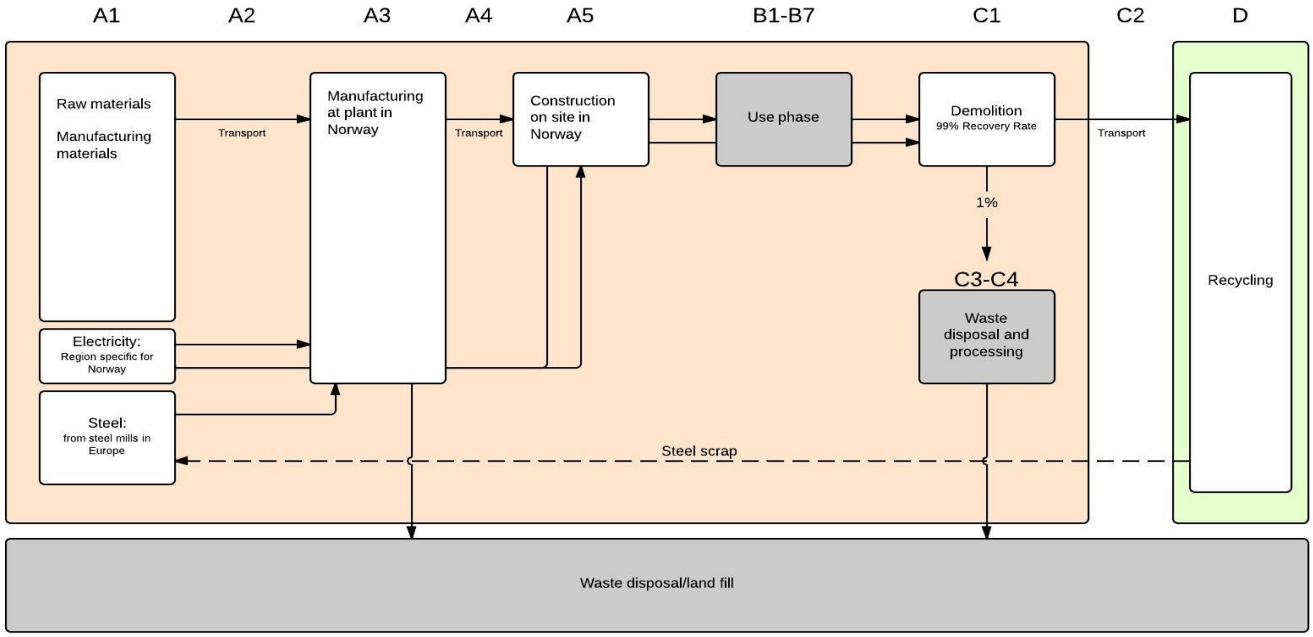
Market:
Norway

Reference service life:
100 years

LCA: Calculation rules

Functional unit:
per kg building steel structure with an expected service life of 100 years.

System boundary:
Grey areas are left out of the system. Green reperesents the system receiving the scrap steel at the EOL, from which and environmental credit is returned to the system. Waste disposal is < 1 %.



Data quality:
General requirements and guidelines concerning use of generic and specific data and the quality of those are as described in EN 15804: 2012, clause 6.3.6 and 6.3.7. The data is representative according to temporal, geographical and technological requirements.

Temporal: Data for use in module A3 is supplied by the manufacturer and consists of the 2012 annual total material and energy consumption. Specific data has been collected through 2013. Generic data has been created or updated within the last 10 years.

Geographical: The geographic region of the production sites included in the calculation is Europe.

Technological: Data represents technology in use.

Allocation:
Impacts due to production are allocated by mass. Welding processes are allocated to the fraction of 5/8. The consumption of primer paint is allocated to the fraction of 1/10.

To account for the impacts generated in the construction and demolition phases, electricity has been allocated to the phases by the fractions of 1/3 and 1/6 respectively.

Cut-off criteria:
Processes that do not contribute to more than 1% of the total mass and 1 % of the energy use are excluded from the study. Omitted products shall not have relevant contribution to the selected impact categories.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	85*	Lorry truck>16t	400	l/tkm	**

* Utilisation ratio stated in background process "RER: Lorry transport PE" used in GaBi 6
** Fuel consumption data not available through GaBi 6 from which the modeling of transport was conducted.

Additional information: Transport from production site to central warehouse in Norway is 0 km
Central warehouse is production site
To account for the impacts generated in the construction phase, electricity has been allocated to the phase by a fraction of 1/3 of the manufacturing phase (A3).

Installation in the building (A5)

	Unit	Value
Auxiliary	kg	-
Water consumption	m^3	-
Electricity consumption	kWh	0,096
Other energy carriers	MJ	-
Material loss	kg	-
Output materials from waste treatment	kg	-
Dust in the air	kg	-

End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	-
Collected as mixed construction waste	kg	0,01
Reuse	kg	0,06
Recycling	kg	0,93
Energy recovery	kg	-
To landfill	kg	-

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	85*	Lorry >16t	50	l/tkm	**

* Utilisation ratio stated in background process "RER: Lorry transport PE" used in GaBi 6
** Fuel consumption data not available through GaBi 6 from which the modeling of transport was conducted.

Benefits and loads beyond the system boundaries (D)

	Unit	Value
GWP	kg CO_2-eqv	-1,39E+00
ODP	kg CFC11-eqv	-5,12E-09
AP	kg SO_2-eqv	-3,07E-03
EP	kg PO_4^{3-}-eqv	-4,03E-04
POCP	kg NMVOC	-2,86E-03
ADPM	kg Sb -eqv	-3,04E-07
ADPE	MJ	-1,45E+01

Module D is calculated as a scenario in which the net new steel scrap received in Module D is given an environmental burden. This burden is subtracted from this system as a credit, representing the environmental benefit from recycling the steel structure at its end of life. Including Module D will therefore show the total environmental performance of the product for the whole life cycle.

Additional technical information
No additional information is required.

LCA: Results

The impacts generated in the life cycle stages described within the system boundaries are calculated using the GaBi 6.

Background data is from the GaBi 6 professional database. The impact assessment methodology used is ReCiPe. Exceptions are for the ADP-elements and ADP-fossil categories, which according to NPCR 013 are to be derived from the CML 2001 impact assessment methodology.

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

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	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	MNR	MNR	MNR	MNR	MNR	MNR	MNR	X	X	MNR	MNR	X

Environmental impact

Parameter	A1 - A3	A4	A5	B1-7	C1	C2	C3	C4	D
GWP	3,56	2,39E-02	4,10E-03	-	2,05E-03	2,98E-03	-	-	-1,39
ODP	1,14E-08	4,18E-13	8,82E-13	-	4,40E-13	5,22E-14	-	-	-5,12E-09
AP	7,75E-03	3,16E-05	4,10E-06	-	2,08E-06	3,95E-06	-	-	-3,07E-03
EP	1,25E-06	2,52E-08	1,60E-09	-	8,20E-10	3,14E-09	-	-	-4,03E-07
POCP*	7,00	3,39E-05	4,60E-06	-	2,30E-06	4,23E-06	-	-	-2,86E-03
ADPM	2,41E-06	8,92E-10	1,91E-08	-	9,54E-09	1,11E-10	-	-	-3,04E-07
ADPE	40,50	3,31E-01	4,90E-02	-	2,44E-02	4,14E-02	-	-	-14,50

GWP Global warming potential (kg CO_2-eqv.); **ODP** Depletion potential of the stratospheric ozone layer (kg CFC11-eqv.); **POCP** Formation potential of tropospheric photochemical oxidants (kg NMVOC*); **AP** Acidification potential of land and water (kg SO_2-eqv.); **EP** Eutrophication potential (kg PO_4^{3-}-eqv.); **ADPM** Abiotic depletion potential for non fossil resources (kg Sb -eqv.); **ADPE** Abiotic depletion potential for fossil resources (MJ). * According to the recommendations in the ReCiPe-methodology, kg NMVOC is used in stead of kg C_2H_4-equivalents.

Resource use

Parameter	A1 - A3	A4	A5	B1-7	C1	C2	C3	C4	D
RPEE	39,20	1,30E-02	4,33E-01	-	2,16E-01	1,62E-03	-	-	-1,64E-01
RPEM	7,74E-05	4,11E-15	1,13E-14	-	5,66E-15	5,14E-16	-	-	-2,34E-05
TPE	39,20	1,30E-02	4,33E-01	-	2,16E-01	1,62E-03	-	-	-1,64E-01
NRPE	40,60	3,31E-01	4,90E-02		2,45E-02	4,14E-02	-	-	-14,40
NRPM	-	-	-	-	-	-	-	-	-
TRPE	40,60	3,31E-01	4,90E-02	-	2,45E-02	4,14E-02	-	-	-14,40
SM	-	-	-		-	-	-	-	-
RSF	-	-	-	-	-	-	-	-	-
NRSF	-	-	-	-	-	-	-	-	-
W	7,62E+01	1,29E-03	8,61E-01	-	4,31E-01	1,62E-04	-	-	-7,00E-03

RPEE Renewable primary energy resources used as energy carrier (MJ); **RPEM** Renewable primary energy resources used as raw materials (MJ); **TPE** Total use of renewable primary energy resources (MJ); **NRPE** Non renewable primary energy resources used as energy carrier (MJ); **NRPM** Non renewable primary energy resources used as materials (MJ); **TRPE** Total use of non renewable primary energy resources (MJ); **SM** Use of secondary materials (kg); **RSF** Use of renewable secondary fuels (MJ); **NRSF** Use of non renewable secondary fuels (MJ); **W** Use of net fresh water (m^3)

End of life - Waste									
Parameter	A1 - A3	A4	A5	B1-7	C1	C2	C3	C4	D
HW	2,78E-04	-	-	-	-	-	-	-	-
NHW	8,79E-02	-	-	-	< 0,01	-	-	-	-
RW		-	-	-	-	-	-	-	-

HW Hazardous waste disposed (kg); **NHW** Non hazardous waste disposed (kg), **RW** Radioactive waste disposed (kg)

End of life - Output flow									
Parameter	A1 - A3	A4	A5	B1-7	C1	C2	C3	C4	D
CR	-	-	-	-	0,06	-	-	-	-
MR	-	-	-	-	0,93	-	-	-	-
MER	-	-	-	-	-	-	-	-	-
EEE	-	-	-	-	-	-	-	-	-
ETE	-	-	-	-	-	-	-	-	-

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

Reading example: 9,0 E-03 = $9,0*10^{-3}$ = 0,009

Specific Norwegian requirements

Electricity
Electricity used in the manufacturing processes has been accounted for using an electricity mix process specific to Norway.

Greenhouse gas emissions: 0,012 kg CO_2 - eqv/MJ

Dangerous substances
None of the following substances have been added to the product: Substances on the REACH Candidate list of substances of very high concern (of 06.01.2014) substances on the Norwegian Priority list (of.06.01.2014) and substances that lead to the product being classified as hazardous waste. The chemical content of the product complies with regulatory levels as given in the Norwegian Product Regulations.

Transport
Central warehouse is production site, transport is 0 km

Indoor environment
This product has no influence on the indoor environment.

Carbon footprint
Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2006	*Environmental labels and declarations - Type III environmental declarations - Principles and procedures*
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012	*Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products*
ISO 21930:2007	*Sustainability in building construction - Environmental declaration of building products*
NPCR 013-2013	Product Category Rules Steel as Construction Material
LCA-report EMV	Life Cycle Assessment Report, EMV Construction, Global & Local report 1-Nov 2013

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