

LIUNETM
SIMPLIFY YOUR DOORS

**Rakennustietosääti" RTS
Building Information
Foundation RTS**

RTSEPD,
No. RTS_38_19
LIUNE-door system
with glass/MDF door

Scope of the declaration

This environmental product declaration covers the environmental impacts of LIUNE-door system with MDF/glass door. The declaration has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version, 14.6.2018). This declaration covers the life cycle stages from cradle-to-gate with options including transportation to installation site, deconstruction, transportation, treatment and recovery of the product at its end-of-life.

RAKENNUSTIETO

14.11.2019
Building Information Foundation
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Malminkatu 16 A
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General information, declaration scope and verification (7.1)

1. Owner of the declaration, manufacturer

Aulis Lundell Oy
Tarrankuja 2, 08500 Lohja, Finland
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2. Product name and number

Liune Door Li08 MDF
Liune Door Li08 Glass
Liune Door Li09 MDF
Liune Door Li09 Glass

3. Place of production

Lohja, Finland

4. Additional information

More information can be found at webpage of the company www.aulislundell.fi

5. Product Category Rules and the scope of the declaration

This EPD has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards together with the RTS PCR (English version, 14.6.2018). Product specific category rules have not been applied in this EPD. EPD of construction materials may not be comparable if they do not comply with EN 15804 and seen in a building context.

6. Author of the life-cycle assessment and declaration

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7. Verification

This EPD has been verified according to the requirements of ISO 14025:2010, EN 15804:2012+A1:2013 and RTS PCR by a third party. The verification has been carried out by Vahanen Environment Oy, Teija Käpynen according to the above mentioned PCR.

8. Declaration issue date and validity

14.11.2019-12.11.2024

European standard EN 15804: 2014 A1 serves as the core PCR

Independent verification of the declaration and data, according to ISO14025:2010

Internal External

Third party verifier:

Teija Käpynen, Vahanen Environment Oy

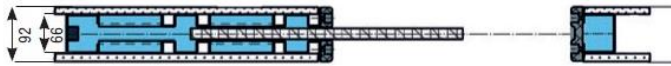
Product information

9. Product description

The studied product is LIUNE sliding door system for homes and offices. Doors can be made of MDF board or glass with different design, color and thickness properties. Market area of the product covers Nordic countries.

10. Technical specifications

Doors are integrated into wall and designed to feet into regular intermedia wall construction with thickness 66 mm, 95mm and 120mm. Door system can be mounted into intermediate wall made of steel or wood. Sectional view of door layout in wall construction is presented at the picture below. Wall surface material (e.g. gypsum board) doesn't belong to LIUNE-door system.



11. Product standards

More information can be found at webpage of the company www.aulislundell.fi

12. Physical properties

Studied door sizes:

- Size LiO8. Door dimensions 831x 2060 , steel frame dimensions 1735 x 2130, 66mm
- Size LiO9. Door dimensions 931x 2060 , steel frame dimensions 1935 x 2130, 66 mm

13. Raw-materials of the product

Material	LiO8 MDF	LiO9 MDF	LiO8 Glass	LiO9 Glass
MDF	38,6	42,4	6,0	6,0
Glass, 8mm	-	-	34,3	38,4
Steel components (steel frame , sliding elements, door handles)	29,1	30,1	29,4	30,4
Aluminum	0,3	0,3	0,3	0,3
Paint	0,7	0,8	0,1	0,1
Plastic	0,0	0,0	0,0	0,0
Tot.	68,7	73,7	70,1	75,3

14. Substances under European Chemicals Agency's REACH, SVHC restrictions

Name	EC Number	CAS Number
The product does not contain REACH SVHC substances.		

15. Functional / declared unit

Door unit

16. System boundary

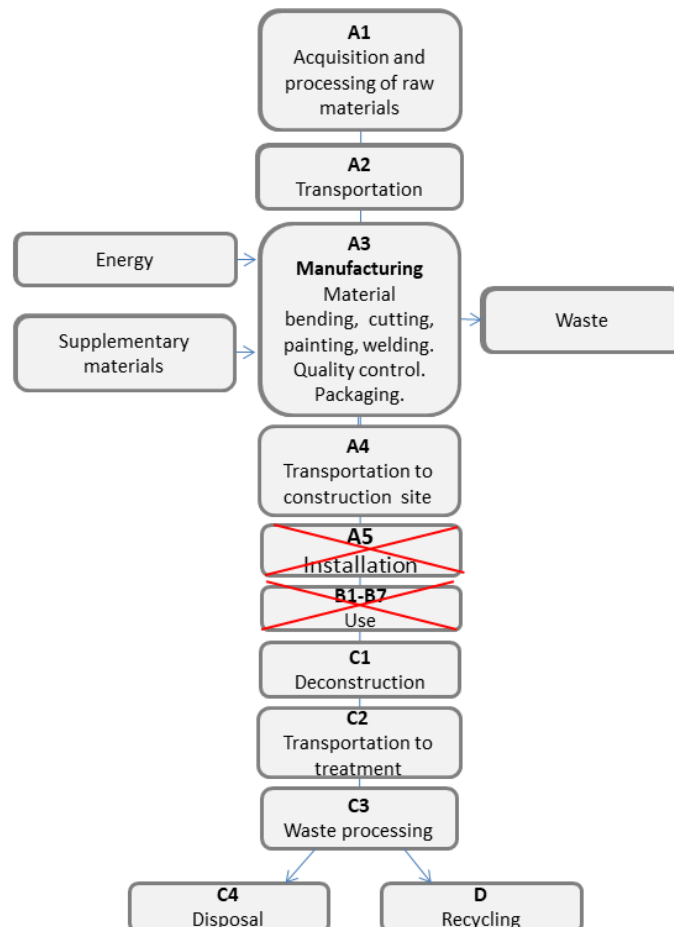
This EPD covers the following modules; A1 (Raw material supply), A2 (Transport), A3 (Manufacturing) and A4 (Transportation of the product to the building site) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary - have been included.

17. Cut-off criteria

All used materials, energy, packaging, transportation fuel and waste treatment until the end-of-waste state have been included in the product stage (A1-A3). Results for the product stage have been provided as an aggregate. A4 transportation has been estimated to be 80km, the return trip has not been considered. Module B information has not been included in the LCA calculation. It was assumed that building machine was used in deconstruction process(C1). Transportation distance to treatment facility is assumed to be 50 km. Most of materials (steel, aluminum, glass) go to recycling (C3). Only plastic and ash from wood energy recovery process are landfilled (C4). Module D considers the benefits of energy recovery which replaces district heat and secondary materials recycling.

18. Production process

Manufacturing of LIUNE-door system includes following processes: bending, cutting, welding, painting and packaging.



Scope of the Life-Cycle Assessment (7.2.1-2)

Mark all the covered modules of the EPD with X. Mandatory modules are marked with blue in the table below. This declaration covers "cradle-to-gate with options". For other fields mark MND (module not declared) or MNR (module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	MND	MND	MNR	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
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

	Mandatory modules
	Mandatory as per the RTS PCR section 6.2.1 rules and terms
	Optional modules based on scenarios

Environmental impacts and raw-material use (7.2.3-7.2.4)

19. Environmental impacts

The results of a life cycle assessment are relative. They do not predict impact on category endpoints, exceeding of limit values, safety margins, or risks. The impacts are presented per door unit. Scope of the LCA includes acquisition and processing of raw-materials and supplementary.

Environmental impact, LiO8 MDF								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential	kg CO ₂ -eqv	1,05E+2	5,23E-1	0E0	3,11E-1	2,47E+0	4,11E-2	-7,15E+1
Depletion of stratospheric ozone layer	kg CFC11-eqv	9,90E-6	9,88E-8	0E0	5,88E-8	3,56E-7	6,15E-9	-7,40E-6
Formation of photochemical ozone	kg C ₂ H ₄ -eqv	5,75E-2	8,55E-5	0E0	5,08E-5	5,31E-4	1,80E-5	-3,98E-2
Acidification	kg SO ₂ -eqv	4,95E-1	1,73E-3	0E0	1,03E-3	1,81E-2	3,22E-4	-4,16E-1
Eutrophication	kg PO ₄ 3--eqv	6,37E-2	2,82E-4	0E0	1,68E-4	4,51E-3	9,36E-5	-2,88E-2
Abiotic depletion of non fossil resources	kg Sb-eqv	4,92E-4	3,13E-6	0E0	1,86E-6	3,85E-6	1,01E-7	-4,21E-5
Abiotic depletion of fossil resources	MJ	1,59E+3	8,16E+0	0E0	4,85E+0	3,23E+1	5,94E-1	-1,00E+3

Environmental impact, LiO9 MDF								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential	kg CO2 -eqv	1,12E+2	5,58E-1	0E0	3,33E-1	2,59E+0	4,48E-2	-7,59E+1
Depletion of stratospheric ozone layer	kg CFC11-eqv	1,06E-5	1,06E-7	0E0	6,30E-8	3,71E-7	6,75E-9	-8,01E-6
Formation of photochemical ozone	kg C2H4 -eqv	6,10E-2	9,14E-5	0E0	5,45E-5	5,60E-4	1,97E-5	-4,19E-2
Acidification	kg SO2 -eqv	5,29E-1	1,85E-3	0E0	1,10E-3	1,90E-2	3,53E-4	-4,46E-1
Eutrophication	kg PO4 3--eqv	6,82E-2	3,01E-4	0E0	1,80E-4	4,77E-3	1,03E-4	-3,05E-2
Abiotic depletion of non fossil resources	kg Sb-eqv	5,33E-4	3,34E-6	0E0	1,99E-6	4,10E-6	1,11E-7	-4,44E-5
Abiotic depletion of fossil resources	MJ	1,69E+3	8,72E+0	0E0	5,20E+0	3,38E+1	6,52E-1	-1,06E+3

Environmental impact, LiO8 Glass								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential	kg CO2 -eqv	1,13E+2	5,37E-1	0E0	3,19E-1	2,16E+0	6,73E-3	-8,77E+1
Depletion of stratospheric ozone layer	kg CFC11-eqv	9,66E-6	1,02E-7	0E0	6,04E-8	3,54E-7	9,67E-10	-1,15E-5
Formation of photochemical ozone	kg C2H4 -eqv	5,27E-2	8,79E-5	0E0	5,23E-5	4,40E-4	2,87E-6	-5,01E-2
Acidification	kg SO2 -eqv	6,47E-1	1,78E-3	0E0	1,06E-3	1,53E-2	5,04E-5	-5,26E-1
Eutrophication	kg PO4 3--eqv	6,45E-2	2,90E-4	0E0	1,72E-4	3,30E-3	1,48E-5	-8,45E-2
Abiotic depletion of non fossil resources	kg Sb-eqv	6,17E-4	3,22E-6	0E0	1,91E-6	3,42E-6	1,59E-8	-1,54E-3
Abiotic depletion of fossil resources	MJ	1,48E+3	8,38E+0	0E0	4,99E+0	3,06E+1	9,34E-2	-1,41E+3

Environmental impact, LiO9 Glass								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential	kg CO2 -eqv	1,19E+2	5,74E-1	0E0	3,43E-1	2,25E+0	6,73E-3	-9,41E+1
Depletion of stratospheric ozone layer	kg CFC11-eqv	1,03E-5	1,09E-7	0E0	6,49E-8	3,68E-7	9,67E-10	-1,27E-5
Formation of photochemical ozone	kg C2H4 -eqv	5,55E-2	9,40E-5	0E0	5,62E-5	4,58E-4	2,87E-6	-5,34E-2
Acidification	kg SO2 -eqv	6,99E-1	1,90E-3	0E0	1,14E-3	1,59E-2	5,04E-5	-5,69E-1
Eutrophication	kg PO4 3--eqv	6,91E-2	3,10E-4	0E0	1,85E-4	3,42E-3	1,48E-5	-9,29E-2
Abiotic depletion of non fossil resources	kg Sb-eqv	6,74E-4	3,44E-6	0E0	2,06E-6	3,63E-6	1,59E-8	-1,72E-3
Abiotic depletion of fossil resources	MJ	1,57E+3	8,97E+0	0E0	5,36E+0	3,20E+1	9,34E-2	-1,52E+3

20. Use of natural resources

Resource use, LiO8 MDF								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	9,63E+1	1,19E-1	0E0	7,08E-2	0E0	0E0	0E0
Renewable primary energy resources used as raw materials	MJ	8,47E+2	0E0	0E0	0E0	4,67E-1	2,21E-2	-2,25E+1
Total use of renewable primary energy resources	MJ	9,43E+2	1,19E-1	0E0	7,08E-2	4,67E-1	2,21E-2	-2,25E+1
Nonrenewable primary energy resources used as energy carrier	MJ	3,70E+2	8,32E+0	0E0	4,94E+0	0E0	0E0	0E0
Nonrenewable primary energy resources used as materials	MJ	1,62E+3		0E0	0E0	3,29E+1	6,20E-1	-1,02E+3
Total use of non-renewable primary energy resources	MJ	1,99E+3	8,32E+0	0E0	4,94E+0	3,29E+1	6,20E-1	-1,02E+3
Use of secondary materials	kg	1,62E+1	2,42E-3	0E0	1,44E-3	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of non-renewable secondary fuels	MJ	4,54E+1	1,29E-2	0E0	7,68E-3	1,15E-1	8,50E-4	-4,62E+1
Use of net fresh water	m3	1,89E+0	1,70E-3	0E0	1,01E-3	-3,87E-3	6,41E-4	-2,46E+0

Resource use, LiO9 MDF								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	9,97E+1	1,27E-1	0E0	7,59E-2	0E0	0E0	0E0
Renewable primary energy resources used as raw materials	MJ	9,04E+2	0E0	0E0	0E0	4,94E-1	2,42E-2	-2,37E+1
Total use of renewable primary energy resources	MJ	1,00E+3	1,27E-1	0E0	7,59E-2	4,94E-1	2,42E-2	-2,37E+1
Nonrenewable primary energy resources used as energy carrier	MJ	3,83E+2	8,88E+0	0E0	5,30E+0	0E0	0E0	0E0
Nonrenewable primary energy resources used as materials	MJ	1,72E+3	0E0	0E0	0E0	3,44E+1	6,80E-1	-1,08E+3
Total use of non-renewable primary energy resources	MJ	2,10E+3	8,88E+0	0E0	5,30E+0	3,44E+1	6,80E-1	-1,08E+3
Use of secondary materials	kg	1,72E+1	2,58E-3	0E0	1,54E-3	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of non-renewable secondary fuels	MJ	4,70E+1	1,38E-2	0E0	8,24E-3	1,23E-1	9,32E-4	-4,78E+1
Use of net fresh water	m3	2,03E+0	1,81E-3	0E0	1,08E-3	-4,53E-3	7,03E-4	-2,70E+0

Resource use, LiO8 Glass								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	9,64E+1	1,22E-1	0E0	7,28E-2	0E0	0E0	0E0
Renewable primary energy resources used as raw materials	MJ	4,01E+2	0E0	0E0	0E0	6,32E-1	3,47E-3	-2,16E+2
Total use of renewable primary energy resources	MJ	4,98E+2	1,22E-1	0E0	7,28E-2	6,32E-1	3,47E-3	-2,16E+2
Nonrenewable primary energy resources used as energy carrier	MJ	3,76E+2	8,54E+0	0E0	5,08E+0	0E0	0E0	0E0
Nonrenewable primary energy resources used as materials	MJ	1,48E+3	0E0	0E0	0E0	3,18E+1	9,76E-2	-1,87E+3
Total use of non-renewable primary energy resources	MJ	1,86E+3	8,54E+0	0E0	5,08E+0	3,18E+1	9,76E-2	-1,87E+3
Use of secondary materials	kg	1,05E+1	2,48E-3	0E0	1,48E-3	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of non-renewable secondary fuels	MJ	4,55E+1	1,33E-2	0E0	7,90E-3	6,28E-2	1,34E-4	-4,72E+1
Use of net fresh water	m3	1,26E+0	1,74E-3	0E0	1,04E-3	5,93E-3	1,01E-4	-1,84E+0

Resource use, LiO9 Glass								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	9,97E+1	1,31E-1	0E0	7,82E-2	0E0	0E0	0E0
Renewable primary energy resources used as raw materials	MJ	4,06E+2	0E0	0E0	0E0	6,79E-1	3,47E-3	-2,40E+2
Total use of renewable primary energy resources	MJ	5,06E+2	1,31E-1	0E0	7,82E-2	6,79E-1	3,47E-3	-2,40E+2
Nonrenewable primary energy resources used as energy carrier	MJ	3,90E+2	9,14E+0	0E0	5,46E+0	0E0	0E0	0E0
Nonrenewable primary energy resources used as materials	MJ	1,57E+3		0E0	0E0	3,32E+1	9,76E-2	-2,04E+3
Total use of non-renewable primary energy resources	MJ	1,96E+3	9,14E+0	0E0	5,46E+0	3,32E+1	9,76E-2	-2,04E+3
Use of secondary materials	kg	1,08E+1	2,66E-3	0E0	1,59E-3	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of non-renewable secondary fuels	MJ	4,70E+1	1,42E-2	0E0	8,49E-3	6,51E-2	1,34E-4	-4,88E+1
Use of net fresh water	m3	1,32E+0	1,86E-3	0E0	1,11E-3	6,43E-3	1,01E-4	-2,01E+0

21. End of life – Waste

Waste LiO8 MDF								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	8,45E-2	2,17E-4	0E0	1,29E-4	6,36E-3	3,71E-5	-2,53E-2
Non-hazardous waste	kg	1,15E+1	7,03E-1	0E0	4,18E-1	3,99E+1	2,18E+0	-1,47E+0
Radioactive waste	kg	7,32E-3	5,66E-5	0E0	3,37E-5	1,90E-4	3,53E-6	-3,60E-3

Waste LiO9 MDF								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	9,11E-2	2,32E-4	0E0	1,38E-4	6,65E-3	4,07E-5	-2,73E-2
Non-hazardous waste	kg	1,23E+1	7,51E-1	0E0	4,48E-1	4,38E+1	2,39E+0	-1,53E+0
Radioactive waste	kg	7,70E-3	6,05E-5	0E0	3,61E-5	1,98E-4	3,87E-6	-3,93E-3

Waste LiO8 Glass								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	4,96E-2	2,23E-4	0E0	1,33E-4	6,48E-3	5,84E-6	-1,39E-1
Non-hazardous waste	kg	1,18E+1	7,22E-1	0E0	4,30E-1	1,23E+1	3,42E-1	-9,21E+0
Radioactive waste	kg	7,23E-3	5,82E-5	0E0	3,46E-5	2,04E-4	5,55E-7	-8,33E-3

Waste LiO9 Glass								
Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	5,13E-2	2,38E-4	0E0	1,42E-4	6,78E-3	5,84E-6	-1,55E-1
Non-hazardous waste	kg	1,26E+1	7,73E-1	0E0	4,62E-1	1,31E+1	3,42E-1	-1,02E+1
Radioactive waste	kg	7,60E-3	6,22E-5	0E0	3,72E-5	2,13E-4	5,55E-7	-9,22E-3

Scenarios and additional technical information (7.3)

23. Electricity in the manufacturing phase (7.3.A3)

<p>A3 data quality of electricity and CO2 emission kg CO2 eq. / kWh</p>	<p>FI 0,23</p>	<p>Based on country specific fuel mixes for the production year 2017 from Statistics Finland and Finnish Energy.</p> <p>Imported electricity has been considered. The environmental impacts of the fuels are based on ecoinvent 3.4 database. The impacts include all upstream processes as well as transmission losses.</p>
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24. Transport from production place to user (7.3.2A4)

Variable	Amount	Data quality
Fuel type and consumption in liters / 100 km	38	Source: Driver
Transportation distance km	80	Transportation to Helsinki, according RTS PCR
Transport capacity utilization %	100	Assumption
Bulk density of transported products kg/m³	NA	
Volume capacity utilisation factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products)	1	Assumption

25. End-of-life process description (7.3.4)

Processes	Unit (expressed per declared unit of materials and by type of material)	Amount kg/door			
		Data quality			
		LiO8 MDF	LiO9 MDF	LiO8 Glass	LiO9 Glass
Collection process specified by type	kg collected separately	68,7	73,7	70,1	75,3
	kg collected with mixed construction waste	0	0	0	0
Recovery system specified by type	kg for re-use	0	0	0	0
	kg for recycling (metals, glass)	29,4	30,4	64,0	69,1
	kg for energy recovery (painted MDF)	39,3	43,2	6,1	6,1
Disposal specified by type	kg product or material for final deposition (plastic, ash from wood energy recovery)	2,12	2,33	0,33	0,33
Assumptions for scenario development, e.g. transportation	units as appropriate	Transportation distance estimation based on average recycling facility locations; 50 km			



26. Additional technical information

Biogenic carbon of studied products is calculated in accordance to NS-EN 16449:2014 and EN 16485:2014.

	LiO8 MDF	LiO9 MDF	LiO8 Glass	LiO9 Glass
Biogenic carbon kg CO2e/door	70	76	15	15

27. Product data sheet

Available via manufacturer.

28. Additional information (7.4)

Air, soil and water impacts during the use phase have not been studied.

29. Bibliography

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines. EN 15804:2012+A1 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products. RTS PCR 18.6.2018 RTS PCR protocol: EPDs published by the Building Information Foundation RTS sr. PT 18 RT EPD Committee. (English version 14.6.2018)
NS-EN 16449:2014 Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
NS-EN 16485:2014 Round and sawn timber - Environmental Product Declaration - Product category rules for wood and wood-based products for use in construction