ENVIRONMENTAL PRODUCT DECLARATION

Load-bearing wood based board

OSB2 Unsanded, OSB3 Unsanded, OSB4 Unsanded

Version	2.0
Publication date:	2020-08-24
Update:	2021-04-27
Valid until:	2026-04-27

In accordance with EN 15804+A1 and ISO 14025

INFORMATION

Manufacturing company	SIA "KRONOSPAN Riga" Registration No.: 40003774690 VAT No.: LV40003774690
Production site	The document refers to SIA "KRONOSPAN Riga" OSB products from Riga (Latvia)
Adress/Production site	Daugavgrivas soseja 7B LV-1016, Riga Latvia
Statutory body	CEO Vivita Vavere-Ozola
EPD representative	Ing. Valters Toropovs
Contacts	Phone: +37128349460 E-mail: v.toropovs@kronospan-riga.lv Web: https://lv.kronospan-express.com/lv
Third party verifier:	Marcel Gómez Consultoría Ambiental
	Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

MODIFICATION BETWEEN V1.0 AND V2.0

The end of life scenario has been changed between the version 1.0 and 2.0.
The end of life scenario followed in the first version was incineration with energy recovery for 100% of the products. In the second version the scenario considered is the recycling of 100% of the product.

COMPANY AND PRODUCT INFORMATION

COMPANY INFORMATION

Owner of the EPD:

SIA KRONOSPAN Riga
Daugavgrivas soseja 7B
Riga, LV-1016 Latvia
www.kronospan-express.com

Contact person
Vivita Vavere-Ozola
v.ozola@kronospan-riga.lv

Description of the organization: Kronospan is the world's leading manufacturer of wood-based panels using advanced technology, and as such Kronospan have pioneered many of industry's key advances and will continue to lead product development and innovation into the future. Kronospan have more than 120 years of experience in the industry and more than 40 manufacturing sites around the world.

For additional information about KRONOSPAN please visit the company web site at https://lv.kronospan-express.com/en.

Product-related or management system-related certifications: Declared products are manufactured in the KRONOSPAN Daugavgrivas soseja factory.

Name and location of production site: KRONOSPAN Daugavgrivas soseja factory production plant in Latvia.

Product name

This study covers three product families: OSB 2 unsanded, OSB 3 unsanded and OSB 4 unsanded. The environmental impacts have been calculated for one only reference product for each product family. The densest product of each product family has been chosen as reference product for each product family. All the following commercial references are covered:

- OSB2 Unsanded
- OSB3 Unsanded
- OSB4 Unsanded

Impacts have been calculated for the densest reference of each product family and cover all the other references.

UN CPC code: 31432 Oriented Strand Board (OSB)

Geographical scope: International.

Product description

Kronospan OSB Unsanded are wooden panels made from oriented wood strands connected by resin, in range of thickness 9–30 mm. OSB Unsanded is developed and manufactured entirely in compliance with the current demand of ecological living focused on organic materials. Selecting suitable wood and binder, OSB Unsanded meets high standards of not only environmental buildings.

Strands are bound with a formaldehyde-free binder. Formaldehyde emissions are limited to the natural content of formaldehyde in solid wood (< 0.03 ppm).

Product characteristics:
- High durability and resistance
- High load-bearing capacity
- High performance material
- High stability.

Applications

- Load-bearing cladding of exterior walls or roofs,
- Structural floor decking
- Sub- floors and base boards for flooring systems
- Internal non load-bearing cladding of walls and ceilings, partitions
- Attic conversions or extensions
- Framework for upholstered furniture
- Packaging
- Warehouse management (racks, fences, etc.)

Technical data

Performance data of the product are in accordance with its Declaration of performance (DoP) and with respect to the Essential characteristics according to EN 13986 and EN 300. For more details on technical information, please see technical brochure Kronobuild.
Quality assurance according to EN 300 and EN 13986:2004+A1:2015 - type OSB 2 unsanded, OSB 3 unsanded and OSB 4 unsanded. Reaction to fire classification acc. EN 13501-1: class D-s2,d0.

Delivery status

• Standard formats:	2500 x 1250 (625) x thickness mm
• Thickness (min–max):	9–30 mm
• Width (min–max):	2100–2620 mm
• Length (min–max):	2250–6200 mm
• Edge profile:	S.E. (straight edges), T+G (tongue and groove)
• Surface:	unsanded

Additional sizes and formats can be delivered upon request

Base materials / Ancillary materials

Product does not contain Substance of Very High Concern.

- Wood content is 95–98 % with dominant amount of spruce and pine (70%). Products has been assessed and certified according FSC-STD-40-004 V3-0; FSC-STD-40-0005 V3-1; FSC-STD-40-007 V2-0; FSC-STD-50-001 V2-0 and PEFC ST 2002:2013 Chain of Custody Certification.
- Binder (2–4 % of content) is PMDI - polymeric diphenyl methane diisocyanate binder used is generally reacted into polyuria and biurets, a small number of urethane and polyurete bonds may also be formed. This product does not liberate MDI vapour. MDI and pMDI are not classified as carcinogenic by ACGIH or IARC, they are not regulated as carcinogens by OSHA nor listed as carcinogens by NTP.
- Paraffin wax emulsion (0.6- 0.99 %) is used as a water repellent.

Manufacturing

- Debarking of logs
- Transforming round wood to the strands in flaker
- Drying
- Sorting strands to outer and middle layer fraction
- Mixing strands with resin
- Forming station spreading and orientating strands on the belt
- Pressing stands in continuous press at high pressure
- Cooling of the raw format OSB boards
- Cutting OSB according standard sizes
- Packaging OSB boards

Environment and health during manufacturing

In face of the manufacturing conditions, no particular statutory or regulatory health protection measures are required.

Air from manufacturing is cleaned in accordance with statutory specifications. Emissions are significantly below the requisite limit values.

Production is free of waste water.
Waste wood products (bark etc.) are internally using for heat production and drying of inputs

Product processing/Installation

It is not necessary to use special tools. Kronospan OSB Unsanded boards can be cut, drilled or milled using conventional woodworking tools. Boards can be installed using known methods, standard tools and fasteners (nails, screws or staples).

When processing, standard safety measures must be taken. Protective googles, gloves and dust mask should be worn when sawing and grinding.

Packaging

Recyclable PE foils and tapes, iron clips, paper corners and labels are used for packing.

Conditions of use

Material composition for the time of use complies with the base materials mentioned above.

Environment and health during use

No damage to health and environment can be anticipated if Kronospan OSB Unsanded is used as designated.

Reference service life

The service life of Kronospan OSB Superfinish depends on the area of application and is at least 50 years when used correctly.

Extraordinary effects

- Fire

Building material class according to EN 13501-1: D (normal flammable materials)

Smoke emission level: s1, s2 (quantity/speed of emissions absent or weak / of average intensity)
Flaming droplets and/or particles production: d0 (no dripping)

- Water (e.g flooding)

No heavy metals could be established in the quantitative analysis of inorganic trace substances in the material. No environmental consequences are to be anticipated.
OSB boards are not resistant to exposure to water. Damaged parts must be replaced.

- Mechanical destruction

No environmental or health consequences are to be anticipated in the event of mechanical destruction.

Re-use phase

Provided they are untreated and undamaged, Kronospan OSB Unsanded can be easily segregated and re-used for the same application.

Segregated product can be recycled for chipboard production.

In face of high heat value, energetic utilisation for generating process energy and electricity is possible.

Disposal

Waste key: EWC code 17 02 01 in accordance with the European Waste Catalogue.

Further information

Further information is available at request

Physical characteristics and applications:

	OSB 2 unsanded	OSB 3 unsanded	OSB 4 unsanded
Characteristics of the family product			
Application	For internal use as a structural component in dry conditions	For internal use as a structural component in humid conditions	For internal use as a structural component in humid conditions
Release of formaldehyde	Class E1	Class E1	Class E1
Characteristics of the reference product			
Definition	The densest product of the OSB2 product family	The densest product of the OSB3 product family	The densest product of the OSB4 product family
Moisture content (%)	4,5 – 5,2		
Reaction to fire (EN 13501-1)	D-s2, d0		

LCA : CALCULATION RULES

DECLARED UNIT

The declared unit is one cubic metre (1 m3) of Kronospan OSB2 unsanded, OSB3 unsanded and OSB4 unsanded manufactured by production facility in Riga, Latvia.

OSB bulk density is from 600kg/m3 – 620kg/m3.

REFERENCE SERVICE LIFE

The RSL is 50 years.

TIME REPRESENTATIVNESS

Data were collected by KRONOSPAN from February 2020 to May 2020 and are representative of 2019 manufacturing technologies.

DATABASE AND LCA SOFTWARE USED

Databases used are BDD CODDE-2018-11, ELDC version 3.2, and Ecoinvent 3.0.1. The software used is EIME V5.8.1.

Environmental indicators calculated according to EN 15804 (CEM baseline).

DESCRIPTION OF SYSTEM BOUNDARIES

Type of EPD: cradle to grave, with options
The following life cycle stages are taken into account in the analysis:

- Product stage A1-A3
- Transport stage A4
- End of life stage C4
- Benefits and loads beyond the system boundary D

Hence, as is not relevant for this kind of product, life cycle stages from A5 to C3 have been excluded.

Energetic consumption and waste production have been allocated per m^3 of final product.

CUT-OFF CRITERIA

Flows that can be excluded from the study because of the difficulty of attributing them to a particular reference flow are the following:

- The lighting, heating, sanitation and cleaning of facilities
- The transportation of employees and the staff catering facilities.
- The manufacture and maintenance of production tools and infrastructures
- Flows from R&D, administrative, management, and marketing poles.

The proportion of non-modelled elements is in compliance with the 1 % of renewable and non-renewable primary energy usage and the 1%-in-weight cut-off rule over the life-cycle considered. The total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass.

Modularity principle and polluter pays principle have been applied in the study.

CRADLE-TO-GATE WITH OPTIONS SYSTEM BOUNDARIES DIAGRAM

Life Cycle Stages																
Building life-cycle information																Benefits and loads beyond the system boundary
Manufacturing stage			Construction process stage		Use stage							End of life stage				Other environmental information
Raw material supply	Transport	Manufacturing	Transport	Construction - installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction - 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
	✓		✓	MND	MND	MND	MND	MND	MND	MND	MND	MND	✓	✓	✓	✓

- **<u>Product stage</u>**
  - **A1 - Raw material supply**: extraction and processing of raw materials.

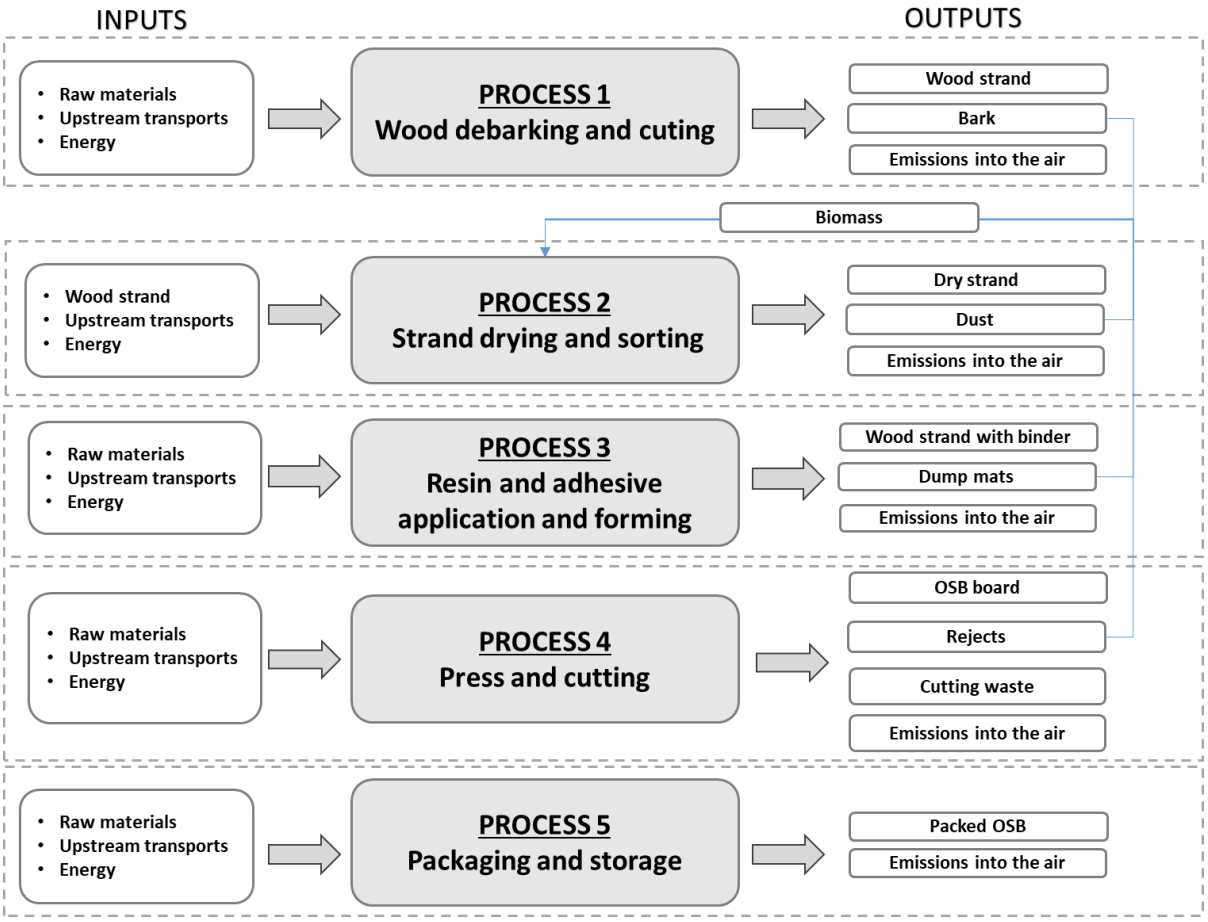
  Generation of electricity, steam and heat from primary energy resources, also including their extraction, refining and transport. This also includes energy needed for raw material supply and energy for manufacturing in core process.
  - **A2 - Transportation:** external transportation to the manufacturing plant and internal transport
  - **A3 - Manufacturing:**
    - The recycling process of any purchased recycled material and the transport from the recycling process to where the material is used.
    - Manufacturing of the construction product.
    - Packing materials etc. used.
    - Production of ancillary materials or pre-products;

- **<u>Transport stage:</u>**
  - **A4 – transport of construction products to the building site**

- **<u>End of life stage</u>**
  - **C2 – transport of the end-of-life construction product to waste processing facility**
  - **C3 – waste processing operations for reuse, recovery or recycling**
  - **C4 – final disposal of end-of-life construction product**

- **<u>Benefits and loads beyond the system boundary</u>**
  - **D – Reuse/recovery/recycling potential evaluated as net impacts and benefits**

FLOW DIAGRAM OF PROUCT MANUFACTURING



LCA ASSUMPTIONS

Distribution stage

PARAMETER	VALUE/DESCRIPTION
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Average truck trailer with a 27t payload, diesel consumption 38 liters for 100 km Transoceanic tanker for boat transport
Distance	OSB 2: 1.900 km by truck and 7.139 Km by boat OSB 3: 868 km by truck and 67 Km by boat OSB 4: 1.570 km by truck
Capacity utilisation (including empty returns)	100% of the capacity in volume % included in the database
Bulk density of transported products*	OSB bulk density is from 600kg/m3 – 620kg/m3
Volume capacity utilisation factor	1

End of life stage

PARAMETER	VALUE/DESCRIPTION
Collection process specified by type	100% collected with mixed construction waste
Recovery system specified by type	100% of OSB board are recycled to produce wood chips (sorting and crushing)
Disposal specified by type	-
Assumptions for scenario development (e.g. transportation)	A 100 km transport is considered between the construction site and the OSB recovery takes place

Module D

This module takes into account the benefits and loads beyond the system boundary. Beyond the system boundary, wood chips obtained from OSB recovery are transformed in particle boards. Hence, module D includes:

- The impact of resin necessary to obtain the final particle board
- The avoided impacts of virgin wood chips that would have been used without the OSB recycling

CONTENT DECLARATION

OSB2 unsanded, OSB3 unsanded and OSB4 unsanded have the following average composition:

Constituent materials		
Wood	**Resin**	**Paraffin wax emulsion**
95 – 98%	2 – 4%	0,6 – 0,99%

None of Candidate List of Substance of Very High Concern (SVHC) for authorization have been used in a percentage higher than 0,1% of the weight of the product

Packaging

Distribution packaging: recyclable PE foils and tapes, iron clips, paper corners and labels

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: There is no recycled material on the product.

ENVIRONMENTAL PERFORMANCE

OSB2

Impacts of 1m3 of OSB2 Unsanded load-bearing wood based boards

POTENTIAL ENVIRONMENTAL IMPACT

INDICATORS	UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Global Warming Power (GWP) - Total	kg CO2 eq.	-8,25E+02	2,53E+02	MND	1,53E+01	1,09E+03	0,00E+0	5,38E+02	-5,83E+01
Global Warming Power (GWP) – Fossil part	kg CO2 eq.	3,14E+2	2,53E+2	MND	1,53E+01	1,56E-2	0,00E+0	5,82E+02	-1,51E+02
Global Warming Power (GWP) – Biogenic part	kg CO2 eq.	-1,14E+3	0,00E+0	MND	0,00E+0	1,09E+03	0,00E+0	-5,00E+01	9,72E+1
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	1,17E-05	1,72E-05	MND	1,04E-06	8,73E-10	0,00E+0	3,00E-05	-8,36E-06
Acidification potential (AP)	kg SO2 eq.	2,18E+00	1,74E+00	MND	7,53E-02	3,61E-05	0,00E+0	3,99E+00	-1,32E+00
Eutrophication potential (EP)	kg PO43- -eq	3,33E-01	2,88E-01	MND	1,66E-02	4,20E-06	0,00E+0	6,37E-01	-2,83E-01
Formation potential of tropospheric ozone (POCP)	kg C2H4-eq	2,01E-01	6,01E-02	MND	2,52E-03	2,99E-06	0,00E+0	2,64E-01	-1,58E-01
Abiotic depletion potential – Elements	Abiotic depletion kg Sb-eq resources	2,87E-04	5,22E-04	MND	2,93E-05	2,02E-10	0,00E+0	8,38E-04	-2,15E-04
Abiotic depletion potential – Fossil resources	MJ	2,26E+03	1,14E+03	MND	6,87E+01	2,30E-01	0,00E+0	3,47E+03	3,30E+02

USE OF RESSOURCES (PRIMARY ENERGETIC AND WATER RESSOURCES)

INDICATORS		UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	6,40E+03	4,76E+01	MND	2,75E+00	1,04E-02	0,00E+00	6,45E+03	-5,45E+3
	Used as raw materials	MJ, net calorific value	1,13E+04	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	1,13E+04	-1,18E+4
	Total	MJ, net calorific value	1,77E+04	4,76E+01	MND	2,75E+00	1,04E-02	0,00E+00	1,78E+04	-1,73E+04
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	1,71E+03	1,14E+03	MND	6,87E+01	2,59E-01	0,00E+00	2,92E+03	-2,10E+02
	Used as raw materials	MJ, net calorific value	7,76E+02	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	7,76E+02	7,53E+02
	Total	MJ, net calorific value	2,48E+03	1,14E+03	MND	6,87E+01	2,59E-01	0,00E+00	3,69E+03	5,43E+02
Secondary material		kg	1,22E-05	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	1,22E-05	0,00E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m3	2,92E+00	6,05E-01	MND	3,70E-02	1,55E-04	0,00E+00	3,56E+00	1,35E+00

WASTE PRODUCTION AND OUTPUT FLOWS

INDICATORS	UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Hazardous waste disposed	kg	3,39E-02	0,00E+00	MND	0,00E+00	3,05E-04	0,00E+00	3,43E-02	-2,66E-04
Non-hazardous waste disposed	kg	5,02E+00	0,00E+00	MND	0,00E+00	7,41E-03	0,00E+00	5,02E+00	6,46E-01
Radioactive waste disposed	kg	2,07E-03	0,00E+00	MND	0,00E+00	8,54E-06	0,00E+00	2,07E-03	3,58E-04

Waste production

INDICATORS	UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Components for reuse	kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,11E-02	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	1,11E-02	1,11E-02
Materials for energy recovery	kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flows

OSB3

Impacts of 1m3 of OSB3 Unsanded load-bearing wood based boards

POTENTIAL ENVIRONMENTAL IMPACT

INDICATORS	UNIT	A1-A3	A4	A5-C1	C2	C4	C3	Total	D
Global Warming Power (GWP) - Total	kg CO2 eq.	-8,40E+02	1,34E+02	MND	1,51E+01	0,00E+00	1,09E+03	3,99E+02	-6,51E+01
Global Warming Power (GWP) – Fossil part	kg CO2 eq.	2,41E+02	1,34E+02	MND	1,51E+01	0,00E+00	1,13E-2	3,90E+02	-5,61E+1
Global Warming Power (GWP) – Biogenic part	kg CO2 eq.	-1,08E+03	0,00E+00	MND	0,00E+00	0,00E+00	1,09E+03	1,00E+01	-9,00E0
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	1,11E-05	9,20E-06	MND	1,03E-06	0,00E+00	9,22E-10	2,13E-05	-8,26E-06
Acidification potential (AP)	kg SO2 eq.	2,09E+00	7,46E-01	MND	7,44E-02	0,00E+00	3,04E-05	2,91E+00	-1,34E+00
Eutrophication potential (EP)	kg PO43- -eq	3,21E-01	1,49E-01	MND	1,64E-02	0,00E+00	2,72E-06	4,87E-01	-2,80E-01
Formation potential of tropospheric ozone (POCP)	kg C2H4-eq	1,94E-01	2,50E-02	MND	2,49E-03	0,00E+00	4,00E-06	2,22E-01	-1,57E-01
Abiotic depletion potential – Elements	Abiotic depletion kg Sb-eq resources	2,76E-04	2,97E-04	MND	2,90E-05	0,00E+00	8,22E-10	6,02E-04	-2,14E-04
Abiotic depletion potential – Fossil resources	MJ	2,04E+03	6,07E+02	MND	6,79E+01	0,00E+00	1,46E-01	2,72E+03	2,54E+02

USE OF RESSOURCES (PRIMARY ENERGETIC AND WATER RESSOURCES)

INDICATORS		UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	6,10E+03	2,36E+01	MND	2,72E+00	1,76E-02	0,00E+00	6,12E+03	-5,47E+03
	Used as raw materials	MJ, net calorific value	1,10E+04	0,00E+00	MND	0,00E+00	-1,10E+04	0,00E+00	0,00E+00	-1,15E+04
	Total	MJ, net calorific value	1,71E+04	2,36E+01	MND	2,72E+00	1,76E-02	0,00E+00	1,71E+04	-1,70E+04
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	1,56E+03	6,07E+02	MND	6,79E+01	2,44E-01	0,00E+00	2,24E+03	-2,23E+02
	Used as raw materials	MJ, net calorific value	7,00E+02	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	7,00E+02	7,00E+02
	Total	MJ, net calorific value	2,26E+03	6,07E+02	MND	6,79E+01	2,44E-01	0,00E+00	2,94E+03	4,77E+02
Secondary material		kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m3	2,68E+00	3,30E-01	MND	3,66E-02	2,32E-02	0,00E+00	3,07E+00	1,18E+00

WASTE PRODUCTION AND OUTPUT FLOWS

INDICATORS	UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Hazardous waste disposed	kg	1,08E-02	0,00E+00	MND	0,00E+00	7,78E-04	0,00E+00	1,16E-02	-2,77E-04
Non-hazardous waste disposed	kg	6,74E-01	0,00E+00	MND	0,00E+00	1,48E-02	0,00E+00	6,91E-01	6,69E-01
Radioactive waste disposed	kg	3,84E-04	0,00E+00	MND	0,00E+00	1,81E-05	0,00E+00	4,01E-04	3,71E-04

Waste production

INDICATORS	UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Components for reuse	kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,17E-02	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	1,17E-02	1,17E-02
Materials for energy recovery	kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flows

OSB4

Impacts of 1m3 of OSB4 Unsanded load-bearing wood based boards

POTENTIAL ENVIRONMENTAL IMPACT

INDICATORS	UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Global Warming Power (GWP) - Total	kg CO2 eq.	-8,48E+02	1,90E+02	MND	1,55E+01	1,11E+03	0,00E+00	4,68E+02	-5,19E+01
Global Warming Power (GWP) – Fossil part	kg CO2 eq.	2,61E+02	1,90E+02	MND	1,55E+01	6,98E-3	0,00E+00	4,68E+02	-1,00E+00
Global Warming Power (GWP) – Biogenic part	kg CO2 eq.	-1,11E+03	0,00E+00	MND	0,00E+00	1,11E+03	0,00E+00	0,00E+00	-5,09E+01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	1,13E-05	1,31E-05	MND	1,06E-06	5,57E-13	0,00E+00	2,54E-05	-8,28E-06
Acidification potential (AP)	kg SO2 eq.	2,18E+00	9,39E-01	MND	7,66E-02	2,94E-05	0,00E+00	3,20E+00	-1,30E+00
Eutrophication potential (EP)	kg PO43- -eq	3,28E-01	2,09E-01	MND	1,69E-02	2,45E-06	0,00E+00	5,54E-01	-2,80E-01
Formation potential of tropospheric ozone (POCP)	kg C2H4-eq	2,00E-01	3,09E-02	MND	2,56E-03	1,75E-06	0,00E+00	2,33E-01	-1,56E-01
Abiotic depletion potential – Elements	Abiotic depletion kg Sb-eq resources	2,84E-04	4,33E-04	MND	2,98E-05	1,43E-09	0,00E+00	7,47E-04	-2,12E-04
Abiotic depletion potential – Fossil resources	MJ	2,25E+03	8,61E+02	MND	6,99E+01	7,58E-02	0,00E+00	3,18E+03	4,39E+02

USE OF RESSOURCES (PRIMARY ENERGETIC AND WATER RESSOURCES)

INDICATORS		UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	6,07E+03	3,23E+01	MND	2,80E+00	4,64E-02	0,00E+00	6,11E+03	-5,62E+03
	Used as raw materials	MJ, net calorific value	1,12E+04	0,00E+00	MND	0,00E+00	-1,12E+04	0,00E+00	0,00E+00	-1,16E+04
	Total	MJ, net calorific value	1,73E+04	3,23E+01	MND	2,80E+00	4,64E-02	0,00E+00	1,73E+04	-1,72E+04
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	1,69E+03	8,61E+02	MND	6,99E+01	1,49E-01	0,00E+00	2,63E+03	-1,23E+02
	Used as raw materials	MJ, net calorific value	8,35E+02	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	8,35E+02	8,35E+02
	Total	MJ, net calorific value	2,52E+03	8,61E+02	MND	6,99E+01	1,49E-01	0,00E+00	3,46E+03	7,12E+02
Secondary material		kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m3	3,04E+00	4,72E-01	MND	3,77E-02	4,90E-02	0,00E+00	3,60E+00	1,51E+00

WASTE PRODUCTION AND OUTPUT FLOWS

INDICATORS	UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Hazardous waste disposed	kg	1,08E-02	0,00E+00	MND	0,00E+00	5,83E-06	0,00E+00	1,08E-02	-3,31E-04
Non-hazardous waste disposed	kg	7,93E-01	0,00E+00	MND	0,00E+00	1,88E-02	0,00E+00	8,12E-01	7,88E-01
Radioactive waste disposed	kg	4,51E-04	0,00E+00	MND	0,00E+00	2,73E-05	0,00E+00	4,78E-04	4,37E-04

Waste production

INDICATORS	UNIT	A1-A3	A4	A5-C1	C2	C3	C4	Total	D
Components for reuse	kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,43E-02	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	1,43E-02	1,43E-02
Materials for energy recovery	kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	kg	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flows

LCA INTERPRETATION

In next diagram are represented results declared as an average of environmental results of OSB2 Unsanded, OSB3 Unsanded, OSB4 Unsanded

	Product (A1-A3)	Transport (A4)	End-of-Life (C2-C3)	Benefits and loads beyond the system boundary (D)	TOTAL
Abiotic depletion elements ADPe	2,82E-04	4,17E-04	2,94E-05	-2,13E-04	**5,15E-04 kg Sb eq**
Abiotic depletion fossil ADPf	2,18E+03	8,68E+02	6,90E+01	3,41E+02	**3,46E+03 MJ**
Global warming fossil part	2,72E+02	1,92E+02	7,66E+00	-5,71E+01	**4,15E+02 kg CO_2 eq**
Global warming with carbon sequestration	-8,38E+02	1,93E+02	1,11E+03	-5,84E+01	**4,07E+02 kg CO_2 eq**
Ozone Depletion ODP	1,13E-05	1,32E-05	1,04E-06	-8,30E-06	**1,72E-05 kg CFC^{-11} eq**
Photochemical oxidation POCP	1,98E-01	3,87E-02	2,53E-03	-1,57E-01	**8,22E-02 kg C_2H_4-eq**
Acidification (A)	2,15E+00	1,14E+00	7,54E-02	-1,32E+00	**2,05E-00 kg SO_2 eq**
Eutraphisation (E)	3,27E-01	2,15E-01	1,66E-02	-2,81E-01	**2,78E-01 kg PO_4^{3-} eq**

ADP – ABIOTICE DEPLETION POTENTIAL

This impact category indicator is related to extraction of minerals and fossil fuels due to inputs in the system. The Abiotic Depletion Factor (ADF) is determined for each extraction of minerals (kg antimony equivalents/kg extraction) and fossil fuels (MJ) based on concentration reserves and rate of de-accumulation. The geographic scope of this indicator is at global scale.

Abiotic depletion of fossil resources (ADPf) is mainly caused by the resin and paraffin manufacturing used in OSB products. For non-fossil resources depletion (ADPe) the transport of products to customers and transport of raw materials play decisive roles.

GWP - GLOBAL WARMING POWER

Climate change can result in adverse affects upon ecosystem health, human health and material welfare. Climate change is related to emissions of greenhouse gases to air. The characterization model as developed by the Intergovernmental Panel on Climate Change (IPCC) is selected for development of characterization factors. Factors are expressed as Global Warming Potential for time horizon 100 years (GWP100), in kg carbon dioxide/kg emission. The geographic scope of this indicator is at global scale.

The sequestration of carbon during tree growth has a positive impact in the raw material supply. This carbon is considered as released at the end of the product's life.

Resin and paraffin are the main contributors to GWP impact generated during OSB board manufacturing. Indeed they are petrochemical industry product and their production involve energy-intensive processes.

Biomass is the main combustible that provide energy in the plant and is so the second main contributor to GWP. It is due to all the activities necessary to burn biomass (transport, electricity…). It should be noticed that at the end of life, it is considered that the biogenic carbon stored during the A1-A3 stage is released back. The rest of the impact of the end of life stage (modules C) is linked to recovery process of OSB into recycled wood chips (that will be then used to manufacture particle board). The benefits and charges of the wood chips transformation into final particle board are calculated in module D. Module D is negative because avoided impacts of a particle board made from virgin wood chips are more important than impacts generated by particle board made from OSB recovery wood chips.

Impact generated during forestry operation to get wood and it transport to the plant, play also significant role.

ODP – OZONE DEPLETION

Ozone depletion represents the reduction of the stratospheric ozone layer by atmospheric emissions. The ozone layer is a part of the stratosphere that acts as a filter for certain harmful rays from the Sun (UV rays in particular). Human activities, and in particular the emissions of CFCs present in aerosols before the implementation of the Montreal Protocol, led to the reduction in the thickness of this layer.

The main processes that contributes to this indicator are transport of raw materials to the manufacturing plant and transport of OSB to final client. Also forestry operation (softwood and hardwood production) and biomass incineration have significant contribution on ODP.

POCP – PHOTOCHEMICAL OXIDATION

Photo-oxidant formation is the formation of reactive substances (mainly ozone) which are injurious to human health and ecosystems and which also may damage crops. This problem is also indicated with “summer smog”.

Photochemical Ozone Creation Potential (POCP) for emission of substances to air is calculated and expressed in kg ethylene equivalents/kg emission. The time span is 5 days and the geographical scale varies between local and continental scale.

The main contributor to POCP is the combustion of fuel, natural gas and biomass for heat and power production. Forestry operation (harvesting) has also significant contribution on this indicators.

A - ACIDIFICATION

Acidifying substances cause a wide range of impacts on soil, groundwater, surface water, organisms, ecosystems and materials (buildings). Acidification Potential (AP) for emissions to air is calculated with the describing the fate and deposition of acidifying substances. AP is expressed as kg SO2 equivalents/ kg emission. The time span is eternity and the geographical scale varies between local scale and continental scale.

The main processes in this category is the combustion of fuel, natural gas and biomass for heat and power production. Resin consumption and forestry operation (harvesting) that occurs during the manufacturing stage are other important contributors. Also the distribution step (transport of OSB from manufacturing plant to final client) has a significant impact on this indicator.

EP - EUTROPHISATION

Eutrophication (also known as nutrification) includes all impacts due to excessive levels of macro-nutrients in the environment caused by emissions of nutrients to air, water and soil. Nutrification potential (NP) is expressed as kg PO4 equivalents per kg emission. Fate and exposure is not included, time span is eternity, and the geographical scale varies between local and continental scale.

The main processes in this category is the combustion of fuel, natural gas and biomass for heat and power production. Forestry operation (harvesting) needed to get wood and transport (of raw materials to the manufacturing plant and of OSB board to final client) have a significant contribution to this indicator.

REFERENCES

EIME software, Version 5.8. – database : CODDE-2018-11 (updated November 2018)

EIME v5 guides1 2: for the modelling of the different processes

NF EN 15804:2012+A1:2014: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

NF EN 16485: Round and sawn timber – Environmental Product Declarations – Product category rules for wood and wood-based products for use in construction (2014)

ISO 14040: Environmental management -- Life cycle assessment -- Principles and framework (2006)

ISO 14044 : Environmental management -- Life cycle assessment -- Requirements and guidelines (2006)

ISO 14025:2006 : Environmental labels and declarations -- Type III environmental declarations -- Principles and

LCA report

LCA study made by: LCIE Bureau Veritas CODDE department

Project management: provided by Bureau Veritas Latvia (riga@lv.bureauveritas.com)
Phone: +37167323246