



# MDF

Medium Density Fibreboard

## ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A2:2019

**S-P Code**

S-P-01989

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**Programme**

EPD Turkey

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## Owner of the EPD

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# Program Information

Programme

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Product Category Rules (PCR): 2019:14 Version 1.1, 2019-09-14, Construction Products and CPC 54  
Construction Services, EN 15804:2012 + A2:2019 Sustainability of Construction Works, c-PCR-006 Wood  
and wood-based products for use in construction (EN 16485)

Independent third-party verification of the declaration and data, according to ISO 14025:2006:

EPD process certification                       EPD verification

**Third party verifier:** Vladimír Kocí, PhD

**Approved by:** The International EPD® System

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 programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.



# About Company

Maintaining its uninterrupted production for half a century in the wood-based panel industry, Kastamonu Entegre is a global-scale company engaged in production in 6 countries, with investments in Romania, Bulgaria, Bosnia and Herzegovina, Russia, Italy and Turkey. In the USA, it has a company that carries out wood chip supply and logistics processes.

Kastamonu Entegre has become the world's sixth largest company in the wood-based panel industry with its overseas investments extending more than 20 years, and has been among the top four manufacturers in Europe. It is one of the four largest manufacturers in the world with each of its main product groups; namely MDF, chipboard, laminate flooring, and door skin. It undertakes 6% of the world laminate flooring production alone. Not only the Turkey's industry leader with its 30% market share, Kastamonu Entegre, at the same time is by far the leader of the industry with its imports each year to 100 countries in six continents extending from China to America and Australia to Canada.

With its turnover of 1.3 billion dollars and its strength, knowledge and experience in production, it provides employment to more than 6 thousand people in its domestic and foreign production facilities as well as its offices. In its production facilities with a total of 6 million m<sup>3</sup>/year wood-based panel production capacity, where it caters the requirements of furniture, decoration and construction industries with its MDF and particle board, laminate flooring, worktop and door skin products, it

produces a volume that contributes to the formation of living spaces of 4 500 homes every day. Proud bearer of "The Biggest Turkish Investor of Italy" title, Kastamonu Entegre also happens to be the largest MDF producer and exporter of Russia.

Responding to the demands of its customers, Kastamonu Entegre can produce FSC, CARB2 / EPA Certified products and at E1, E0.5 (1/2), E0, F4Start quality by obtaining wood raw materials from 100% sustainable and renewable sources. In addition, E1 quality production is carried out in all its facilities. "Floorpan" and "Artfloor" are the first Turkish laminate flooring brands that have "Blue Angel" certificate, which shows that environmentally friendly materials are used in production and that the products do not contain any hazardous substances for human health. Acting with the mission of preserving natural balance and contributing to the society, the company is one of the three companies that prepared the sustainability report in the industry. It carries out studies on product and process development, efficiency increase, efficient resource utilization and advanced material technologies in its R&D center in Istanbul, which it has set up to develop technologies of the future.

The company has certifications such as ISO 9001 Quality Management, ISO 45001 Occupational Health and Safety Management, ISO 14001 Environmental Management, ISO 50001 Energy Management, and also the Turquality Certificate. Production is made in conformity with the TSE and European Norms (EN).



**+6000**  
employees

**6**  
million m<sup>3</sup>/year  
production  
capacity

production  
in **6**  
countries

**1<sup>st</sup>**  
in Turkey

**4<sup>th</sup>**  
in Europe

**6<sup>th</sup>**  
in the world





# About Products

Raw MDF with high surface layer density is used in high quality furniture and interior design applications. Supports edge profiling and surface processes. Furthermore, it has low formaldehyde content. Suitability for profile application, high edge stability, good density profile, high bending rigidity, strong body structure, even fiber distribution, high surface quality, high static loading capacity, low swelling value. Furniture, interior decoration, 3D front panels, the surface can be coated with melamine film, laminate, facing can be applied, folio can be applied, lacquer paint can be applied.

**MEDEPAN**  
MDF-ORTA YOĞUNLUKTA LİF LEVHA MDF-MEDIUM DENSITY FIBERBOARD

**COLORPAN**  
RENKLİ MDF COLORED MDF

**MAXIPAN**  
DÜŞÜK YOĞUNLUKLU MDF LOW DENSITY MDF

**NEOPAN**  
DÜŞÜK YOĞUNLUKLU MDF LOW DENSITY MDF

**SUPERPAN**  
DÜŞÜK YOĞUNLUKLU MDF LOW DENSITY MDF

The average density of Kastamonu Entegre MDF boards with a thickness of 3 to 40 mm is approx.737 kg/m<sup>3</sup>.

The UN CPC code of the product is 3143.

## Typical Material Composition, 1 m<sup>3</sup>

Raw Material	Weight, %
Wood Chips	80-90
UMF Glue	10-13
Paraffin Wax	0.1-1

Wood chips type can be varied and mainly sourced from pine, beech, and oak trees.



### Thickness Range

3 - 40 mm



### Dimensions

2440x2800 mm  
2100x2800 mm  
2200x2800 mm  
1830x3660 mm

## MDF Technical Specifications

Technical Data	Test Standard	Unit	Thickness Range						
			2.5<t≤4	4<t≤6	6<t≤9	9<t≤12	12<t≤19	19<t≤30	30<t≤45
Density	EN 323	kg/m <sup>3</sup>	Specific to Plant						
Internal Bond	EN 319	N/mm <sup>2</sup>	0.65	0.65	0.65	0.6	0.55	0.55	0.50
Bending Strength	EN 310	N/mm <sup>2</sup>	23	23	23	22	20	18	17
Modulus Of Elasticity	EN 310	N/mm <sup>2</sup>	*	2700	2700	2500	2200	2100	1900
Swelling 24 H	EN 317	%	35	30	17	15	12	10	8
Screw Hold Edge	EN 320	N	> 700 (for t> 15 mm )						
Sand Content	EN 3340	%	< 0.05						
Moisture Content	EN 322	%	4-11						
Formaldehyde Release	EN 12460-5	mg/100gr	≤8 (E1)						
	EN 12460-5	mg/100gr	>8 to ≤ 30 (E2)						
	EN 12460-1	mg/m <sup>3</sup> air	≤ 0.062 (E0) / ≤ 0.124 (E1)						
Density	EN 323	%	±7						
Thickness (Sanded)	EN 324	mm	±0.2				±0.3		
Edge Straightness	EN 622-1	mm	±5						
Edge Squareness	EN 622-1	mm/m	±2						

*Note 1: This document may be modified at any time by the company without any express obligation to send any updated edition to all original recipients. To verify that you have the latest edition available, you are advised to contact the relevant sales executive.*

*Note 2: For current TSE document / document scope, it is recommended to contact the relevant sales executive.*



As Kastamonu Entegre, we adopt an ethical, transparent, equitable and accountable management approach in the awareness of our environmental, economic and social contributions and impacts.

We engage in activities that strengthen our corporate structure, and we take sustainable development-based growth as the basis, in line with our target of becoming a global brand.

In determining our strategies, we always consider the expectations and opinions of our stakeholders and create a strong bond by ensuring their satisfaction. We conduct practices with an employee-oriented perspective that takes into account their expectations and needs, thereby creating an efficient and peaceful working environment.

Besides ensuring the health and safety of all our employees, we also contribute to their training and development activities.

Pursuant to our responsible purchasing approach, we perform our raw material supply processes based on sustainable forest management. We support initiatives related to this model and contribute positively to their development.

Our innovation and R&D processes enable us to develop and manufacture products that create high quality, environmentally friendly and healthy living spaces using state-of-the-art technology.

We respect human rights and encourage equal opportunity.

We pay regard to energy and water efficiency; we implement renewable and innovative energy projects accordingly.

We contribute to the welfare of the local community by creating employment and economic value in our geographic locations.



# KASTAMONU ENTEGRE Sustainability Policy





# LCA Information

**Declared Unit** 1 m<sup>3</sup> of MDF with an average weight 737 kg/m<sup>3</sup>

**Time Representativeness** 2019

**Database(s) and LCA Software Used** TLCID ver. 1.0 (Turkish Lifecycle Inventory Database), Ecoinvent 3.6, SimaPro 9.1

The inventory for the LCA study is based on the 2019 production figures for MDF products by Kastamonu Entegre production plants in Kastamonu, Gebze, Adana and Russia

This EPD's system boundary is cradle to gate. The system boundary covers A1 - A3 product stages, C1 - C4 end of life and D stages.

Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Benefits and Loads
Raw Material Supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction, demolition	Transport	Waste Processing	Disposal	Future reuse, recycling or energy recovery potentials
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

X = Included in LCA, ND = Not Declared

# > System Boundary



## **A1: Raw Material Supply**

Kastamonu Entegre's productions start from wood. The company supplies its raw materials necessary from suitable forests. Raw material supply includes raw material extraction/preparation and pre-treatment processes before production.



## **A2: Transportation**

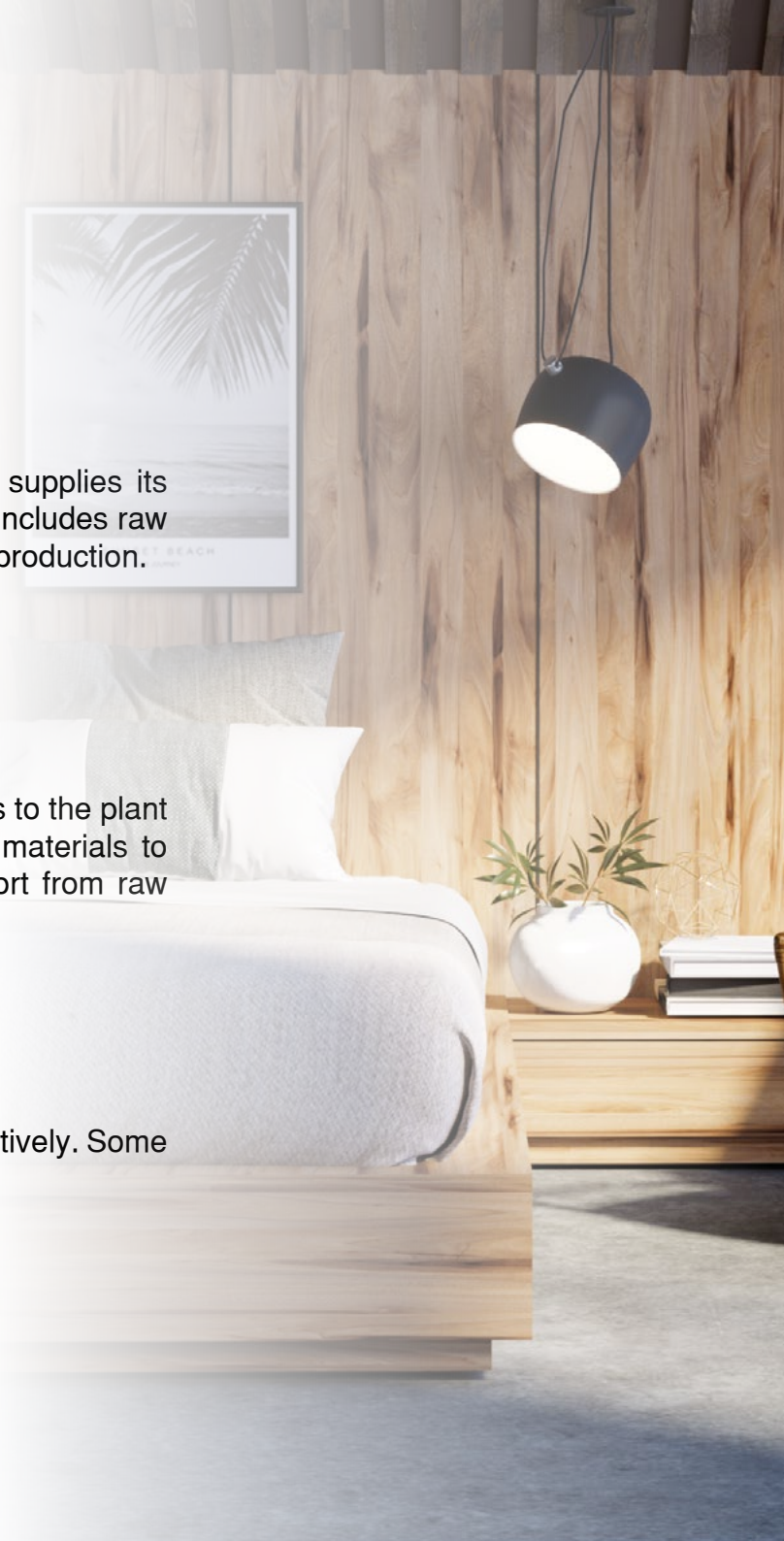
Transport is relevant for delivery of raw materials and other materials to the plant and the transport of materials within the plant. Transport of raw materials to production sites is taken as the weight average values for transport from raw materials supplier in 2019.



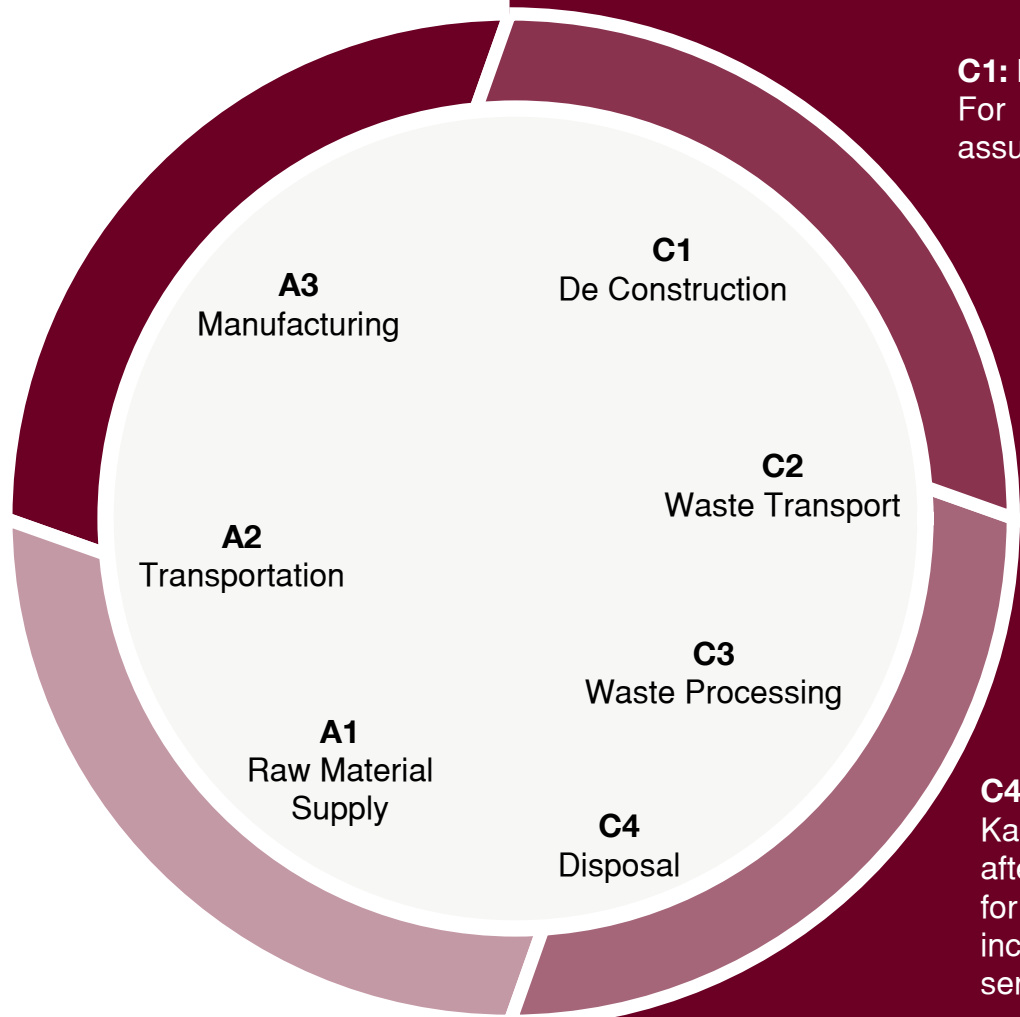
## **A3: Manufacturing**

Kastamonu Entegre's manufacturing flows are given as below respectively. Some process can be vary according to production plant.

- |                          |                        |
|--------------------------|------------------------|
| 1 - Debarking logs       | 7 - Pressing           |
| 2 - Chipping             | 8 - Cutting & trimming |
| 3 - Refining wood fibres | 9 - Cooling            |
| 4 - Gluing fibres        | 10 - Sanding           |
| 5 - Drying fibres        | 11 - Quality control   |
| 6 - Mat formation        | 12 - Storage           |







**C1: Deconstruction and Demolition**

For deconstruction stage, 0.323 MJ electricity use per kg of material was assumed (Gervasio et al., 2018)

**C2: Waste Transport**

A distance of 200 km is assumed for the transport of the deconstructed material to the disposal area.

**C3: Waste Processing**

If the wastes are going to landfill or incineration, there is no need for any waste process.

**C4: Disposal**

Kastamonu Entegre’s products may dispose with any disposal scenario after construction and demolition as their final fate and modelled as such for this EPD. It is assumed that 75% of the wastes used as raw material for incineration plants due to their high calorific value and 25% of the wastes send to the landfill site.

**D Stage (Benefits and Load)**

For benefits and loads beyond, a calorific value of 18.6 MJ per kg of MDF was assumed (Günther et al., 2012) to calculate the amount of avoided electricity production from heat. In this stage, the production efficiency of the plant which electricity generation from incineration is assumed as %20.



# More Information

## **Production Plants and Allocations**

Kastamonu Entegre has production facilities for wood-based products in Turkey, Italy, Russia, Romania, and Bulgaria. Raw material contents are modeled for each product and each factory. Water consumption, energy consumption and raw material transportation were weighted according to 2019 production figures.

In addition, hazardous and non-hazardous waste amounts were also allocated from the 2019 total waste generation.

## **Packaging**

Products by Kastamonu Entegre is delivered en users in film plastic packaging, corrugated board, or composite packaging. The packaging of the final product is included in the LCA.

## **Cut-Off Criteria**

%1 cut-off applied. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

## **REACH**

The product contains formaldehyde which is a substance of very high concern (SVHC) and is subject to authorization under the REACH Regulation. For details, test results are provided in the additional information section and table of technical specifications.

## **LCA Modelling, Calculation and Data Quality**

The results of the LCA with the indicators as per EPD requirement are given in the LCA result tables. All energy calculations were obtained using Cumulative Energy Demand (LHV) methodology, while fresh water use is calculated with selected inventory flows in SimaPro according to the PCR.

There are no co-product allocations within the LCA study underlying this EPD.

The SimaPro 9.1 LCA software and the Ecoinvent 3.6 LCA database were used to calculate the environmental impacts. The regional energy datasets were used for all energy calculations.

Raw materials, energy and water consumption, waste and material and product transport data is collected from Kastamonu Entegre. All primary data collected from Kastamonu Entegre is for the period year of 2019.

## **Geographical Scope**

The geographical scope of this EPD is global. The assumptions of the end of life (C modules) and benefit (D module) stages can be referred to as the global.





# LCA Results



Environmental Impacts for 1 m <sup>3</sup> of MDF							
Impact Category	Unit	A1-A3	C1	C2	C3	C4	D
GWP - Fossil	kg CO <sub>2</sub> eq	433	38.9	13.4	0	6.38	-409
GWP - Biogenic	kg CO <sub>2</sub> eq	-1158	0.355	0.010	0	826	-1.88
GWP - Luluc	kg CO <sub>2</sub> eq	1.10	0.371	0.004	0	0.002	-0.819
GWP - Total	kg CO <sub>2</sub> eq	-724	39.7	13.4	0	832	-412
ODP	kg CFC-11 eq	71.8E-6	1.10E-6	3.15E-6	0	1.19E-6	-17.0E-6
AP	mol H+ eq	2.80	0.256	0.056	0	0.186	-2.04
EP - Freshwater	kg PO <sub>4</sub> eq	62.2E-3	41.1E-3	948E-6	0	3.76E-3	-202E-3
EP - Marine	kg N eq	0.527	41.7E-3	17.1E-3	0	154E-3	-389E-3
EP - Terrestrial	mol N eq	8.49	378E-3	187E-3	0	977E-3	-3.90
POCP	kg NMVOC	1.76	0.103	0.060	0	0.261	-1.04
ADPE	kg Sb eq	1.30E-3	93.8E-6	229E-6	0	43.2E-6	-505E-6
ADPF	MJ	7778	428	208	0	92.0	-5302
WDP	m <sup>3</sup> depriv.	596	18.2	0.677	0	1.96	-64.2
PM	disease inc.	42.6E-6	1.09E-6	1.21E-6	0	1.68E-6	-14.9E-6
IR	kBq U-235 eq	15.8	0.578	1.06	0	0.488	-59.8
ETP - FW	CTUe	4903	374	166	0	159	-7186
HTTP - C	CTUh	4.56E-6	6.88E-9	4.09E-9	0	164E-9	-82.1E-9
HTTP - NC	CTUh	3.46E-6	332E-9	189E-9	0	557E-9	-3.47E-6
SQP	Pt	90497	24.7	239	0	124	-830
Acronyms	GWP-total: Climate change, GWP-fossil: Climate change- fossil, GWP-biogenic: Climate change - biogenic, GWP-luluc: Climate change - land use and transformation, ODP: Ozone layer depletion, AP: Acidification terrestrial and freshwater, EP-freshwater: Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical oxidation, ADPE: Abiotic depletion - elements, ADPF: Abiotic depletion - fossil resources, WDP: Water scarcity, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, ETP-FW: Ecotoxicity freshwater, HTP-c: Cancer human health effects, HTP-nc: Non-cancer human health effects, SQP: Land use related impacts, soil quality.						
Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, C1: De-Construction, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary.						
Biogenic Carbon Content		Unit			A1-A3		
Biogenic carbon content in product		kg C / m <sup>3</sup> product			316		
Note: 1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub> .							



Resource Use for 1 m <sup>3</sup> of MDF							
Impact Category	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	14414	102	2.62	0	3.88	-603
PERM	MJ	0	0	0	0	0	0
PERT	MJ	14414	102	2.62	0	3.88	-603
PENRE	MJ	7766	428	208	0	92.0	-5302
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	7766	428	208	0	92	-5302
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m <sup>3</sup>	1.68	0.163	0.043	0	0.646	-1.70
Waste & Output Flows for 1 m <sup>3</sup> of MDF							
Impact Category	Unit	A1-A3	C1	C2	C3	C4	D
HWD	kg	0.134	0	0	0	0	0
NHWD	kg	6.93	0	0	0	0	0
RWD	kg	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	0	0	0	568	0	0
EE (Electrical)	MJ	0	0	0	0	2073	0
EE (Thermal)	MJ	0	0	0	0	0	0

PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy, PENRE: Use of non-renewable primary energy excluding 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, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water, HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy, Thermal.



# Additional Informations

For more information about Kastamonu Entegre and its products



*Scan or Click!*

With all technical details and 3D images, Kastamonu Entegre products are available on your mobile phone or tablet. Download IDS 3D (Interior Design Studio 3D) application and experience reality.



## VOC Emissions

**Testing Laboratory:** RISE Research Institutes of Sweden AB

**Test Reference:** For updated test reference ID, it is recommended to contact the relevant sales executive.

Emission measurements according to SS-EN ISO 16000-9:2006 (Indoor air – Part 9: Determination of the emission of volatile organic compounds from building products and furnishing – Emission test chamber method) after 28 days regarding volatile organic compounds (VOC and TVOC/SVOC), carcinogenic substances (VOC-substances, EU Regulation No 1272/2008 Annex VI, cat 1A and 1B) formaldehyde and acetaldehyde (ISO 16000-3:2011). Evaluation according to EN 16516:2017 (EU-LCI values).

**Version History : V1.1 - 01.10.2022 - Company logo and Eco Platform logo updated.**





KEAS



# References

/GPI/ General Programme Instructions of the International EPD® System. Version 3.0

/ISO 9001/ Quality management systems – Requirements

/ISO 14001/ Environment Management System- Requirements

/EN 15804:2012+A2:2019/ Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

/ISO 14020:2000/ Environmental labels and declarations — General principles

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

/ISO 14040-44/ ISO 14040:2006-10, Environmental management - Life cycle assessment -Principles and framework (ISO 14040:2006) and Requirements and guidelines (ISO 14044:2006)

/ISO 45001/ Occupational Health & Safety Management System Certification - Requirements

/ Gervasio et al., 2018 /Model for Life Cycle Assessment of buildings LCA, JRC Technical Reports, 2018.

/ Günther et al. ,2012 /Calorific value of selected wood species and wood products, Springer.

/PCR for Construction Products and CPC 54 Construction Services/ Prepared by IVL Swedish Environmental Research Institute, Swedish Environmental Protection Agency,

SP Trä, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB, The International EPD System, 2019:14 Version 2.0, DATE 2019-12-20

/Ecoinvent/ Ecoinvent Centre, [www.ecoinvent.org](http://www.ecoinvent.org)

/SimaPro/ SimaPro LCA Package, Pré Consultants, the Netherlands, [www.pre-sustainability.com](http://www.pre-sustainability.com)





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