

Environmental Product Declaration



In accordance with ISO 14025 and EN 15804 for:

Wood Particleboard (18M Type)

by

TOKYO BOARD INDUSTRIES CO., LTD.



Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-00070
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An EPD should provide current information and may be updated if conditions change. The stated validity is, therefore, subject to the continued registration and publication at www.environdec.com



TOKYO BOARD INDUSTRIES,CO.,LTD.



Summary --- Environmental product declaration		
Verified by	Mamoru Yanagisawa, EPD Verifier	
Owners declaration by	TOKYO BOARD INDUSTRIES CO., LTD. 12-5, Shinkiba 2-chome, Koto-ku, Tokyo 136-0082, JAPAN	
Declaration construction products	as	The products to be verified herein are the plain wooden particle boards, commercially designated as 18M type. References <ul style="list-style-type: none"> •ISO14020, 14025, ISO14040, and 14044 •General Programme Instructions for the International EPD System 3.01 published by Swedish Environmental Management Council •Product Category Rules: PCR 2019:14 version 1.0 CONSTRUCTION PRODUCTS •LCA Report (2020:ver.1) by Tokyo Board Industries Co., Ltd.
Validity	2023-7-30 Note: unless there is a variation greater than 10% on the environmental effects in any of the categories of impact.	
Contents of the declaration	This declaration is complete in itself and contains the following: <ul style="list-style-type: none"> -The product description -Description of manufacturer -Details of material and components -The results of the life cycle analysis -Data on formaldehyde 	
Issuing date	2020-7-31	
Manufacturer	Masahide Nagashima, TOKYO BOARD INDUSTRIES CO., LTD.	
Verified by	Mamoru Yanagisawa, EPD Verifier	
Signatures	 Masahide Nagashima Tokyo Board Industries Co., Ltd.	 Mamoru Yanagisawa EPD Verifier

Product description	<p>Particleboards are wood products, made of small chips of timber, lumber, and wood. All wooden chips are from used material such as demolition material.</p> <p>First, the wooden materials are crumbled into chips. The chips are bonded with glues, and then compressed into board by thermal compressor.</p> <p>Particleboards are used in many places in our daily life, such as frames of integrated kitchen system and</p>
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TOKYO BOARD INDUSTRIES,CO.,LTD.



	<p>subflooring. They have been well utilized in the field of construction, building materials, furniture, and woodworking industries.</p> <p>18M Type represents that the bending strength is 18.0 N/mm² and the glue used is melamine resin.</p>
Geological Boundary	This product is only for Japanese market, and used in Japan.
Application	Integrated kitchen system Construction and building materials, furniture, and woodworking industries.
Scope of application of the LCA	<p>Standards: LCA was conducted in accordance with ISO14040 and 14044. This LCA study does not fully comply with LCA related part of EN 15804:2012+A1:2013. For testing method of formaldehyde, Japanese standards are applied and EN standards are not applicable to this product, because the horizontal standards on measurement of release of formaldehyde from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.</p> <p>Data collection: At the manufacturing phase of particleboard, wooden chips, and compounds, site specific data was used. At the transportation, average distance calculated from accumulated data of actual distance was applied.</p> <p>General Data Source: Tokyo Electric Power Company: Annual Report (2015) Economic Statistic Directory: The Energy Conservation Center (1998) Website of Bureau of Waterworks Tokyo Metropolitan Government: Environment Report (2017) Japan LCA Forum database (2019) Matsuno etal.: Inventory Data of 9 Electric Supply Companies in Japan (1997)</p> <p>LCA method: LCA Method: Buildup approach (Process to Process data accumulation)</p> <p>Assess Life Cycle Stage(EN 15804): LCA was conducted from A1 to A3 as following</p> <p>A1: Raw material Supply</p> <ul style="list-style-type: none"> •Production of raw material •Production of glues <p>A2: Transport</p> <ul style="list-style-type: none"> •Transport of recycled wood and of chips obtained from chip suppliers •Transport of raw materials for glues for wood <p>A3: Manufacturing</p> <ul style="list-style-type: none"> •Manufacturing chips •Manufacturing of particleboards

	<ul style="list-style-type: none"> • Secondary elaboration of particleboards (cutting) <p>Undeclared Module (MNA) Construction Process Stage (A4,A5) Use Stage (B1-B7) End of Life Stage (C1-C4) Resource Recovery Stage (D)</p>
Other evidence and verifications	<p>The emission of free formalin is within the standard of JIS A 5908 (Particleboard). Measurement was made by TOKYO BOARD INDUSTRIES CO., LTD. in accordance with JIS A 1460 (Testing Method for the emission of free formalin of architectural boards).</p>

Manufacturer: TOKYO BOARD INDUSTRIES CO., LTD.

URL : <http://www.t-b-i.co.jp/>

Place of Corporate Facility: Recycling Factory of
 TOKYO BOARD INDUSTRIES CO., LTD.



TOKYO BOARD INDUSTRIES, CO., LTD.

Plain Particle Board (per m ³)					
Impact Category	Unit	A1	A2	A3	Total
Greenhouse Gases	CO ₂ -eq (kg)	2.87E+02	3.55E+00	1.50E+02	4.08E+02
Potential Depletion of Ozone Layer	CFC-11-eq (kg)	6.84E-10	0.00E+00	0.00E+00	6.84E-10
potential Acidification	SO ₂ -eq (kg)	2.43E+00	3.67E-02	4.90E-01	2.96E+00
Potential Eutrophication	PO ₄ ³⁻ -eq (kg)	2.40E-01	8.97E-03	8.31E-02	3.32E-01
Potential Formation of Photochemical Oxidants	ethene-eq (kg)	4.40E-01	5.40E-01	1.67E+00	2.65E+00
Primary Non Renewable Energy	MJ	3.40E+01	0.00E+00	2.37E-02	3.40E+01
Primary Renewable Energy	MJ	9.74E-02	0.00E+00	1.94E+02	1.94E+02
Electricity	kWh	1.12E+02	0.00E+00	2.24E+02	3.36E+02
Secondary Energy other than Electricity	MJ	2.24E+02	6.29E+01	9.67E+01	3.84E+02
Water Usage	kg	1.84E+03	0.00E+00	1.01E+01	1.85E+03

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DESCRIPTION OF THE PRODUCT AND OF THE COMPANY

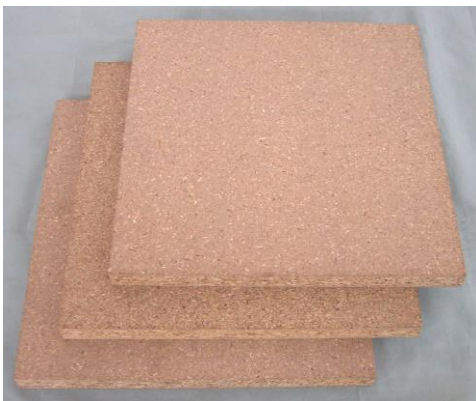
1.1. Product Description

Particleboards are wood products, made of small chips of timber, lumber, and wood. First, the wooden materials are crumbled into chips. The chips are bonded with glues, and then compressed into board by thermal compressor.

Particleboards are used in many places in our daily life, such as frames of integrated kitchen system and subflooring. They have been well utilized in the field of construction, building materials, furniture, and woodworking industries.

18M Type represents that the bending strength is 18.0 N/mm^2 and the glue used is melamine resin.

1.2. Picture of Products



(300mm x 300 mm x 20mm thick)



(Example of packing)

1.3. Description of Manufacturer

TOKYO BOARD INDUSTRIES CO., LTD. started production of particleboards in April 1984. We are the first particleboard manufacturer in Japan, who has used exclusively forest resources in industrial and general wastes as raw materials since 1991, which would otherwise be incinerated or used for landfill.

Recycling Factory of TOKYO BOARD INDUSTRIES CO., LTD. has obtained ISO14001 certification since 1999, which was followed by ISO 9001 certification in 2002.

Manufacturer:

TOKYO BOARD INDUSTRIES CO., LTD.

Place of Corporate Facility:

Recycling Factory, TOKYO BOARD INDUSTRIES CO., LTD.

Address: 12-5, Shinkiba 2-chome, Koto-ku, Tokyo 136-0082, JAPAN

Telephone: +81 3 3522 1522

Fax: +81 3 3522 1525

URL: <http://www.t-b-i.co.jp/>

Person in Contact:

Masahide NAGASHIMA

1.4. Consideration of Recycling

Materials used for the particleboards manufactured by Tokyo Board Industries Co., Ltd. are woodchips from demolition materials and classified as “Material Recycle” in the concept of wood cascading use.

Forests play a specific and important role in the global carbon cycle by absorbing carbon dioxide during photosynthesis, storing carbon above and below ground. Burning recyclable wood or use them for thermal recycle contribute CO² release to the atmosphere and cause of the Global Warming (See Annex 1).

The most efficient use of wood is to reuse or recycle the resource as many times as possible, desirably from larger unit to smaller composites, and finally to burn the wood waste only that cannot be recycled as thermal recycling.

While cascading the forest based resource, the afforestation and proper forest management should be carried out, and it could increase the carbon stored in wood and consequently minimize its contribution to greenhouse effects.

1.5. Material and Component

The following table shows the constituent material, the weight, and other specifications of 1 m³ particleboard. This is the main manufacturing size at Shinkiba Factory. 1 m³ particleboard would convert into 45.8 panels of the ordinary size of the product (1820mm x 600 mm x 20mm thick).

Recycled wood	594.5 ~ 601.0kg
Glues	73.6kg
Thickness	9~35mm
Density	0.745g/cm ³
Moisture content	7 ~ 8%
Bone-dry weight of wood	594.5~601.0kg
Bending strength	18.0 N/mm ²

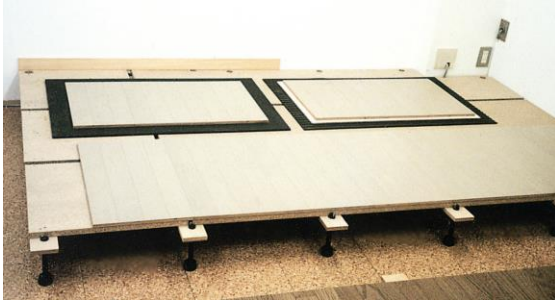
1.6. Free Formalin

The table below shows that the emission of free formalin is within the standard of JIS A 5908:2015 (Particleboard). JIS Mark certificate No. TC 03 08 225 (2008). Measurement was made by TOKYO BOARD INDUSTRIES CO., LTD. in accordance with JIS A 1460:2015 (Testing Method for the emission of free formalin of architectural boards). Particleboards manufactured by TOKYO BOARD INDUSTRIES CO., LTD. are distributed only in Japan, and not exported to other countries.

Standard	JIS A 5908			JIS A 1460 Testing Method for Emission of Free Formalin
	Acceptable Criteria (F☆☆☆☆)			
Details	No. of sample	Average	Maximum	Desiccator Method
	3	Less than 0.3 mg/l	Less than 0.4 mg/l	

Note:
This product is only distributed and used in the Japanese market.

(Example of installation)



2. ENVIRONMENTAL PERFORMANCE DECLARATION

Environmental performance declaration is based on the result of the life cycle assessment.

2.1 LIFECYCLE STAGE

The LCA results are classified into the following phases:

【A1】

- Production of raw materials for glues for wood
- Production of glues for wood

【A2】

- Transport of recycled wood and of chips obtained from chip suppliers
- Transport of raw materials for glues for wood

【A3】

- Manufacturing chips
- Manufacturing of particleboards
- Secondary processing of particleboards (cutting and hole making)

2.2 CONDITION ON LCA

- 1) Functional Unit: 1m³ of particleboard
- 2) The calculation is made on the basis of the data collected from November 2016 to October 2017.
- 3) The flow chart of LCA particleboard is

attached in the Annex 2. Chip manufacturing phase, glue production phase, glue transport phase, and particleboard manufacturing phase are colored in different colors.

The Chemical Substances Used in Particleboard Manufacturing.

Chemical substances	Regulation	Purpose	Amount used (kg)/FU
Methanol	Industrial Safety and Healthy Law	Raw material for glues for wood	9.58E-01
	Tokyo Ordinance		
Formaldehyde	Pollutant Release and Transfer Register Law	Raw material for glues for wood	2.54E+01
	Industrial Safety and Healthy Law		
	Tokyo Ordinance		

2.3 LCIA AND RESOURCE USAGE

Plain Particle Board (per m ³)					
Impact Category	Unit	A1	A2	A3	Total
Greenhouse Gases	CO ₂ -eq (kg)	2.87E+02	3.55E+00	1.50E+02	4.08E+02
Potential Depletion of Ozone Layer	CFC-11-eq (kg)	6.84E-10	0.00E+00	0.00E+00	6.84E-10
Potential Acidification	SO ₂ -eq (kg)	2.43E+00	3.67E-02	4.90E-01	2.96E+00
Potential Eutrophication	PO ₄ ³⁻ -eq (kg)	2.40E-01	8.97E-03	8.31E-02	3.32E-01
Potential Formation of Photochemical Oxidants	ethene-eq (kg)	4.40E-01	5.40E-01	1.67E+00	2.65E+00
Primary Non Renewable Energy	MJ	3.40E+01	0.00E+00	2.37E-02	3.40E+01
Primary Renewable Energy	MJ	9.74E-02	0.00E+00	1.94E+02	1.94E+02
Electricity	kWh	1.12E+02	0.00E+00	2.24E+02	3.36E+02
Secondary Energy other than Electricity	MJ	2.24E+02	6.29E+01	9.67E+01	3.84E+02
Water Usage	kg	1.84E+03	0.00E+00	1.01E+01	1.85E+03

2.4 SUPPLIED ELECTRICITY

Power generation facility ratio of Tokyo Electric Power Co., Ltd. in fiscal year 2015 is as follows.

The difference between electricity consumption in non-renewable resource and that in renewable resource was quantified based on the power generation facility ratio.

Power generation facility ratio	Electricity consumed at Recycling Factory
Thermal power generation (65.0%)	2.18E+02 kWh
Generation of electricity by nuclear power (20.0%)	6.72E+01 kWh
Hydraulic power generation (15.0%)	5.04E+01 kWh
Geothermal and solar power generation (0.0%)	0.00E+00 kWh
Total electricity consumed	3.36E+02 kWh

2.5 WASTE

Environmental impact	Industrial waste
Unit	kg
Total	1.76E+00
A1	1.62E+00
A2	-
A3	1.46E-01

*The definition of industrial waste is in accordance with Waste Disposal and Public Cleaning Law.

2.6 OTHER INFORMATION

- 1) EPD within the same product category may be comparable, but EPD from different Type III Environmental label programs may not be comparable.
- 2) Since the product is mostly made from wood, avoid the handling near the fire. In order to lengthen the life of the product, avoid the use in high-humidity environment.

2.7 INFORMATION ABOUT RECYCLING

The product itself can be recycled repeatedly as raw material for particleboard. For the purpose, plastic resin, non-ferrous metal, cloth, paper etc. should be removed from the product.

In recycling the particleboard used for furniture or woodworking such as frames of integrated kitchen system, case goods, plastic resin, non-ferrous metal, surface material, should be removed.

When the particleboard used for construction and/or building material eg subflooring is recycled, plastic resin, non-ferrous metal, height adjusters should be removed.

3. OTHER INFORMATION

3.1 VERIFICATION

The present declaration has been developed according to standards ISO 14025, ISO 14040, and ISO 14044.

Independent verification according to ISO 14025: 2006

Internal external

Validation of the present declaration by:



Mamoru Yanagisawa

3.2 DECLARATION

For detailed information on the environmental product declarations, see the web page of the Swedish Environmental Management Council (<http://www.environdec.com/>).

3.3 REFERENCE

- ISO14025:2006
- ISO14040:2006
- ISO14044:2006
- General Programme Instructions for the International EPD System 3.01 published by Swedish Environmental Management Council
- Product Category Rules: PCR 2019:14 version 1.0 CONSTRUCTION PRODUCTS
- LCA Report (2019:ver.1) by Tokyo Board Industries Co., Ltd.

3.4 JAPANESE STANDARDS EQUIVALENT TO EN STANDARDS

For testing method of formaldehyde, Japanese standards are applied and EN standards are not applicable to this product because the horizontal standards on measurement of release of formaldehyde from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available. EN 312 is applied in the EU market, but JIS A1460 which is equivalent standard to EN312. applied in Japanese market.

Japanese Standard	EN Standard
JIS A 5908	EN312, 1350-1
JIS A 1460	EN120, 717-1

*Desiccator method is used.

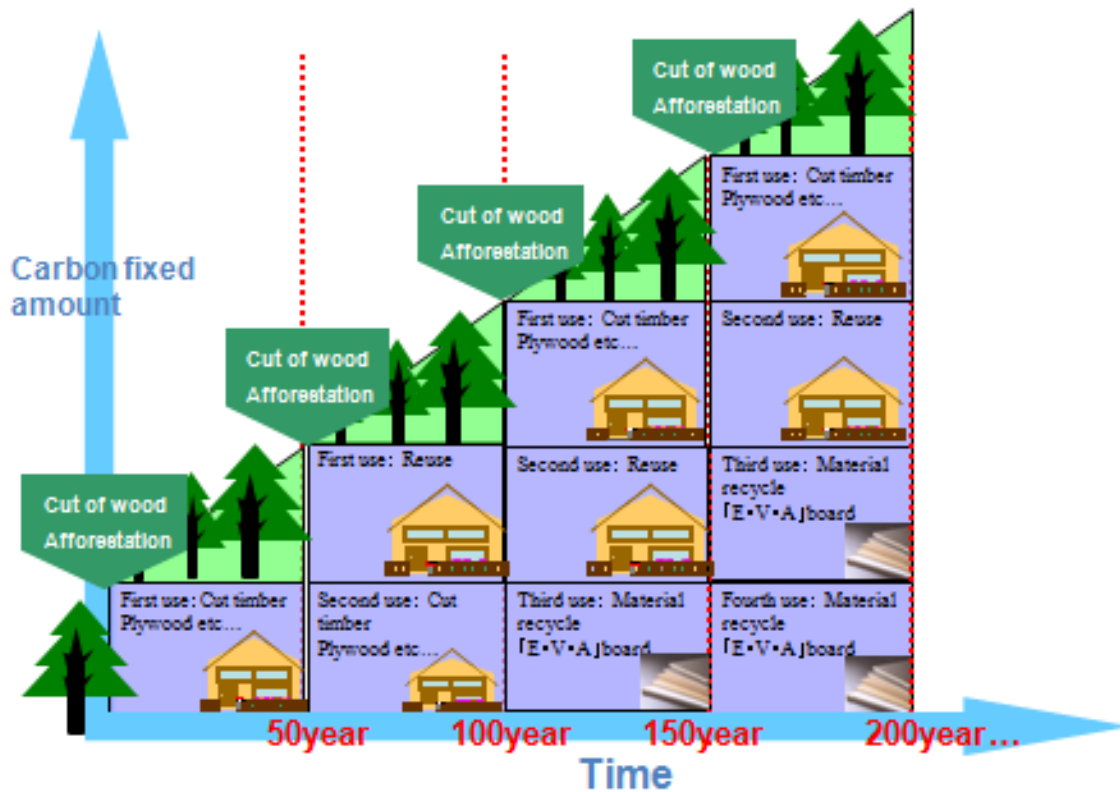
(Products are distributed and used only in Japanese market)

3.5 INTERPRETATION

The results show that a high level of impact of global warming is observed in the production process of glues. The amount of global-warming gases in the glue production phase accounts for about 65 % of the total global-warming gases emission, and above all, the amount of emission in the raw material production process accounts for about 96 % of the total emission. As for the second largest, the emission in particleboard manufacturing phase occupies more than 88% is observed. It is assumed that many big motors installed in the facility and thermal compressors as heat source are attributed to it.

Additional Information
Annex 1

Recycling Model



*Afforestation described in the model above is not covered by this EPD, for conducting the life cycle environmental impact assessment at the stage of the primary use. The rough wood described in the life cycle flow diagram is the materials with no market value and diverted from the waste stream, which is not a resource produced by the afforestation or forestry activities carried out to provide raw materials.

Additional Information
Annex 2 Material Flow Chart

