



LINSON



L I N S E N

SHENZHOU CITY LINSSEN WOOD INDUSTRY CO., LTD  
LINSSEN RAILWAY VEHICLE COMPONENT CO., LTD

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**LINSSEN RAILWAY VEHICLE COMPONENT CO., LTD**

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WHEN YOU NEED HIGH-QUALITY COMPOSITE PANELS  
OR VEHICLE INTERIOR PRODUCTS,  
LINSEN IS YOUR BEST CHOICE!

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# LINSEN INTRODUCE

## INTRODUCE



LINSEN WOOD INDUSTRY CO., LTD establish in 1997 and located in shenzhou city, hebei province which is near by beijing city, the capital of china. At present, company covers an area of 80000 m<sup>2</sup>, including 40000m<sup>2</sup> of plant area, Over 16 million US dollars in fixed assets. There are nearly 200 employees in LINSEN, including 37 undergraduate and above, 12 professional and technical personnel.

LINSEN specializing in manufacture of various plywood, composite board and vehicle interiors. Which is widely application in the field for railway vehicle, Industrial flooring, component manufacture and furniture manufacture and so on. Our long-term partners include CRRC, Yutong Bus, FAW-Volkswagen, GuJia Household as well as well-known enterprises at domestic and overseas such as EISENMANN, DURR.

Our company has a strict quality management system, has obtained ISO9001: 2008 quality management system certification. From the design of the product to raw materail purchase, producing, testing and packaging, strict quality control covers every aspect.

In 2015, we newly established LINSEN RAILWAY VEHICLE COMPONENT CO., LTD, which company focusing on the development of rail vehicle interior, house car interior and other function products business. Now the business of the new company volume increase steadily and we expected that the output value will exceed 35 million US dollar by 2018.

When you need high-quality composite panels or vehicle interior products, Linsen is your best choice!

# LINSEN QUALIFICATION



# LINSEN IMAGE ENTERPRISE PANORAMIC



## PRODUCTION EQUIPMENT



Log cutting



Rotary-cut line



Flame retardant tank



Veneer drying line



Veneer jointing machine



Composer machine



Hot press machine



Automatic sawing machine



Sanding machine



UV Painting line



Electronic panel saw



CNC machines



Edge sealing machine

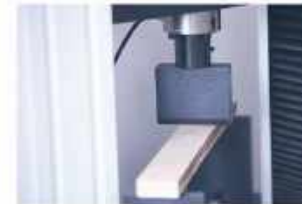


Mould pressing



Five-axis Machining Center

## TESTING EQUIPMENT



## PARTNER



## PRODUCTS APPLICATION



**G** The interior of the railcar



**G** The interior of the railcar



**G** Industrial floor



**G** Industrial floor



**F** Interior for motor home



**F** Interior for motor home

**PRODUCTS APPLICATIONS**



**The yacht interiors**



**Fancy decoration**



**Vehicle floor**



**Container floor**



**Building Construction**



**Fancy decoration**



**Parquet**



# Wood industry

## **LINSEN WOOD PRODUCTS**

When you need high-quality composite panels or vehicle interior products Linsen is your best choice!



# PLYWOOD



## 1. Birch plywood

LINSON® full birch plywood is made of high quality white birch wood from Russia and is produced using full veneer unitization, with high strength, good structure and stable quality.

To achieve a better bonding strength, weather resistance (EN314-2, Grade 3), formaldehyde emission (EN717-1, E1 grade), Linsen used phenolic resin glue as binder.

### Surface grade

The surface grade of the product is divided into four grades: I, II, III and IV. Customers can choose different surface quality products.

### Further processing

One proven technique to achieve the customer requirements is the ability of our further processing. We could not only cut the products by sizing, drilling, edge banding, slotting and other processing, but also make the surface for UV painting, film, paste HPL and other treatment.

## Products parameter list

Thickness	≥2.5mm
width	≤1830mm
length	≤3100mm
Density	About 680kg/m <sup>3</sup>
Surface grade	I、II、III、IV
Bonding quality level	Level 3 (according to European standard EN314-2)
Formaldehyde emission level	E1 grade (according to European standard EN717-1)
Nail-holding force	≥2000N, according to GB / T17657
Surface treatment services	sanding, UV painting, film, paste HPL and so on
Processing services	Cutting by sizing, drilling, edge banding, slotting and so on
Product characteristics	Moderate density and strength, beautiful texture, excellent bonding performance



# BEECH PLYWOOD

## 2. Beech plywood

LINSON® beech plywood is made of beech wood from German. Products using full veneer unitization, with high strength, good structure and stable quality.

To achieve a better bonding strength ,weather resistance (EN314-2, Grade 3), formaldehyde emission (EN717-1, E1 grade) ,Linsen used phenolic resin glue as binder.

### Surface grade

The surface grade of the product is divided into four grades I , II and III . Customers can choose different surface quality products.

### Further processing

One proven technique to achieve the customer requirements is the ability of our further processing. We could not only cut the products by sizing, drilling, edge banding, slotting and other processing, but also make the surface for UV painting, film, paste HPL and other treatment.



### Products parameter list

Thickness	≥2.5mm
width	≤1830mm
length	≤3100mm
Density	About 780kg/m³
Surface grade	I、II、III
Bonding quality level	Level 3 (according to European standard EN314-2)
Formaldehyde emission level	E1 grade (according to European standard EN717-1)
Nail-holding force	≥2000N , according to GB / T17657
Surface treatment services	sanding, UV painting, film, paste HPL and so on
Processing services	Cutting by sizing, drilling, edge banding, slotting and so on
Product characteristics	Higher density, good strength, beautiful texture



## 3. Basswood plywood

LINSON® basswood plywood is made of basswood wood from Russia and it is produced by using full veneer unitization, with high strength, good structure and stable quality.

To achieve a better bonding strength ,weather resistance (EN314-2, Grade 3), formaldehyde emission (EN717-1, E1 grade) ,Linsen used phenolic resin glue as binder.

### Surface grade

The surface grade of the product is divided into three grades I , II and III . Customers can choose different surface quality products.

### Further processing

One proven technique to achieve the customer requirements is the ability of our further processing. We could not only cut the products by sizing, drilling, edge banding, slotting and other processing, but also make the surface for UV painting, film, paste HPL and other treatment.

### Products parameter list

Thickness	≥2.5mm
width	≤1830mm
length	≤3100mm
Density	About 550kg/m³
Surface grade	I、II、III
Bonding quality level	Level 3 (according to European standard EN314-2)
Formaldehyde emission level	E1 grade (according to European standard EN717-1)
Surface treatment services	sanding, UV painting, film, paste HPL and so on
Processing services	Cutting by sizing, drilling, edge banding, slotting and so on
Product characteristics	Lower density, good toughness and flatness, beautiful texture

## 4. Flame retardant plywood

Base on the relevant state regulations, interior decoration and decoration of personnel intensive places , people should use the non-flammable, flame retardant materials in accordance fire safety standards requirements.

LINSON® flame retardant plywood is a non-flammable material. The product is not easily ignited in case of fire, and has a lower smoke density and smoke toxicity. This can effectively delay the fire spread and reduce the harm to people when a fire occurs.

### Flame retardant technology of products

Take veneer into the vacuum tank, through the vacuum - filling with halogen-free flame retardant - pressure - pumping flame retardant - vacuum and these steps make the flame retardant fully immersed in the veneer to achieve flame retardant effect.

### Flame retardant proformance of products

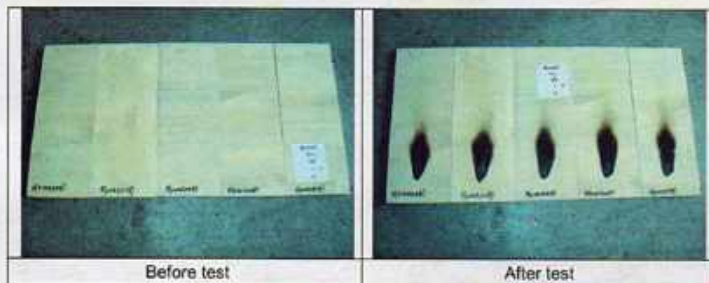
Test standard	Test result	Test organization
EN45545-2:2013	R10 material, Class HL3	TUV
DIN5510-2:2009	Flame class S-4 (SF3) ; Smoke level SR-2; Drip level ST-2;	SGS
EN13501-1:2007	Fire performance class B <sub>1</sub> ;	National building materials testing center
TB/T 3237-2010	Fire class: class B; Oxygen index≥30%;	Iron Academy

### Application cases

The reliability of LINSON® flame retardant plywood is widely validated:

1. On the hundreds of CRH D-series high-speed train, LINSON® flame-retardant plywood is used as floor and siding.
2. A large number of LINSON® flame-retardant plywood are used as workshop floor in domestic and overseas automobile factories such as Peugeot of France, Nissan of Mexico, Beijing Benz and Changchun Audi.

Photo Appendix:



## COMPOSITE PLATE

### 1. Composite acoustic panel

Linsen LINSON® composite acoustic panel is a series of products, mainly including rubber composite acoustic panel, cork composite acoustic panel and plastic steel composite acoustic panel and so on. These products are mainly used as vehicle floors to isolate noise from the bottom of the vehicle and create a quiet interior environment.

Composite acoustic panel products have excellent sound insulation, fire resistance, load bearing and durability. Specific performance parameters are as follows:

	Rubber composite acoustic panel	Cork composite acoustic panel	Plastic steel composite acoustic panel
Structure	Plywood + Rubber Damping Layer + Plywood	Hardwood + Cork + Soundproofing	Plywood + Lightweight Plastic Steel Plate + Plywood
Areal density	≥15.5kg/㎡	About 12kg/㎡	About 10kg/㎡
Sound insulation	≥32dB	About 31dB	About 30dB
Flam retardant rating	Flame retardancy	Flame retardancy	Flame retardancy
Static bending strength	≥40MPa	≥50MPa	≥50MPa
Elastic Modulus	≥4000MPa	≥5000MPa	≥5000MPa





## 2. HPL veneered plywood

LINSON® HPL veneered plywood consists of a high pressure refractory board (HPL) on the surface and an intermediate plywood substrate.

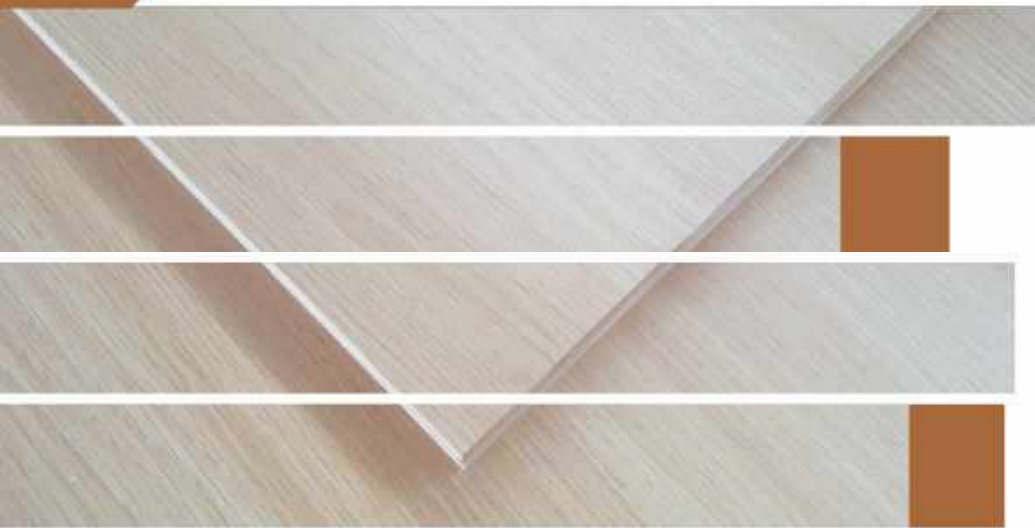
High pressure refractory board (HPL) has a rich surface color and texture, and has flame retardant, wear-resistant, waterproof, stain-resistant, durable and other excellent features. It is an ideal surface decoration materials.

Plywood substrate can be selected according to the working conditions. Decorative products generally use basswood plywood or poplar plywood as a substrate. Flooring products can use birch plywood or beech plywood as a substrate.

### Product parameter

HPL thickness	0.5-1.2mm
Substrate thickness	≥2.5mm
Width	≤1500mm
Length	≤3000mm
Bonding quality grade	level 2, (according to European standard EN314-2)
Formaldehyde emission level	E1 grade (according to European standard EN717-1)
Product characteristics	Beautiful, flame retardant, wear-resistant, waterproof, stain-resistant, durable





### 3. Melamine Board

The full name of melamine board is melamine impregnated paper decorative wood-based panels. Consist of the melamine impregnated paper surface and middle plywood base material.

#### Surface

Surface melamine impregnated paper is composited with the plywood surface by high temperature and pressure. Melamine impregnated paper is similar with HPL, with rich surface color and texture, and has a certain flame retardant, wear-resistant, waterproof properties.

#### Substrate

There are two options for substrates, poplar plywood and birch plywood. Both substrates use melamine urea formaldehyde resin as binder, with good adhesive quality (EN314-2, grade 2) and low formaldehyde emission (EN717-1, E1 grade).

#### Product parameter

Thickness	≥2.5mm
Width	≤1220mm
Length	≤2440mm
Bonding quality grade	level 2, (according to European standard EN314-2)
Formaldehyde emission level	E1 grade (according to European standard EN717-1)
Product characteristics	flame retardant, wear-resistant, waterproof, easy to clean
Application	Furniture, fitment and so on

### 4. Film faced plywood

LINSON® Film faced plywood is composed of the surface phenolic resin impregnated paper and plywood substrate.

#### Surface

Surface phenolic resin impregnated paper is composited with the plywood surface by high temperature and pressure, forming a dense protective film. It is flame retardant, wear-resistant, waterproof, easy to clean and has a certain acid and alkali resistance.

The standard weight of impregnated paper is 120g / m<sup>2</sup>. we can also provide products of different weights. The color of the impregnated paper are mainly two kinds for black and reddish brown.

In addition, It can be use embossed steel sheet during the film faced processing which make the products surface for concavoconvex non-slip texture.



#### Substrate

There are two options for substrates, poplar plywood and birch plywood. Both substrates are made of phenolic resin as adhesive, excellent water and weather resistance (EN314-2, grade 3), formaldehyde emission is low (EN717-1, E1 grade).

#### Product parameter

Thickness	3-40mm
Width	≤1830mm
Length	≤3100mm
Surface colors	Black or reddish brown
Surface treatment	Mirror surface, spongy surface, honeycomb non-slip surface and so on
Bonding quality Grade	level 3, (according to European standard EN314-2)
Formaldehyde Emission level	E1 grade (according to European standard EN717-1)
Product Characteristics	flame retardant, wear-resistant, waterproof, easy to clean
Application	Coach floor, trucks floor, ship floor, concrete formwork, stage, horse block, flight case



# CUSTOMIZED PROCESSED PRODUCTS

## 1. Shaped curved board

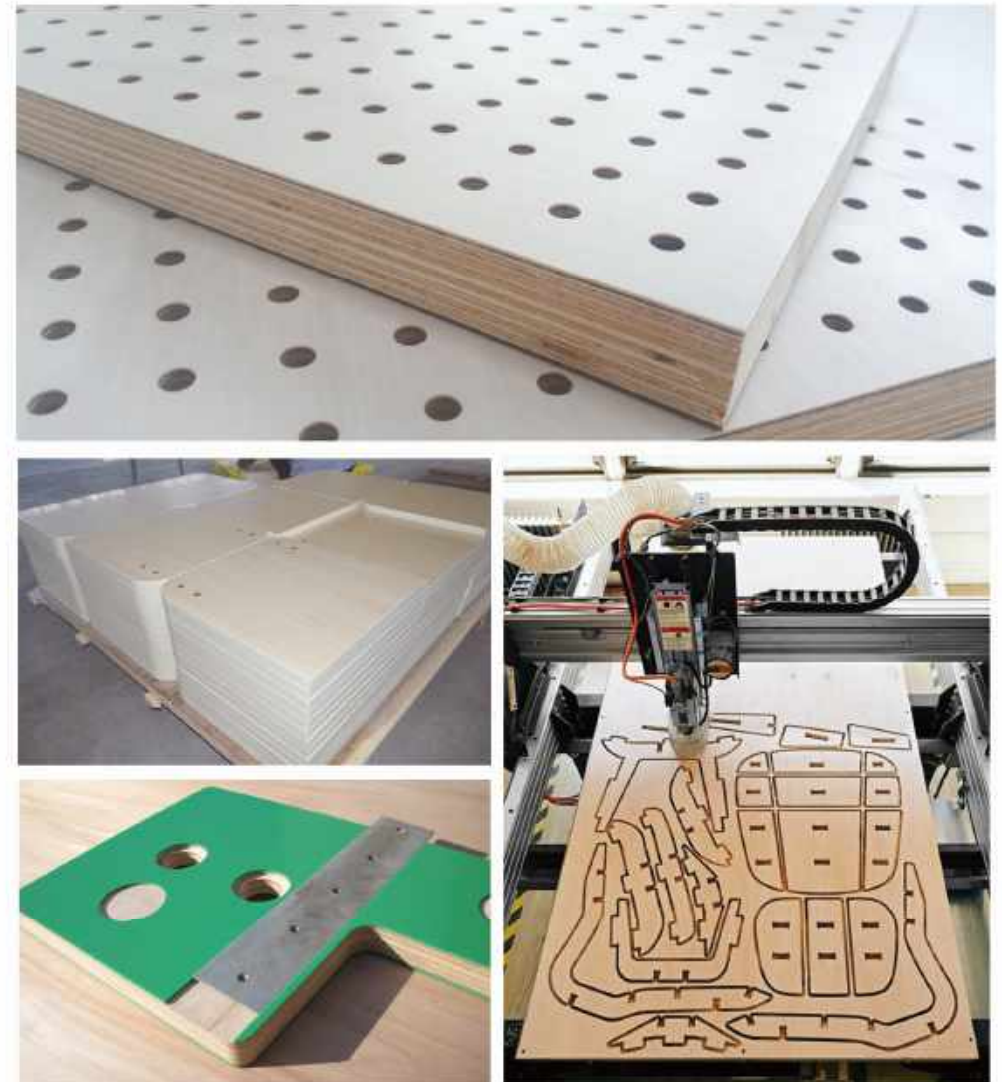
Linsen has extensive experience in the production and processing of curved plywood and curved honeycomb panels. Products including curved plywood chairs, curved train cabinet walls, curved RV partitions, etc.

All curved plywood products are one-time pressed by a wood mold or a steel mold. The product has high strength and is not easy to chip. The curved plywood is milled and trepanned through five-axis machining center with precise dimensions and minimal errors.



## 2. Wood structure accessories

We combine, join and assemble our own plywood with other stainless steel, aluminum alloy, rubber, and glass steel products, and we could also perform precision machining for the products according to the drawings. As a result, we now produce the parts with different characteristics and precise dimensions. Such as vehicle interior accessories, mechanical accessories and so on.



### 3. Industrial floor

LINSON® Industrial Floor is a flooring product designed specifically for industrial use and with special properties. This product is mainly used as working pedal and cover plate of industrial equipment in the automobile production plant.

It is safe (flame-retardant, anti-static, non-slip), beautiful (natural and beautiful pattern), comfortable (wood elastic structure), durable (wearproof, waterproof, acid and alkali resistant) and so on. The main parameters of the product are as follows:

Thickness	20mm or 28mm (customizable)
Width	≤1250mm
Length	≤3000mm
Structure	Plywood substrate, each surface with HPL
Substrate Material	Russian Birch or German Beech
Adhesives	Phenolic resin
Surface	1mm thickness HPL fireproof board on both sides
Density	Approx 780kg/m <sup>3</sup>
Glue quality grade	Grade 3, according to European standard EN314-2
Formaldehyde emission grade	Grade E1, according to European standard EN717-1
strength	Static bending strength ≥ 60Mpa, Elastic modulus ≥ 6000Mpa
Flame-retardant performance	Flame-retardant rating "B <sub>1</sub> " grade, according to European standard EN13501
Wear resistance performance	Wearproof grade "AC4" grade, according to European standard EN13329
Anti-slip performance	critical anti-slip angle ≥ 4° according to German standard DIN 51130
Processing	Cutting, opening and chamfering according to customer drawings



Application Project	Usable area	Usable year
FAW-Volkswagen Tianjin factory painting workshop	3500 m <sup>2</sup>	2017
Guangzhou Automobile Assembly Plant	2300 m <sup>2</sup>	2017
Beiqi Zhuzhou Factory Assembly Workshop	2400 m <sup>2</sup>	2017
SAIC Thailand factory assembly workshop	700 m <sup>2</sup>	2017
FAW-Volkswagen Qingdao Factory Painting Workshop	3000 m <sup>2</sup>	2016
Great Wall Motor Russia assembly plant in Tula factory	1930 m <sup>2</sup>	2016
Future automotive assembly workshop	720 m <sup>2</sup>	2016
Audi PA4 factory	2200 m <sup>2</sup>	2016
French Peugeot Mulhouse factory	3200 m <sup>2</sup>	2016
Grand Mercure Automobile assembly workshop renovation	2200 m <sup>2</sup>	2016
Great Wall Hover Xushui Phase III Assembly Workshop	3280 m <sup>2</sup>	2016
Shenlong Automobile Chengdu 4th Assembly Plant	1700 m <sup>2</sup>	2016
Geely Baoji Factory Assembly Workshop	1700 m <sup>2</sup>	2015
FAW-Volkswagen Foshan Phase II Painting Workshop	3000 m <sup>2</sup>	2015
FAW-Volkswagen Factory one Painting Line Modification	1700 m <sup>2</sup>	2015
Geely Linhai project interior line and final assembly line	1646 m <sup>2</sup>	2015
Shanghai Volkswagen Third Plant Final Assembly Workshop	1996 m <sup>2</sup>	2013
Shenlong Automobile Wuhan 3rd Assembly Plant	1089 m <sup>2</sup>	2013



**LINSEN VEHICLE  
COMPONENT PRODUCTS**



# VEHICLE INTERIOR MATERIAL

## 1. Aluminum honeycomb panel

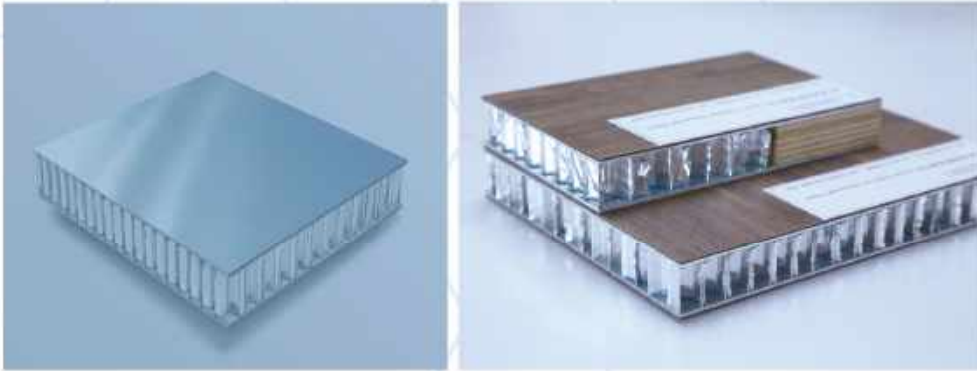
The aluminum honeycomb panel is composed of aluminum honeycomb sandwich in the middle and aluminum plates on the upper and lower surfaces.

The surface aluminum sheet is thin and strong, which is the main force bearing part of the product. Honeycomb sandwiches are thick and light and serve to support and connect the panels. Reinforced aluminum frame is placed around the honeycomb core. Between the panel and the honeycomb core and the reinforcement beam is glued together with polymer glue.

Surface aluminum plate is generally 3003-H24, common thickness is 1mm. Honeycomb sandwich generally uses 3003-H18, aluminum foil common thickness is 0.04-0.06mm.

### Product parameters:

Plane compression strength	≥1.5MPa , According to GB/T1453
Plane shear strength	≥1.5MPa , According to GB/T1455
Plane stretch strength	≥3.5MPa , According to GB/T1455
Drum peel strength	≥23MPa , According to GB/T1457
Impact resistance	≥4级 , According to ISO4211-4

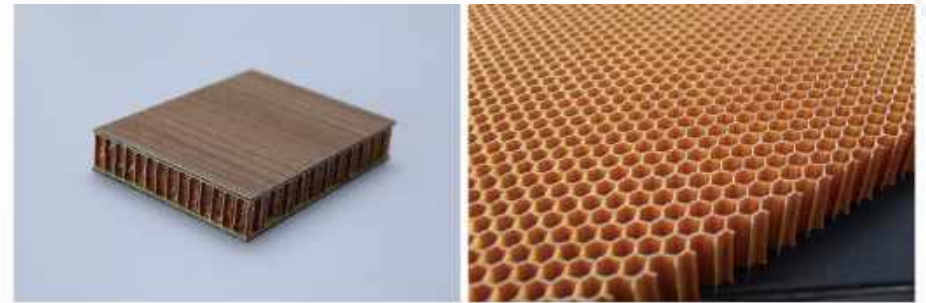


## 2. Paper honeycomb board

HPL paper faced honeycomb board is a sandwich kind material with paper honeycomb sandwich, prepreg and HPL veneer. Paper honeycombs are generally made from aramid paper which is impregnated with phenolic resin. The prepreg is made of epoxy resin impregnated with glass fiber cloth and plays a reinforcing role between the paper honeycomb core and HPL.

### Product parameters:

Plane compression strength	≥2.2MPa , According to GB/T1453
L-direction plane shear strength	≥0.98MPa , According to GB/T1455
W-direction plane shear strength	≥0.56MPa , According to GB/T1455
L-direction plane shear strength	PETS5 , According to ISO4211-4



## 3. Foam aluminum plate

Foaming aluminum, also known as foam aluminum, using titanium hydride as a tackifier and foaming agent, is made by stirring the molten aluminum. In addition to its ultra-light characteristics, the material also has the functions of sound absorption, sound insulation, energy absorption and electronic shielding electromagnetic waves:



# VEHICLE INTERIOR PRODUCTS

## 1. Middle and low speed railway passenger car interior



## 2. Train wooden floor



## 3. Train cabinet



## 4. Train tea table



## 5. RV interior ornament

