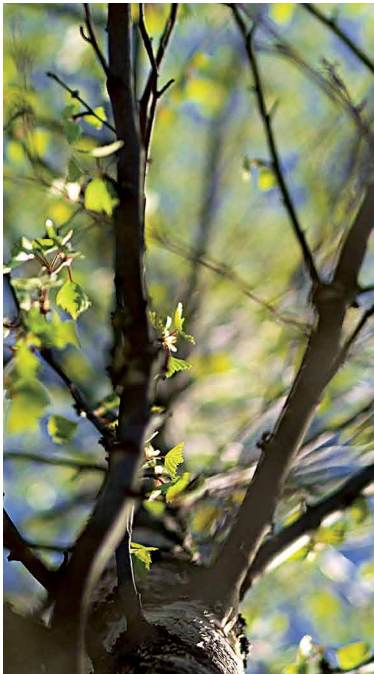


METSÄ WOOD PLYWOOD FOR THE TRANSPORT INDUSTRY



MetsäWood

Photo: Wilh. Wilhelmsen ASA

METSÄ WOOD PLYWOOD FOR THE TRANSPORT VEHICLE INDUSTRY

Metsä Wood plywood industry turns the long traditions of plywood manufacturing and transport industry cooperation into the latest technological and customer-driven innovations. By setting the standards for new and more traditional plywood products and services, Metsä Wood is a proven and reliable partner for your business needs.

Our widespread and continuous market monitoring and R&D work, with high-quality plywood expertise, provide you with up-to-date high-quality tested plywood products. By using technically superior raw material, we use less wood and are able to produce lighter, more economical components without any loss of rigidity. We use low-maintenance, slip- and wear-resistant finishes that meet the most demanding performance requirements. Metsä Wood plywood is stable and predictably easy to work with.

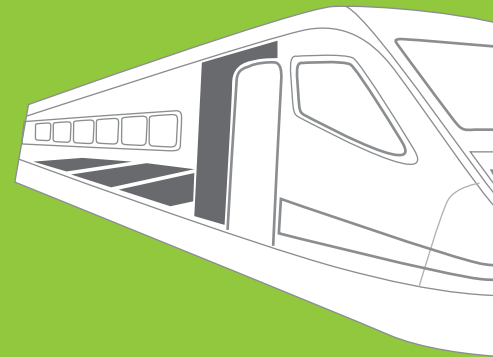
We care for the environment and are committed to sustainability throughout the whole supply chain. We have worked for a long time in cooperation with European testing bodies and universities. Our products fulfill the strictest quality requirements and are tested according to international standards.

We are proud to introduce our product and service portfolio for the diversity of end uses in the transport segment. Metsä Wood's professionals are always ready to provide you with more plywood information and support.

Be our partner in meeting demanding transport applications!

"TAILORED FOR YOUR NEEDS"

SOUND REDUCTION



METSÄ WOOD ADVANTAGES



Sustainable Forestry



Renewable Raw Material



Cooperation Values



Production Technology



High-quality Plywood Products



R&D with New Ideas



Machining & Logistics Network



On-time Deliveries



Sustainability

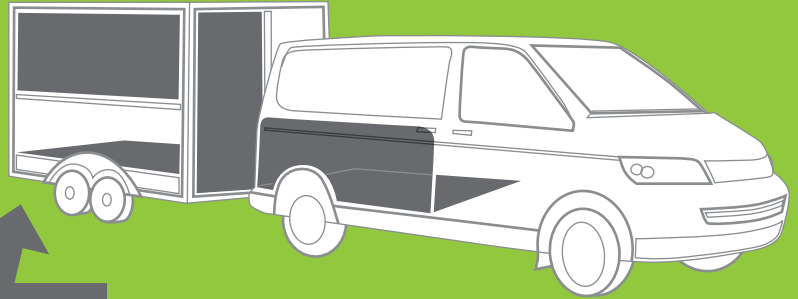


Continuous Development

LOADING SECURITY

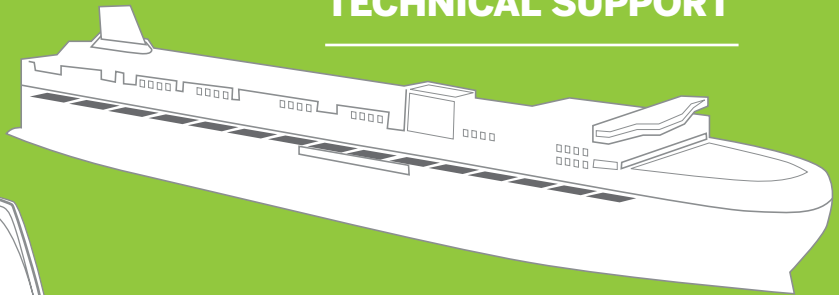


WEIGHT SAVINGS



PLYWOOD
COMPONENTS

COMPREHENSIVE TECHNICAL SUPPORT



NEW SOLUTIONS FOR FUTURE CHALLENGES



DID YOU KNOW

METSÄ WOOD HAS OVER 30 PLYWOOD PRODUCTS IN VARIOUS THICKNESSES FOR THE END USES IN THE TRANSPORT INDUSTRY.

TRUCKS AND HEAVY TRAILERS

Metsä Wood's plywood products and service offering enables our customers to concentrate on their key strengths, while we take care of correct and timely deliveries with high-quality products.

We at Metsä Wood understand the importance of the long life span and size variety of our plywood products. We have developed our transport plywood products in long cooperation relationships with key trailer manufacturers. Metsä Wood sales and R&D teams follow the markets with the changing legislation and norms, and focus on developing the plywood products to meet and exceed these requirements. Metsä Wood plywood products for heavy trailer applications are built to withstand the daily grind of continual loading, unloading and constant wear on the road.

Metsä Wood plywood has a worthy reputation for exceptional strength, light weight and ease of fixing characteristics. Floorings come in a wide range of sizes and overlays, with quick-assembly joints and machining to order. Our plywood flooring products contribute to traffic safety by having exceptionally good friction values and thereby improving loading security.

Metsä Wood applications for heavy trailers include maximized load bearing capacity components for your floor applications, solutions for refrigerated trailers and, as a new feature, a glueable trailer floor to revolutionise the floor fixing system. Our plywood products integrate into your manufacturing process. Metsä Wood sales team is there to provide you with more information and support.



DID YOU KNOW

METSÄ WOOD 30 mm TRAILER FLOOR COMPONENTS, WITH A 300 mm SPAN, EASILY CARRY A 7800 KG FORKLIFT TRUCK LOAD.



"STRENGTH IN MOTION"





SUITABLE METSÄ WOOD PLYWOOD

- Floor 500/700
- Deck (XL)
- Top
- KingSize
- Birch (XL)
- Gluable Metsä Wood Integra

MAJOR ADVANTAGES

- High strength/weight ratio
- Tailor-made components
- Maximal panel size 13 500 mm x 2850 mm
- On-time deliveries
- Variety of sizes
- Floor 500 – Slip resistance R13
- Gluable King Size floor panel – fastening without screws

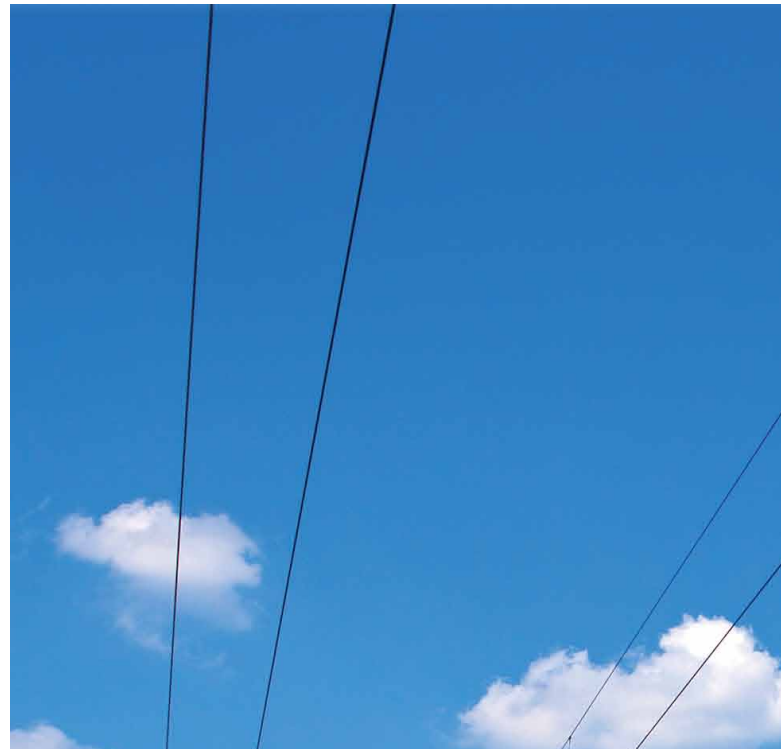


PASSENGER TRANSPORT

Metsä Wood plywood products offer solutions for the demanding end use applications in the bus and train industries, where passenger safety and comfort are the first priority. We offer a broad product range from sound insulation and fire resistance to durable coatings and lightweight panels. Our product range allows our customers more freedom in choosing the optimised product for their end use application.

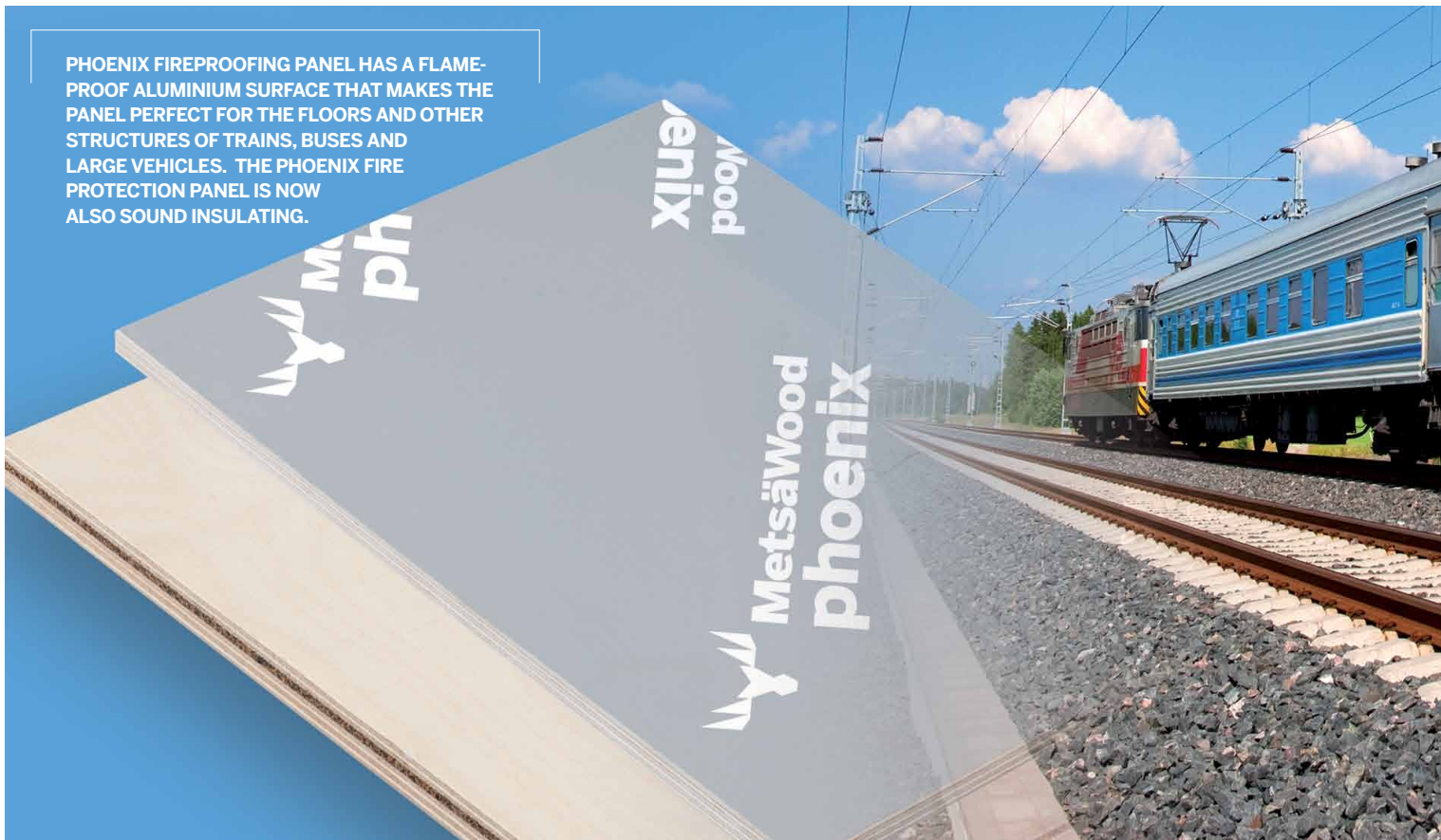
In addition to our excellent products, our machining services enable ready-made component manufacture for the easy installation of panels. Metsä Wood plywood goes through strict quality control during the manufacturing process and as a final product. Our products for passenger transport fulfill the most common standards used in the bus and train industries.

We have extended our fire resistance and sound insulation product families. Our continuous development work ensures that our customers are provided with the latest technological products. By correctly choosing, installing and maintaining plywood constructions, you provide the desired performance and service life for plywood products. Please contact your Metsä Wood plywood sales team for more information.



“METSÄ WOOD LATEST TECHNOLOGY – PASSENGER SAFETY AND COMFORT COUNTS“

PHOENIX FIREPROOFING PANEL HAS A FLAME-PROOF ALUMINIUM SURFACE THAT MAKES THE PANEL PERFECT FOR THE FLOORS AND OTHER STRUCTURES OF TRAINS, BUSES AND LARGE VEHICLES. THE PHOENIX FIRE PROTECTION PANEL IS NOW ALSO SOUND INSULATING.





DID YOU KNOW

THAT FINLAND HAS THE GREATEST PERCENTAGE OF CERTIFIED FORESTS IN THE WORLD?

95% OF FINNISH COMMERCIAL FORESTS HAVE BEEN CERTIFIED. ONLY 9% OF ALL THE FORESTS IN THE WORLD HAVE BEEN CERTIFIED.

EXAMPLES OF SUITABLE METSÄ WOOD PLYWOOD:

- Sonex
- Sonex Light
- Phoenix
- Birch
- Flex
- Deck
- Top

MAJOR ADVANTAGES WITH METSÄ WOOD PRODUCTS:

- Sound reduction with standard panels up to -34 dB
- Fulfils requirements for fire safety
- High strength/weight ratio
- Light and dimensionally stable panels
- Plywood with International Approvals
- No endangered wood species
- No hazardous chemicals



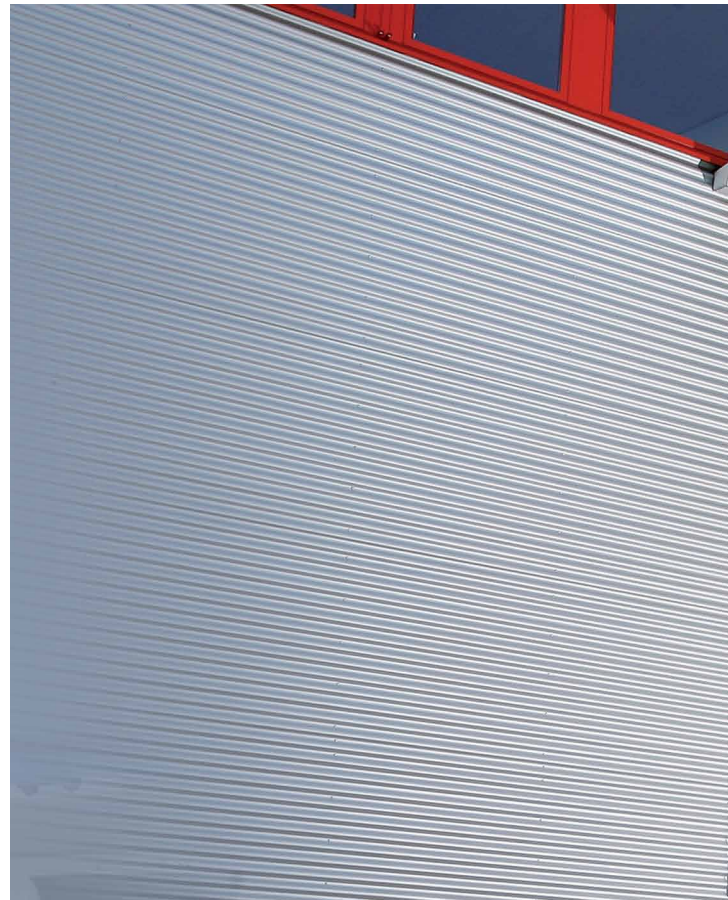
DELIVERY VANS AND LIGHT TRAILERS

Delivery vans and light trailers set high requirements for plywood strength, durability, visual quality and easy assembly. Metsä Wood plywood products with a long life span are the right solution for these needs. We offer a wide product range as ready-to-install components through our machining and logistics services network.

Metsä Wood plywood components are rigid, hard-wearing and are ideal for a whole range of specialist trailers to delivery vans. Our products offer a choice of finishes from plain sanded wood to smooth, easy-clean overlays. Metsä Wood components are easily maintained and have good fixing characteristics. All of our products are of high-quality Finnish Birch throughout the plywood construction. The panels come in a wide range of sizes and surface weights, and machining to order.

Metsä Wood plywood components are manufactured according to customer specifications, with sizes varying from cut-to-size small components to XL-size elements. This mill-direct service not only involves specialist machining, T&G and drilling, but goes as far as specifying the particular lay up of the panels to provide you with the perfect grain orientation for your precise requirements. From forest to factory to you, our customers' specific needs are our core priority.

The superb combination of technical properties with high-class surfaces brings the quality of plywood components to a new level. With Metsä Wood plywood components our customers are able to build lightweight structures with a long life span and save time in the assembly phase.



“STRONG AND DURABLE COMPONENTS WITH HIGH VISUAL QUALITY”





EXAMPLES OF SUITABLE METSÄ WOOD PLYWOOD

- Deck (XL)
- Flex (XL)
- Tuff
- Top
- Freight

MAJOR ADVANTAGES

- Variety of surfaces and colours
- Strength/weight ratio
- XL sizes up to 2400 x 6000
- Tailor-made components
- High visual quality
- Easy to clean surfaces
- Good weather resistance



DID YOU KNOW

THAT FINLAND IS THE MOST
WOODED COUNTRY IN EUROPE?
OF FINLAND'S TOTAL AREA, 86%
OR 26 MILLION HECTARES IS FOREST.

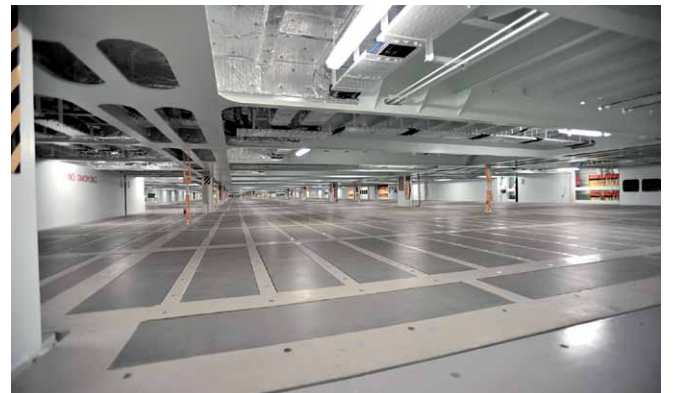
SPECIAL APPLICATIONS



Photo: With. Wilhelmsen ASA

Metsä Wood plywood R&D team is constantly developing new next generation plywood products for the existing and new end use areas. Due to the Metsä Wood broad plywood product range there are panels available for many special applications.

Our strong knowledge and enthusiasm in plywood solutions helps our customers to fulfil the most demanding project requirements. Our R&D team is able to provide project-based calculations for specific needs. Let us know your plywood challenges and we will find a solution together!



EXAMPLES OF METSÄ WOOD PLYWOOD SPECIAL APPLICATIONS

- RoRo car decking
- Cassette systems
- Liquefied natural gas carriers
- Transport platforms



DID YOU KNOW

THAT FINLAND'S FORESTS GROW FASTER THAN THEY ARE FELLED?

THE ANNUAL GROWTH OF TREES TOTALS 100 MILLION CUBIC METRES, WHILE THE AMOUNT OF FELLED TIMBER IS ONLY 60 MILLION CUBIC METRES.

SERVICE, MACHINING AND LOGISTICS

Thorough knowledge of our customers' manufacturing processes and logistics is one of our key targets. As a reliable and long-standing business partner, we support our industrial customers' value chain, improving their profitability and efficiency.

Metsä Wood provides a ready supply of components via its machining and logistics network. We can free your resources saving you time and money, allowing you to concentrate on your core business.

- Cut-to-size services
- T & G profiles
- CNC machining
- JOT deliveries

METSÄ WOOD MACHINING OFFERS

- Tailored solutions for demanding industrial applications
- Processed ready-made components for assembling
- Technical support
- Logistics services

METSÄ WOOD MACHINING TECHNIQUES

- CNC machining (up to 13 500 mm x 2850 mm)
- Cut-to-size services
- Edge profiling & sealing



“THE FINAL STEP TO END-USE”



Metsä forest owners



Own plywood mills



Wide product portfolio



Metsä Wood Machining

- CNC processing
- Cut-to-size
- Edge processing



Logistics services

- Labelling
- Packing
- Stocking
- Shipment



END USE

METSÄ WOOD PLYWOOD TECHNICAL DATA

Standard thicknesses and sizes

METSÄ WOOD STANDARD BIRCH PLYWOOD PANEL SIZES

1220/1250 x 2440/2500/3000/3050/3660 mm
1500/1525 x 2500/3000/3050/3660 mm

The first measurement indicates the orientation of the surface veneer grain. Plywood panels can be specially ordered with a longitudinal grain direction. Other sizes and special constructions available by order.

PANEL TOLERANCES

LENGTH/WIDTH (MM)	STANDARD SIZE TOLERANCE	KINGSIZE TOLERANCE
< 1000	± 1 mm	
1000-2000	± 2 mm	± 2 mm
> 2000	± 3 mm	
2000-6000		± 3 mm
> 6000		± 5 mm
Squareness tolerance	± 0.1 % or ± 1 mm/1000 mm	
Edge straightness	± 0.1 % or ± 1 mm/1000 mm	

The lengths and widths of the panels are with a 95% probability within the given tolerances, measured according to SFS-EN 324. Cut-to-size panels have higher tolerance requirements.

Thicknesses and packing quantities of Metsä Wood standard birch plywood

The thickness tolerances fulfil the requirements of standard EN 315 and are in part more stringent than the official requirements.

Table 1. Thicknesses, number of plies, thickness tolerance and weights per square meter (MC 8-12%) and packaging quantities of sanded Metsä Wood standard birch plywood.

NOMINAL THICKNESS (mm)	NUMBER OF PLYS (pcs)	THICKNESS TOLERANCE		WEIGHT kg/m ²	PACKAGING QUANTITY (PANEL SIZE mm)	
		min. (mm)	max. (mm)		1500/1525 x 2400-3660 1200/1220/1250 x 3000-3660	1500/1525 x 1500-2135 1200/1220/1250 x 1200-2750
4	3	3.5	4.1	2.7	150	240
7	5	6.1	6.9	4.4	90	140
9	7	8.8	9.5	6.1	65	100
12	9	11.5	12.5	8.2	50	75
15	11	14.3	15.3	10.2	40	60
18	13	17.1	18.1	12.2	35	50
21	15	20.0	20.9	14.3	30	45
24	17	22.9	23.7	16.3	25	40
27	19	25.2	26.8	18.4	25	35
30	21	28.1	29.9	20.4	20	30
35	25	33.5	35.5	23.8	15	25
40	29	38.8	41.2	27.2	10	20
45	32	43.6	46.4	30.6	10	20
50	35	48.5	51.5	34.0	10	20

Moisture content of the product affects its dimensions
Average density of Metsä Wood birch plywood is 680 kg/m³ (at relative humidity of RH 65%)
Special structures and thicknesses are available on request
Customised tolerances are possible but must be agreed separately

Edge sealing

Metsä Wood panel edges are sealed against moisture absorption with a moisture resistant acrylic edge sealing paint. Even though edge sealing slows down the absorption of moisture into the wood, it does not eliminate it completely.

Floor products – resistance to abrasion, rolling and slipperiness

Rolling wear simulates the surface tolerance under a wheel load whereas the taber value indicates the surface tolerance against abrasion.

Table 2. Abrasion, rolling wear and slip resistance of overlaid plywood products.

PRODUCT	SURFACE	OVERLAY WEIGHT IF OPTIONAL	TABER REVOLUTIONS*	ROLLING WEAR**	SLIP RESISTANCE (FLOORING) ***
Form	Smooth	120	350	3500	-
Deck	Wire mesh	120	350	3500	R10
Deck	Wire mesh	220	700	5000	R12
Top, Carat and Freight	Pattern	440	2100	7000	Top R10, Carat R9, Freight R11
Top, Carat and Freight	Pattern	660	3500	9000	Top R11
Floor 500	Wire mesh	-	3200	7000	R13
Floor 700	Wire mesh	-	4300	9000	R11

* Abrasion resistance is tested according to DIN 53799/EN 438 until overlay is penetrated. The taber value is an approximate number of revolutions before the first signs of penetration occur.

** Resistance to rolling wear is determined by a method corresponding to SS 923508. Rolling wear is an average calculated from the random rolling movements with a load of 200 kg before the first signs of breakdown occur. The values are indicative and are valid for new unused panels.

*** Slip resistance is tested according to DIN 51130.

Wall products – trailer side walls, doors and bulk heads

Metsä Wood plywood products are available in a wide range of surface options. Birch plywood with excellent strength and stiffness properties combined with a high-quality surface is a good choice for demanding wall applications.

Table 3. Thickness and colours of overlaid wall products.

PRODUCT	MATERIAL	THICKNESS	COLOURS
Form	Phenol	6,5–30 mm	Dark Brown, Grey, Yellow, Light Brown
Flex 0,2 mm	Thermoplastic	4–30 mm	White, Black, Grey, Silver
XL Flex 0,6 mm	Thermoplastic	9–30 mm	White, Grey, Silver
SP	Impregnated paper	9–30 mm	Light Brown

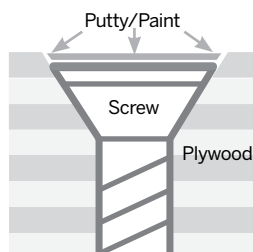
Trailer floor installation – fixings and sealing

Hot dip galvanized or stainless steel round head screws are most commonly used for plywood due to biocorrosion risk in humid conditions. Pilot drilling is always recommended when using screws, with the exception of self tapping screws. The dimensions of the fixings depend on the used plywood thickness.

Recommended spacing of screws:

- Along the edge of the panel 200-300 mm c/c
- In the middle of the panel 300-500 mm c/c
- Distance from edge min. 10 mm

A 1-2 mm gap must be left between the plywood panels to allow moisture movements. Gaps and fixing depressions should be filled with putty or paint. This enables the moisture movements of the panel and improves the edge protection.



Trailer floor installation – Panels

Depending on the chassis design the panels can be installed longitudinally or transversally. Plywood panels must be supported on all four sides. By using oriented plywood constructions the thickness of the plywood panel can be reduced. With KingSize panels the floor can be made with only one piece.

For more information on the panel installation, please visit

WWW.METSAWOOD.COM →

Table 4. Loading table. Maximum wheel load F (kN/wheel) for birch plywood with oriented structure. Surface grain direction parallel to shorter edge of the panel. Strongest direction in direction of the longer panel dimension. Chassis construction: a rigid steel frame. Plate side ratio of 2.

THICKNESS (MM) / NUMBER OF PLYS

SPAN mm	15/11		18/13		21/15		21/16		24/17		24/18	
	F kN	u mm	F kN	u mm	F kN	u mm	F kN	u mm	F kN	u mm	F kN	u mm
300	10	5.9	14	4.9	19	4.2	22	3.9	24	3.6	27	3.4
400	9	9.7	12	8.0	16	6.8	19	6.4	21	5.9	23	5.6
500			11	11.7	15	10.0	17	9.3	19	8.6	21	8.2
600					14	13.6	15	12.7	17	11.8	20	11.2
800									16	19.2	18	18.2

SPAN mm	27/19		27/20		30/21		30/22		35/25		40/29	
	F kN	u mm	F kN	u mm	F kN	u mm	F kN	u mm	F kN	u mm	F kN	u mm
300	30	3.2	33	3.0	37	2.9	39	2.7	45	2.1	52	1.5
400	26	5.2	29	5.0	31	4.7	35	4.5	44	3.9	52	2.9
500	23	7.6	26	7.3	28	6.8	31	6.5	40	5.7	52	4.7
600	22	10.4	24	9.9	26	9.3	29	8.9	37	7.7	49	6.5
800	19	17	21	16.1	23	15.2	26	14.5	33	12.6	44	10.7

F = Maximum wheel load (kN)

u = approximate deflection (mm)

Moisture Content 15%. An increase in moisture strength will result in a decrease in strength, modulus of elasticity and shear modulus values.

Wheel contact area 80 mm x 180 mm.

Fire approvals

PHOENIX PRODUCT RANGE

- CEN/TS 45545-2
- DIN 5510-2
- NF F 16101:1988, NF P92-501:1995, NF P 92-507:2004
- NFX 10702/NFX 70100
- UNE 23721 :1990, UNE 23727 :1990
- BS 6853
- ASTM E162, ASTM E662, SMP 800C, BSS 7239 (Phoenix Sonex Light 19 mm)
- EN 13501-1 (Phoenix)

SONEX PRODUCT RANGE AND METSÄ WOOD BIRCH

- Directive 95/28/EC
- FMVSS 302
- DIN 5510-2

Phoenix panels have been tested according to EN13501-1 (2007) and they comply with the highest European fire rating possible for wood panels (SBI, Single Burning Item) B- s1, d0.

For the latest approvals, please visit

WWW.METSAWOOD.COM



DID YOU KNOW

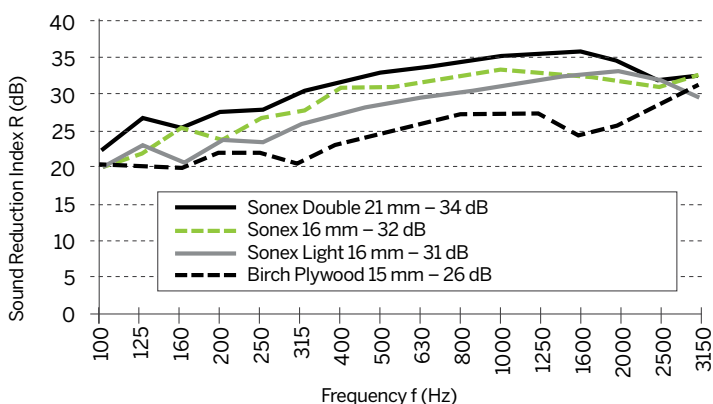
THAT THE LOGGING WASTE OF ONE LOG PROVIDES

- HEATING ENERGY FOR ONE HOUSE FOR A MONTH OR
- BIODIESEL FOR A PASSENGER CAR FOR 1,250 KM

Sonex sound insulation

	NOMINAL THICKNESS (MM)	SOUND REDUCTION INDEX * RW (DB)	WEIGHT OF THE PANEL (KG/M ²)
SONEX LIGHT	One sound reduction layer		
	13	30	9,3
	16	31	10,9
SONEX	19	31	13,2
	One sound reduction layer		
	11	32	13,1
	13	33	15,0
	16	32	16,4
	19	33	18,3
	Two sound reduction layers		
21	34	20,0	

* The sound reduction index R was measured in accordance with EN ISO 10140-2:2010 and the weighted sound reduction index Rw was determined in accordance with EN ISO 717-1:1996. Special structures with higher sound insulation properties available on special request.



SUSTAINABILITY

At Metsä Wood we engage in responsible operations and consider the economic, social and environmental impacts of our actions.

Metsä Wood's environmental policy is based on the principles of environmental impact minimisation, continuous improvement, efficient use of raw materials and open communication. Our certified environmental and quality systems support operational monitoring and systematic improvement in our production units.

GLUING

Metsä Wood plywood panels are glued with weather- and boil-proof phenolic resin adhesive (WBP, BFU, AW, exterior). The plywood panel gluing meets the requirements of the following international standards:

- EN 314-2/class 3 (Exterior)
- DIN 68705 - 3/BFU 100
- BS 6566 - 8/WBP

QUALITY CONTROL

In addition to Metsä Wood's own quality control, the VTT Technical Research Centre of Finland oversees production operations and the internal quality control at Metsä Wood plywood mills. External plywood quality control is conducted according to standard EN 13986 and its CE-marking rules in cooperation with VTT.

RENEWABLE AND SUSTAINABLE MATERIAL

The ISO 9001 and ISO 14001 certified quality and environmental management systems of Metsä Group include a wood origin management system. The PEFC logo ensures that the raw material is sourced from sustainably managed forests.

Metsä Wood products are manufactured with low energy and emissions, using the best available technology. Wood raw material is utilised to the fullest during the manufacture of different products. The by-products – wood chips, sawdust and bark – are used as raw material for production plants or bioenergy production.

RECYCLING AND DISPOSAL

Disposal of Metsä Wood plywood products can be carried out by several methods. It should be noted that the instructions for disposal may vary in different countries depending on current legislation. Recycling of plywood by utilising it in other applications is always preferred, but Metsä Wood plywood products can be safely burnt when the combustion temperature is at least 850°C and correct combustion conditions are maintained. Metsä Wood plywood products contain nothing classified as hazardous waste.

FORMALDEHYDE EMISSIONS

Determined according to EN 717-1, the formaldehyde emitted by Metsä Wood Plywood products falls far below the Class E1 requirement of ≤ 0.100 ppm and most products also fulfill the most stringent requirements in the world (≤ 0.030 ppm). More information of the formaldehyde emissions of different products is given in the Product Data Sheets.

FURTHER INFORMATION

- Metsä Wood product data sheets
- Handbook of Finnish Plywood, Finnish Forest Industries Federation, 2001
- www.metsawood.com

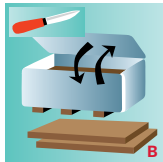
PLYWOOD HANDLING INSTRUCTIONS

PANEL HANDLING AND REPAIR

Metsä Wood Plywood panels can be fastened, cut, shaped and drilled using correct woodworking fasteners and tools. Seal the resulting raw edges with water resistant paint. Panel surfaces can be repaired with water resistant fillers or patching materials.



- Unopened packages can be temporarily stored outside due to the plastic wrapping.



- Once the wrapping has been removed protect the panels from contact with water and direct sunlight by storing in a building or by covering with a suitable waterproof cover. Also avoid very dry and hot storage areas. **(A)**



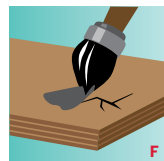
- You can also remove only a few plywood panels from the plastic wrapping. Please close the package top again after removing the panels. **(B)**
- Loose panels should not be moved further on site using mechanical handling equipment, as overlaid panels are slippery. **(C)**



- At the end of their service life Metsä Wood plywood panels can be chipped and utilised in the bio mass energy production industry. **(D)**



- All Metsä Wood plywood packing material is recyclable. **(E)**



- Minor damage to the phenolic panels can be easily repaired by first sanding and then painting over the damaged area. **(F)**

Metsä Wood offers competitive and eco-efficient wood-based solutions for industrial construction customers, other industrial customers and the home and lifestyle sectors. We manufacture products from Nordic wood, a sustainable raw material of premium quality. Metsä Wood is part of Metsä Group.

Further information & sales contacts

WWW.METSAWOOD.COM →

METSÄ WOOD

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