

1247/2526

AkzoNobel Wood Coatings
Marketing Adhesives

Product Information

Adhesive system 1247/2526 consists of 1247, which is a flexible, liquid MUF adhesive, and 2526, which is a liquid hardener. It is a light coloured system to be used with either mix-in or separate application of glue and hardener in load bearing timber structures, such as laminated beams, cross laminated timber (CLT) and duo- and trio-beams. The system can also be used mixed and separate for the application of finger joints.

1247/2526 is used for applications in the wood working industry, where there is demand for light-coloured bond-lines with high water and weather resistance.

1247/2526 is approved according the requirements in EN 301:2013 as a type 1 adhesive by Norsk Treteknisk Institutt (NTI), Norway, Materialprüfungsanstalt Universität Stuttgart - Otto-Graf-Institut (MPA), Germany, Institut Technologique FCBA, France and SKH/KOMO (DHBC No. 32389), Holland for flexible mixing ratio (see below).

The system is suitable for the production of laminated beams according to EN14080:2013. The system is also suitable for the production of cross laminated timber (CLT) according to EN 16351 and for the production of structural finger jointed solid timber according to EN15497:2014

1247/2526 meets the demands of following types:

EN 301-I-90-GP-0,6-M
EN 301-I-90-GP-0,3-S
EN 301-I-90-FJ-0,1-M
EN 301-I-90-FJ-0,1-S

1247/2526 is tested by Materialprüfungsanstalt Universität Stuttgart – Otto-Graf-Institut - (MPA), Germany according to DIN 68141:2008, and fulfils the requirements to the production of glued load-bearing timber parts according to DIN 1052 for flexible mixing ratio (see below).

It is allowed to colour the products with Acomix WZ1, WY1 and WR1. The maximum allowed addition is 1 part by weight to either the adhesive or the hardener or to both as long as the total amount is maximum 1%

When adhesive and hardener are applied separately our Separate Ribbon Spreader 6230 or 7230 Ecoflex are recommended.

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Product Specification

	1247	2526
Product	MUF adhesive	Hardener
Delivery Form	Liquid	Liquid
Colour	Opaque white	White
Viscosity (at time of production)	10000-25000 mPas, (Brookfield LVT/RVT sp. 4, 12 rpm, 25°C/77°F)	1700 - 2700 mPas (Brookfield LVT, sp3, 12 rpm, 25°C/77°F)
pH (at time of production)	9,5-10,7 (at 25°C / 77°F)	1.3 – 2.0 (at 25°C / 77°F)
Dry content	Approx 64-69%	Not applicable
Density	Appr. 1270 kg/m ³	Appr. 1070 kg/m ³
Formaldehyde Info	≤0.8% free formaldehyde	Contains no formaldehyde

Storage Conditions and Storage Life

In order to achieve the given storage life for the product, it is very important that the product is stored under the recommended conditions.

The optimal storage conditions for the adhesive is at temperature 15°C to 25°C.

Only short time exposure to temperatures below 10°C and above 30°C are acceptable. The product can be frozen but it must be thawed, raised to room temperature and homogenized before usage.

The optimal storage conditions for the hardener is at temperature 15°C to 25°C.

Only short time exposure to temperatures below 10°C and above 30°C are acceptable.

Frozen and thawed product cannot be used due to irreversible changes in the product.

The storage life for a product is determined by parameters such as reactivity, viscosity and rheology. The storage time ends when the reactivity, viscosity or rheology transforms from a relatively stable value to a value that can affect the gluing quality.

If the packaging is left open for long periods, the glue is susceptible to skin formation on the surface. To avoid skin formation, keep the packaging closed when not in use.

The storage life of 1247/2526 is listed below.

Storage Life (months)		15°C	20°C	25°C	30°C
	1247	4	4	---	2

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	2526	4	4	---	2.5
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Gluing Operation Information

1247/2526 is intended for use in the wood working industry, for applications such as laminated beam production according to EN14080:2013, CLT, Duo- and Trio-beams as well as I-beams.

Mixing ratio

1247/2526 is approved according to EN301:2013 to be used in the following mixing ratios:

Spruce, Pine, Fir,	Mixed for fingerjointing	100 : 20-100 (glue:hardener)
European Larch,	Separate for fingerjointing	100 : 100 (glue:hardener)
Siberian Larch (by weight)	Mixed and Separate for face lamination	100 : 20-100 (glue:hardener)

The adhesive and hardener shall be used in between the mixing ratio provided above. If other mixing ratios are used, various factors including press times, pot lives, assembly times, and glue line quality will be affected.

In the production of structural timber constructions the maximum allowed deviation from the given hardener ratio is ± 2 parts by weight.

If a mixed system is used it is important to ensure that the adhesive and hardener have been thoroughly mixed before the mixture is used. If mixing the hardener and adhesive by hand, add the hardener to the adhesive.

Separate application of glue and hardener

1247/2526 is optimal for use of separate application of glue and hardener for face gluing, preferably with our separate ribbon spreader 6230 or 7230 Ecoflex. These machines ensure correct ratio of glue and hardener is applied. Assembly times are prolonged while keeping short press times.

The use of other separate application spreader is only allowable if the suitability of these machines has been proven for the intended use.

When glue and hardener are used in separate application no problem with pot life will occur since the glue and hardener are not mixed until being applied on the surfaces to be bonded.

The maximum allowable bond line when using separate application of resin and hardener for face lamination is 0.3 mm.

Mixed application of glue and hardener

1247/2526 can also be used as a mix-in system for finger jointing, preferably with our mixers. Here it is important to have control of the pot life, as this limits the working life with which the system can be used. Pot life is defined as the period of time during which the mixture of glue and hardener can be used. We measure pot lives using controlled methods of analyses, so the pot lives of different systems can be compared.

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The following pot life has been established using EN302-7:

	Mixing ratio	15°C	20°C	30°C
Pot Life	100:20	---	40 min	---
	100:50	---	15 min	---
	100:100	----	8 min	---

Assembly time

Assembly time is the time from the application of adhesive to the application of full pressure to the substrate.

The total assembly time is comprised of open assembly time (OAT) plus closed assembly time (CAT). OAT is the time from the application of adhesive to substrate assembly. CAT is the time from substrate assembly to the application of full pressure.

The OAT and the CAT are influenced by the glue spread, mixing ratio, the moisture content in the wood, and the ambient temperature and humidity. Higher glue spread, lower temperature, and higher moisture content in the wood and in the surrounding air will extend the OAT and CAT.

The pressure must be applied while the adhesive is still tacky.

The OAT and CAT data should be regarded separately. The total assembly time (OAT + CAT) must be evaluated in each specific case. The open assembly time should be kept as short as possible.

The following total assembly times are recommended for 1247/2526

	Mixing ratio	Gluing conditions	Maximum AT
Assembly Time, Separate application	100:20	20°C/250 g/m ²	30 min
		20°C/400 g/m ²	2 h
	100:100	20°C/250 g/m ²	18 min
		20°C/400 g/m ²	50 min

	Mixing ratio	Gluing conditions	Maximum AT
Assembly Time, Mixed application	100:20	20°C/250 g/m ²	15 min
		20°C/400 g/m ²	40 min
	100:100	20°C/250 g/m ²	10 min
		20°C/400 g/m ²	30 min

Depending on ambient temperature, lamella temperature and lamella quality, glue amounts can be optimized for a specific production. This shall always be done in cooperation with an AkzoNobel technician.

Pressing time

Pressing time is the interval of time a bonded joint should be kept under pressure before handling. We measure pressing times using controlled methods of analyses, so the pressing times of different systems can be compared.

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Numerous parameters influence the performance of the glue system, such as the condition of the press, the moisture content of the substrate, the type of construction, and the species of wood.

The given pressing times are related to a material temperature of 20°C. If the temperature of the material is lower, the pressing time must be prolonged. Material temperatures of less than 18°C are not allowed within the production of structural timber elements according to DIN 1052. The values given in table 1 and 2 are to be used as guidelines.

Pressing times are established using DIN EN 302-6. For the production of structural timber elements, these pressing times are usually used, see table 2.

When thin bond lines (approx. 0.1 mm) are always guaranteed, shorter pressing times as compared to the ones established by using EN 302-6 can be used. These values are found in table 1 (see below). For these cases, the maximum bond line thickness has to be controlled regularly within the factory production control and proper quality of bond lines has to be controlled regularly within factory production control by means of delamination tests.

Table 1: Pressing time when a thin glue line (approx. 0,1 mm) is guaranteed

Pressing time when a thin glue line is guaranteed (250 g/m ² , approx. 0.1 mm)	Glue joint temperature	Mixing ratio 100:20	Mixing ratio 100:100
	20°C	5 h 45 min	1 h 5 min

The pressing time can be influenced, among other things, by the bond line thickness. In cases where a thin bondline of approximately 0,1 mm cannot be guaranteed, the pressing times determined according to EN 302-6 must be followed. This minimum pressing time is given below.

Table 2: Pressing time according to EN 302-6

Pressing time According to EN302-6 (approx. 0.3 mm)	Glue joint temperature	Mixing ratio 100:20	Mixing ratio 100:100
	20°C	5 h 45 min	3 h

The given pressing times are related to the production of straight beams with a moisture content of approx. 12%. When gluing curved beams or using wood with higher moisture content the pressing times have to be prolonged.

When structural beam production is conducted at an elevated temperature, either by gluing in a heated press or using high frequency curing, the pressing time can be shortened. For these special cases our technical advisors must always be consulted and before establishing gluing conditions for a specific production plant delamination tests according EN 14080 Annex C.4.3 or C.4.4 must show results in accordance with EN 14080:2013 Table 9.

Pressure

In laminated beam production the necessary pressure is depending on e.g. the thickness of the lamella and

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the wood species.

Lamella thickness of under 35 mm requires pressure between 0.6 – 0.8 MPa. If lamellas have thickness between 35 - 45 mm, pressure should be 0.8 MPa (grooved lamellas) or 1.0 MPa (non-grooved lamellas). For lamella thickness between 45 - 80 mm, pressure should be 0.8 - 1.0 MPa. Bear in mind that lamella thicknesses of more than 45 mm are not allowed in glulam production. Same pressure can be used when separate application of resin and hardener is used for face lamination.

Too high pressure may cause excessive adhesive squeeze out, resulting in a starved glue line.

Too low pressure may result in poor contact between the two surfaces, causing a weak bond.

Glue spread

The glue spread may vary, depending on wood specie, wood moisture content, relative humidity, room temperature, press types, assembly times, and planing quality. The minimum glue spread should not be lower than the values stated in the table below:

The glue spread should not be below 220 g/m² for curing at room temperature.

The glue spread should not be below 180 g/m² for curing with radio frequency.

For the production of structural timber constructions a reduction of the glue spread, e.g. at very short assembly times, is only allowed to be done together with our Technical Advisors and depends on the production parameters for the production line in question. The optimization implies that the set parameters are followed and that a continuous control of the bonding quality is made by means of delamination tests. For these cases signed written statements from AkzoNobel and the adhesive approval institute are mandatory.

A slight squeeze out of adhesive along the edge of all the joints when pressure is applied indicates adequate glue spread and that the total assembly time has not been exceeded.

A high squeeze out indicates excessive glue spread, very high press pressure, or a combination of these two factors.

Higher glue spread can be used when long assembly times are required.

An evenly applied glue spread is important.

Moisture content of Wood

The moisture content of the wood will affect the gluing result. High moisture content can slow down the system, and for some adhesive systems, excessively high moisture content will negatively affect the glue line quality.

In some cases, excessively low moisture content can accelerate the gluing process.

The moisture content of the wood will also affect the overall quality of the end product. Moisture content that is uneven, excessively low or high, can cause the material to warp, cup and become uneven.

For laminated beam production, moisture content should be preferably 10 - 12%, or at least within 6 - 15%. The maximum allowable difference of the moisture content between two boards is 5% according to EN14080, Annex I.

Preparation of wood

For best result the wood must be smoothly planed. For optimum bond strength the bonding operation shall take place within 24 hours after preparation.

The surface must be free from dust, grease, oil, and other contaminants.

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The substrate must be carefully selected so an optimum bond line quality is achieved. In order to meet the pressing times given above, lamella temperature must be at least 20°C. Material temperatures of less than 18°C are not allowed within the production of structural timber elements according to DIN 1052.

1247/2526 is approved for following wood species: Spruce, Fir, Pine, European Larch and Siberian Larch.

Post curing

After the pressing time, the bond line has enough strength for the construction to be handled. Full strength will be reached after a certain time, depending on the pressing time and the pressing temperature.

Post curing is the time needed for the bond line to build enough strength to reach final strength and water resistance.

The specific post curing time depends on the pressing time, the pressing temperature, lamellae temperature, and the post curing temperature.

Curing at temperatures other than 20°C will change the required post curing time. The relevant post curing time must be provided by an AkzoNobel technical advisor.

At 20°C, the post curing time is 20 hours for 100:20, and 10 hours for 100:100.

Formaldehyde emission information

The glue system has been tested according to EN14080 and has passed E1 at worst level conditions.

To determine the emission level of your glued product, a product sample must be sent to a testing institute for measurement.

For more information on emissions norms, post treatments, and related information, please contact your technical representative.

Additional information for finger jointing

For the production of finger joints the requirements given in DIN1052 and EN14080:2013 must be followed. Mix-in or separate application can be used. When using separate application the requirements of Z-9.1-730 must be followed. The table below highlights important bonding information:

Nominal mixing ratio	Mixed application: 100:20 to 100 Separate application: 100:100
Glue spread	Recommended between 250 -350g/m ²
Maximum assembly time	5 min
Curing time	100:20 5 h 45 min 100:50 2 h 100:100 1 h 5 min
Pressure	According to EN 14080:2013

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Mixed application of finger joints

When a glue mixture is used, profiled rollers or similar equipment is recommended. Mix ratios between 100:20 (glue:hardener) and 100:100 part by weight can be used. The accuracy of the ratio between glue and hardener shall be ± 3 pbw. 75% of the area of the fingers needs to be covered with glue mixture. It is important here to check pot life, as it limits the usage of a glue mixture. The table listed under "Pot life" can be used to check the pot life at 20°C for different mix ratios. A cooled glue mixture will have longer pot life. Higher temperature will shorten the pot life.

Separate application of finger joints

When using separate application on finger joints, double application of glue and hardener, and continuous surveillance of the glue and hardener application in accordance with the technical specification Z-9.1-730 (DIBt) must be ensured. The nominal mix ratio is 100:100 (glue:hardener) with a machine system inherent deviation of ± 3 pbw hardener. Deviations on the flanges of the fingers due to application issues shall be less than ± 30 pbw of hardener. At least 75% of the area of the fingers must be covered with glue and also with hardener.

Curing of finger joints

The minimum pressing temperature shall be +20°C, when producing according to EN14080:2013. If Radio frequency curing (RF) is used, the temperature in the zone of the finger joint should reach a temperature of minimum 65°C.

Further treatment of finger joints

Finger jointed lamellae can be further processed directly after the finger jointing operation if the transportation equipment and the planing of the lamellae do not expose the joints for any damaging stresses. Otherwise the pressing time in the table above shall be followed.

End strength of finger joints

The time of final strength of a finger joint will depend on curing conditions and adhesive system used. For 1247/2526 used with a mixing ratio of 100:20 this time is 20 hrs., for 100:100 this time is 10 hrs.

Quality control of finger joints

The quality control of the finger joints must be in line with the respective product standard.

Handling and HSE info

Cleaning Agent 2704;

It is highly recommended to use Cleaning Agent 2704 to clean the adhesive ribbon spreader. Add a 50/50 (by weight) solution of warm water and Cleaning Agent 2704 to the spreader. Let the solution pump around the spreader for four minutes, then wash with warm water

Cleaning

Equipments must be cleaned with lukewarm water before the adhesive has cured. Cured adhesive must be

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removed mechanically.

Handling

Avoid direct contact with adhesives and hardeners. Always use gloves and goggles. If adhesive or hardener comes in contact with skin, immediately wash the affected area with soap and lukewarm water.

Due to its low pH the hardener is corrosive to copper and copper-containing alloys. Steel or plastic is therefore recommended for use in direct contact with the product.

The Safety Data Sheet provides information regarding health and safety. Study this information carefully.

Miscibility

Whether a product can be mixed with another product (for example when changing the glue or the hardener to another product) must be determined in each specific case. Please contact your technical representative for more information.

Waste Handling

Glue - Is normally classified as hazardous waste (contains free formaldehyde).

Hardener - Depending on classification hardeners may be considered as hazardous waste, check the SDS (section 13).

Mixed glue and hardener – Can normally be treated as not hazardous waste when fully cured.

NOTE! There might be national and/or local regulatory differences, therefore always keep a dialogue with the local authorities

Waste water treatment

Mechanical Precipitation → municipal sewage with biological treatment

Mechanical precipitation (sedimentation) is used to lower the solid content of the waste water in order to minimize the risk of clogging of pipes. Sedimentation of the waste water can easily be carried out in an empty barrel or IBC container depending on the amount of wash water used. When the container is full of sludge it should be left to dry (preferably above 50°C) and can after that normally be treated as not hazardous industrial waste. The water phase can normally not be let out directly into the drain without permission from the local authorities.

NOTE! There might be national and/or local regulatory differences, therefore always keep a dialogue with the local authorities. If assistance is needed, contact our technical representative.

Health and Safety

For more information, see SDS

Legal clause

The information is based on laboratory tests and practical experience. It is introductory and intended to help the user find the most suitable method of working. Since the user's production conditions are beyond our control, we cannot be held responsible for the results of the work which is affected by local circumstances. In each particular case testing and continuous control are recommended.

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