

Liquid one-component polyurethane adhesive for load-bearing structural wood bonding

Application: Jowapur® 686.60 is a joint-filling fibre-reinforced one-component adhesive curing with wood moisture or ambient humidity. Jowapur® 686.60 is used for glulam and fingerjointing, and matches in the application range the adhesive type I following the DIN EN 301. Other uses are non-loadbearing wooden structural components with dimensional stability, and for many other substrates.
Not suitable for larch.

Characteristics: Jowapur® 686.60 was tested according to the DIN 68 141 following DIN EN 302 by the Otto-Graf Institut (MPA) of the University of Stuttgart, respectively by the Norsk-Treteknisk Institute/Norway, also for other criteria. It was established that the adhesive may be used for the manufacture of load-bearing laminated wood components for interior and exterior use according to the DIN 1052, for joints below max. 0.3 mm. thickness.

Jowapur® 686.60 has been tested by the DIBt with certificate number Z-9.1-636 for the assembly of load-bearing structural timber components.

Jowapur® 686.60 can also be used for many other bonding procedures.

The adhesive cures due to the components of isocyanate groups which cure with the wood moisture to form a resin which is not water-soluble.

Directions for Use:

For the manufacture of building components according to the DIN 1052, please observe pages 3 to 5, and the General Approval for Building Purposes Z.9.1-636.

Parameters		non-loadbearing applications	loadbearing applications
Open time at +20 °C:		50 – 70 min	30 – 45 min
Processing temperature:		> +10 °C	> +20 °C
Pressing time at +20 °C:		3 – 4 h	see table page 4
Pressure	soft wood species:	0.3 – 1.0 N/mm ²	0.6 – 1.0 N/mm ²
	hard wood species:	0.8 – 1.2 N/mm ²	
Application amount	laminated timber:	100 – 230 g/m ²	*) 150 – 250 g/m ²
	for fingerjointing:		*) 120 – 200 g/m ²
Wood moisture	laminated timber:	8 – 18 %	8 – 15 %
	for fingerjointing:		8 – 18 %
for wood for interior applications with a moisture content of 6 – 8 % the surfaces have to be misted with water.			

*) The adhesive application amount needs to be sufficient to ensure that the bonding partners are fully coated after pressing.

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01/16 All data indicated are characteristics represented as average values. Our technical data sheets are constantly revised to represent the latest state of technology. This edition is replacing all previous ones, and is valid on the date of compilation.
Please turn page for additional information.

Technical Data:	Viscosity at +20 °C [mPas]:	approx. 10,500 (Brookfield)
	Density [g/cm ³]:	approx. 1.15
	Solids [%]:	approx. 99.5
	NCO content [%]:	approx. 15
	Appearance:	light beige
Storage:	In original sealed containers, cool and dry (15 – 25 °C). Best-before date, please refer to label on the packaging unit.	
Disposal:	Cured adhesive can undergo disposal with the domestic waste disposal.	
Packaging:	Types of packaging and units upon request.	
Remarks:	For further information concerning handling, transport and disposal, please refer to the Safety Data Sheet. Our information on this data sheet is based on test results from our laboratories as well as on experience gained in the field by our customers. It can, however, not cover all parameters for each specific application and is therefore not binding for us. The information given in this leaflet represents neither a performance guarantee nor a guarantee of properties, nature, condition, state or quality. No liability may be derived from these indications nor from the recommendations made by our free technical advisory service.	

- General Information:** Jowapur® 686.60 can be used in the wood processing industry as supplied. The adhesive cures due to its content of isocyanate groups, which react with the wood moisture to form a water-insoluble resin. Since a certain level of wood moisture is required for curing, it may not drop below 8 %. Due to the content of isocyanate, any skin contact with uncured Jowapur® 686.60 must be prevented (please also observe the precautions below).
Due to the fact that the reactive groups react with moisture, the processing characteristics of the adhesive will undergo substantial changes after storage when preliminarily exposed to moisture. The containers in which Jowapur® 686.60 is supplied must therefore be hermetically closed at all times. Jowapur® 686.60 used in production has to be processed with a moisture-absorbing filter at the glue container. The adhesive is applied directly from a closed application system onto the wooden substrates.
Jowapur® 686.60 bonds many materials and also bonds metals. If this is undesirable, any contact of the adhesive with metals has to be prevented. Undesired bonding with the press can be prevented by using a separating agent and/or a silicone-coated release paper. These objectives may be reached using a Jowat® Separating agent suitable for PU adhesives and/or a silicone release paper.
- Wood:** The regulations governing the manufacture of load-bearing timber under the requirements for proof of glue in use are to be observed. As already mentioned, the moisture content of the wood is of major importance for the curing of the adhesive. The lowest acceptable percentage of wood moisture for Jowapur® 686.60 is 8 %. The wood temperature may not go below 18 °C.
- Adhesive application:** When using Jowapur® 686.60, it is recommended to apply the adhesive directly from the container in which it is supplied onto the wooden surface, under total exclusion of air. When bonding glulam, a guide value for the application amount of 150 to 250 g/m² can be assumed. Application is one-sided with a nozzle applicator system.
If fingerjointing procedures are to be carried out, the preferable application method is by using an applicator comb. The bonding of fingerjoints has to be done observing the DIN 68140-1.
- Open time:** The open time covers the period from adhesive application until the pressure is fully applied. The open time is determined by wood moisture and humidity. The maximum open time for fingerjoints is 45 minutes (at 20 °C, 12 % wood moisture and 65 % relative humidity). Any increase in humidity will also reduce the permissible open time.
- Pressure:** The pressure required depends on the wood species (soft or hard) and on the type of assembly. If glulam made of softwood species is to be bonded, the pressure should be between 0.6 – 1.0 N/mm² (6 – 10 kp/cm²). In case of fingerjointing, the pressure (longitudinal) has to match the requirements of the EN 385 under consideration of the length of the fingerjoints.

Pressing times: a) Glulam

When glulam is bonded with Jowapur® 686.60, the pressing times depend on the temperature in the bondline and on the thickness, also on the wood moisture. The table below gives the minimum pressing times for wood of a moisture content of 9 or 12 %.

Wood moisture	Joint thickness	Pressing time in hours	
		20 °C	30 °C
9 %	0.1-0.3 mm	3	2
12 %	0.1 mm	2 1/4	1 1/2
	0.3 mm	2 3/4	2

All other parameters remaining equal, the thickness of the bondline will depend on the open time. At an open time of 30 minutes, the bondline will be max. 0.1 mm. Open times between 30 and 45 minutes will be associated with bondlines of 0.2 - 0.3 mm. Please observe that the data indicated above refer to the bondline temperature and the wood moisture content of the surface of the laminate timber to be bonded.

When the pressing times above have expired, the adhesive will have cured to the point where the glulam may undergo subsequent processing. To reach complete water-resistance at a wood moisture of 12 %, however, a period of two days has to elapse. During this time, the parts have to be stored at a temperature of at least 20 °C. The glulam may not be subject to any major load/stress during this post-cure.

b) Fingerjoints

Fingerjointing with Jowapur® 686.60 has to be carried out at an ambient temperature of at least 20 °C. Since curing depends on the wood temperature and moisture, and since the dimensions and geometry of the fingers will modify the time needed for curing until the necessary bond strength is reached, it is impossible to give exact recommendations with regard to the curing times required. These have to be determined based on test bonds.

Cleaning:

The adhesive nozzles have to be cleaned in regular intervals.

If the applicator unit is not hermetically sealed, the adhesive may thicken. If this happens, the applicator unit has to be emptied and cleaned immediately, since otherwise there is a danger of the adhesive curing completely, whereupon it becomes insoluble and has to be scraped off. Following this, the unit should be immersed in a container with a cleaner. This cleaning procedure is to be carried out with Jowat® Cleaner 402.30.

Hose couplings and machine parts are to be protected with a Jowat® Separating agent suitable for PU adhesives. At the end of the last daily shift, the orifices of the nozzles or the comb have to be sealed with grease free of water, to protect the adhesive against humidity.

The Jowat® Cleaner contains solvent. When this cleaner is used, please ensure adequate ventilation.

As described earlier, Jowapur® 686.60 bonds many substrates. It is therefore recommended to use a Jowat® Separating agent suitable for PU adhesives.

Precautionary measures:

Due to its content in isocyanate groups, which may cause skin irritations and allergies of the respiratory tract, Jowapur® 686.60 has been classified as Xn, harmful. People who suffer from chronic respiratory problems should not work with isocyanates. Jowapur® 686.60 can still be processed safely, if the standard precautions for handling chemicals are observed.

For instance, any skin contact of the uncured adhesive has to be avoided. Using protective gloves and glasses is recommended. If Jowapur® 686.60 is spilled accidentally, it can be contained with sawdust. Positioning a container with sawdust or water under the applicator unit is recommended.

The Jowat® Cleaner 402.30 is classified as Xn, harmful. Jowat® Cleaner 402.30 can be processed safely if all standard safety precautions for handling chemicals are observed.

Please ensure that adequate ventilation is in place during processing.

When using Jowapur® 686.60 and Jowat® Cleaner 402.30, hands and lower arms should be washed carefully with soap and warm water before eating and after work. Solvents may not be used. For drying, paper towels are recommended. For all other information please refer to the Material Safety Data Sheet for Jowapur® 686.60, Jowat® Separating agents and Jowat® Cleaner 402.30.

Jowat Information

Gluing as one of the most efficient methods of bonding is constantly gaining importance and expanding into new areas of application. At the same time, the number of substrates to be bonded is also growing at an unprecedented rate. New methods and equipment to process adhesives are developed.

The in-house R & D departments of Jowat are responding with intensive efforts to keep pace with these constant changes. A highly qualified team of chemists and engineers is using the latest techniques and brightest ideas to provide the utmost in advice our customers and to make sure that they get the adhesive which meets their needs.

Our information is based on test results from our laboratories as well as on experience gained in the field by our customers. This advice, however, cannot cover all eventualities for each specific application and as such is not binding for us. Please, contact our technical service department in each case to find out what the actual technical state of development for the respective product is, and request the latest data sheet. Any use of our product without this precautionary measure would be your sole responsibility.

The processing company itself must therefore test the adhesives manufactured by us for suitability in each individual case. This applies to the first use of a sample as well as to modifications during an ongoing production.

We are therefore requesting all our new customers to test our adhesives for suitability on original parts at conditions equal to normal processing conditions. The bond has then to be subjected to the actual stress which it would undergo when in use and has to be assessed. This test is absolutely necessary.

Customers who undertake modifications during a running production are requested to pass this information on to us. Please notify us when machines are set to new parameters as well as when the substrates to be bonded are changed. Only then will Jowat be able to provide our most up-to-date information to the processor using our adhesives.

The information given in this leaflet is based on practical experience and on results of tests in our laboratory, and does in no way constitute any guarantee of properties. No liability may be derived from these indications nor from the recommendations made by our technical advisory service.