



# Jowapur® 681.xx Load-bearing glulam



**One-component, moisture-curing prepolymer adhesives  
based on polyurethane for load-bearing glulam**

**Optimised assembly-pressing time ratio of up to 1:1**

**Flexible assembly times between 10 and 60 minutes**

**Fibre-reinforced for high strength during curing**

**Certified according to EN 15425:2017**





## INFO: Reactive 1-C PUR adhesives

Reactive one-component adhesives based on polyurethane (PUR) are chemically curing products that are liquid or paste-like at room temperature. They are easy to process and provide a wide range of adhesion to differing materials as well as bondlines with good resistances to heat and water. The one-component moisture-curing PUR prepolymer adhesives of the Jowapur® product line cure via a reaction with water or humidity. They are free of formaldehyde, need lower application amounts compared to other adhesives, cure at room temperature within a few minutes after application and form a water-insoluble resin due to the isocyanate groups contained in them. The advantage: Fully cured adhesive can undergo disposal in the domestic waste system. Reactive 1-C PUR adhesives are used in load-bearing timber construction, diverse assembly operations in the crafts sector, outdoor applications and for manufacturing sandwich elements.



# Jowapur® 681.xx – New product series for load-bearing glulam

Manufacturers of bonded timber components for load-bearing applications have special challenges to master. On the one hand, production is subject to different standards. On the other hand, the adhesives used for that purpose must have been tested by an accredited institute and meet the requirements under EN 15425:2017.

Furthermore, the processing characteristics of the adhesive have to match the very specific requirements of every individual applications, from finger-jointing to laminating operations.

The Jowapur® 681.xx series supplied by Jowat provides a comprehensive portfolio of one-component, moisture-curing PUR prepolymer adhesives with different product versions for a wide variety of processes in the production of load-bearing glulam. All products in the series are tested according to the European Norm 15425:2017 in which the performance requirements for polyurethane adhesives in load-bearing timber structures are specified.

Compared to other adhesive systems for load-bearing glulam, e.g. condensation resins, polyurethane adhesives provide several advantages for the manufacturing process and for the end product. They are completely free of formaldehyde and require significantly lower application amounts due to a solids content of 100 %. In addition, the prepolymers cure at room temperature within a few minutes already. They are colourless, which facilitates visually discreet glue lines. Jowapur® adhesives are processed as a one-component system, and therefore mixing, pot lives and production remnants become obsolete.

The adhesives of the Jowapur® 681.xx series have undergone careful and extensive preliminary testing and provide an optimum fulfilment of the needs in load-bearing structural wood bonding due to their composition, characteristics and processing parameters. They can be used for fingerjointing as well as for flat bonding, offer the choice of assembly times between 10 and 60 minutes, and facilitate an assembly-pressing time ratio of 1:1 that has never before been achieved.

Industrial users can optimise their processes by choosing the formulation best-suited for their application. A simple change of adhesive, for instance, can lead to the realisation of an increase in capacity or alternatively improve process reliability without the need for major investments.

Another benefit of the Jowapur® prepolymers is that they are reinforced with fibres, which increases the bond strength while the adhesive is curing. This virtually eliminates the risk of the fingers sliding apart during manufacturing after they have been pressed together.

The Jowapur® 681.xx series provides certified, highly efficient bonding solutions for every field of application in the production of engineered timber. The product portfolio is complemented by Jowat's own comprehensive service in all things adhesive.



# Technical information (only applicable to certified processes)

For the manufacture of load-bearing timber, observe the specifications in the applicable national and/or European regulations for the manufacture of the corresponding timber components (e.g. EN 14080, EN 15497, EN 16351, ETA, etc.), as well as the following points.

## Applications

Jowapur® 681.xx is a joint-filling, fibre-reinforced one-component adhesives series based on polyurethane with an optimum fibre geometry. It cures with wood moisture and/or ambient humidity to create a water-insoluble resin, and is used for manufacturing load-bearing timber.

## Directions for use

Jowapur® 681.xx was tested and classified as adhesive type **EN 15425 – I – 70 – GP – 0.3 – w** by the Materials Testing Institute (MPA, Otto-Graf Institut) of the University of Stuttgart, Germany.

It has been established that Jowapur® 681.xx can be used for the manufacture of load-bearing timber made of spruce, fir, or pine wood according to EN 14080:2013, EN 15497:2014, and EN 16351:2015. In addition, the MPA Stuttgart has also determined the performance characteristics of the adhesives following EN 15416-4/5.

The manufacture of load-bearing timber is subject to the specifications in the applicable national and/or European regulations for the manufacture of the corresponding timber structures (e.g. EN 14080, EN 15497, EN 16351, diverse ETA, etc.). Beyond that, the information indicated on the technical data sheets is to be observed.

Our Application Technology Department and our Application Specialists will provide technical data to assist you in your choice of an appropriate adhesive for your requirements.

## General information

Jowapur® 681.xx are ready-to-use adhesives for the wood-processing industry. Due to the content of isocyanate, any skin contact with uncured Jowapur® 681.xx must be prevented (please also observe the following precautions). Due to the fact that the reactive groups react with moisture, the processing characteristics of the adhesives will undergo substantial changes after storage when preliminarily exposed to moisture. Containers with Jowapur® 681.xx must therefore be closed at all times. Containers with Jowapur® 681.xx that are used in production must be equipped with a moisture-absorbing air intake filter (silica gel), and the adhesives must be applied directly from a completely closed application system that is suitable for processing polyurethane adhesives. Jowapur® 681.xx bond many materials and also bond metals. To prevent the adhesives from coming into contact with metal, we recommend using a Jowat® separating agent suitable for PUR adhesives and/or a coated release paper.

## Wood

The regulations governing the manufacture of load-bearing timber under the applicable product standards are to be observed. The surface of the laminated timber must be planed or undergo a similar treatment before bonding. Planing must be carried out 24 hours or less before bonding, unless the wood species and the storage conditions are such that there will be no unacceptable changes to the surface. If wood species are used which are difficult to bond, e.g. wood with a high resin content, the surface has to be planed within 6 hours before bonding.

A minimum moisture content is decisive for the curing of PUR adhesives. Therefore, the lowest acceptable percentage of wood moisture of the surfaces to be bonded using Jowapur® 681.xx is 8 %. If wood moisture is less than 8 %, the necessary minimum moisture can be achieved by spraying additional water onto the surface. However, this must be coordinated in advance with the Application Technology Service of Jowat SE. If additional humidification is intended, the amount of water applied must not be more than 10 % of the adhesive application amount. The spraying and the amount of water applied are to be documented.

## Adhesive application

The adhesive Jowapur® 681.xx is applied directly from the container it is supplied in, using a closed application system, under exclusion of air. If fingerjoints are to be bonded, application can be one- or two-sided using either an applicator comb or contactless application systems. The requirements with regard to monitoring measures under the applicable technical regulations are to be observed. The application amount chosen must be such that full-surface wetting of the substrates is ensured after pressing. When bonding fingerjoints, the guide value for the application amount is 120 – 160 g/m<sup>2</sup>.

When bonding flat surfaces, the adhesive is usually applied in bead form onto one of the two surfaces with an automatic application system. The guide value for adhesive application is 140 – 200 g/m<sup>2</sup>. The application amount must be chosen such that full-surface wetting of both surfaces is ensured after pressing. Unfortunately, it is not possible to specify an exact application amount in advance because the necessary application amount depends on the joint thickness, the uniformity of the application, and the structure of the surfaces to be bonded. Any application amount below the aforementioned values is to be coordinated with and approved by the Application Technology Service of Jowat SE.

## Assembly time

The assembly time covers the period from the start of adhesive application until full pressure is applied, and should be as short as possible. The assembly time is determined by several factors, e.g. by humidity, wood moisture, the temperature, and the adhesive application amount.

It must be ensured that the parts to be bonded are pressed together within a time in which there has been no skin formation on the surface of the adhesive and its adhesive performance has not been affected. Still liquid adhesive being pressed out of the joint is a sign that the permissible assembly time was not exceeded.

For individual assembly times, please refer to the table on the following page or to the technical data sheets.

## Pressing time

If fingerjointing procedures are to be carried out, the prescribed pressure must be applied onto the joint for at least 1 or 2 seconds depending on the applicable product standard. After that, parts bonded with Jowapur® 681.xx are to be stored for a minimum curing time as specified in the corresponding technical data sheet (temperature 20 °C, wood moisture 12 %). Any increase in wood moisture and temperature will reduce the minimum pressing time, lower temperatures and less moisture will increase it.

During the curing time, it is imperative to prevent all mechanical load/stress on the bonded parts. Any moving of the not yet completely cured fingerjointed wood must be carried out such that the curing process will not be affected by deformation or vibrations. If flat surfaces are bonded, the pressing time depends especially on the application amount, the temperature, the amount of moisture available, and the tensions acting on the bondline. At a temperature of 20 °C, a wood moisture of 12 %, and perfectly matching joints (approx. 0.1 mm), the minimum pressing time for parts bonded with Jowapur® 681.xx will be between 10 and 60 minutes (depending on the product).

Any increase in temperature and moisture will reduce the minimum pressing time, lower temperatures and less moisture will increase it, as will higher application amounts and joint thicknesses. If a perfectly matching joint (max. permissible thickness up to 0.3 mm) is not ensured, the pressing time must be adapted. The exact pressing time is to be determined separately in each individual case based on the given conditions.

## Storage time after bonding

When the curing time (fingerjointing) or the pressing time (flat bonding) has expired, the parts bonded with Jowapur® 681.xx must be stored at a temperature of minimum 18 °C (see technical data sheet for further information). If the bonded parts have a wood moisture content of less than 12 %, the storage time after bonding will increase accordingly. During the storage time after pressing, the bonded parts can already be processed further, but they are to be moved in such a way as to prevent deformation and/or vibrations that could affect the post-cure process. After that, the bonded parts can also be exposed to lower temperatures. The bonded wood is only allowed to be exposed to the final load/stress after final strength is reached. At 20 °C and 12 % wood moisture, final strength is reached after approx. 24 hours.

## Pressure

In the manufacture of fingerjointed assemblies, the longitudinally applied pressure has to match the requirements of the respective technical regulations under consideration of the length of the fingerjoints. According to the standard, a pressure of approx. 7.5 – 10.0 N/mm<sup>2</sup>, depending on the profile used, is recommended to ensure a perfectly matching joint and correct tip gap. In case of flat bonding, the pressure chosen has to be such as to ensure an optimum fitting of the parts to be joined and a bondline as thin as possible. If glulam or cross-laminated timber made of soft wood species is to be manufactured, the recommended pressure according to the standard is 0.6 – 1.0 N/mm<sup>2</sup>. If the product or the machine requires another pressure, this is to be coordinated in advance with the Application Technology Service of Jowat SE.

## Cleaning

Adhesive nozzles and applicator combs must be cleaned in regular intervals. If the applicator unit is not hermetically sealed, the adhesive inside it can react. Therefore, the applicator unit has to be emptied immediately and all parts be cleaned. Otherwise, there is a danger of the adhesive curing completely. Completely cured adhesive is insoluble and has to be scraped off. Following this, the affected unit parts have to be immersed in Jowat® Cleaner 402.38.

Hose couplings and all machine parts that come into contact with adhesive, should be protected with a Jowat® separating agent suitable for PUR adhesives. It is recommended that at the end of the last daily shift, the orifices of the nozzles and the comb should be cleaned and sealed with the aforementioned Jowat® separating agent. This protects the adhesive from moisture during standstill.

## Precautions

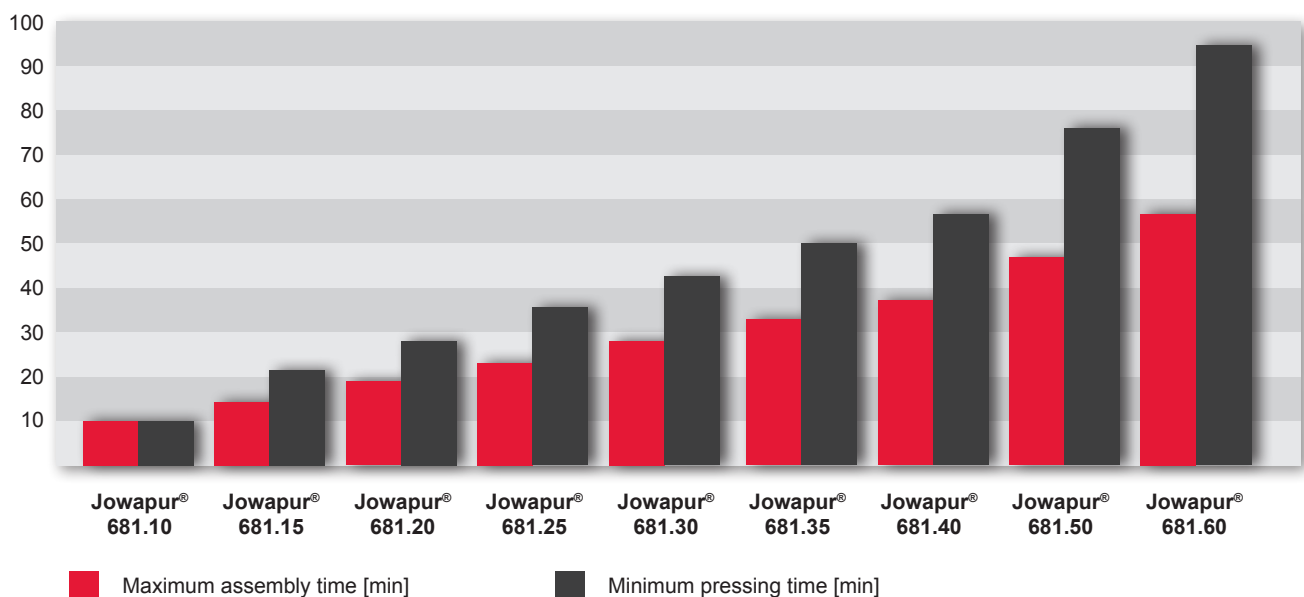
The adhesives series Jowapur® 681.xx and the cleaner Jowat® 402.38 can be processed safely if the standard precautions for handling chemicals are observed. For instance, any skin or eye contact of the cleaner or the uncured adhesive must be prevented. Therefore, using protective gloves and glasses is recommended when directly handling the adhesive. In addition, adequate ventilation should be in place during processing. Beyond that, please refer to the material safety data sheets for Jowapur® 681.xx as well as for the corresponding Jowat® separating agents and Jowat® cleaners.

## Product overview

The table below provides an overview of our one-component polyurethane adhesives of the Jowapur® series for load-bearing glulam. The product range comprises different adhesive types with special performance characteristics, adapted to the common process requirements in load-bearing glulam applications. Please contact our sales representatives for a more detailed assistance in the selection of an adhesive.

		Jowapur® 681.10	Jowapur® 681.xx	Jowapur® 681.60
Technical data	Adhesive type	EN 15425 – I – 70 – GP – 0,3 – w		
	Viscosity at 20 °C [mPas]	15,000 ± 2,500		
	Solids content [%]	99 ± 1		
	Density [g/cm³]	1.15		
	Maximum assembly time [min]	from 10 to 60 minutes, depending on adhesive type		
	Minimum pressing time (flat bonding) [min]	from 10 to 60 minutes, depending on adhesive type		
	Minimum curing time (fingerjointing) [min]	from 10 to 60 minutes, depending on adhesive type		
	Maximum permissible joint thickness [mm]	0.3		
	Appearance	beige to yellowish		

### Jowapur® 681.xx - Maximum assembly time / Minimum pressing time





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The information given in this leaflet is based on test results from our laboratories as well as on experience gained in the field, and does in no way constitute any guarantee of properties. Due to the wide range of different applications, substrates, and processing methods beyond our control, no liability may be derived from these indications nor from the information provided by our free technical advisory service. Before processing, please request the corresponding data sheet and observe the information in it! Customer trials under everyday conditions, testing for suitability at normal processing conditions, and appropriate fit-for-purpose testing are absolutely necessary. For the specifications as well as further information, please refer to the latest technical data sheets.

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**Jowat – first class bonding**

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