WOOD GLUE

Product Guide

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DANA LIM

WOOD GLUE - RETAIL

Product	Brief Description	**Application temp.** (Min. °C / Max. °C)	**Open time** (Max) Minutes (If the waiting time is "closed", it can be prolonged 1-2 min.)	**Press time** Min. minuts. Pine 9% wood moisutre content 20 °C	**Viscositet (mPas)** Brookfield RVF, 20 r.p.m. 20°C	**Water resistance** (EN 204/205)
Wood Glue PU Light 421	One-component polyurethane adhesive for bonding of most wood joints, metals and rigid plastics. Moisture/water is needed when PU adhesive cures. High strength and water resistance of glue joints will be obtained when wood moisture content is high.	+15/+40	30	180	2.000	D4
Wood Glue PU Dark 422	Same type as Wood Glue PU Light 421, but has higher viscosity and light brown glue lines.	+15/+40	30	180	10.000	D4
Wood Glue D3 Outdoor 430	A fast setting and strong bonding 1-component PVAc adhesive. Suitable for furniture, frame wood and kitchen tabels used in wet rooms. D4 water resistance can be obtained by adding 5% of DANAFIX Hardener 921 or Dark Hardener 923.	+3/+90	5-6	5-7	13.000	D3 D4
Laminate Floor Glue 433	An all-round PVAc wood adhesive, is especially developed for gluing of tongue and other wooden floors. UV detector is added.	+3/+90	5-6	5-7	13.000	D3
Wood Glue D4 Outdoor 440	2-component PVAc wood adhesive, suitable for furniture, frame wood and kitchen tabels used in wet rooms. The adhesive itself fulfils D2 water resistance. D4 water resistance is achieved when adding 5% Light Hardener 922.	+3/+90	5-6	5-7	18.000	D2 D4
Wood Glue Winter 465	Anti-frost all-round indoor PVAc wood adhesive, suitable for working temperature down to -10 °C.	-10/+70	6	10	14.500	-
DANAFIX 461 H/G Taplim	PVAc adhesive designed for tenon, dowel joints where strong bonding are requested. A UV-detector is added.	+10/+70	6-10	6	9.000	-
Wood Glue Indoor 490	Fast setting, strong bonding PVAc adhesive for all kinds of indoor wood applications.	+10/+70	5-6	6	13.000	-

WOOD GLUE - INDUSTRY

Product	Brief Description	**Application temp.** (Min. °C / Max. °C)	**Open time** (Max) Minutes (If the waiting time is "closed", it can be prolonged 1-2 min.)	**Press time** Min. minuts. Pine 9% wood moisutre content 20 °C	**Viscositet (mPas)** Brookfield RVF, 20 r.p.m. 20°C	**Water resistance** (EN 204/205)
DANAFIX 434	Fast setting, suitable viscosity, high moisture resistant and all-round PVAc-adhesive with neutral pH. No discolouration.	+5/+90	5 - 8	4	9.000	D3
DANAFIX 435	Fast setting, suitable viscosity, high moisture resistant and all-round PVAc-adhesive with high bonding strenght. D4-class if used with 5% DANAFIX Hardener 921.	+3/+90	6 - 8	4	10.000	D3 D4
DANAFIX 437	Moisture resistant PVAc-adhesive for finger joint applications. UV detector has been added. D4 water resitance if used with 5% DANAFIX Hardener 921.	+5/+90	7 - 10	4 - 6	6.200	D3 D4
DANAFIX 439	Moisture resistant, all-round PVAc-adhesive with high strenght. UV dectector has been added. D4-water resistance if used with 5% DANAFIX Hardener 921.	+5/+90	7 - 10	4 - 6	7.000	D3 D4
DANAFIX 446	1-component D4 PVAc-adhesive with very high bonding strenght, suitable for finger joint application. Fulfills WATT 91 and the demands of frame wood production for doors and windows.	+5/+80	5 - 8	6	4.500-5.500	D4
DANAFIX 463	Mailny used for easy manual joints and is suitable for gluing accessay to self assemble furniture.	+10/+70	10	20	10.000	-
DANAFIX 467	Dowel- and tenon PVAc adhesive with very low viscosity. For automatic application.	+10/+70	10 - 15	10	400	-
DANAFIX 471-2	D3 PVAc-based fast setting foil bonding adhesive, specially devoloped for foaming application where very low glue amount is used.	+5/+70	4 - 5	1	6.300	-
DANAFIX 476	EVA based adhesive for gluing foil on wood-, fibre- and plastic boards etc, offers very good wet tack.	0-50	10	-	5.000	-
DANAFIX 496	Fast PVAc-adhesive for all indoor wood joints. Especially for automatic application and press. UV detector has been added.	+10/+80	3 - 5	8	13.000	-
DANAFIX 497	All-round PVAc-adhesive with longer open assembly time, for all indoor wood joints. Recommended for only soft wood types.	+10/+80	8 - 10	30	12.000	-

GLUING WOOD GUIDE

In preparing a good glue joint, although a suitable glue has been chosen, it is still necessary to keep your mind on a couple of ground rules:

1. Working temperature should be higher than minimum film forming temperature (MFFT).
2. Control wood moisture to the required level.
3. Clean surface and ensure suitable surface tension
4. Joints should fit properly
5. Apply correct quantity of glue on the joint.
6. Assemble wood elements within open time.
7. Choose correct pressing temperature and pressing time.

Minimum film forming temperature (MFFT)

Every adhesive has its own MFFT varies between 3 to 15°C depending on the glue types, in special cases, it can be down to -10°C like winter adhesive. MFFT indicates the lowest temperature which adhesive is able to form a thin film in glue joint. If the working temperature is below MFFT, the glue only dries and forms a layer which cannot develop the required strength.

Wood moisture

The moisture content in wood has a significant effect on gluing, especially gluing of solid wood. The ideal wood moisture is 7-12% when use PVAc adhesive, polyurethane adhesive requires higher wood moisture of 12-20%. Extra water /water damp normal are provided when polyurethane is applied to ensure a fully curing. The wood elements to be bonded should always have nearly the same moisture content with a maximum tolerance of ±2%, otherwise the different shrinkage and swelling will lead to stress which not only affect the glue joint but can also cause deformation of the wood product. To avoid this, the wood must be thoroughly conditioned before gluing.

Surface checking

To be bonded wood should be flat and achieve a good fit. The surfaces must be clean, dry and free of dust, grease and other contaminations before glue is applied. Wood preferable is glued within the same day after machining/cutting so that surface will not change again.

An easy compatibility test can be done to check the surface. Place one drop of water or glue to the surface to be bonded, if the drop beads up on the surface, the surface must be cleaned or sanded before bonding; if the drop spreads out flat, the glue will result in a positive tack on the surface.

This surface is difficult to glue.

This surface is easy to glue.

Application of adhesive

The glue can be applied with a brush or a roller or nozzle. It is important that the glue is applied evenly. The necessary quantity of glue applied depends on absorbency and fit of the wood, normally ranges between 100-250 g/m^2. The glue is often only applied to one surface, so called one-sided application, when working with solid wood or wood containing oils and resins, double-sided application is recommended. The sufficient quantity of glue is achieved if small glue beads is squeezed out of both sides of the joint under pressure.

• Open time:

Open time is defined as the period "after application of adhesive during which wet bonding is possible" according to DIN 16920. However, people also know it as the time between application of adhesive and the time pressure is applied. On page 2 in the brochure, the stated open times are obtained by using pine wood with the wood moisture of 9% and 50% relative humidity of air, the testing temperature is around 20°C.

• Closed assembly time:

According to DIN 16920, it is the time after closing of the wood elements until the required the pressure is reached. Closed assembly time is part of open time.

• Pressing time and pressing temperature:

To achieve a successful joint, correct pressing time and pressing temperature have to be chosen. If pressing time is not sufficient or pressing temperature is lower, joints perhaps will open after pressure is released. If pressing temperature is increased, the pressing time can be decreased co-ordinately. The stated pressing times in this brochure are minimum and they can vary depending on the wood type and pressing temperature.

By using PVAc glue, extra pressing time can be suggested for following cases:

Hard/oil-containing wood:	+ 50% - 100%
Decreasing 5°C in temperature:	+100%
Wood moisture is 15%:	+100%

• Pressure:

Pressure must be sufficient to guarantee required fit of the joints. A pressure of 1-3 kg/cm^2 is common used for veneering and compact laminating, 7-10 kg/cm^2 is for soft wood lamination, and 13-15 kg/cm^2 is recommended for hard wood like oak. Be aware that too high pressure might result in glue penetrating into the substrates or being squeezed out so that there is not enough glue left in glue line, and consequently lead to defective bonds. A fully bonding strength could be obtained after 24 hours.

In general, open time and pressing time can be prolonged in the situation listed below:

- Too high wood moisture
- High of relative humidity in air
- Low wood and room temperature
- High density of wood
- Thick layer of glue
- Low press temperature
- Double-sided application

The open time and pressing time can be reduced if:

- The relative humidity is low
- Wood and room temperature is high
- Wood surface is porous
- Glue layer is thin.

If clamp is used, the following is suggested:

Pine:	300 cm^2 per clamp
Mahogany:	250 cm^2 per clamp
Teak:	200 cm^2 per clamp

Polyurethane glue requires approx. half of the area per clamp.

Finishing of glued wood

Wood finishes give a desired appearance, protect wood surfaces, and provide a cleanable surface. However, when selecting a finish, one should consider whether the finishing performances will impact glued joints and also how surface properties of glued lines affect finish applications. At page 6 the guideline table indicates the suitable finishing on the different type of adhesives. It is strongly recommended to carry out sufficient finishing tests before larger scale of finish performances.

Staining:

There are many types of products can be used for staining including oil-based, water-based, solid-color stains as well as wood conditioners. If the adhesive is not stainable, problems such as discoloration, blister and cracking might be caused after performance.
In general, PU and UF adhesives are more stainable than PVAc adhesives.

Vacuum impregnation:

Finishes will penetrate into wood by vacuum impregnation in order to retard water absorption and extend their service life. Adhesives have to be dried minimum 1 day at 20°C before impregnation.

Lye treatment

Wood lye treatment has a lightening effect on the wood. Cross-linkable adhesives such as PU, UF resins and D4 PVAc can be considered to tolerate lye treatment. Otherwise they are not recommended.

Advice and guidance

The products mentioned in this folder are DANA LIM's general wood adhesives.
DANA LIM produces others and more specialized adhesives. In case of request special tasks or in need of further information or a good advice, please do not hesitate to contact DANA LiM's Technical Service on phone number +45 56640075.
All products' Technical and Safety data sheets are available on DANA LIM's home page: www.danalim.dk.

Product Guide - Detail

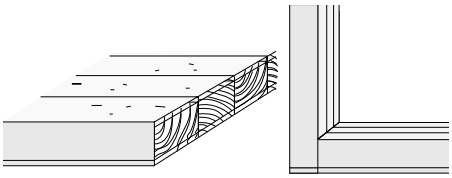
DANA LIM

Adhesion
- ● Recommended
- ❍ Test first
- ☐ Not recommended

		Wood Glue PU Light 421	Wood Glue PU Dark 422	Wood Glue D3 Outdoor 430	Wood Glue D3 Outdoor 430 w/hardener 921/923	Wood Glue Laminate 433	Wood Glue D4 Outdoor 440	Wood Glue D4 Outdoor 440 m/light hardener 922	Wood Glue Winter 465	DANFIX 461 H/G Taplim	Wood Glue D2 Indoor 490	
LAMINATING (LAMINATED WOOD)												
Furniture	Cold press (clamps)	●	●	●	●	●	●	●	●	●	●	
	Cold press (automatic systems)	●	●	●	●	●	●	●		●	❍	
	High frequency			●	●	●	●	●		●	●	
	Warm press			●	●	●	●	●		●	●	
Frame wood	Cold press	●	●		●			●				
	Warm press				●			●				
ASSEMBLING												
Furniture	Dowel joint - Automatic assembling											
	Dowel joint / Tenon joint - Manual	●	●	●	●	●	●	●	●	●	●	
	Tenon joint	●	●	●	●	●	●	●	●	●	●	
	Finger joint			●	●	●	●	●		●	●	
Outdoors (Frame wood)	Tenon joint			●	●	●		●				
	Finger joint				●							
Floor	Laminate floor (tongue and groove)			●	●	●	●	●				
EDGE BONDING												
Wood	Cold press	●	●	●	●	●	●	●			●	
	Heating bars			●	●	●	●	●			●	
	High frequency			●	●	●	●	●			●	
PVC	Cold press											
SURFACE BONDING												
Veneering	Veneer/chip board - Warm press			●	●	●	❍	❍			❍	
	Veneer/chip board - Cold press			●	●	●	❍	❍			❍	
Foiling	PVC-foil/wood fibre board											
	Metal-foil/wood fibre board											
	Impregnated paper/wood fibre board			●	●	●	●				●	
	Laminate/wood fibre board			●	●	●	●				●	

In practice, variations can occur in the different materials, therefore it is always recommended to carry out sufficient bonding tests before commencing - in particular for larger tasks.

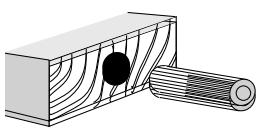
LAMINATING
(Laminated Wood)



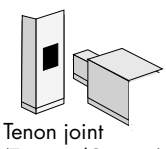
Furniture

Frame wood

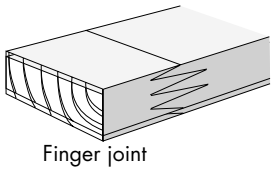
ASSEMBLING



Dowel joint



Tenon joint
(Tongue/Groove)



Finger joint

Product Guide - Industry

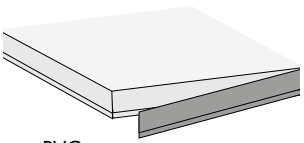
DANAFIX
KVALITETSPRODUKTER TIL INDUSTRI & HÅNDVÆRK

Adhesion
● Recommended
❍ Test first
□ Not recommended

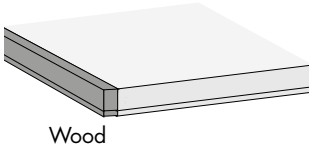
DANAFIX 434	DANAFIX 435	DANAFIX 437	DANAFIX 437 w/hardener 921	DANAFIX 439	DANAFIX 439 w/hardener 921/923	DANAFIX 446	DANAFIX 463	DANAFIX 467	DANAFIX 471-2	DANAFIX 476	DANAFIX 496	DANAFIX 497		
													LAMINATING (LAMINATED WOOD)	
●	●	●	●	●	●	●					●	●	Cold press (clamps)	**Furniture**
●	●	●	●	●	●	●					●	❍	Cold press (automatic systems)	
●	●	●	●	●	●	●					●	●	High frequency	
●	●	●	●	●	●	●					●	●	Warm press	
			●		●	●							Cold press	**Frame wood**
			●		●	●							Warm press	
													ASSEMBLING	
							●						Dowel joint - Automatic assembling	**Furniture**
●	●	●	●	●	●	●	●	●	●		●	●	Dowel joint /Tenon joint - Manual	
●	●	●	●	●	●	●	●	●	●		●	●	Tenon joint	
●	●	●	●	●	●	●		●	●				Finger joint	
●	●	●	●	●	●	●					❍	❍	Tenon joint	**Outdoors (Frame wood)**
			●		●	●							Finger joint	
●	●	●	●	●	●	●							Laminate floor (tongue and groove)	**Floor**
													EDGE BONDING	
●	●	●	●	●	●	●			●		●	●	Cold press	**Wood**
●	●	●	●	●	●	●			●		●	●	Heating bars	
●	●	●	●	●	●	●			●		●	●	High frequency	
										●			Cold press	**PVC**
													SURFACE BONDING	
●	●	●	●	●	●	●			❍		❍		Veneer/chip board - Warm press	**Veneering**
●	●	●	●	●	●	●			❍		❍		Veneer/chip board - Cold press	
										●			PVC-foil/wood fibre board	**Foiling**
										●			Metal-foil/wood fibre board	
●	●	●	●	●					●	●	●	●	Impregnated paper/wood fibre board	
●	●	●	●	●					●	●	●	●	Laminate/wood fibre board	

In practice, variations can occur in the different materials, therefore it is always recommended to carry out sufficient bonding tests before commencing - in particular for larger tasks.

EDGE BONDING

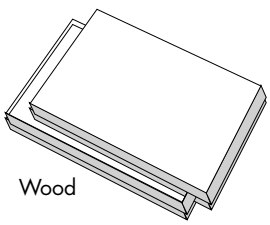


PVC

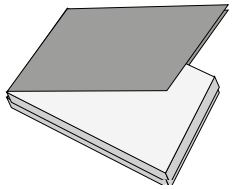


Wood

SURFACE BONDING



Wood



PVC-foil/compact laminating /metalfoil

Material Guide - Retail

DANA LIM

Adhesion

● Recommended
◯ Test first
☐ Not recommended

		Wood Glue PU Light 421	Wood Glue PU Dark 422	Wood Glue D3 Outdoor 430	Wood Glue D3 Outdoor 430 w/hardener 921/923	Wood Glue Laminat 433	Wood Glue D4 Outdoor 440	Wood Glue D4 Outdoor 440 w/light hardener 922	Wood Glue Winter 465	DANFIX 461 H/G Taplim	Wood Glue D2 Indoor 490	
WOOD	Ash	●	●	●	●	●	●	●	◯	●	◯	
	Beech	●	●	●	●	●	●	●	●	●	●	
	Oak	●	●	●	●	●	●	●	◯	●	◯	
	Elm	●	●	●	●	●	●	●	◯	●	◯	
	Pine	●	●	●	●	●	●	●	●	●	●	
	Fir	●	●	●	●	●	●	●	●	●	●	
	Mahogany	●	●	●	●	●	●	●	◯	●	◯	
	MDF	●	●	●	●	●	●	●	◯	●	◯	
	Cherry	●	●	●	●	●	●	●	◯	●	◯	
	Palisander	●	●	●	●	●	●	●	◯	●	◯	
	Pitch pine (american pine)	●	●	●	●	●	●	●	◯	●	◯	
	Sipo	●	●	●	●	●	●	●	◯	●	◯	
	Chipboard	●	●	●	●	●	●	●	●	●	●	
	Teak	●	●	●	●	●	●	●	◯	●	◯	
WOOD (treated)	Stain	●	●	●	●	●	●	●	●	●	●	
	Lacquer											
	Pressure impregnate			●	●	●	●	●				
	Vacuum impregnate			◯	◯	◯	◯	◯				
METAL	Metal, general	●	●	●	●	●		●				
	Metal foil			●	●	●		●				
SYNTHETIC	Synthetic, general	●	●									
	PVC-foil											
	Laminate			●	●	●		●			◯	
VARIOUS	Plasterboard	●	●	●	●	●	●	●	●	●	●	
	Masonite, soft	●	●	●	●	●	●	●	●	●	●	
	Cork	●	●	●	●	●	●	●	●	●	●	
	Cardboard/paper	●	●	●	●	●	●	●	●	●	●	
	Textile			●	●	●	●	●	●	●	●	
	Glass			●	●	●		●				

In practice, variations can occur in the different materials, therefore it is always recommended to carry out sufficient bonding tests before commencing - in particular for larger tasks.

Finishing of glued wood

● Can be carried out
◯ Test is recommended

For further information about treatment of glued subjects, see page 3.

		Wood Glue PU Light 421	Wood Glue PU Dark 422	Wood Glue D3 Out 430	Wood Glue D3 Out 430 w/hardener 921/923	Wood Glue Laminat 433	Wood Glue D4 Out 440	Wood Glue D4 Out 440 w/light hardener 922	Wood Glue Winter 465	DANFIX 461 H/G Taplim	Wood Glue D2 In 490	
Staining		●	●	◯	◯	◯	◯	◯				
Impregnate	Vaccum impregnate	●	●	●	●	●		●				
Lye treatment				●	●	●		●			●	

Material Guide - Industry

DANAFIX
KVALITETSPRODUKTER TIL INDUSTRI & HÅNDVÆRK

Adhesion
● Recommended
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●	●	●	●	●	●	●			●	●		❍	❍	Ash	**WOOD**
●	●	●	●	●	●	●		●	●	●	●	●	●	Beech	
●	●	●	●	●	●	●		❍	●	●		❍	❍	Oak	
●	●	●	●	●	●	●			●	●		❍	❍	Elm	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	Pine	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	Fir	
●	●	●	●	●	●	●			●	●		❍	❍	Mahogany	
●	●	●	●	●	●	●	●		●	●	●	❍	❍	MDF	
●	●	●	●	●	●	●			●	●		❍	❍	Cherry	
●	●	●	●	●	●	●			●	●		❍	❍	Palisander	
●	●	●	●	●	●	●			●	●		❍	❍	Pitch pine (american pine)	
●	●	●	●	●	●	●			●	●		❍	❍	Sipo	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	Chipboard	
●	●	●	●	●	●	●			●	●		❍	❍	Teak	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	Stain	**WOOD (treated)**
														Lacquer	
●	●	●	●	●	●	●				❍				Pressure impregnate	
❍	❍	❍	❍	❍	❍	❍				❍				Vacuum impregnate	
❍	●	●	●	●	●	●								Metal, general	**METAL**
❍	●	●	●	●	●	●					●			Metal foil	
											❍			Synthetic, general	**SYNTHETIC**
											●			PVC-foil	
●	●	●	●	●						❍	❍	❍	❍	Laminate	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	Plasterboard	**VARIOUS**
●	●	●	●	●	●	●	●	●	●	●	●	●	●	Masonite, soft	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	Cork	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	Cardboard/paper	
●	●	●	●	●	●	●			●	●	●	●	●	Textile	
	●	●	●	●	●	●			●					Glass	

In practice, variations can occur in the different materials, therefore it is always recommended to carry out sufficient bonding tests before commencing - in particular for larger tasks.

Finishing of glued wood
● Can be carried out
❍ Test is recommended

For further information about treatment of glued subjects, see page 3.

DANAFIX 434	DANAFIX 435	DANAFIX 437	DANAFIX 437 w/hardener 921	DANAFIX 439	DANAFIX 439 w/ hardener 921/923	DANAFIX 446	DANAFIX 463	DANAFIX 467	DANAFIX 469	DANAFIX 471-2	DANAFIX 476	DANAFIX 496	DANAFIX 497		
❍	❍	❍	❍	❍	❍	❍									**Staining**
	●	●	●	●	●	●								Vaccum impregnate	**Impregnate**
❍	●	●	●	●	●	●					●		●		**Lye treatment**

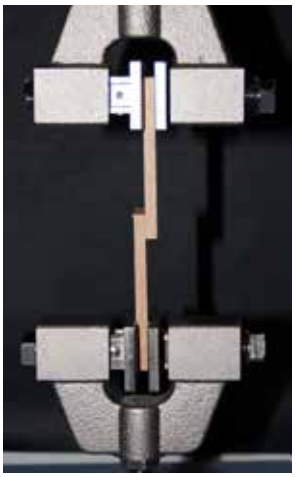
WOOD ADHESIVE DURABILITY

Moisture/water resistance
Different types of adhesives contribute different levels of moisture/water resistance. In general, thermosetting resins such as epoxies, urea- formaldehyde and polyurethane are considered to be adhesives having higher level of water resistance due to their well cross-linked chemical structure. As thermoplastic resins like polyvinyl acetate (PVAc) adhesive, without any cross-link, have poor moisture resistance. However, this characteristic can be significantly improved by modifying PVAc to be crosslinkable.

The water resistance of PVAc is classified as D1, D2, D3 and D4 according to European standard EN 204/205 where the tensile shear strength is measured on bonded joint of beech wood which has been exposed to different climatic conditions. Uncrosslinked pure PVAc dispersion only reach D2 durability class, by adding filler or plasticizers into formulation, the water resistance might be reduced to D1. Modified crosslinkable PVAc with pH of 3 or 4-5 for new generation can provide D3 or even D4 grades. Concerning thermosetting resins like urea formaldehyde resin, the water resistance is classified as C1, C2, C3 and C4 according to EN 12765.
In the table at this page, the application on different water resistant of adhesives has been recommended.

Weather resistance
Even though a PVAc glue meet the water resistant requirement of D4, it does not grant a weather resistance to wood joint which without protection will be placed outside door. The wood joints bonded with D4 PVAc glue have to be coated with water resistant paint or lacquer before it is exposed to the outside weather.

Heat resistance
The heat resistance of glued wood joints is an important characteristic to evaluate whether the product can be used in the application of engineered wood. Basically with increasing the temperature, the bonding strength of wood joints decreased. However, there are big differences in heat resistance between thermoplastic and thermosetting adhesives. The wood joints glued with PU or UF adhesive can be used in the condition that the temperature is up to 110°C at which the boning strength is only slight decreased compared to its strength at 20°C. The wood joints bonded by D2 PVAc adhesive show strong bonding when temperature is between 20 to 40°C, but with temperature increased to 50°C, the strength will be great decreased. Cross-linked PVAc like D3 and D4 glues can offer heat resistance up to 80°C specially when glue is approved by means of EN 14257 Watt 91 test.
In the application of load-bearing construction, PVAc adhesives are not recommended, instead PU adhesives as well Melamine urea formaldehyde resin are preferable.



D1	Interior use, in which the temperature only occationally exceeds 50°C for a short time. The moisture content of the wood is max. 15%. E.g. furniture is placed in dry rooms.
D2	Interior use with occational short time exposure to running or condensed water. The moisture content of the wood should not exceed 18%. E.g. furniture in dry rooms.
D3	Interior use with frequent short time exposure to running or condensed water and/or can be long time exposed to high humidity. E.g. furniture and equipment in wet rooms, kitchen tabels og wood exposed to high moisture.
D4	Interior use with frequent long time exposure to running or condensed water. Exterior use only if product is protected by an adequate surface coating. E.g. frame wood for windows and doors, garden furnitures and wood, and equipment exposed to high moisture.

The tensile strenght of the adhesive is tested accordingly to EN 204/205, after the bonded joints have been keept under different climate conditions.

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470	Foil- and lining glue
480	Lacquer glue
490	laminating glue

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