

## Technical Data Sheet

### Wood & Specialty Adhesives

Telephone +47 63897100

Telefax +47 63819050

www.dynea.com

## Prefere 4131

Storage stable liquid urea-formaldehyde adhesive for the furniture and wood industry

### Use

Prefere 4131 is a liquid urea-formaldehyde resin, which used together with the liquid hardener Prefere 5111 is excellent for edge-lamination (solid wood panels) of pine and spruce. The glue system can also be used for lamination of hardwood. The glue system is used for hot bonding as well as for radio frequency heating conditions.

Prefere 4131 is a thermosetting adhesive, thus there is no risk of glue line creep.

Solid wood panels produced with Prefere 4131 are of E1-quality and the bonds conform to the requirements for D3 quality to EN 204/205.

### Technical data for the resin

Appearance	Water-clear or opaque liquid
Solids content, 2 hours at 120°C (%)	approx. 69
Viscosity at delivery, at 20°C (mPas)	3300-5500
Viscosity at delivery, at 25°C (mPas)	2400-4000
pH	8.0-8.6
Specific gravity at 25°C (g/cm <sup>3</sup> )	approx. 1.30

### Storage of the resin

Prefere 4131 have limited shelf life. The viscosity of the adhesive increases during storage and may eventually become so high that the adhesive no longer is usable. The shelf life is shorter the higher the storage temperature is.

The table on the next page shows the shelf life from the date of production for Prefere 4131 at different storage temperatures.

Storage temperature	Shelf life
15°C	approx. 4 months
20°C	approx. 3 months
25°C	approx. 2 months
30°C	approx. 1 month

Although the shelf lives are longer at lower temperatures cold resin will be higher in viscosity and can be difficult to pump. Optimal storage temperature is 15-20°C. If the resin has been stored at too low temperature it should not be diluted with water. Instead it is recommended to keep it for a few days at 20-25°C.

Customers who get Prefere 4131 supplied in bulk are referred to our Technical Information Leaflet No. 5E "Bulk storage and handling of liquid resins" which contains useful information about storage of resins and operation of storage tanks.

The adhesive is not flammable.

**Technical data for the hardener**

Appearance	Milky white liquid
Viscosity at 25°C (mPas)	ca 500
pH at 25°C	2-3
Density at 25°C (g/cm <sup>3</sup> )	ca 1.08

**Storage of the hardener**

Hardener Prefere 5111 may be stored for 6 months at 20°C in the original containers. It must not be allowed to freeze. NOTE: The hardener must not be stored in unlaquered tin containers due to the risk of rust formation and discoloration of the glue.

**Preparation of the glue mix**

The recommended mixing ratio is 100 pbw resin to 30 pbw hardener. The hardener addition can be varied between 20-42% if other pot lives and pressing times are required. The glue system is not suitable for glue application equipment without cooling.

Prefere 4131	100 pbw
Hardener Prefere 5111	30 pbw

**Pot life**

The curing reaction starts as soon as the resin and hardener are mixed, and it proceeds until the resin is completely cured. How long this takes, depends on the temperature. Thus the pot life, i.e the period of time during which the glue mix has a sufficiently low viscosity to be applied to the adherents, is shorter the higher the temperature is.

Pot life in minutes at			
10°C	15°C	20°C	25°C
60	45	30	25

**The wood**

The wood to be bonded must be of uniform thickness. The surfaces must be free from oil, fat, dust or other deposits.

Preferre 4131 gives the highest bond strength when the moisture content of the wood is 6-15%.

**Glue spread**

The glue spread rate is dependent on the surface of the adherents. Normal glue spread is 100-200 g/m<sup>2</sup>.

**Assembly time**

Assembly time is the time elapsing between glue application and pressure application. Maximum assembly time depends on the absorbency of the wood materials, glue spread rate, temperature and moisture content of the wood, temperature, relative humidity and air circulation in the workshop and finally on the reactivity of the glue mix. Under all circumstances the glue must still be tacky when the pressure is applied.

**Pressure**

The pressure is dependent on the wood species. For softwood the pressure should be 0.5-1.0 N/mm<sup>2</sup> and for hardwood 0.8-1.2 N/mm<sup>2</sup>.

**Pressing times**

a) *Hot bonding:*

The pressing time is influenced by the press temperature and the thickness of the laminates. As the pressing time also is dependent on the density and moisture content of the wood and of the heat capacity of the press, the pressing time will vary with these factors. The pressing times in the table on the next page can be used as guidelines for edge lamination of softwood.

Thickness of laminate, mm	Pressing time in seconds at		
	60°C	80°C	98°C
20	250	175	90
30	325	215	110
40	375	250	135
50	540	380	225
60	700	500	325

b) *Radio frequency curing:*

Prefere 4131 is very well suited for curing under radio frequency heating conditions. Since the necessary pressing time is dependent on a number of factors, such as the shape of the adherents, the placing of the electrodes, the effect of the generator, etc., it is recommended to establish the pressing time by trials. A general requirement is that the glue line temperature immediately after pressing should be at least 60°C.

## Cleaning

The mixing and spreading equipment must be cleaned before the glue mixture has cured. If the glue thickens in the application equipment, the equipment must be emptied immediately and cleaned since there otherwise is a risk that the glue will cure. Cured glue is insoluble and must be scraped off. The equipment is easily cleaned with warm water. If glue remainders in a roller spreader are mixed with equal quantities of a 40 % w/w solution of urea to which 0.5% w/w sodium hydroxide (caustic soda) has been added, and the spreader is kept running until a homogeneous mix is obtained, the cleaning becomes easier. Less water is required and the temperature of the wash water can be lower.

For more information see Technical Information Leaflet No. 20E: Cleaning of equipment used for applying urea-formaldehyde resin adhesives. Urea-formaldehyde glue is a potential pollutant. Glue remainders and untreated wash water may not be discharged into public drains or watercourses unless a permit has been obtained from the appropriate authorities. Advice on safe handling of glue remainders and wastewater can be found in our Technical Information Leaflet No. 2E "Glue waste disposal - Pollution prevention".

## Safety precautions

Reference is made to the Safety Data Sheet for Prefere 4131 and hardener Prefere 5111.

When the adhesive and the hardener are mixed a chemical reaction will start. The pH of the mixture will be in between the value for the adhesive and the hardener. The free formaldehyde content for the adhesive will be reduced. The acid/salt concentration of the hardener will be diluted.

When handling the adhesive, hardener and the glue mix it is recommended that certain precautions normally taken when handling chemicals is observed. Skin contact with the uncured glue should be avoided, since people with particularly sensitive skin may be affected. It is recommended to wear protective gloves, likewise eye protection where there is a risk of splashes. Hands and underarms should be thoroughly washed with soap and warm water at the end of the working day.

Adequate ventilation of the workshops should be maintained.

*The suggestions given in these notes are based on data gained from experience and tests. However, since operating conditions in the user's plant is beyond our control, we cannot assume responsibility for any risks or liabilities, which may result from the use of our products.*

Replaces Prefere 4131 dated October 2005.

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