

TIMBER LAMINATING

A GUIDE TO SUCCESSFUL BONDING

The successful laminated bonding of timber depends on adherence to a number of important practices. Laminated bonding places severe stress on the glue line and this stress is higher in relation to the increased density or hardness of the timber species.

1. Moisture Content of Timber

This should be controlled at 8 – 14% for softwood and 8-12% for hardwood. In addition all boards should be at similar moisture content to avoid uneven drying stress.

SHRINKAGE STRESS FROM FRYING IS THE GREATEST CAUSE OF BOND FAILURE

2. Fresh Machining/Surface Preparation for Gluing

Timber faces for gluing should be prepared the day of glue application or a maximum of 24 hours prior to gluing. Timber prepared in advance can case harden and prevent glue penetration.

3. Assembly Time

Always work within the Open Assembly time specified for the glue in use.

Ensure that full clamp pressure is applied within the closed assembly time specified for the glue in use.

If assembly time is exceeded, the glue will not wet and penetrate the timber surface.

4. Clamp Pressure

As a general rule the pressure needed for adequate surface joining are:

Softwood 100 psi (690 kPa)

Hardwood 200 psi (1380 kPa)

Hardwood will not compress to give intimate contact at low pressure. Accurate surface tolerance will greatly assist mating of the surfaces. A specifically designed press is recommended for all work, especially with hardwood.

The use of individual clamps is inefficient and if they must be used there should be sufficient clamps to space these 9 inches (22cm) apart. This method can also cause difficulty in staying within the assembly time of the glue.

Whenever possible allow glued timber to stabilize after the clamp pressure is removed. This allows equilibrium moisture content to be achieved prior to further machining. This is particularly important where glued items are processed on a lathe or routed. These actions expose fresh surface and encourage drying stresses.

5. Maintenance of Cutting Tools

Sharp cutters are essential to prepare timber face for gluing. Blunt cutters will polish the surface making glue penetration impossible.

6. Glue Selection

Select a glue suitable for application. Considerations are:

End use of item – Internal External...Types of Timber...Colour of Glue Line

Specifications where applicable (e.g. Beams)...Assembly Time Requirements

Clamp Time of glue...also consider Timber Recovery/Stabilisation

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Full Cure of Glue Line

A fully cured glue is more resistant to lacquer and polish solvents and thus more resistant to glue line growth.

Radio Frequency Cure

- a) **Spot Welding**
Where this technique is used it is imperative that full cold cure procedure is followed prior to further processing of the item.
- b) **Full Cure System**
Even though the glue line is fully cured, we recommend the timber be allowed to stabilize to equilibrium conditions, prior to further processing. The optimum time should be determined by trial for the type of timber and the size of the assembly, a general recommendation is 24 hours.

Treated Timber

This is a complex area which requires considerable attention to the processing method. In general terms water based treatments (e.g. CCA) are performed prior to bonding, while solvent based treatments (e.g. LOSP) are performed after bonding.

From the following range of glue, we recommend that trials be conducted to select the glue most suitable for each application:

- **Phenol Resorcinol Formaldehyde**
Room Temperature Bonding for marine, beams, and exterior joinery.
- **Urea Formaldehyde**
Bench Top Lamination, Cold and RF Cure.
- **Thermosetting Modified PMA - TimbaTech 03 and 05**
Laminations of soft and hardwood where a clear glue line is required. Cold cure and RF can be used.
- **Single Pack Crosslink PVA - TimbaTech 04**
For softwood lamination
- **Single Pack Moisture Curing Polyurethane**
For laminations of porous to porous or porous to non porous substrates. Provides strong bond, high moisture resistance and a D4 classification.
TimbaTech PU15, PU60, PU300 and PU165 depending on application considerations.

Material Safety Data Sheet available on request.

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