Hot Press Schedule

Hot press cure times can be estimated with this hot press schedule and verified with in-plant trials. ***See below for suggested hot press cycles using lumber or particleboard cores.*** *Panels should be stacked after coming out of the press to complete glue curing. Panels should be cool before sanding or additional processing occurs.*

Distance to Deepest Glue Line

	1/32″	1/16″	3/32″	1/8″	5/32″	3/16″	7/32″	1/4″
160°	1′31″	1′53″	2′22″	2′58″	3′42″	4′38″	5′47″	7′15″
170°	1′25″	1′46″	2′13″	2′46″	3′28″	4′20″	5′25″	6′47″
180°	1′19″	1′39″	2′04″	2′36″	3′15″	4′03″	5′05″	6′21″
190°	1′14″	1′33″	1′56″	2′26″	3′02″	3′48″	4′45″	5′57″
200°	1′09″	1′27″	1′49″	2′16″	2′51″	3′33″	4′27″	5′34″
210°	1′05″	1′21″	1′42″	2′08″	2′40″	3′20″	4′10″	5′13″
220°	1′01″	1′16″	1′35″	1′59″	2′29″	3′07″	3′54″	4′53″
230°	1′57″	0′11″	1′29″	1′52″	2′20″	2′55″	3′39″	4′34″
240°	1′53″	0′07″	1′24″	1′45″	2′11″	2′44″	3′25″	4′17″
250°	1′50″	0′02″	1′18″	1′38″	2′03″	2′33″	3′12″	4′00″

Temperatures above 200° F *are not recommended for high pressure laminates by the manufacturers.*

Distance to Deepest Glue Line

	0.5mm	1.0mm	1.5mm	2.0mm	2.5mm	3.0mm	3.5mm	4.0mm
70°C	1′25″	1′38″	1′53″	2′10″	2′29″	2′52″	3′18″	3′48″
75°C	1′20″	1′32″	1′46″	2′02″	2′21″	2′42″	3′06″	3′34″
80°C	1′15″	1′27″	1′40″	1′55″	2′12″	2′33″	2′56″	3′22″
85°C	1′11″	1′22″	1′34″	1′48″	2′05″	2′24″	2′45″	3′10″
90°C	1′07″	1′17″	1′29″	1′42″	1′58″	2′15″	2′36″	3′00″
95°C	1′03″	1′13″	1′24″	1′36″	1′51″	2′08″	2′27″	2′49″
100°C	1′00″	1′09″	1′19″	1′31″	1′45″	2′00″	2′19″	2′39″
105°C	0′56″	1′05″	1′14″	1′26″	1′39″	1′53″	2′11″	2′30″
110°C	0′53″	1′01″	1′10″	1′21″	1′33″	1′47″	2′03″	2′22″
115°C	0′50″	0′57″	1′06″	1′16″	1′28″	1′41″	1′56″	2′13″

Temperatures above 90° C *are not recommended for high pressure laminates by the manufacturers.*

gluing guide

Adhesives for Lamination

Technical Leadership

With over 70 years of combined hands-on experience, our technical support team is one of the most recognized and respected in the industry. We welcome your calls and encourage you to contact us if you have any questions or concerns regarding any of our lamination adhesives.

1.800.877.4583
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FF810

Franklin Adhesives & Polymers™

Hot Press Lamination

Hot press laminating offers the versatility of pressing many different shaped panels without extensive equipment changes. Hot press gluing generally consists of either all-veneer constructions or composite-core veneer constructions. To achieve optimal results using our adhesives in hot press lamination applications, please follow the below guidelines.

Spread

Generally, 35-45 pounds of adhesive per 1,000 square feet or 170-220glm^2 of glue line is adequate. Lower spread rates require closer stock tolerances and shorter assembly times. Commonly, a mechanical glue spreader is used to apply a uniform spread to the gluing surfaces.

Assembly time

Assembly time can vary greatly depending on the adhesive used, glue spread, porosity and moisture content of stock, environmental conditions, etc. A small bead of adhesive squeeze-out around the perimeter of the bottom panel in the stack is desirable. Generally accepted assembly times range from five to 20 minutes at room temperature – assembly time should be kept at a minimum. We recommend gluing veneer with the tight side out.

Tolerances

Gluing stock should be uniform in thickness. Variation in thickness should not exceed ±0.005 inches or ±0.125 mm. Sanding to thickness should be performed using higher than 50 grit abrasives. Tight-cut veneer is recommended. Panels should not be over-sanded, especially to the point of exposing lathe checks.

Pressure

Pressure is dependent upon the species or material to be glued and joint preparation. Direct contact of the gluing surfaces must be made to obtain maximum strength. Suggested pressures for various wood densities are: low 100-150 psi or 2.1-5.6 kglcm^2; medium 125-175 psi or 7.0-10.5 kglcm^2; high 175-250 psi or 7.0-17.6 kglcm^2.

Press time

Press time should be determined under plant conditions. Times will vary according to platen temperature and distance to the deepest glue line. Press time is dependent on the adhesive used, stock type and moisture content of the stock and environmental conditions. Radio frequency press times should be determined by in-plant testing on each machine. Environmental conditions should be managed inside the plant during seasonal changes. Wood should be kept in an environmentally controlled area. Moisture content of veneer should be between six and eight percent and held at this level before and after pressing. Regular glue audits from technical professionals should occur.

Press time

Press time is dependent on the adhesive used, gluing stock type, moisture content of the stock and environmental conditions. Typical press times range from 30 minutes to two hours in a cold press. Press times should be determined under plant conditions. Environmental conditions should be managed inside the plant during seasonal changes. Wood should be kept in an environmentally controlled area. Moisture content of veneer should be between six and eight percent and held at this level before and after pressing.

Minimum temperature

Curing temperatures should be higher than the minimum use temperature of the adhesive. This includes the temperature of the stock to be glued as well as the air and adhesive temperature.

Consult your account manager for guidance in selecting the adhesive that best suits your operation and equipment.

Franklin's recommended lamination adhesives

Advantage 310 with Catalyst A

A versatile two-part, high performance, water-resistant adhesive that can be used for finger jointing, edge gluing, hot pressing and radio frequency curing.

Doorbond 200

A moderately fast-setting, water and heat resistant, one-component flush door adhesive. It has been designed for hot or cold pressing of flush and architectural doors and formulated to prevent bleed-through.

Laminating 6W

Excellent choice for cold-press laminating of fancy face veneers to particleboard, medium density fiberboard or other core stock.

Laminating 25

Moderately fast-setting adhesive for cold pressing high-pressure laminate to a variety of core materials.

Multibond MX-90

Water resistant adhesive designed for use in hot press laminating.

Multibond SK-8

Highly water resistant adhesive for the manufacture of skateboards in cold and hot press operations.

Multibond 2000

Produces a water-resistant bond recommended for hot or cold press, radio frequency, edge and face and assembly gluing applications.

Multibond 2015

Ideal for hot or cold press veneering and performs well for edge and face gluing in radio frequency applications.

Multibond 2025

Recommended for hot and cold pressing of veneers and high-pressure laminates to various cores. It also offers excellent bleed-through protection with porous veneers.

Multibond 4000 FF

Formaldehyde free, water resistant adhesive that can be hot pressed, cold pressed and used in edge and face gluing.

Multibond EZ-1

Produces a water resistant bond for hot or cold press applications.

Multibond Advantage 2 with Catalyst A

Highly water resistant two part adhesive with a good catalyzed pot life.

Multibond X-016 with Catalyst A

A highly water-resistant, two-part adhesive with a light-colored glue line. Multibond X-016 is an excellent choice for finger jointing, cold press, radio-frequency and hot press applications.

Titebond Quickset 2000

A fast setting adhesive which can be used in a variety of ways including: continuous heated-panel laminating systems, pinch roll and dead stacking; or limited lay-up time cold-press operations designed to bond HPL to particleboard and fiberboard.

ReacTITE EP-925 Hardener 200

A two-part, highly water resistant adhesive that can be utilized with cold press, hot press or radio frequency press equipment.

Adhesives for lamination

Franklin Adhesives & Polymers offers a complete line of high-quality glues for all types of laminating applications, including hot and cold press lamination. Our traditional line of water-based PVA glues has set the industry standard for hot and cold pressing of plywood, veneers and laminates. Our technical service teams have compiled extensive research on hot and cold press techniques and use this data to create the highest quality products. We offer wood adhesives designed specifically for skateboards, plywood and non-wood substrates. In addition, we have "no-added formaldehyde (NAF)" and "formaldehyde-free" products included in our line. To determine an appropriate product option for your application, please contact your account manager.

Hot Press Trouble Shooting Guide

Below is a listing of the most common problems, causes and recommendations when hot pressing.

	Problem	Possible cause	Recommendation
	Spotty bonds	■ Low spread ■ Uneven core thickness ■ Low pressure ■ Cold spots in platen ■ Pressure	■ Increase adhesive spread ■ Calibrate cores to uniform thickness ■ Increase pressure ■ Check bond line temperature with thermocouples ■ Decrease assembly time
	Glue bleeds through face veneers	■ Excessive glue spread ■ Excessive pressure ■ Face veneers high in moisture content ■ Wrong adhesive type	■ Reduce glue spread ■ Use higher viscosity adhesives ■ Reduce pressure ■ Dehumidify plant in wet seasons ■ Contact your account manager
	Warpage of panels	■ Excessive spread ■ Unequal spread ■ High moisture content ■ Unbalanced construction ■ High press temperature	■ Reduce adhesive spread ■ Make sure that top & bottom spread are equal ■ 6-8% moisture content recommended ■ Check grain orientation ■ Reduce platen temperature
	"Telegraphing" of core defects or banding	■ Excessive pressure ■ Uneven or variable thickness ■ Foreign material on core	■ Reduce pressure ■ Re-sand cores ■ Pre-clean core
	Precure	■ Glue left exposed too long ■ Thin spread	■ Add pressure faster ■ Increase spread rate ■ Switch to an adhesive with a longer open time ■ Check planers, blades & spreader rolls
	Checking & cracking	■ Moisture content of stock too high or low ■ Improper conditioning ■ Press temperature too high ■ Press period too long in hot press	■ Do not dry stock below 5% moisture content ■ Humidify plant if below 25% relative humidity ■ Dehumidify plant during rainy seasons ■ Be sure stock is at 6% - 8% moisture content ■ Panels should be squarely dead stacked & weighted for 12 hours after removing from press ■ Do not use high temperatures to attain short pressure periods unless moisture content is carefully controlled ■ Avoid excessive drying or over-curing ■ Remove panels as soon as hot press is opened
	Steam blisters	■ Excessive adhesive spread ■ High moisture content ■ High press temperature ■ Non-uniform moisture (wet spots) ■ Press or assembly time too short	■ Reduce adhesive spread ■ Check planers, blades & spreader rolls ■ 6-8% moisture content recommended ■ Dehumidify plant in wet seasons ■ Reduce temperature ■ Avoid worm-holes, dents, knots & fillers ■ Use longer assembly time

Cold Press Lamination

Cold press laminating is desirable when large numbers of like-sized materials need to be glued. The materials used can vary widely. Cold press laminating normally falls into one of three categories: panel-on-frame, veneer/solid core laminating or high-pressure laminate gluing. To obtain optimal results in using our adhesives, please follow the guidelines below.

Spread

Generally, 35-45 pounds per 1,000 square feet or 170-220 g/m^2 of glue line is adequate. Lower adhesive spreads require better stock tolerances and shorter assembly times. Commonly, a mechanical glue spreader is used to apply a uniform spread to the gluing surfaces.

Assembly time

Assembly time can vary greatly depending on the adhesive used, glue spread, porosity and moisture content of stock, environmental conditions, etc. A small bead of adhesive squeeze-out around the perimeter of the bottom panel in the stack is desirable. Generally accepted assembly times range from five to 20 minutes at room temperature – assembly time should be kept at a minimum. We recommend gluing veneer with the tight side out.

Tolerances

Gluing stock should be uniform in thickness. Variation in thickness should not exceed ±0.005 inches or ±0.125 mm . Sanding to thickness should be performed using higher than 50 grit abrasives. Tight-cut veneer is recommended. Panels should not be over-sanded, especially to the point of exposing the checks.

Pressure

Pressure is dependent upon the species or material to be glued. Direct contact of the gluing surfaces is required to obtain maximum strength. Suggested pressures for various substrates are: high-pressure laminates, 30-80 psi or 2.1-5.6 kglcm^2; solid core stock, 100-150 psi or or 7.0-10.5 kglcm^2; all-veneer constructions, 100-250 psi or 7.0-17.5 kglcm^2.

Cold Press Trouble Shooting Guide

Below is a listing of the most common problems, causes and recommendations when cold pressing.

	Problem	Possible cause	Recommendation
	Total delamination with little or no substrate failure	■ Pre-cure (no glue transfer) ■ Low pressure (poor contact) ■ Short press time	■ Increase glue spread ■ Decrease assembly time ■ Increase pressure and/or increase press time
	Spotty bond	■ Uneven surfaces ■ Worn spreader rolls ■ Pre-cure (no glue transfer)	■ Calibrate cores to uniform thickness and/or increase pressure ■ Replace or regroove rolls ■ Increase glue spread ■ Decrease assembly time
	Glue bleeds through face veneers	■ Excessive glue spread ■ Excessive pressure ■ Wrong adhesive type	■ Reduce glue spread ■ Reduce pressure ■ Contact your account manager
	Telegraphing of core defects or banding	■ Excessive pressure ■ Uneven or variable thickness ■ Foreign material on core	■ Reduce pressure ■ Re-sand core, pre-clean core ■ Reduce glue spread
	Warpage of panels	■ Excessive or unequal spread ■ Unbalanced construction ■ Excessive moisture	■ Equal spread on both sides ■ Check grain orientation & number of plies ■ 6-8% moisture content recommended
	Brilliant white on glue squeeze-out and/or glue line	■ Chalking caused by low temperatures	■ Raise temperature of plant, wood and adhesive above minimum use temperature of adhesive