



## Multibond 2000

**Multibond 2000** is a one-part crosslinking polyvinyl acetate emulsion adhesive developed for a wide range of laminating as well as edge and face gluing operations. Multibond 2000 is the first one-part shelf stable polyvinyl acetate developed for wood bonding. This adhesive can be used in radio frequency, hot press and cold press applications.



### PHYSICAL PROPERTIES

**Chemical family description:** Crosslinking polyvinyl acetate emulsion adhesive

**Appearance:** Yellow colored liquid

**Typical viscosity (cps):** 3000 - 4300 (3/12/83°F)

**Weight solids (%):** 46.0 - 49.0%

**pH:** 2.0 - 3.3

**Specific gravity:** 1.09    **Weight pounds per gallon:** 9.09

**Suggested minimum use temperature:** 60°F/ 16°C

### KEY PRODUCT FEATURES

- Excellent for radio frequency gluing
- Light colored glue line
- Water-resistant
- Fast setting
- Meets the definition of NAF for CARB and TSCA Title VI
- 175.105 FDA Compliant

### PERFORMANCE PROPERTIES

- Meets requirements for ANSI/HPVA HP-1-2004 Type 2
- Meets requirements for ANSI/HPVA EF 2009
- Meets WDMA Type 1 and 2 water resistance
- Meets CARB requirements when tested in various wood constructions.
- Meets TSCA Title VI Formaldehyde Emission Standards for Composite Wood Products
- European E-1 formaldehyde emission standard

Like all adhesives, proper gluing practices are needed to achieve stated performance.

### APPLICATION GUIDELINES

**Moisture content:** Six to eight percent is the recommended moisture content for the gluing stock. High moisture content will dramatically increase the clamp time needed. Panel shrinkage may occur resulting in stress cracks or end-joint delamination.

**Stock preparation:** The preparation of the stock to be glued is extremely important. Joints cut from rip saws should be free of saw marks. They should also be straight and square. Moulded or jointed stock should be free of knife marks. Glazed or burnished joints will prevent adhesive penetration and should be guarded against. Gluing stock should be uniform in thickness. Variation in thickness should not exceed  $\pm 0.005$  inches/0.12 mm. Sanding to thickness should be performed using higher than 50 grit abrasives. When possible, glue joints should be prepared and glued the same day.

**Spread:** Generally, 35-50 pounds of adhesive per 1,000 square feet or 170-250 grams per square meter of glue line is adequate. Verify adequate glue coverage by monitoring for squeeze out along the glue line once the panels are under pressure. A Web-based spread calculator can be found at [www.franklinadhesivesandpolymers.com](http://www.franklinadhesivesandpolymers.com).

**Pressure:** Pressure is dependent upon the species or material to be glued and joint preparation. Direct contact of the gluing surfaces is required to obtain maximum strength. The use of a compressometer will aid in accurately measuring the amount of pressure being applied to the gluing area. Suggested clamp locations for various wood densities are eight to fifteen inches (20-38 cm) apart and two inches (five cm) from the end of the panel to evenly distribute pressure along the entire length of the glue line. A Web-based pressure calculator can be found at [www.franklinadhesivesandpolymers.com](http://www.franklinadhesivesandpolymers.com).

**Recommended clamping pressures:**

Species	Clamping pressure	Example
Low density wood species	100-150 psi or 7-10 kg/cm <sup>2</sup>	Pine, Poplar
Medium density species	125-175 psi or 9-13 kg/cm <sup>2</sup>	Rubberwood, Cherry
High density species	175-250 psi or 13-18 kg/cm <sup>2</sup>	Oak, Maple

**Assembly time:** The assembly time is influenced by many factors some of which include glue spread, moisture content of the stock, porosity of the stock, environmental conditions and adhesive choice. Assembly times of five to ten minutes are approximate. It is desirable to see a bead of adhesive squeeze out around the perimeter of the bottom panel of the stack.

At 70°F and 50% relative humidity, approximately 6 wet mils:

Open Assembly Time – 5 minutes

Total Assembly Time – 10 minutes

**Press/ clamp time:** Press times are dependent on the adhesive used, gluing stock type, moisture content of the stock and environmental conditions. Press times can range from a minimum press time of 30 minutes to greater than two hours. Shorter times are required under ideal conditions when using soft wood species at moisture content slightly less than eight to ten percent and factory temperatures of 68 degrees Fahrenheit/ 20 degrees Celsius. Longer press times will be required for higher density species, higher moisture contents and colder factory temperatures. It is recommended that optimum press times be determined in actual plant conditions recognizing that seasonal changes may lead to variable requirements.

**Machining/ post process conditioning:** After the minimum clamping time period, the panel will develop enough handling strength and can be removed and stacked out of the press. Twenty-four hours of cure is recommended before further machining. Three or four days may be required to eliminate sunken joints caused by residual moisture in the glue line.

**Minimum use 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 temperatures. If the temperatures are below the minimum use temperatures you will see a white, chalky appearance of the glue line. These bonds are usually weak.

**RF cure time:** Radio frequency cure times will vary from machine to machine. Machine manufacturers suggest that machines will cure between 75 and 100 square inches of glue line per minute per kilowatt. Glue joints should feel warm immediately after the cure cycle. Cure times should be determined through plant trials.

**Press time:** Press time is dependent on the adhesive used, gluing stock type, moisture content of the stock and environmental conditions. This hot press schedule is provided as a recommended starting point. In plant testing is recommended especially for temperatures and substrate thicknesses beyond this chart.

## Platen Temperature °F

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

**Clean-up:** For easy removal of adhesive from equipment, clean up while it is still wet with warm water (this includes the glue roller and pans). For dried glue, steam and/or hot water are the most effective. Using glue release agents on equipment will also allow for easier clean up.

## STORAGE AND HANDLING

**Shelf life:** Best if used within twelve months of date of manufacture. Mix before use for best results. Product is freeze-thaw stable, but may need to be mixed prior to use.

For additional questions, Franklin's technical service team is available at 1.800.877.4583. 24/7 technical service is available online at [www.franklinadhesivesandpolymers.com](http://www.franklinadhesivesandpolymers.com).

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