

TOOLING BOARD MACHINING PARAMETER + GLUE UP GUIDE



BUILDING TRUST

MODELING BOARDS - POLYURETHANE							
Product	Density (Ibs/ft³)	Color	Roughing Spindle Speed (RPM)	Roughing Feed (IPM)	Finishing Spindle Speed (RPM)	Finishing Feed (IPM)	
SikaBlock® M600	37	Lt. Brown	2,500	100	15,000	200	
SikaBlock® M700	44	Lt. Brown					
TOOLING BOARDS - EPOXY							
SikaBlock® M974	45	Blue	1,600	40	10,000	100	
TOOLING BOARDS - POLYURETHANE							
DP-1051 (Die Plank®)	52	Gray	1,600				
PP-1052 (Pattern Plank®)	71	Red	1,500	40	10,000	100	
Lab 850	74	Red	1,500				

CUTTERS	
ROUGHING	1" Ball End Mill 4-Flute Carbide
FINISHING	5/8" Ball End Mill 2-Flute Carbide

DEPTH	
ROUGHING	Varies from ¼" to 2" deep with 40% step-over
FINISHING	Varies from 1/8" deep leaving 0.002 scallop height

TIPS

- Pressured air can be used for quick chip removal to prevent cutter heat build-up
- Eliminate burning by using sharp cutters and slower spindle speeds
- Coolant/machining fluid can be used for higher density tooling and high temperature boards. Wipe off immediately after use.
- To band saw cut dense boards (tooling boards) use a saw with offset carbide teeth to reduce binding

NOTE: These machining parameters are represented as starting points. Cutter type and material, spindle speed, feed rate, machine power and rigidity all affect results. User must determine the best parameters for specific situations.

MODELING/TOOLING BOARD GLUE-UP PROCEDURE

Modeling/Tooling Board Inspection & Preventative Steps, as required:

Prior to bonding boards, Inspect the board surfaces to be bonded. They must be clean & dry with no contaminates. For removing oils and or grease, use a degreasing solution, such as dish soap. Rinse off & dry thoroughly. **DO NOT USE SOLVENTS, AS THEY LEAVE RESIDUAL FILM** which is detrimental to bonding.

Choosing Board Adhesives:

- Room-Temp Modeling/Tooling to 180°F: TCC-230 Epoxy Board Laminating Adhesive, with TCC-102 Fast or -104 Slow Hardener.
- High-Temp Tooling to 235°F: EL-336/336 High-Temp Epoxy Laminating Adhesive System.

Applying Board Adhesive:

- (1) Mix Resin & Hardener at the proper ratio as indicated on the hardener container: Thoroughly mix the resin & hardener in #1 mixing cup for 30 seconds. Hand mix under 300 RPM. Excess RPM's increases solution temperature, thus shortening pot life. Pour & scrape clean #1 mixing cup into # 2 cup. Thoroughly mix adhesive in #2 cup for 30 seconds. This eliminates using any un-mixed material on the job.
- (2) With brush or squeegee, evenly coat both surfaces to be bonded giving 100% coverage.
- (3) Clamping/Pressing:

In the absence of a press, position the boards, making sure all board edges are in line & true. Place steel bars & flat stock along the clamping points. These will equalize clamping pressure between the clamps. Place clamps no more than 8" apart over the steels. Use extra-reach clamps for applying clamping pressure in the central region on the boards. In the absence of extra-reach clamps, locate weights on the central region. Again - steel plates or bars aid pressure equality across the central region to assist with uniform squeeze-out.

Prior to unclamping and removal of clamps and weights, allow the adhesive to completely cure. A good rule is 24 hours at room temperature (68 – 80°F) and a Shore 75-D Hardness build, as witnessed by the hardness of adhesive squeezed out along the edges.

EPOXY TOOLING BOARD GLUE-UP PROCEDURE

Bonding SikaBlock[®] M974 High Temperature Epoxy Board:

- (1) Use EL-336 higher temperature epoxy laminating resin. Apply and clamp per same parameters as given above in steps 1, 2 and 3 above using EL-336 mixed at ratio on hardener container.
- (2) Dwell the Glue-Up for 24 hours at room temperature (68-80°F) before heat curing per ramp schedule on EL-336 TDS. (This is all before machining of board to shape needed).
- (3) Heat cure the adhesive per slow ramp rate/soak rates given below to the required tool or part cure temperature needed up to 235°F maximum. Machine board to final shape only after curing adhesive per these parameters.

CURE PARAMETERS FOR USE WITH SikaBlock[®] M974 Tools:

To protect from excess movement, cracking, thermal shock, or warpage, the temperature differential (Δ T) between the center of mass of the tool and the external surface should never exceed 55°F on either ramp up or cool down. To achieve this, temperature soaks of 6-8 hours, for every 55°F, up and down in the oven and temperature ramp rates of no more than .5°F/min are recommended. Leave the tool in the oven for at least 6-8 hours below 100°F before opening doors and exposing the tool to room temperature conditions. Do not cure or use over a 235°F temperature.

Please contact Sika Advanced Resins US Technical Service or your Sika Representative with any questions.

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Sika's product lines feature high-quality concrete admixtures, specialty mortars, sealants and adhesives, damping and reinforcing materials, structural strengthening systems, industrial flooring and membranes. Subsidiaries in more than 101 countries worldwide and approximately 18,000 employees link customers directly to Sika.

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