

## RAKU-TOOL<sup>®</sup> Board Products

### Guide to cutting, bonding, machining, repairing and finishing.

#### General cutting recommendations for RAKU-TOOL<sup>®</sup> board products:

RAKU-TOOL<sup>®</sup> board products can be cut using normal wood working power tools with high-speed steel tools however carbide tools will provide longer tool life. For boards over 43,7pcf (0.72 g/cm<sup>3</sup>) saw blades with offset carbide teeth will reduce binding.

#### Bonding of RAKU-TOOL<sup>®</sup> board products:

The most widely used adhesives to bond styling, modeling and working boards into rough shapes are based upon room-temperature curing two-part epoxy systems. We recommend the following RAKU-TOOL<sup>®</sup> adhesives:

**For styling boards with a density < 34.3pcf (0.55g/cm<sup>3</sup>)**

	EP-2305/EH-2904	EP-2305/EH-2903
Color	Apricot	Apricot
Mix Ratio (parts by weight)	100:30	100:25
Pot life @ 77°F (25°C)	25 minutes	15 minutes
Minimum curing time	16 hours	16 hours

**For modeling boards with a density 34.3 to 44.9pcf (0.55 to 0.72g/cm<sup>3</sup>)**

	EP-2306/EH-2904	EP-2306/EH-2903
Color	Brown	Brown
Mix Ratio (parts by weight)	100:30	100:25
Pot life @ 77°F (25°C)	35 minutes	20 minutes
Minimum curing time	16 hours	16 hours

**For working boards with a density 44.9 to 106pcf (0.72 to 1.7g/cm<sup>3</sup>) (all except WB-0700)**

	EL-2210/EH-2910
Color	Transparent
Mix Ratio (parts by weight)	100:60
Pot life @ 77°F (25°C)	60 minutes
Minimum curing time	16 hours

**For epoxy based working boards with a density of 43.7pcf (0.72g/cm<sup>3</sup>) (WB-0700 only)**

	EP-2304/EH-2934
Color	Green
Mix Ratio (parts by weight)	100:20
Pot life @ 77°F (25°C)	90 minutes
Minimum curing time	18 hours

Cut and assemble the boards into the rough shape taking care to minimize gaps larger than 1/8 inch. For gaps larger than 1/8" the adhesive can be thickened using Cab-O-Sil®, micoballons or other suitable filler. Apply adhesive to all surfaces to be bonded using a 1/8" notched trowel. Clamp the assembled rough shape using light pressure to ensure that adhesives is not squeezed from the joints. Cure the assembly following the adhesive manufacture's recommendation.

User experience has shown that many 100% reactive room-temperature curing epoxies, polyurethanes, methacrylate and cyanoacrylate adhesives will work in most applications. Physical loads, resistance to vibration, shock and impact, environmental and chemical resistance, ease of use plus good thixotropic properties for gap filling capabilities are factors in choosing the best adhesives system. The cured hardness of the adhesives should be similar to the hardness of the particular board being bonded to reduce the tendency for cupping when sanding across a bond line. Single component adhesives will also work in some cases but should be carefully evaluated for the intended application.

**General machining recommendations for RAKU-TOOL® board products:**

Machining parameters are impacted by machine capability and condition, cutter type and condition, material being machined, geometry being machined and final end results required. Therefore these recommended general machining parameters are represented as starting points only and the user must determine the best parameters for their individual specific applications.

ROUGHING: 1/2" to 1" four-flute carbide tipped ball-end mill. Cuts up to 2" deep with 35% step-over.  
 FINISHING: 1/2" two flute carbide tipped ball-end mill. Cuts 1/8" deep with a small step-over to minimize scallop height.  
 High speed steel tools will cut all RAKU-TOOL boards however tool life may be reduced.

**For styling boards with a density < 34.3pcf (0.55g/cm<sup>3</sup>)**

	Roughing	Finishing
Spindle Speed (RPM)	2,500	15,000
Feed rate (ipm)	200	200

**For modeling boards with a density 34.3 to 44.9pcf (0.55 to 0.72g/cm<sup>3</sup>)**

	Roughing	Finishing
Spindle Speed (RPM)	2,500	10,000
Feed rate (ipm)	100	200

**For working boards with a density 44.9 to 106pcf (0.72 to 1.7g/cm<sup>3</sup>)**

	Roughing	Finishing
Spindle Speed (RPM)	2,000	10,000
Feed rate (ipm)	100	100

Dusting can be reduced by lowering spindle speed or increasing feed rate. Clear chips to minimize cutter heat build-up and reduce airborne dust.

## Repairing or modifying structures from RAKU-TOOL® board products:

For making small repairs or modifications Rampf recommends the following RAKU-TOOL® products:

**For styling boards with a density < 34.3pcf (0.55g/cm<sup>3</sup>)**

	<b>UP-4300/UH-4900</b>
Color	Light Brown
Mix Ratio (parts by weight)	100:1-3
Pot life @ 77°F (25°C)	4-6 minutes
Minimum curing time	25-30minutes

**For modeling boards with a density 34.3 to 44.9pcf (0.55 to 0.72g/cm<sup>3</sup>)**

	<b>UP-4310/UH-4900</b>
Color	Light Brown
Mix Ratio (parts by weight)	100:1-3
Pot life @ 77°F (25°C)	4-6 minutes
Minimum curing time	25-30minutes

**For working boards with a density 44.9 to 106pcf (0.72 to 1.7g/cm<sup>3</sup>)**

Repair by bonding inserts of the same material.

User experience has shown that many automotive repair compounds (such as Bondo) can also be used to make small repairs or modifications. Use multiple thin layers to prevent excessive shrinkage and cracking. Pastes can also be made from traditional polyester and epoxy laminating and surface coat resins by adding various fillers. For best results the cured hardness should be similar to the hardness of the board being repaired or modified.

For larger repairs or modifications Rampf recommends that inserts of the same material be used.

## Sealing and finishing RAKU-TOOL® board products:

User experience has shown that most common sanding sealers will work to fill any small voids created during milling of RAKU-TOOL® board products. Optimum results are achieved by using multiple thin coats with light sanding between coats. User must ensure that the sealer used is compatible with any finishing materials or mold release materials. Some users have found that common drywall compound works as a quick and cheap filler and surface finish.

Normal woodworking and automotive finishes and techniques work well for preparing a finished surface with the desired effects.

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Our recommendations on the use of these materials are based on many years of experience and current scientific and practical knowledge. They are, however provided without obligation on our part and do not relieve the buyer of the need for suitability tests. They do not constitute a legal relationship, nor are any third party rights whatsoever affected thereby.

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