



FAQ

Frequently Asked Questions Precision Board Machining & Composite Applications

1. What is the primary use of Precision Board Urethane Tooling Board?

Precision Board has been formulated for composite laminate layup tools, check fixtures, prototype models, foundry patterns, trim fixtures, CNC program proofing substrates, theme park characters, concept cars, and many other applications. Precision Board is very versatile. Both PBLT & PBHT have been developed for these applications.

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2. What is the difference between PBLT & PBHT?

The only difference between the two products is PBLT has been designed to withstand composite oven/autoclave curing temperatures of 200°F, 94°C, and PBHT is designed to withstand composite curing temperatures of 300°F, 149°C. Neither PBLT or PBHT outgas at these temperatures.

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3. What is outgassing and what causes it?

Outgassing occurs when a urethane tooling board, other than Precision Board, is used to make a composite layup tool which is then heated during curing of the composite laminate. When a typical urethane tooling board is heated, it outgases, which releases by products that keep the composite laminate adhesive from curing. This obviously ruins the composite laminate and can damage the urethane tool.

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4. Are there any machining differences between LT and HT?

No. Both products machine very well and at high feed rates.

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5. Is either PBLT or PBHT abrasive?

No. Precision Board, both PBLT and PBHT contain no abrasive components or fillers. This means standard high speed steel (HSS) cutting tools may be used.

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6. What size sheets are available?

Standard sheet sizes are 4' x 8', 4' x 10', 5' x 8', 5' x 10', 24" x 60" and 20" x 60". Thickness to 20", depending on density. Custom sheet sizes and thicknesses are available.

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7. What standard densities are available?

Standard densities are: 4pcf, 6pcf, 10pcf, 12pcf, 15pcf, 18pcf, 20pcf, 30pcf & 40pcf. Custom densities available on request. Call for minimum quantities.

8. Is Precision Board a polyurethane based material?

Yes. Precision Board is a specially formulated urethane that is designed for higher curing temperatures than standard urethane tooling boards.

9. Are there specific oven/autoclave ramping procedures necessary for Precision Board during the heat up and cool down cycle of curing?

Yes. Precision Board being an organic material and not a heat conducting one like aluminum and steel, must be heat cycled differently. Precision Board takes longer than metal to absorb heat into it during the heating cycle. So, it releases heat slower than metal, during the cool down cycle.

10. What is the typical oven/autoclave ramp up and ramp down procedures?

Temperature ramp up should not exceed 1°F per minute. This allows the temperature to be evenly absorbed during heat expansion which will reduce possibility of internal stress and warping. Temperature ramp down should not exceed 2°F per minute. This allows the temperature of the tool to come down slowly so contraction does not cause internal stress and cracking in the thin sections of the tool. In thick tools with thin webs or sections the cool down should be even slower. Prior testing is always recommended before heat cycling on actual tool.

11. Are the ramping temperatures different for LT or HT?

No. When in doubt with either material, extend ramping times.

12. How much vacuum pressure will PB withstand?

Since all organic materials tend to soften when heated, the maximum pressure allowed is much less on Precision Board than on aluminum or steel. Both PBLT and PBHT, at maximum service temperatures, should not be subjected to pressures over 30psi. The lower the maximum curing temperature the higher the pressure both materials can tolerate. It is always best to test for deformation pressure in the actual oven/autoclave being used to determine the specific configuration maximum pressure.

13. What is the CTE of PBLT and PBHT?

Both materials, in a 15 pound density, have a CTE of 32 x 10⁻⁶. Call for CTE of other densities.

14. Is it necessary to hold down or "dog" Precision Board to the vacuum table or oven support fixture during heating & cooling?

Yes. Due to the internal stresses that are occurring in the tool during the heating and cooling part of the cure cycle it is important to hold the Precision Board tool flat. However, due to the differential of expansion and contraction between the Precision Board lay up tool and the support structure it is crucial that they be allowed to move independent of each other. It is always a good idea to securely, not excessively, hold PBLT and PBHT tooling to the vacuum or table to support the piece during ramp up and ramp down. Dogs, or equivalent, every 2' +/- is adequate. Remember not to over tighten which will restrict horizontal expansion and contraction and possibly damage tool and composite laminate.

15. How many parts should I expect to be able to run on a Precision Board tool?

Typically Precision Board "soft tooling" is used for 1 to 5 prototypes or production parts depending on complexity of configuration. The more familiar tooling personnel are with soft tooling the longer the tool life. In some cases 10 to 12 production parts have been made. Configuration of the finished part and personnel product awareness has a major affect on tool life.

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16. What about using a Precision Board composite layup tool for production runs?

For production runs it is better to use the Precision Board tool as a "master tool" to reproduce "production" tooling. This method allows for multiple production tools to be made from one Precision Board master. This is a very effective way to make lower cost, faster completion, production tooling.

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17. What can I use to bond Precision Board to make larger sections?

Precision Board can be easily bonded with high quality epoxy adhesives. Coastal Enterprises makes a very easy to use, machinable grade, high strength epoxy called EP-76. It machines, sands and carves very smoothly. Contact Coastal Enterprises for more information and helpful bonding tips.

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18. What are typical Shore D hardness ratings of Precision Board?

Call us for specific hardness information.

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19. Are custom bonded sizes of Precision Board tools readily available?

Yes - Coastal Enterprises will fabricate any size rough tool to meet your specifications. This allows you to immediately start the machining process with no delay. Fast turn around times are our specialty.

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20. Does Coastal Enterprises fabricate custom support fixtures for machining and layup tools?

Yes. Coastal Enterprises will fabricate a support fixture for any Precision Board tool. This support tool can be used for tool transport, CNC machining, lay up of composite laminate, oven/autoclave curing, final inspection, and every other process procedure. Support structures are designed with all direction casters, leveling jacks, and tool hold down attachments that can be tightened during machining, etc. and loosened during oven/autoclave cycling. The custom hold down attachments have independent movement between steel support structure and the Precision Board lay up tool.

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21. Do I need a mold release on either PBLT or PBHT?

Yes. Mold releases are designed to be used against all tooling surfaces so that after cure cycle, the composite part can be released and removed from the layup tool without damaging the tool or the part. Care must be taken when choosing a release agent to be sure it will not outgas during the composite heat curing cycle and affect resin cure. Be sure to run test on a sample part to verify mold release compatibility with your chosen prepreg or composite laminate.

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22. Where can I receive more information about Precision Board products?

For information, technical assistance, free Precision Board samples, and the closest location for purchasing our products please call us at (800) 845-0745 or email at www.precisionboard.com. We are always glad to hear from you.