



Ren® Epoxy

RP 4040 PATTY
(Formerly TDT 177-150 PATTY)
ONE-COMPONENT HIGH TEMPERATURE RESISTANT TOOLING CLAY

DESCRIPTION: RP 4040 is a high temperature resistant, low CTE, machinable one-component epoxy designed for directly machining curing tools for prepreg parts. RP 4040 is a void-free, clay-like compound that can easily be formed into complex shapes by hand application. This material exhibits a very long shelf life at room temperature (one year) and cures readily with a heat cure to 350°F. The cured epoxy is machined with standard carbide cutters. RP 4040 is supplied in pre-formed ready to use patties.

APPLICATIONS:

- Tool face for LCTC (Low Cost Tooling for Composites) process
- Curing tools for prepreg and wet lay-up parts
- Heat forming tools
- Low CTE master models
- Durable low CTE checking fixtures
- Stretch form dies
- Hydroform dies
- Compression molding
- LPLTMC molding

ADVANTAGES: RP 4040 is a one component, syntactic epoxy that has a very low CTE for excellent dimensional stability. It can be used continuously up to 300°F, and intermittently up to 350°F under full autoclave conditions. It is supplied as a drapable clay-like preformed patty. Shelf life at 77°F is one year. No refrigerated storage is necessary.

TYPICAL HANDLING PROPERTIES: Tested at 77°F (25°C) unless otherwise noted.

Property	ASTM Test Method	Test Value
Color	Visual	Off-white
Appearance		Soft Clay

NOTE: Typical Properties – These physical properties are reported as typical test values obtained by our test laboratory. If assistance is needed in establishing product specifications, please consult with our Quality Control Department.

PROCESSING: Roll out patties of RP 4040 between the supplied plastic sheets using spacer bars to determine the thickness required. Transfer these RP 4040 sheets to a properly sealed and released heat-resistant master. Don't butt adjacent sheets. Allow a gap of about ½ inch between. Roll the edges of adjacent sheets to form a knit line taking care to not trap air. Don't roll out thinner than ¾ of an inch thick.

Cured tools should not be thermally shocked. Never take a hot tool (over 100°F directly out of oven. Always cool down at a rate not to exceed 5°F per minute (part temperature). Always make sure that the backup support structure has been designed to allow the RP 4040 tool face to float. Rigid backup can distort and crack a tool face. The LCTC method is a fast low-cost alternative to rigid backup structures. Call for more information on this new tooling process.

MACHINING: Roughing Speed Roughing Feed Finishing Speed Finishing Feed
 6,000-10,000 RPM 240 IPM 15,000 RPM Variable

Cutters: Roughing – ¾" Ball End Mill Carbide
 Finishing – 3/32" Diameter Carbide

Depth: Roughing – 5/32"
 Finishing – 0.006 stepover

Blades: High-helix carbide tipped, 3-tooth saw blades are recommended.

Specialty Saw Blades such as Lenox® 3T-TriMaster® or 2.3 TriMaster® (for faster cut) are available from the following company: **American Saw and Manufacturing Company (800) 628-8810**

RECOMMENDED CURE SCHEDULE:

Temperature	Time
250°F (121°C)	2 hours plus
350°F (177°C)	3 hours

Curing Instructions: RP 4040 is demoldable and can be self-supporting after 16 hours at 200°F. Final cure can be completed by curing at the above schedule.

NOTE: A 5°F per minute ramp up/down is recommended to prevent thermal shock of material.

TYPICAL CURED PROPERTIES:

Property	ASTM Test Method	Test Value
Density, lb./ft ³ (g/cm ³)	D-792	100 (1.60)
Cubic inch per lb.		17.3
Hardness (Shore D)	D-2240	88
Ultimate Flexural Strength (psi)	D-790	8,140
Flexural Modulus, (psi)	D-790	1.11 x 10 ⁶
Tg by DMA, E", °F (°C)	D-4065	324 (162)
Ultimate Compressive Strength, (psi)	D-695	20,500
Coefficient of Thermal Expansion (in/in/°F) -22° to 86°F, in/in/°F -30° to 30°C, in/in/°C 32° to 220°F, in/in/°F 0° to 104°C, in/in/°C	D-3386	9 x 10 ⁻⁶ 16.2 x 10 ⁻⁶ 10 x 10 ⁻⁶ 18.0 x 10 ⁻⁶
Thermal Conductivity, W/m °K		1.13

Cured 2 hours @ 250°F (121°C) plus 3 hours @ 350°F (177°C).

Tested @ 77°F (25°C) unless otherwise noted.

PACKAGING: This product is available in the following package size(s):

RP 4040 Patty 4 Pounds

Please call Customer Service (800-367-8793) for price and availability.

STORAGE/HANDLING: Store material at 40-80°F. Do not exceed 100°F.

In accord with good industrial practice, handle with due care. Avoid dusty conditions, use adequate ventilation. Avoid breathing dust. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.

SHELF LIFE: Provided materials are stored under the recommended storage conditions in their original containers, they will remain in useable condition for at least one year from date of shipping.

SAFETY/HANDLING PRECAUTIONS: Do not use or handle this product until the Material Safety Data Sheet has been read and understood.

RP 4040 Patty

DANGER! Causes severe skin irritation. Causes eye and respiratory irritations. May cause skin burns and allergic skin reaction. Causes allergic skin and respiratory reactions.

Do not get in eyes, on skin, or on clothing.
Avoid breathing vapor or mist.
Avoid prolonged or repeated contact with skin.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Nuisance dust may be generated when sanding or sawing cured material.

FIRST AID: In case of contact with:

Skin: Immediately wash with soap and water. Remove contaminated clothing and launder before reuse. Destroy contaminated shoes.

Eyes: Immediately flush with water for at least 15 minutes. Call a physician.

Ingestion: If conscious, give plenty of water to drink. Do not induce vomiting. Call a physician.

Inhalation: Remove to fresh air. Administer oxygen or artificial respiration if necessary. Call a physician.

Other: Referral to physician is recommended if there is any question about the seriousness of any injury.

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