



**EC-433  
HIGH TEMPERATURE  
EPOXY  
CASTING SYSTEM  
ALUMINUM FILLED**



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**DESCRIPTION**

EC-433 aluminum filled epoxy casting systems are developed for use in heat resistant tooling applications such as prototype injection molding, vacuum forming, and other high temperature cast tooling applications. **EC-433 offers 3 hardener options** with various working times, suitable for any tool size. EC-433 is a room temperature hardening (B Stage) system, but a post cure is necessary for use over 150°F (66°C). Tools made with EC-433 can be used at continuous temperatures of 300°F (160°C) and intermittent temperatures up to 350°F (177°C). EC-433 features easy mixing, accepts higher loading of bulk aluminum, and exhibits greater dimensional stability. **Typical Applications Include: Vacuum Form Molds, Compression Molds, Prototype Injection Moldings, RIM Molds, Foam Molds and other High Temp Cast Applications.**

**TYPICAL HANDLING CHARACTERISTICS @ 77°F (25°C)**

	<b>EC-433-2 (FAST)</b>	<b>EC-433-3 (MEDIUM)</b>	<b>EC-433-4 (SLOW)</b>
Mix Ratio (parts by weight) .....	100R/12H .....	100R/13H .....	100R/13H
Specific Gravity (g/cc) .....	1.62 .....	1.59 .....	1.59
Mixed Density (lbs/cu.in.) .....	0.058 .....	0.058 .....	0.058
Mixed Viscosity (cps) .....	9,000 .....	15,000 .....	15,000
Work Life .....	120 min. ....	200 min. ....	270 min
Demold Time .....	24 hours ***	See Cure Schedule ***	***
Complete Cure .....	Post cure .....	Post Cure .....	Post Cure
Maximum Casting Thickness (without aluminum filler additive) .....	< 1 inch .....	1 inch .....	<3 inches
Suggested Casting Mass (with N-20 Aluminum bulk filler additive) .....	< 2 cu/ft .....	2-5 cu/ft .....	> 5 cu/ft
Color .....	Gray Resin / Amber Hardener		
Shelf Life EC-433 Resin (in original unopened containers) .....	1 year .....	1 year .....	1 year
Shelf Life EC-433-2, 3 and 4 Hardeners (in original unopened containers) .....	2 years .....	2 years .....	2 years

NOTE: Bulk filler mix ratio is 100 parts-by-weight catalyzed EC-433 : 155 parts-by-weight N-20 Aluminum Grain

**TYPICAL PHYSICAL PROPERTIES (Cast Bar 5" x 1/2" x 1/2")**

	<b>EC-433-2 (FAST)</b>	<b>EC-433-3 (MEDIUM)</b>	<b>EC-433-4 (SLOW)</b>
Tensile Strength (ASTM D-638.91) .....	5,750psi .....	6,185psi .....	7,990psi
	(40MPa) .....	(43MPa) .....	(55MPa)
Tensile Modulus (ASTM D-638.91) .....	941,200psi .....	803,200psi .....	665,000psi
	(6,489MPa) .....	(5,538MPa) .....	(4,585MPa)
Flexural Strength (ASTM D-790.92) .....	10,620psi .....	10,280psi .....	11,670psi
	(73MPa) .....	(71MPa) .....	(81MPa)
Flexural Modulus (ASTM D-790.92) .....	700,900psi .....	620,300psi .....	756,000 psi
	(4,833MPa) .....	(4,277MPa) .....	(5,212MPa)
Compressive Strength (ASTM D-695.91) .....	16,300psi .....	16,100psi .....	18,650psi
	(112MPa) .....	(111MPa) .....	(129MPa)
Impact Strength – Notched Izod (ASTM D-256.93A) .....	11.8 in-lbf/in .....	7.22 in-lbf/in .....	8.8 in-lbf/in
Coefficient of Thermal Expansion (TMA) (ppm/°F (°C)) .....	28 (51) .....	28 (51) .....	29 (53)
T <sub>g</sub> by DMA .....	288°F (142°C) .....	305°F (152°C) .....	285°F (141°C)
Hardness .....	90 Shore D .....	90 Shore D .....	91 Shore D
Linear Shrinkage (200 cm <sup>3</sup> mold (-2); 4,650 cm <sup>3</sup> mold (-3 & -4)) .....	0.005in/in .....	0.004 in/in .....	0.004in/in
Linear Shrinkage filled with N-20 aluminum grain (4,650 cm <sup>3</sup> mold) .....	0.002 in/in .....	0.003 in/in .....	0.003in/in

**RECOMMENDED CURE SCHEDULE**

**PRELIMINARY CURE:**

24 hours @ 77°F (25°C) + 3 hours @ 150°F (66°C) is the minimum cure temperature

You may de-mold tool after the preliminary schedule is complete and the tool has cooled.

**POST CURE SCHEDULE:**

A conditioning post cure at a temperature equivalent to the constant operational temperature of your production mold is advised. If an additional post cure is necessary beyond the preliminary cure schedule, the recommended cure schedule is as follows:

- 2 hours @ 200°F (93°C)
- 2 hours @ 250°F (121°C)
- 2 hours @ 300°F (149°C)

Ensure proper heat curing temperatures are met by installing a thermocouple directly in the center of the tool.

**Notes:** It is always advisable to heat cure cast epoxy molds internally by using the copper tubing temperature control system built into your mold.

\*\*\*If oven curing is your only option, it is advisable to complete the initial cure on the model at 125°F (52°C) for 8 hours or overnight before reverting to the higher post cure temperatures outlined above.

\*\*\***Extremely large cast molds should always be heat cured internally** and not moved or transported prior to completing an internal heat cure process of 150°F (66°C) minimum.

\*\*\*Always allow a cast tool to cure 24hrs at room temperature before heat cure. This will prevent excessive exotherm and shrink stress from occurring.

\*\*\*When taking cast tools through a preliminary or post cure phase always place tool in a room temperature oven and increase temperature at a rate of no more than 50°F (30°C) per hour.

\*\*\*When cooling cast tools, always allow tool to remain in heat environment and decrease temperature at a rate of no more than 50°F (30°C) per hour. Do not remove tool from heat environment until tool has reached 100°F (38°C) or less. Removing tool at temperatures above 100°F (38°C) can result in thermal shock and warping.

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