

Product Bulletin

CASS POLYMERS

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EL-335 & EL 335-2
EPOXY LAMINATING SYSTEM
HIGH TEMP – HIGH IMPACT
FOR USE WITH GRAPHITE FABRIC

0302

DESCRIPTION

ADTECH's EL-335 systems are high temperature laminating systems developed for high performance applications. These systems exhibit greater mechanical shock properties, increased hardness at elevated temperatures, greater degree of flexibility, increased heat distortion and lower viscosity for use with graphite and other types of fabrics which are difficult to penetrate or wet-out.

EL-335 systems, when used with graphite fabric, exhibit increased impact resistance in the fabrication of parts which will be used in a heat environment where stability and performance are required. Parts made with EL-335 systems will maintain excellent shape. Because hardness and impact strength are high even at elevated temperatures, the systems will withstand vibration and crushing blows which can render other matrix types of part fabrication useless. The handling properties are designed for use in vacuum bagging and autoclave cure as well as in 24-36 hour "B" stage cure.

The EL-335 systems have exceptional physical properties compared to competitive systems. ADTECH EL-335 and EL-335-2 are health safe for shop use and contain no MDA or VCHD.

ADVANTAGES

- Greater mechanical shock properties
- Increased Shore D hardness at elevated temperatures
- Greater degree of flexibility
- Increased heat distortion temperature
- Lower viscosity for better cloth penetration

HANDLING CHARACTERISTICS @ 25°C/77°F

	<u>EL-335</u>	<u>EL-335-2</u>
Mix Ratio (parts by weight).....	100R/20H	100R/13H
(parts by volume).....	4.1R/1H	6.3R/1H
Density (Mixed).....	9.51 lbs/gal	9.4 lbs/gal
.....	0.041 lbs/cu in	0.040 lbs/cu in
Specific Gravity	1.14 gms/cc	1.12 gms/cc
Mixed Viscosity	950-1,400 cps	1,900 cps
Work Life (228 gram mass).....	40-50 minutes	90 minutes
Demold Time	24 hours	24 hours
Complete Cure.....	3 days	3-5 days
Color.....	Amber	Amber
Storage Life	1 year	1 year

(@25°C/77°F; Containers tightly closed)

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PHYSICAL PROPERTIES (Tested after completion of alternate cure schedule)**6 Layer, 10 Ounce Glass Fabric Laminate:**

	<u>EL-335</u>	<u>EL-335-2</u>
Tensile Strength (ASTM D-638-946).....	34,930 psi	56,570 psi
Tensile Modulus (ASTM D-638-946).....	1.43 x 10 ⁶ psi	3.69 x 10 ⁶ psi
Flexural Strength (ASTM D-790-92).....	49,014 psi	78,200 psi
Flexural Modulus (ASTM D790-92).....	2.028 x 10 ⁶ psi	4.95 x 10 ⁶ psi
Tg by DMA.....	100.5°C/213°F	

Cast Bar:

Compressive Strength (ASTM D-695-91).....	14,990 psi	15,300 psi
Impact Strength (IZOD Impact Test) (ASTM D-256-93A).....	9.27 in-lb/in	6.37 in-lb/in
Hardness (ASTM D-2240-91).....	85 Shore D	87 Shore D
Tensile Elongation (ASTM D-638-946).....	1.579%	1.934%
Heat Deflection Temperature (ASTM D-648-82)..... @ 66 psi....	185.5°F	189.7°F
	@ 264 psi...	177.1°F
Coefficient of Thermal Expansion (ASTM D-696-91)..... °in/in/°F	3.63x10 ⁻⁵ in/in/°F	2.15 X 10 ⁻⁵

CURE SCHEDULE

	<u>EL-335</u>	<u>EL-335-2</u>
Preliminary:	24 Hours @ 25°C/77°F 2 Hours @ 150°F	24 Hours @ 25°C/77°F 4 Hours @ 150°F

You may demold after this schedule is complete.

Complete:	24 Hours @ 25°C/77°F 16 Hours @ 150°F	25 Hours @ 25°C/77°F 16 Hours @ 150°F
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Insure proper heat curing temperatures are met by installing a thermocouple directly in the center of the tool.

Always allow tools made with ADTECH's high temp systems to cure at room temperature before subjecting them to post cure (24 hours is sufficient). This will prevent excessive exotherm and shrinkage from occurring. When taking tools through a preliminary or post cure phase always place tool in a room temperature oven and increase temperature as a rate of 5°F/minute.

When cooling tools always allow tool to remain in heat environment and decrease temperature at a rate of 10°F/minute. Do not remove tool from heat environment until tool has reached 100°F. Removing tool heated above 100°F can result in thermal shock and warp.