

Fiber to Ferrule Bonding



What is Fiber to Ferrule Bonding?

Fiber optic cables require proper termination for optimum transmission efficiency and minimal data loss. Selecting the right adhesives assures limited fiber displacement and mitigates interference from mechanical and thermal factors. Epoxies are used to maintain fiber alignment within the ferrule, as well as allowing light to be transmitted.

Where Can Fiber to Ferrule Bonding Materials Be Used?

Epoxies bond well to most substrates; notably glass, stainless steel, zirconia, and ceramic. A small amount of epoxy can be used to pot (fill-in) the void between the outer diameter of the fiber and the inner diameter of the ferrule. This ensures the epoxy holds the fiber within the ferrule, which is then polished to help sustain the fibers' optical properties.

Which EPO-TEK® Products Are Best Suited For Fiber to Ferrule Bonding?

Epoxy Technology manufactures a variety of optical adhesives, listed below by cure type:

- Low Viscosity:
 - Room Temp Cure: [301](#), [301-2](#), [302-3M](#), [OM125](#)
 - Thermal Cure: [323LP](#), [353ND](#), [354](#), [377](#), [383ND](#)
 - UV Cure: [OG142-87](#), [OG198-54](#), [OG603](#)
- Low/Non-Flow:
 - Room Temp Cure: [OJ2116](#)
 - Thermal Cure: [323LP-T](#), [353ND-T](#), [354-T](#)
 - UV Cure: [OG116-31](#), [OG198-55](#)

Characteristics To Help Choose the Correct EPO-TEK® Product

EPO-TEK	Key advantages/ Characteristics
301	Low viscosity, RT cure, highly wicking, commonly used in fiber optic catheters
301-2	Low viscosity, long pot life, RT cure, highly wicking ISO-10993, USP Class VI approved
302-3M	Medium viscosity, RT cure, strong moisture and chemical resistance
323LP	Medium viscosity, heat cure, long pot life version of 353ND
323LP-T	Non-flowing version of 323LP
353ND	Well known (Industry standard) in fiber optics, high performance and reliability
353ND-T	Non-flowing version of 353ND
354	Long pot life (3 days) version of 353ND, high strength and reliability USP Class VI approved
354-T	Thixotropic version of 354
377	Low viscosity, heat cure, low stress and strong chemical resistance, ideally suited for fiber optic bundles
383ND	8 hour pot life version of 353ND
OG116-31	Higher viscosity, UV cure, low flow material with high strength and low stress
OG142-87	Low viscosity, UV cure, high strength epoxy
OG198-54	Low viscosity, UV cure, allows for some shadow cure through heat
OG198-55	Non-flowing version of OG198-54, allows for some shadow cure through heat
OG603	Low viscosity, very fast UV cure, acrylate type, for fiber optic pigtails
OJ2116	Medium viscosity, very fast cure for field assembly and repairs
OM125	Medium viscosity, RT cure, low shrinkage and low stress, blue color



How Do The EPO-TEK Properties Compare?

EPO-TEK®	NO. of COMPONENTS	COLOR Before/ After CURE (thin film)	CURE TEMPERATURE (minimal)	VISCOSITY @ 23°C	GLASS TRANSITION TEMPERATURE (Tg)	DIE SHEAR STRENGTH @ RT (60min x 60min)	INDEX OF REFRACTION (nD)	SPECTRAL TRANSMISSION	TGA DEGRADATION TEMPERATURE	GTE Below 1g, Above 1g (µl/m ² /°C)	POT LIFE @ room temp.)	SHELF LIFE @ room temp. (unless noted)
301	Two	Clear/ Colorless	65°C – 2 hours 23°C – 24 hours	100 - 200 cPs @ 100 rpm	≥65°C	≥10 kg/3,400 psi	1.5190 (uncured)	>99% @ 380-980nm >97% @ 980-1640nm >95% @ 1640-2040nm	430°C	39 x 10 ⁻⁶ 98 x 10 ⁻⁶	1-2 hours	1 year
301-2	Two	Clear/ Colorless	80°C – 3 hours 23°C – 24 hours	225 - 425 cPs @ 100 rpm	≥80°C	≥15 kg/5,100 psi	1.5318 (uncured)	>94% @ 320nm >99% @ 400-1200nm >98% @ 1200-1600nm	360°C	61 x 10 ⁻⁶ 180 x 10 ⁻⁶	8 hours	1 year
302-3M	Two	Clear/ Colorless	65°C – 3 hours 23°C – 24 hours	800 - 1,600 cPs @ 100 rpm	≥55°C	≥10 kg/3,400 psi	1.5446 (uncured)	>95% @ 460-1620nm	351°C	56 x 10 ⁻⁶ 193 x 10 ⁻⁶	1 hour	1 year
3231P	Two	Amber/ Dark Amber	90°C – 30 min	3,500 - 5,000 cPs @ 50 rpm	≥100°C	>20 kg/6,800 psi	1.5704 (uncured)	≥94% @ 820-1620nm ≥90% @ 640-800nm	413°C	31 x 10 ⁻⁶ 132 x 10 ⁻⁶	24 hours	1 year
3231P-T	Two	Amber/ Dark Amber	90°C – 30 min	22,451 cPs @ 10 rpm	118°C	>20 kg/6,800 psi	N/A	N/A	419°C	N/A	24 hours	6 months
353MD	Two	Amber/ Dark Red	150°C – 1 min 80°C – 30 min	3,000 - 5,000 cPs @ 50 rpm	≥90°C	≥15 kg/5,100 psi	1.5694 (uncured)	>50% @ 550nm >98% @ 800-1000nm >95% @ 1100-1600nm	412°C	54 x 10 ⁻⁶ 206 x 10 ⁻⁶	≤3 hours	1 year
353MD-T	Two	Tan/ Dark Red	150°C – 1 min 80°C – 20 rpm	9,000 - 15,000 cPs @ 20 rpm	≥90°C	≥15 kg/5,100 psi	N/A	N/A	409°C	43 x 10 ⁻⁶ 231 x 10 ⁻⁶	3 hours	1 year
354	Two	Amber	150°C – 10 min 80°C – 2 hours	4,000 - 6,000 cPs @ 50 rpm	≥95°C	≥10 kg/3,400 psi	1.5734 (uncured)	≥96% @ 600nm ≥99% @ 800nm	487°C	96 x 10 ⁻⁶ 175 x 10 ⁻⁶	3 days	1 year
354-T	Two	Amber	150°C – 10 min 80°C – 2 hours	11,000 - 20,000 cPs @ 20 rpm	≥95°C	≥10 kg/3,400 psi	N/A	N/A	485°C	51 x 10 ⁻⁶ 179 x 10 ⁻⁶	3 days	1 year
377	Two	Amber/ Dark Amber	150°C – 1 hour	150 - 300 cPs @ 100 rpm	≥95°C	≥10 kg/3,400 psi	1.5195 (uncured)	≥90% @ 600-1000nm ≥98% @ 1000-6500nm	375°C	57 x 10 ⁻⁶ 210 x 10 ⁻⁶	24 hours	1 year
383MD	Two	Amber/ Dark Red	90°C – 30 min	3,500 - 6,000 cPs @ 50 rpm	>100°C	>20 kg/6,800 psi	1.5715 (uncured)	>90% @ 520-1660nm	415°C	34 x 10 ⁻⁶ 129 x 10 ⁻⁶	8 hours	1 year
06116-31	One	White/White	100mW/cm ² for >2 min @ 240-365nm	20,000 - 30,000 cPs @ 10 rpm	≥115°C	≥10 kg/3,400 psi	1.5665	>96% @ 660-1640nm >92% @ 500nm	409°C	41 x 10 ⁻⁶ 170 x 10 ⁻⁶	N/A	1 year
06142-87	One	Clear/ Colorless	100mW/cm ² for >2 min @ 240-365nm	250 - 600 cPs @ 100 rpm	≥100°C	>20 kg/6,800 psi	1.4925	>97% @ 580-1660nm	384°C	50 x 10 ⁻⁶ 162 x 10 ⁻⁶	N/A	1 year refrigerated
06198-54	One	Clear/ Colorless	100mW/cm ² for >2 min @ 240-365nm	200 - 450 cPs @ 100 rpm	≥131°C	>10 kg/3,400 psi	1.5046 (uncured) 1.5256 (uncured) 1.5023 (uncured)	>97% @ 460-1680nm	369°C	74 x 10 ⁻⁶ 145 x 10 ⁻⁶	N/A	1 year refrigerated
06198-55	One	Cloudy	100mW/cm ² for >2 min @ 240-365nm	1,200 - 2,000 cPs @ 100 rpm	≥120°C	>20 kg/6,800 psi	1.5196 (uncured) 1.5196 (cured)	>97% @ 560-1680nm	354°C	72 x 10 ⁻⁶ 120 x 10 ⁻⁶	N/A	1 year refrigerated
06603	One	Clear/ Colorless	100mW/cm ² for >5 sec @ 240-365nm	150 - 250 cPs @ 100 rpm	≥70°C	≥3 kg/1,020 psi	1.5037	>98% @ 420-1600nm	385°C	69 x 10 ⁻⁶ 170 x 10 ⁻⁶	N/A	1 year
0J2116	Two	Clear/ Colorless	23°C – 30 min	N/A	56°C	17 kg/5,780 psi	1.5459 (uncured)	>97% @ 460-1620nm	347°C	N/A	<5 min	1 year
0M125	Two	Blue/Blue	80°C – 1 hour 23°C – 24 hours	2,400 - 5,400 cPs @ 50 rpm	≥80°C	≥20 kg/6,800 psi	N/A	>96% @ 1500nm >98% @ 1000nm >97% @ 800nm	367°C	28 x 10 ⁻⁶ 114 x 10 ⁻⁶	<1 hour	1 year

N/A - not available/applicable

Please consult our *Application Experts* to find the most suitable adhesives for specific technical challenges at: techserv@epotek.com.

DISCLAIMER: Data presented is provided only to be used as a guide. Properties listed are typical, average values, based on tests believed to be accurate. It is recommended that users perform a thorough evaluation for any application based on their specific requirements. Epoxy Technology makes no warranties (expressed or implied) and assumes no responsibility in connection with the use or inability to use these products. Please refer to the product data sheets and safety data sheets (SDS) for more detailed information.



Epoxy Technology Inc. • 14 Fortune Drive • Billerica, MA 01821
phone 978-667-3805 fax 978-663-9782 techserv@epotek.com

epotek.com