

# Down-Hole Applications



## Why use Epoxies for Down-Hole Applications?

Epoxies are very robust materials that can withstand harsh conditions, such as high temperature, high pressure, and mechanical shock.

Down-hole applications include:

- Electrical connections within a microelectronic package (die attach, capacitor attach)
- Protected thermal connections (heat sinking, capacitor attach)
- Potting compound to encapsulate electronics and protect them from the environment
- Fiber optic cabling and interconnected sensor devices

## Which EPO-TEK® Products Are Best Suited for Down-Hole Applications?

- Electrically Conductive Component Attach
  - *High Temperature Exposure:* [H20E](#), [H20E-175](#), [H24](#), [H35-175MP](#), [H37-MP](#)
  - *Heat Sinking:* [EK1000-1](#)
- Non-Conductive Component Attach
  - *High Temperature Exposure:* [H65-175MP](#), [H67-MP](#), [H74](#), [H77](#)
  - *Heat Sinking:* [T905BN-3](#), [930-4](#)
- Potting & Protection
  - *Small Volume:* [302-3M](#), [353ND](#), [OD2002](#)
  - *Thermally Conductive:* [H77](#), [T905BN-3](#)
- High Temperature Resistant Materials (260°C-300°C)
  - *Low Viscosity Pourable Liquid:* [118-150-2](#)
  - *Thixotropic Paste:* [120-183-3](#)
- Fiberoptic Bundles
  - *Low Viscosity and Wicking:* [353ND](#), [377](#)

## Characteristics To Help Choose the Correct EPO-TEK® Product

EPO-TEK	Key advantages/ Characteristics
<a href="#">118-150-2</a>	Pourable liquid with enhanced performance above 260°C
<a href="#">120-183-3</a>	Thixotropic paste with enhanced performance above 260°C
<a href="#">302-3M</a>	Proven saline resistance for a harsh chemical environment
<a href="#">353ND</a>	Strong chemical and moisture resistance (reliable industry standard)
<a href="#">377</a>	Strong chemical and moisture resistance, long pot life
<a href="#">930-4</a>	Non conductive, high ThK with small particle filler for small gaps
<a href="#">EK1000-1</a>	ECA with highest measured ThK
<a href="#">H20E</a>	ECA with high ThK, rheology ideal for multiple application types
<a href="#">H20E-175</a>	ECA, higher temperature rated version of H20E
<a href="#">H24</a>	ECA with very high degradation temperature
<a href="#">H35-175MP*</a>	High strength ECA
<a href="#">H37-MP*</a>	High strength and high thixotropy ECA
<a href="#">H65-175MP*</a>	ThK version of H35-175MP
<a href="#">H67-MP*</a>	High thixotropy, ThK version of H37-MP
<a href="#">H74</a>	Strong chemical resistance, plus ThK
<a href="#">H77</a>	Potting compound with good chemical resistance for protection of parts
<a href="#">OD2002</a>	Strong chemical, moisture and impact resistance
<a href="#">T905BN-3</a>	High ThK, designed for large volume potting

ECA – Electrically Conductive Adhesives, \* MP – Military Approved, ThK – Thermally Conductive



## How Do The EPO-TEK Properties Compare?

EPO-TEK®	NO. of COMPONENTS	COLOR Before/ After CURE (thin film)	CURE TEMPERATURE (min/hal)	VISCOSITY @ 23°C	GLASS TRANSITION TEMPERATURE (Tg)	DIE SHEAR STRENGTH @ RT (80mil x 80mil)	INDEX OF REFRACTION (nd)	SPECTRAL TRANSMISSION	TGA DEGRADATION TEMPERATURE	GTE Below Tg/Above Tg (In/In <sup>2</sup> )	POT LIFE (@ room temp.)	SHELF LIFE (@ room temp. unless noted)
118-150-2	One	Clear/Amber	80°C - 1 hour + 150°C - 1 hour + 177°C - 2 hours	8,724 cPs @ 20 rpm	264°C	13 kg/4,420 psi	1.5850 (uncured)	N/A	264°C	47 x 10 <sup>-6</sup> 219 x 10 <sup>-6</sup>	16 hours	1 year @ -40°C
120-183-3	One	Off White/Tan	120°C - 1 hour + 177°C - 1 hour + 265°C - 2 hours	124,928 cPs @ 1 rpm	255°C	≥ 7 kg/2,380 psi	N/A	N/A	443°C	46 x 10 <sup>-6</sup> 85 x 10 <sup>-6</sup>	16 hours	1 year @ -40°C
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 <sup>-6</sup> 193 x 10 <sup>-6</sup>	1 hour	1 year
353ND	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)	>98% @ 800-1000nm >95% @ 1100-1600nm	412°C	54 x 10 <sup>-6</sup> 206 x 10 <sup>-6</sup>	≤ 3 hours	1 year
377	Two	Clear/Amber	150°C - 1 hour	150 - 300 cPs @ 100 rpm	≥ 95°C	≥ 10 kg/3,400 psi	1.5195 (uncured)	>90% @ 600-1000nm >98% @ 1000-6800nm	375°C	57 x 10 <sup>-6</sup> 210 x 10 <sup>-6</sup>	24 hours	1 year
930-4	Two	Ivory/Amber	150°C - 10 min 100°C - 4 hours 80°C - 6 hours	12,000 - 17,000 cPs @ 20 rpm	≥ 90°C	≥ 15 kg/5,100 psi	N/A	N/A	425°C	27 x 10 <sup>-6</sup> 136 x 10 <sup>-6</sup>	1 day	1 year
EK1000-1	One	Silver/Silver	150°C - 1 hour + 200°C - 1 hour 200°C - 30 min	13,000 - 21,000 cPs @ 10 rpm	≥ 80°C	≥ 10 kg/3,556 psi	N/A	N/A	372°C	41 x 10 <sup>-6</sup> 162 x 10 <sup>-6</sup>	2 weeks	1 year @ -40°C
H20E	Two	Silver/Silver	175°C - 45 sec 80°C - 3 hours	2,200 - 3,200 cPs @ 100 rpm	≥ 80°C	> 10 kg/3,400 psi	N/A	N/A	425°C	31 x 10 <sup>-6</sup> 158 x 10 <sup>-6</sup>	2.5 days	1 year
H20E-175	Two	Silver/Silver	180°C - 1 hour 150°C - 2 hours	2,800 - 3,800 cPs @ 100 rpm	≥ 85°C	≥ 10 kg/3,400 psi	N/A	N/A	450°C	20 x 10 <sup>-6</sup> 88 x 10 <sup>-6</sup>	3.5 days	1 year
H24	Two	Silver/Silver	150°C - 5 min 80°C - 45 min	15,000 - 23,000 cPs @ 10 rpm	≥ 100°C	≥ 5 kg/1,700 psi	N/A	N/A	470°C	28 x 10 <sup>-6</sup> 104 x 10 <sup>-6</sup>	18 hours	6 months
H35-175MP*	One	Silver/Silver	180°C - 1 hour 165°C - 90 min	22,000 - 28,000 cPs @ 10 rpm	≥ 100°C	≥ 10 kg/3,400 psi	N/A	N/A	372°C	31 x 10 <sup>-6</sup> 97 x 10 <sup>-6</sup>	28 days	1 year @ -40°C
H37-MP*	One	Silver/Silver	150°C - 1 hour	22,000 - 26,000 cPs @ 10 rpm	≥ 90°C	≥ 10 kg/3,400 psi	N/A	N/A	358°C	52 x 10 <sup>-6</sup> 148 x 10 <sup>-6</sup>	28 days	1 year @ -40°C
H65-175MP*	One	Ivory/Ivory	180°C - 1 hour	80,000 - 120,000 cPs @ 2.5 rpm	≥ 100°C	≥ 20 kg/6,800 psi	N/A	N/A	397°C	38 x 10 <sup>-6</sup> 136 x 10 <sup>-6</sup>	28 days	1 year @ -40°C
H67-MP*	One	Ivory/Ivory	150°C - 1 hour	300,000 - 400,000 cPs @ 1 rpm	≥ 90°C	≥ 20 kg/6,800 psi	N/A	N/A	350°C	16 x 10 <sup>-6</sup> 68 x 10 <sup>-6</sup>	28 days	1 year @ -40°C
H74	Two	Grey/Dark Grey	150°C - 5 min 100°C - 20 min	45,000 - 65,000 cPs @ 5 rpm	≥ 100°C	≥ 15 kg/5,100 psi	N/A	N/A	425°C	21 x 10 <sup>-6</sup> 95 x 10 <sup>-6</sup>	2 hours	1 year
H77	Two	Grey/Grey	150°C - 1 hour	6,000 - 12,000 cPs @ 20 rpm	≥ 80°C	≥ 5 kg/1,700 psi	N/A	N/A	405°C	33 x 10 <sup>-6</sup> 130 x 10 <sup>-6</sup>	6 hours	1 year
002002	Two	Cloudy/Ivory	150°C - 5 min 100°C - 30 min	24,000 - 42,000 cPs @ 2.5 rpm	> 140°C	≥ 10 kg/3,400 psi	1.5728 (uncured)	>98% @ 800-1640nm	443°C	45 x 10 <sup>-6</sup> 187 x 10 <sup>-6</sup>	4 hours	1 year
T905BN-3	Two	Grey/Grey	80°C - 2 hours	2,000 - 7,000 cPs @ 50 rpm	≥ 40°C	≥ 10 kg/3,400 psi	N/A	N/A	347°C	37 x 10 <sup>-6</sup> 151 x 10 <sup>-6</sup>	3 hours	1 year

\* MP - Military Approved, N/A - not available/applicable

Please consult our *Application Experts* at Epoxy Technology to find the most suitable adhesives for specific technical challenges at: [techserv@epotek.com](mailto:techserv@epotek.com).



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