Hard Disk Drive Assembly

What is a Hard Disk Drive?

Hard Disk Drives (HDD) are the general storage devices for the management of electronic data. Data is recorded onto the surface of a rotating disk by a magnetic recording (MR) head moving on an actuator arm.

How Can Epoxies Be Used in a HDD?

In HDD assembly there are three ways epoxies are often used:

• Coating • Sealing • Bonding

Which EPO-TEK® Products Are Best Suited For HDD Assemblies?

Epoxy Technology manufactures a variety of optical, electrically conductive & thermally conductive adhesives. Here is a listing of specific HDD areas and adhesives best suited for these areas:

- Coating
  - *Voice Coil Coating/VC Motor:* 323LP, 353ND, 360
  - *Anti-Disk Coating:* 323LP
- Sealing
  - *Spindle Motor Sealing:* 323LP, 353ND, 383ND
- Bonding
  - *Pivot Bonding:* 330
  - *Magnet Bonding:* 323LP-T, 353ND-T, 354-T
  - *MR Head:* EJ2189-LV, H20E, H20E-FC
  - *Flex Substrates*:
    - *Flex Circuit to Heat Sink:* 930-4, TZ101
    - *Piezo Suspension to Flex:* EJ2189-LV, H20E-FC

Characteristics To Help Choose the Correct EPO-TEK® Product

EPO-TEK	Key advantages/ Characteristics
323LP	Low viscosity, long pot life version of 353ND. Can be used to easily coat Ultem® material
323LP-LH Premium	Low halogen version of 323LP
323LP-LH Ultra	Lowest halogen version of 323LP
323LP-T	High viscosity version of 323LP
330	Very low viscosity, thermal cure epoxy for pivot bonding
353ND	Most commonly used in HDD, low viscosity, heat cure allows voice coils and other components to be coated to avoid contamination
353ND-LH Premium	Low halogen version of 353ND
353ND-LH Ultra	Lowest halogen version of 353ND
353ND-T	High viscosity/thixo version of 353ND. High green strength (uncured strength) can hold magnets in place for ease of manufacturing
354-T	High viscosity/thixo with 3 day pot life. High green strength (uncured strength) can hold magnets in place for ease of manufacturing
360	Very low viscosity, thermal cure epoxy for pivot bonding
383ND	Intermediate pot life version of 353ND
930-4	High viscosity, high thermal conductivity paste for bonding heat sinks
EJ2189-LV	RT curing electrically conductive adhesive (ECA) for piezo and MR head bonding
H20E	Thermal curing ECA for MR head bonding
H20E-FC	Fast curing ECA for piezo and MR head bonding
TZ101	High viscosity, flexible paste for bonding heat sinks

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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 (80mil x 80mil)	INDEX OF REFRACTION (Nd)	SPECTRAL TRANSMISSION	TGA DEGRADATION TEMPERATURE	CTE Below Tg/ Above Tg (in/in/°C)	POT LIFE (@ room temp.)	SHELF LIFE (@ room temp. unless noted)
323LP	Two	Amber/ Dark Amber	150°C – 60 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	31×10^{-6} 132×10^{-6}	24 hours	1 year
323LP-LH Premium	Two	Amber/ Dark Red	90°C – 30 min	4,142 cPs @ 50 rpm	118°C	>20 kg/6,800 psi	1.5703 (uncured)	>90% @ 640-800nm >94% @ 820-1620nm	410°C	31×10^{-6} 132×10^{-6}	32 hours	1 year
323LP-LH Ultra	Two	Amber/ Dark Red	90°C – 30 min	3,869 cPs @ 50 rpm	117°C	>20 kg/6,800 psi	1.5703 (uncured)	>90% @ 640-800nm >94% @ 820-1620nm	413°C	31×10^{-6} 132×10^{-6}	35 hours	1 year
323LP-T	Two	Amber/ Dark Red	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
330	Two	Amber/ Dark Amber	150°C – 1 min 100°C – 10 min 80°C – 30 min	350 - 550 cPs @ 100 rpm	≥90°C	≥10 kg/3,400 psi	1.5345 (uncured)	>97% @ 700-1600nm >88% @ 600nm >51% @ 500nm	369°C	39×10^{-6} 175×10^{-6}	6 hours	1 year
353ND	Two	Amber/ Dark Red	150°C – 60 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	54×10^{-6} 206×10^{-6}	≤3 hours	1 year
353ND-LH Premium	Two	Amber/ Dark Red	150°C – 1 min 100°C – 5 min 80°C – 30 min	3,744 cPs @ 50 rpm	99°C	>15 kg/5,100 psi	1.5694 (uncured)	>50% @ 550nm >98% @ 800-1000nm >95% @ 1100-1600nm	407°C	54×10^{-6} 206×10^{-6}	<3 hours	1 year
353ND-LH Ultra	Two	Amber/ Dark Red	150°C – 1 min 100°C – 5 min 80°C – 30 min	3,720 cPs @ 50 rpm	102°C	>19 kg/6,460 psi	1.5672 (uncured)	>98% @ 860-1600nm	418°C	44×10^{-6} 189×10^{-6}	>3 hours	1 year
353ND-T	Two	Tan/Dark Red	150°C – 60 min 80°C – 30 min	9,000 - 15,000 cPs @ 20 rpm	≥90°C	≥15 kg/5,100 psi	N/A	N/A	409°C	43×10^{-6} 231×10^{-6}	3 hours	1 year
354-T	Two	Tan/Dark Red	150°C – 10 min 120°C – 30 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	51×10^{-6} 179×10^{-6}	3 days	6 months
360	Two	Amber/ Dark Amber	150°C – 1 min 100°C – 10 min	350 - 550 cPs @ 100 rpm	≥90°C	≥10 kg/3,400 psi	1.5345 (uncured)	>97% @ 700-1600nm >88% @ 600nm >51% @ 500nm	375°C	39×10^{-6} 175×10^{-6}	6 hours	1 year
383ND	Two	Amber/ Dark Red	150°C – 60 min	3,500 - 6,000 cPs @ 50 rpm	>100°C	>20 kg/6,800 psi	1.5715 (uncured)	>90% @ 520-1660nm	415°C	34×10^{-6} 129×10^{-6}	8 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	27×10^{-6} 136×10^{-6}	1 day	1 year
EJ2189-LV	Two	Silver/Silver	23°C – 72 hour	25,000 - 45,000 cPs @ 1 rpm	≥40°C	≥10 kg/3,400 psi	N/A	N/A	340°C	52×10^{-6} 89×10^{-6}	4 hours	1 year
H20E	Two	Silver/Silver	175°C – 45 sec 80°C – 3 hours	2,200 - 3,2000 cPs @ 100 rpm	≥80°C	>10 kg/3,400 psi	N/A	N/A	425°C	31×10^{-6} 158×10^{-6}	2.5 days	1 year
H20E-FC	Two	Silver/Silver	80°C – 45 min	2,361 cPs @ 50 rpm	85°C	≥10 kg/3,400 psi	N/A	N/A	392°C	53×10^{-6} 233×10^{-6}	20 hours	1 year
TZ101	One	White/White	150°C – 1 hour	24,000 - 30,000 cPs @ 10 rpm	≥40°C	≥10 kg/3,400 psi	N/A	N/A	355°C	32×10^{-6} 173×10^{-6}	28 days	1 year @ -40°C

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.

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