Protavic America Inc.

SPECIALTY ELECTRONIC & ASSEMBLY MATERIALS

Product Selector Guide

PRINTED CIRCUITS
INTEGRATED CIRCUITS

ADHESIVES

ENCAPSULATION
COATINGS

THERMALLY CONDUCTIVE
MATERIALS

UV CURE
MATERIALS

SPECIALITY MATERIALS
NEW TECHNOLOGY

PROTAVIC
AMERICA
MEMBER OF PROTEX INTERNATIONAL

www.protavicamerica.com

Contents

PROTAVIC AMERICA
MEMBER OF PROTEX INTERNATIONAL

Printed Circuit/Integrated Circuit

Electrically Conductive die attach adhesives deliver value for multiple applications: low temp/fast cure, high thermal/high power, low stress/flexible, high-speed dispensing/screen printing. Specifically designed for semiconductor packaging, smart cards and surface mount assemblies. Chemistry portfolio: acrylic, cyanate ester, epoxy and hybrid.

ELECTRICALLY CONDUCTIVE ADHESIVES

Part Number	Chemistry	Viscosity @ 5 rpm CP51 (mPa.s)	Electrical Resistance (mΩ.cm)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Cure Schedule	Description
ACA 20510	Acrylic	9,000	< 0.1	55	N/A	6 mos @ -40°C	8 hrs	30 min @ 200°C	Acrylic based die attach. Designed for high thermal and power applications
ACC 20700	Cyanate Ester	10,000	2	210	N/A	1 year @ -40°C	24 hrs	30 min @ 150°C + 15 min @ 300°C	Good stability at high temperature > 250°C Low out-gassing, very high Tg
ACE 10131	Epoxy	15,000	< 0.2	75	45	6 mos @ -40°C	48 hrs	5 min @ 150°C	Designed to bond tantalum caps to LF in clamp cure systems Thermally conductive (2.5W/mK)
ACE 17021	Epoxy	1,100	< 0.3	95	45	6 mos @ -40°C	24 hrs	3 min @ 150°C	Fast cure, designed for micro needle dot dispensing Thermally conductive (2.5W/mK)
ACE 24530	Epoxy	9,175	0.35	78	50	1 year @ -40°C	24 hrs	15 min @ 175°C	Designed to bond medium sized die with mismatched CTE Thermally conductive (2.6W/mK)
ACE 24814	Epoxy	7,800	0.6	93	65	1 year @ -40°C	48 hrs	15 min @ 175°C	Minimum resin bleed on Cu LF Thermally conductive (2.3W/mK)
ACE 30512	Epoxy	10,000	< 0.05	N/A	N/A	6 mos @ -20°C	1 month	90 min @ 180°C	High Ag %, low temp cure Developed to replace traditional solder
ACE 34030	Epoxy	8,700	0.175	74	35	1 year @ -40°C	24 hrs	30 min @ 175°C	Excellent dispensability Low volume resistivity Thermally conductive (3.6W/mK)

Printed Circuit/Integrated Circuit

ELECTRICALLY CONDUCTIVE ADHESIVES

Part Number	Chemistry	Viscosity @ 5 rpm CP51 (mPa.s)	Electrical Resistance (mΩ.cm)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Cure Schedule	Description
ACE 34034-X2	Epoxy	11,000	N/A	N/A	N/A	1 year @ -40°C	24 hrs	30 min ramp + hold @ 175°C	1-part, designed for gold bonding Thermally conductive (20W/mK)
ACE 34560	Epoxy	11,700	0.35	130	44	1 year @ -40°C	1 week	30 min @ 190°C	1-part, long work life High Thermal, Hi-Rel
ACE 34683	Epoxy	6,100	0.37	134	77	1 year @ -40°C	3 days	20 min @ 200°C	Developed for Alloy 42 packages Used for small LED die
ACE 44011	Epoxy	12,930	0.26	111	N/A	1 year @ -40°C	48 hrs	70 min @ 80°C	Low outgassing, high reliability hermetic image sensors packages (CCD & CMOS)
ACE 56153	Epoxy	16,000	10.0	N/A	N/A	1 year @ 25°C	2 hrs	15 min @ 125°C	2-part, Meets NASA outgassing, Fed Spec. MMM-A-1931 Type I
ACH 20120	Hybrid	9,000	0.03	10	98	6 mos @ -40°C	24 hrs	2 min @ 230°C	Designed for BGA packages and LED dies Die tilt control with 1 or 2 mil spacers
ACH 20130	Hybrid	9,000	2.0	N/A	99	1 year @ -20°C	24 hrs	30 min @ 175°C	Reactivity combines latency and fast curing cycle. Reflow at 260°C, Pb-free
ACH 24053H	Hybrid	9,600	0.2	30	N/A	1 year @ -40°C	24 hrs	60 min @ 175°C	Designed for oscillators. Low modulus and good electrical conductivity
ACH 30200	Hybrid	10,000	0.01	60	20	6 mos @ -20°C	1 week	15 min @150°C + 15 min @ 200°C	Long pot life, good moisture resistance. Thermal conductivity (> 10W/mK)
Metaduct 1202	Epoxy	50,000	0.1	N/A	N/A	6 mos @ 25°C	1 hr	2 hrs @ 65°C	2-part. room temp or low temp cure
Metaduct 1240	Epoxy	5,000	0.1	N/A	N/A	3 mos @ 25°C	N/A	30 min @ 150°C	Flexible, dispense, screen print, or spray Solder substitute for flex circuits Thermally conductive (1.5W/mK)
BCE 34815	Epoxy	10,400	0.7	101	N/A	1 year @ -40°C	48 hrs	30 min @ 80°C + 60 min @ 175°C	Excellent for RF IC and LED die attachment Thermally conductive (10W/mK)

Printed Circuit/Integrated Circuit

Non-Electrically Conductive die attach adhesives deliver value for multiple applications: low temp/fast cure, low stress, flexible, high-speed dispensing/screen printing. Specifically designed for semiconductor packaging, smart cards and surface mount assemblies. Chemistry portfolio: acrylic and epoxy.

NON-ELECTRICALLY CONDUCTIVE ADHESIVES

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Conditions	Pot Life @ 25°C	Curing Schedule	Description
ANA 17710	Acrylic	Clear	3,000	165	N/A	3 mos @ -20°C	24 hrs	2 min @ 120°C	Bonds to metal, plastic (PVC, Teslin®), flex circuit, glass
ANE 10713	Epoxy	White	11,000	110	95	1 year @ -20°C	5 days	10 sec @ 170°C	Very fast cure speed, excellent adhesion strength
ANE 10714	Epoxy	Blue	11,000	110	95	1 year @ -20°C	5 days	10 sec @ 170°C	Very fast cure speed, low bleed
ANE 30100s	Epoxy	Black	7,000	110	55	6 mos @ -20°C	1 week	60 min @ 120°C	Long work life. Developed for jettable die attach
ANH 20142	Hybrid	Off White	8,500	N/A	N/A	1 year @ -20°C	24 hrs	30 min @ 175°C	Developed to bond large dies for image sensor
ATE 10120	Epoxy	Gray	10,000	75	65	1 year @ -20°C	1 week	10 min @ 150°C	Bonds LED dies on metal LF. Used as lid seal
ATE 10130	Epoxy	White	7,500	75	N/A	1 year @ -40°C	5 days	5 min @ 125°C	Thermally conductive (0.7W/mK). Post cure 150°C
PNE 26150 MOD 5	Epoxy	Black	75,000	160	30	6 mos @ -20°C	8 hrs	30 min @ 150°C	Protects dies and components. Used as lid seal

Adhesives

Adhesives provide permanent bonds between two components. These materials are designed for high strength, even when bonding different or difficult to bond surfaces. They must transfer stress without losing reliability, be highly resistant to moisture, chemicals and vibration and survive temperature cycling. Chemistry portfolio: epoxy, and polyurethane.

1-PART ADHESIVES

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Curing Schedule	Description
ANE 10420	Epoxy	Gray	12,000	95	45	3 mos @ 25°C	3 mos	60 min @ 125°C	1-part, large area bonding. Bonds temperature sensors in heating devices
ANE 17526 Mod 10-4	Epoxy	White	7,000	30	56	1 year @ -20°C	6 mos	2 min @ 90°C	1-part, fast, low temp cure. Designed for bonding difficult substrates, including LCP
ANE 17794	Epoxy	White	6,000	100	80	1 year @ -40°C	6 mos	5 min @ 150°C	1-part, fast cure, used for component bonding in assembly, chemical resistant
ANE 26144	Epoxy	Amber	3,700	137	N/A	1 year @ -40°C	3 days	15 min @ 150°C	1-part, low viscosity, low ionics Designed for mounting components to PCB
ANE 26144-2HV	Epoxy	White	25,000	137	N/A	1 year @ -40°C	2 days	15 min @ 150°C	1-part, fast cure, BLT control with spacers (0.5-7mils). Designed for transformer assembly
ATE 10130	Epoxy	White	7,500	75	N/A	1 year @ -40°C	5 days	5 min @ 125°C	Post cure 150°C Thermally conductive (0.7W/mK)
PNE 26150 MOD 5	Epoxy	Black	75,000	160	30	6 mos @ -20°C	8 hrs	30 min @ 150°C	Protects dies and components Used as lid seal

Adhesives

2-PART ADHESIVES

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Curing Schedule	Description
ANE 30424	Epoxy	White	45,000	115	55	1 year @ 10°C	30 min	60 min @ 150°C	2-part, high viscosity. Bonds rubber in automotive applications
ANE 36142	Epoxy	Amber	1,200	113	N/A	1 year @ 25°C	4 hrs	60 min @ 150°C	2-part, unfilled, excellent adhesive to high temperature thermoplastics
ANE 40111	Epoxy	Clear	2,000	110	65	1 year @ 25°C	3 hrs	90 min @ 65°C	2-part, optically clear, bonds glass filter to aluminum
ANE 46505	Epoxy	Clear	30,500	N/A	N/A	1 year @ 25°C	45 min	2 hrs @ 65°C	2-part, flexible, controlled flow rheology Bonds to glass, ceramics, and metals
ANE 46515	Epoxy	Amber	40,000	N/A	N/A	1 year @ 25°C	10 min	60 min @ 85°C	2-part, passes NASA out gassing specification ASTM E 595
ANE 46517	Epoxy	Clear	15,000	N/A	N/A	1 year @ 25°C	10 min	2 hr @ 85°C	2-part, controlled flow rheology Bonds to glass, ceramics and metals
ANE 47921	Epoxy	White	40,000	71	N/A	1 year @ 25°C	30 min	60 min @ 65°C	2-part, low temp cure, toughened Designed for automotive apps
ANE 47291NS	Epoxy	White	50,000	90	60	1 year @ 25°C	30 min	60 min @ 65°C	2-part, low temp cure. Resistant to moisture and hazardous materials

Adhesives

2-PART ADHESIVES

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Curing Schedule	Description
ANE 57090-2	Epoxy	Clear	11,000	(-18)	44	1 year @ 25°C	1 min	2 min @ 65°C	2-part, fast/low temp cure. Designed for fuse housings and tacking wire on PCB
ANE 50100	Epoxy	Clear	15,000	N/A	N/A	1 year @ 25°C	4 min	1 min @ 65°C	2-part, fast/low temp cure. Designed for fuse housings and tacking wire on PCB
PNE 47207	Epoxy	Black	4,100	38	64	1 year @ 25°C	1 hr	90 min @ 65°C	2-part, UL 94 VO, bonds to glass, ceramics and metals
PNU 46202	Polyurethane	Clear	8,000	(-38)	N/A	1 year @ 25°C	5 min	30 sec @ 65°C	2-part, very fast low temp cure, bonds components to PCB, sealing screw-threads
PTE 47850	Epoxy	Black	6,500	85	42	1 year @ 25°C	60 min	30 min @ 65°C	2-part, low temp cure, thermally conductive (0.8W/mK)
Metregrip 303 Series	Epoxy	Tan	600 - 900,000	65	86	1 year @ 25°C	N/A	90 min @ 100°C	2-part, bonds to difficult substrates, wide range of viscosities. Thermally conductive
Mereco XL 330LV	Epoxy	Amber	5,200	121	N/A	1 year @ 25°C	2 hrs	2 hr @ 100°C	2-part, low temp cure, high Tg

Encapsulants and Coatings

Coatings and Potting materials are designed to provide environmental protection for components and assemblies. This include moisture, humidity, chemicals, high temperature, and abrasion. Additional protection of components are provided with glob tops, dam & fill, and underfills. Chemistry portfolio: epoxy, silicone, cyanate ester, polyimide and polyurethane.

COATINGS

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Curing Schedule	Description
ANE 40111	Epoxy	Clear	2,000	110	65	1 year @ 25°C	4 hrs	90 min @ 60°C	Coating, 2-part, unfilled - Developed for optical applications. Bonds glass to aluminum
ANE 50102	Epoxy	Black	8,000	80	65	1 year @ 25°C	60 min	3 hrs @ 65°C	Coating, 2-part, developed for electronic components protection
PNE 90171	Epoxy	Clear	300	60	110	6 mos @ 5°C	5 days	30 sec @ 120 m/Wcm² UV A	Coating, UV fast cure. Resists yellowing. Developed to encapsulate flexible substrates
PNO 57285F	Silicone	Clear	9	110	N/A	1 year @ 25°C	1 year	60 min dry @ RT + 1 hr @ 150°C	Coating, low viscosity, clear sealant with UV tracer. Eliminates corrosion to metals in aggressive environments
PNS 56226	Silicone	Clear	600	(-64°C)	55	1 year @ 25°C	10 min	30 min @ 25°C	Coating, optically clear. RT fast cure, low viscosity, UL 94 VO. Excellent adhesion without primers
PNS 56230	Silicone	Light Blue	Thixo Gel	(-64°C)	55	1 year @ 25°C	2 hrs	30 min @ 85°C	Coating, 2-part, temporary peelable mask for PCB assembly provides wave solder protection
PNU 46202	Polyurethane	Clear	8,000	(-38°C)	N/A	1 year @ 25°C	5 min	30 sec @ 65°C	Coating, 2-part electronics grade for circuit boards, components and screw-thread sealing Unfilled, RT or heat fast cur

Encapsulants and Coatings

POTTING

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Curing Schedule	Description
ANE 57421	Epoxy	Opaque	11,500	(-10)	56	1 year @ 25°C	4 hrs	10 min @ 100°C	2-part, low temp/fast thermal cure, fast RT cure Flexible, high adhesion and high temp resistance
ATE 57105	Epoxy	Black	35,000	35	N/A	1 year @ 25°C	< 5 min	30 min @ 65°C	2-part, low temp/fast cure Designed for potting surge arrestors
ATM 60330	Polyimide	Beige	15,000	N/A	N/A	1 year @ -20°C	6 mos	1 hr @ 150°C + 1 hr @ 275°C	Stable up to 550°C – the lowest CTE Designed for high temp sensor (> 200°C)
EXP 18100 MOD 5	Epoxy	Black	24,000	60	N/A	1 year @ 25°C	25 min	60 minutes @ 65°C	Low viscosity, low temp cure, tough ,flexible, RT fast curing. Designed for potting surge arrestors
PNC 20014	Cyanate Ester	Orange	120,000	265	22	6 mos @ -20°C	1 day	30 min @ 150°C + 30 min @ 260C	Very high Tg, low CTE for extend thermal cycling/shocks from -65 to 250°C High power device potting, up to 250°C
PNE 20274	Epoxy	Black	7,500	175	20	6 mos @ 25°C	1 day	30 min@ 125°C + 4 hrs @ 160°C	2-part, High Tg, low CTE, meets UL 94 VO Designed for potting TMAP sensor and TRIAC power devices for automotive market
PNE 20286	Epoxy	Black	7,500	130	30	6 mos @ 25°C	1 day	30 min @ 150°C	2-part, meets UL 94VO Potting multi-pin connector
PNE 30320	Epoxy/ Cyanate Ester	Black	40,000	165	15	1 year @ -20°C	24 hrs	1 hr @ 125°C + 2 hrs @ 165°C	2-part, low outgassing, pass thermal vacuum test (ESA EC22 Q-ST-70-02). High Tg, Low CTE Designed for potting in aerospace hermetic packages

Encapsulants and Coatings

POTTING

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Curing Schedule	Description
PNE 47207 MOD 5-9-7	Epoxy	Black	140,000	33	65	1 year @ 25°C	90 min	90 minutes @ 65°C	2-part, 1:1 mix ratio, meet UL 94 VO, designed as potting and casting for electronic devices
PNS 30400	Silicone	White	12,000	N/A	N/A	6 mos @ -20°C	24 hrs	30 min @ 150°C + 1 hr @ 250°C	Hard silicone, high insulation resistance, UL 94VO Potting multipin connector (passes 1000 hrs @ 260°C)
PNS 40317	Silicone	Black	10,000	< °C	230	6 mos @ 10°C	10 days	2 hrs @ 150°C	Long pot life, UL 94 VO. Developed for potting sealed glass used in animal ID tags
PNS 40325	Silicone	Black	10,000	(-64°C)	230	1 year @ 25°C	10 days	2 hrs @ 150°C	2-part, flexible, repairable, circuit protection over a large range of temperature
PNS 56226-1	Silicone	Clear	600	(-64°C)	55	1 year @ 25°C	10 min	5 min @ 100°C	2-part, very fast low temp cure, low viscosity UL 94 VO. Provides insulation resistance in battery charger terminals
PTE 47016	Epoxy	Black	35,000	110	29	1 year @ 20°C	4 hrs	30 min @ 125°C	2-part, self-leveling, flows into narrow gaps Developed for stator motors – no thermal cycling cracking. Thermally conductive (0.8W/mK)
PTE 47850	Epoxy	Black	6,500	85	42	1 year @ 25°C	1 hr	30 min @ 65°C	2-part, high thermally conductive sealant and potting compound. Low temp cure
PTS 46303-3	Silicone	Black	12,000	< 0°C	N/A	1 year @ 25°C	4 hrs	40 min @ 85°C	2-part, UL 94VO. Developed to pot battery chargers and DC/DC converters Thermally conductive (1W/mK)
PTS 46303-5	Silicone	Black	13,000	(-64°C)	250	6 mos @ 20°C	4 hrs	60 min @ 85°C	2-part, 1:1 mix ratio, good flow, bonds to aluminum. UL 94VO. Designed for potting on-board chargers (OBC)

Encapsulants and Coatings

POTTING

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Curing Schedule	Description
PTS 46324	Silicone	Gray	12,000	(-64°C)	55	6 mos @ 25°C	45 min	30 min @ 100°C	2-part, UL 94VO recognized Repairable encapsulant for power supplies Thermally conductive (1W/mK)
PTS 46325	Silicone	Gray	Non-sag	(-64°C)	55	1 year @ 25°C	45 min	90 min @ 25°C	2-part, fast RT cure Thermally conductive (1.1W/mK)
PTS 46600	Silicone	White	20,000	(-74°C)	N/A	1 year @ 20°C	2 hrs	30 min @ 65°C	2 part, flows into narrow gaps Thermally conductive (3.5W/mK)
PTS 56227	Silicone	White	2,500	(-64°C)	18	1 year @ 25°C	7 min	15 min @ 25°C	2-part, low viscosity Very fast RT cure. Meets UL 94 VO Thermally conductive (1.3W/mK)
Mereco 809	Epoxy	Clear	10,000	52	39	1 year @ 25°C	90 min	2 hrs @ 65°C	2-part, casting resin, low CTE and low shrinkage during cure Thermally conductive (1.2W/mK)
Metacast 401	Epoxy	Amber	700	N/A	60	6 mos @ 25°C	45 min	1 hr @ 125C	2-part, casting resin, very low viscosity General purpose, with excellent electrical and physical properties
Mereco 1650	Epoxy	Translucent	350 - 272,000	(-34°C)	225	6 mos @ 25°C	3 hrs	10 min @ 150°C	2-part, offers 9 different viscosities, flexible Low stress, excellent damping. Fast cure

Encapsulants and Coatings

Both Glob Top and Dam-and-Fill encapsulates provide protection to semiconductor dies that have been directly wire bonded to the substrate. Glob tops typically are high viscosity and are highly thixotropic. The dam-and-fill combination is a two-step process. First, a thixotropic dam is dispensed around a chip, then the middle is filled with a lower viscosity material that flows in and around the wires. Once both materials are cured, the hard outer shell provides physical and environmental protection. Chemistry portfolio: epoxy.

GLOB TOPS/DAM & FILL

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Curing Schedule	Description
PNE 30251	Epoxy	Black	60,000	110	19	1 year @ -40°C	5 days	10 min @ 150°C	Glob Top, rheology designed for automatic dispensing. Recommended as a fill material
PNE 30252	Epoxy	Black	105,000	140	24	3 mos @ -20°C	1 days	20 min @ 150°C	Glob Top, no slump, high Tg, low CTE. Developed for automotive MAP app
PNE 30270	Epoxy	Black	70,000	150	20	1 year @ -40°C	5 days	10 min @ 150°C	Glob Top, fast cure, with low linear expansion and high ionic purity
PNE 30273	Epoxy	Black	9,000	165	20	1 year @ -40°C	1 day	10 min @ 150°C	Glob Top, fast high Tg, flows into 1mm cavities Developed for automotive applications
PNE 90295	Epoxy	White	2,500	57	100	6 mos @ 5°C	N/A	30 sec @ 120 mW/cm² UV A	Fill material, UV fast cure. Used in smart card assembly. Use with PNE 90595 (dam)
PNE 90595	Epoxy	White	16,000	24	160	6 mos @ 5°C	N/A	30 sec @ 120 mW/cm² UV A	Dam material, UV fast cure. Used in smart card assembly. Use with PNE 90295 (fill)
PNE 90293	Epoxy	White	2,700	60	115	6 mos @ 5°C	5 days	30 sec @ 120 mW/cm² UV A	Fill material, UV fast cure. Used in smart card assembly. Use with PNE 90593 (dam)
PNE 90593	Epoxy	White	17,000	60	115	6 mos @ 5°C	5 days	30 sec @ 120 mW/cm² UV A	Dam material, UV fast cure. High thixo. Used in smart card assembly. Use with PNE 90293 (fill)
PNE 90300	Epoxy	White	16,000	24	140	6 mos @ 5°C	5 days	30 sec @ 120 mW/cm² UV A	Dam material, UV fast cure. High thixo. Used in smart card assembly. Use with PNE 90301 (fill)
PNE 90301	Epoxy	White	2,500	50	100	6 mos @ 5°C	5 days	30 sec @ 120 mW/cm² UV A	Fill material, UV fast cure. Designed for Cu wires encapsulation. Use with PNE 90300 (dam)
PNE 90171	Epoxy	Clear	300	60	110	6 mos @ 5°C	5 days	30 sec @ 120 mW/cm² UV A	Fill material, UV fast cure. Resists yellowing Developed for flexible substrates encapsulation

Encapsulants and Coatings

Capillary Underfill materials are designed to flow fast into small gaps (25µ) and around solder bumps to increase reliability for flip chips during thermal cycling. Needle dispense or jetting, these fast-curing materials provide additional strength and support for larger BGA packages during handling. Chemistry portfolio: epoxy.

UNDERFILLS

Part Number	Chemistry	Color	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Curing Schedule	Description
ANE 10931	Epoxy	Black	25,000	150	25	6 mos @ -40°C	3 days	10 min @ 150°C	Underfill, fast flow, fast cure
ANE 10932	Epoxy	White	25,000	150	25	6 mos @ -40°C	3 days	3 min @ 150°C	Underfill, CMR free - jettable. Developed as a capillary flow for BGA flip chip packages
ANE 10933	Epoxy	Gray	15,000	125	32	6 mos @ -20°C	3 days	10 min @ 150°C	Underfill. Fast flow, fast cure capillary flow for very small gaps (25µ). High Tg, low CTE
ANE 26144	Epoxy	Amber	3,700	137	N/A	1 year @ -40°C	3 days	15 min @ 150°C	Underfill, low viscosity, fast cure. Good adhesion to metals, ceramics and FR4 type substrates
ANE 20904	Epoxy	Black	20,000	50	40	3 mos @ -20°C	8 hrs	4 hrs @ 80°C	Underfill, low temp cure. Jettable Developed for CSP packages
ANE 20960	Epoxy	Black	6,000	165	17	3 mos @ -20°C	5 days	5 min @ 165°C	Underfill, developed for BGA packages Good adhesion to silicon, metals and ceramics Thermally conductive (0.7 W/mK)
ANE 20970	Epoxy	White	7,000	150	25	3 mos @ -20°C	1 day	30 min @ 150°C	Underfill, highly reflective. Designed to extend LED flip chip life

Thermally Conductive Materials

Thermally Conductive or Thermal Interface Material (TIM) allows heat to be move away from power devices. Used to bond heat sinks, metal housings including aluminum, ceramic and encapsulate components. Designed for power applications including automotive, battery, electric vehicles, semiconductors, capacitors, transformers and telecommunications. Chemistry portfolio: acrylic, epoxy, silicone, and polyimide.

GAP FILLER and THERMALLY CONDUCTIVE POTTING

Part Number	Chemistry	Thermal Conductivity	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Cure Schedule	Description
PTS 46500 SERIES	Silicone	2.5 to 9 W/mK	50,000 – 500,000	N/A	N/A	6 mos @ 20°C	2 hrs	24 hrs @ 25°C	2 part-Dispensable Thermal Gap Filler Low viscosity, meets UL-94 V0, excellent wettability and temperature resistance
PTE 47850	Epoxy	0.8W/mK	6,500	85	42	1 year @ 25°C	60 min	30 min @ 65°C	2-part, low temp cure. Conductive sealant and potting compound
PTS 46303-3	Silicone	1W/mK	12,000	< 0°C	N/A	1 year @ 25°C	4 hrs	40 min @ 85°C	2-part, UL 94VO. Designed to pot battery chargers and DC/DC converters
PTS 46303-5	Silicone	1W/mK	13,000	(-64°C)	250	6 mos @ 25°C	4 hrs	60 min @ 85°C	2-part, good flow, bonds to aluminum. UL 94VO Designed for on-board chargers (OBC)
PTS 46313	Silicone	1W/mK	9,000	(-64°C)	200	6 mos @ 40°C	4 hrs	30 min @ 125°C	Encap complete circuit boards, hybrid circuits and power supplies. Flexible, reparable
PTS 46324	Silicone	1W/mK	12,000	(-64°C)	55	6 mos @ 25°C	45 min	30 min @ 100°C	2-part, UL 94VO recognized, Repairable encapsulant for power supplies
PTS 46325	Silicone	1.1 W/mK	Non-sag	(-64°C)	55	1 year @ 25°C	45 min	90 min @ 25°C	2-part, 1:1 mix ratio, fast RT cure
PTS 46600	Silicone	3.5W/mK	20,000	(-74°C)	N/A	1 year @ 25°C	2 hrs	30 min @ 65°C	2 part, flows into narrow gaps
PTS 56227	Silicone	1.3W/mK	2,500	(-64°C)	18	1 year @ 25°C	7 min	15 min @ 25°C	2-part, low viscosity, very fast RT cure Meets UL 94 VO
Mereco XLN 589	Silicone	0.75W/mK	50,000	(-54°C)	140	1 yr @ 25°C	4 hrs	4 hrs @ 65°C	2-part, excellent replacement for silicone RTV. Bonds well to aluminum
Mereco 809	Epoxy	1.25W/mK	10,000	N/A	39	1 year @ 25°C	90 min	2 hrs @ 65°C	2-part, low CTE and low shrinkage during cure

Thermally Conductive Materials

THERMALLY CONDUCTIVE ADHESIVES

Part Number	Chemistry	Thermal Conductivity	Viscosity (mPa.s)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Cure Schedule	Description
ACA 20510	Acrylic	0.6W/mK	< 0.10	55	N/A	6 mos @ -40°C	8 hrs	30 min @ 200°C	Acrylic based die attach. Designed for high thermal and power applications
ACE 34034-X2	Epoxy	2.5W/mK	N/A	N/A	N/A	1 year @ -40°C	24 hrs	30 min ramp + hold @ 175°C	1-part, high thermal Designed for bonding to gold
ACE 34560	Epoxy	2.8W/mK	0.35	130	44	1 year @ -40°C	1 week	30 min @ 190°C	1-part, long work life. High thermal, Hi-Rel
ATE 10120	Epoxy	1W/mK	10,000	75	65	1 year @ -20°C	1 week	10 min @ 150°C	Developed to bond LED dies on metal lead frames
ATE 10130	Epoxy	0.7W/mK	7,500	75	N/A	1 year @ -40°C	5 days	5 min @ 125°C	Thermally conductive. Post cure 150°C
ATE 40163	Epoxy	1W/mK	80,000	90	40	1 year @ 25°C	16 hrs	8 hrs @ 80°C	2-part, excellent adhesion to ceramic and metal
ATM 60330	Polyimide	1.5W/mK	15,000	N/A	N/A	1 year @ -20°C	6 mos	1 hr @ 150°C + 1 hr @ 275°C	Stable up to 550°C – the lowest CTE Developed for high temp sensor (> 200°C)
BCE 34815	Epoxy	10W/mK	0.7	101	N/A	1 year @ -40°C	48 hrs	30 min @ 80°C + 60 min @ 175°C	High thermally conductive die attach Excellent for RF ICs and LEDs

UV Cure Materials

UV Light Cure materials are an alternative option to thermal cure process. UV, UV + moisture cure, and UV + thermal cure are available options for materials designed for optical applications and protection or require a fast throughput in production. Chemistry portfolio: acrylic, epoxy, and polyurethane.

UV LIGHT CURE

Part Number	Chemistry	Color	Viscosity @ 5 rpm CP51(mPa.s)	Viscosity @ 100 rpm CP51(mPa.s)	Tg (°C)	CTE (ppm / °C)	Storage Condition	Pot Life (@ 25°C)	Cure Schedule (thickness)	Description
ANA 97291	Acrylic	Clear	40,000	N/A	N/A	N/A	1 yr @ 25°C	1 year	30 sec @ 120mW/cm²	Very low shrinkage, fast cure Designed for lens bonding
ANE 90520-X	Epoxy	Clear – yellow	45,000	N/A	N/A	N/A	N/A	1 year	30 sec @ 120mW/cm²	Designed for image sensor glass Sealing. Good water barrier
PNA 90311	Acrylic	Clear – yellow	N/A	250	N/A	N/A	3 mos @ 25°C	3 months	30 sec @ 120mW/cm² + 2 min @ 100°C	Dual cure (UV + heat). LED glob top Good protection against corrosion
PNE 90293	Epoxy	Off white	N/A	2,700	68	115	6 mos @ 5°C	1 day	30 sec @ 120mW/cm²	Self-leveling. Apps: smart card glob top and sealing automotive ignition module
PNE 90300	Epoxy	Off white	16,000	N/A	24	160	6 mos @ 5°C	1 week	30 sec @ 120mW/cm²	Smart card dam material. Good moisture resistance. Compatible w/PNE 90301 (fill)
PNE 90301	Epoxy	Off white	N/A	2700	65	N/A	6 mos @ 5°C	1 day	30 sec @ 120mW/cm²	Smart card fill material. Prevents Cu wire corrosion. Self-leveling Compatible with PNE 90300 (dam)
PNE 90306	Epoxy	Off white	17,000	N/A	37	N/A	6 mos @ 5°C	1 week	30 sec @ 120mW/cm²	Smart card dam material Compatible with PNE 90307 (fill)
PNE 90307	Epoxy	Off white	N/A	2,700	90	N/A	6 mos @ 5°C	1 week	30 sec @ 120mW/cm²	Smart card fill material. Good adhesion to Cu. Compatible with PNE 90306 (dam)
PNU 97250	Polyurethane	Blue	5,000	N/A	< 0°C	N/A	6 mos @ 25°C	6 months	10 sec @ 120mW/cm²	Designed for insulating layer/bridge in RFID tags. Good adhesion to PET

Specialty Materials

ELECTRICALLY CONDUCTIVE END TERMINATIONS

Part Number	Chemistry	Viscosity (mPa.s)	Electrical Res. (mΩ.cm)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Cure Schedule	Description
BCE 30370	Epoxy	15,000	0.2	80	100	6 mos @ -20°C	N/A	1 hr @ 150°C	End terminations of MLCC and resistors
BCE 30371	Epoxy	7,000	0.15	80	100	3 mos @ 10°C	N/A	1 hr @ 150°C	End termination of MLCC
BCE 30374M	Epoxy	5,000	0.15	80	100	6 mos @ -20°C	N/A	1 hr @ 150°C	End termination of MLCC
BCE 30381	Epoxy	5,000	0.5	90	N/A	6 mos @ 10°C	3 mos	6 min @ 90°C + 30 min @ 180°C	End termination of multi-layer varistors

SPECIALTY ELECTRICALLY CONDUCTIVE MATERIALS

Part Number	Chemistry	Viscosity (mPa.s)	Electrical Resistance (mΩ.cm)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Cure Schedule	Description
BCE 20240	Epoxy	25,000	N/A	65	50	6 mos @ 0°C	1 month	30 min @ 180°C	B-stageable. screen printable for wafer backside coating
EXP 06335 MOD 10	Silicone	300 (LVT S27 @ 12 rpm)	65-100	N/A	N/A	6 mos @ 25°C	30 min	30 min air dry + 30 min @ 150°C	Ag filled silicone, sprayable Used for electromagnetic shielding

ELECTRICALLY CONDUCTIVE INKS/DIELECTRIC INKS

Part Number	Chemistry	Viscosity (mPa.s)	Electrical Resistance (mΩ.cm)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Cure Schedule	Description
BCE 20250	Epoxy	13,500	0.5	N/A	N/A	1 year @ -20°C	1 month	4 min @ 200°C	Low temp/fast cure. Used for RFID antennas
BCE 37611	Epoxy	7,000	0.3	N/A	N/A	6 mos @ -20°C	1 day	2 min @ 120°C	Low temp/fast cure. Low resistivity
VCO 20200	Other	11,800	<0.1	N/A	N/A	1 year @ 25°C	1 year	20 min @ 150°C	Low electrical resistivity conductive ink
PNU 90252	Urethane	5,000	N/A	N/A	N/A	6 mos @ 25°C	2 days	<10 sec @ 120mW/cm²	Dielectric for multilayer and cross-overs

ACOUSTIC MATERIALS

Ultrasound probes consist of a piezoelectric element, backing material, an acoustic matching layer and an acoustic lens. These probes are commonly used in medical equipment for non-invasive interior body exams. Other uses include the measurement of flow in the oil and gas industry, and microphone components in consumer electronics, A wide range of applications include bonding, encapsulation, matching layers, backing materials and electrical connections.

ACOUSTIC MATERIALS

MERECO Part Number (Hardener)	Cured Density (g/cc)	Velocity (mm/us)	Impedance (Mrayl)	Attenuation @ 2MHz (db/mm)	Attenuation @ 7.5 MHz (db/mm)	Bonding	Encap	Matching Layer "As Is"	Matching Layers w/Filters	Backing Material w/Filters	Electrical Connection	Cure Temps 25°C - 65°C	Cure Temps > 90°C
PR 116	3.75	2.44	9.13	N/A	N/A		X					X	
330 VLV & XLV	1.06	2.39	2.54	0.88	3.66	X	X	X				X	
XL 389T	1.16	2.07	2.39	3.38	11.57		X			X		X	
401ST (12, 16D, 34)	1.59	2.95	4.70	0.84	4.23	X	X	X	X	X		X	X
XLN 589	2.12	1.75	3.71	5.74	17.90	X						X	
CLN 786	1.89	2.87	5.41	0.77	3.05		X					X	X
CN 796F (12)	1.41	2.79	3.94	0.75	2.10		X					X	
CLN 867	1.16	2.66	3.08	0.78	2.83		X					X	X
CN 998 (12)	N/A	N/A	N/A	N/A	N/A	X	X	X	X			X	
1202	N/A	N/A	N/A	N/A	N/A						X	X	
1650-00	N/A	N/A	N/A	N/A	N/A		X			X		X	
MRC 03-1419	N/A	N/A	N/A	N/A	N/A		X				X	X	
MRC 04-1420	N/A	N/A	N/A	N/A	N/A		X			X		X	
MRC 04-1427	N/A	N/A	N/A	N/A	N/A		X			X		X	
MRC 04-1499	1.14	2.53	2.88	N/A	N/A		X						X
MRC 04-1510	1.14	2.59	2.95	1.35	2.95	X	X	X	X			X	
MRC 04-1628	1.29	1.00	1.29	1.28	5.48		X					X	
MRC 04-1632	1.02	1.02	1.04	0.19	1.46		X					X	
MRC 04-1633	1.61	1.01	1.62	1.30	6.70		X					X	
MRC 04-2125	0.80	2.56	2.06	2.63	5.16		X					X	

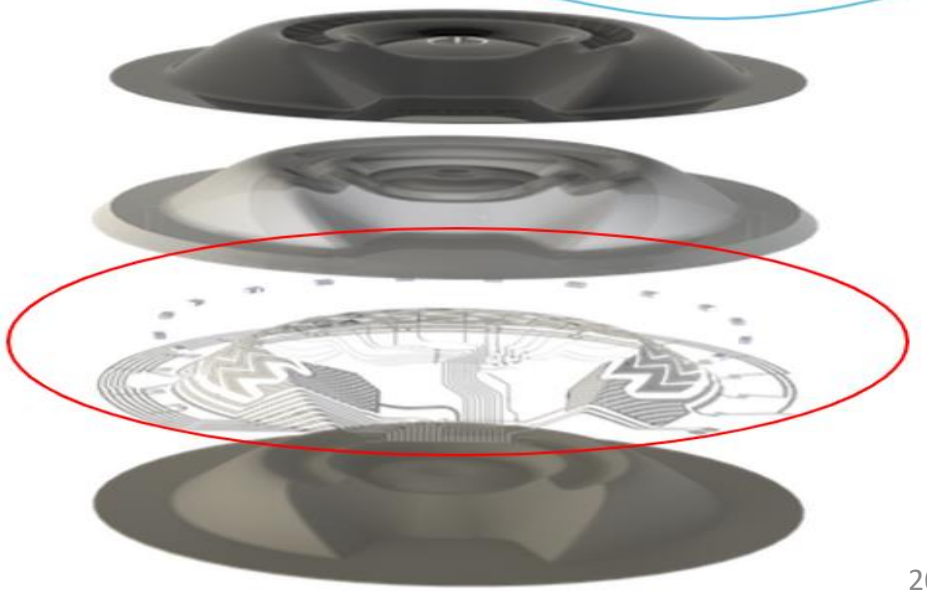
New Technology

SILVER NANO WIRE INKS

Part Number	Chemistry	Viscosity (mPa.s)	Electrical Res. (mΩ.cm)	Tg (°C)	CTE (ppm/°C)	Storage Condition	Pot Life @ 25°C	Cure Schedule	Description
VCO 20260	?	100	0.2	N/A	N/A	1 year @ 25°C	?	30 min @ 150°C	1-part, transparent, conductive electrodes, low viscosity, large are printing, sprayable. Replaces ITO
VCO 20261	?	100	0.2	N/A	N/A	1 year @ 25°C	?	30 min @ 150°C	1-part, transparent, conductive electrodes, low viscosity, large are printing, sprayable. Replaces ITO

IN-MOLD ELECTRONICS INK

- In-Mold Electronics eliminate additional weight and post-processing operations by allowing parts to be directly included in the electronic circuitry during the molding cycle. Benefits include enhanced manufacturing productivity, overall system cost reductions and greater design flexibility. Designers like the technology as it allows them to eliminate the buttons and multiple layers involved in the assembly of conventional electro-mechanical switches and to replace them with pre-integrated plastic parts.
- Typically, an In-Mold Electronics application starts with the screen printing of a PC or PE film with its decorative design. On top of that, conductive and dielectric inks are screen-printed. Once cured, the printed films are thermo-formed into a 3D shape. The final part is a rigid plastic component with functionality. Surface mounted components such as connectors or LEDs are added after the forming and molding operations to increase the functionality of the part.
- **The ink requires no compromise between thermoformability and conductivity.**



PROTAVIC AMERICA

PROTAVIC AMERICA is a French-owned company that designs and develops resins, adhesives and inks for the electronics industry and offers high value-added solutions for optimized industrial processes.
"Doing what big groups don't want to do, and what small companies can't"

PROTEX INTERNATIONAL
An international company with strong entrepreneurial know-how that continues to develop and innovate

Core competencies
- Chemical synthesis
- Polymerization
- Formulation
- Process
- Analysis

PROTEX INTERNATIONAL
A private company of diversification on niche markets in the chemical field
- Textile
- Paints & Coatings
- Electronics
- Chemicals specialties
- Paper
- Agriculture
- Food processing industry
- Parfumes
- Fine Chemicals
- Water treatment
- Biotechnologies
- Commodities

PROTAVIC AMERICA
MEMBER OF PROTEX INTERNATIONAL