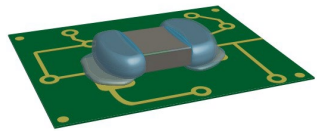


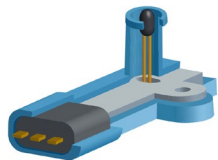
Protavic America Inc.

SPECIALTY ELECTRONIC & ASSEMBLY MATERIALS

Product Selector Guide



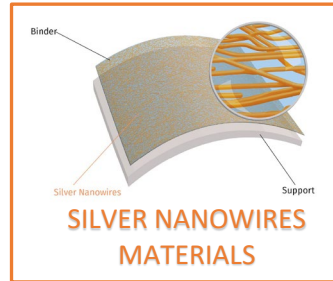
PASSIVE COMPONENT
MATERIALS



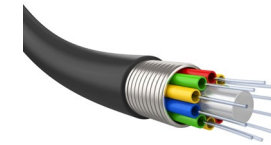
ELECTRONIC ASSEMBLY
MATERIALS



SMART CARDS & RFID
MATERIALS



SILVER NANOWIRES
MATERIALS



TELECOMMUNICATIONS
MATERIALS



ACOUSTIC
MATERIALS



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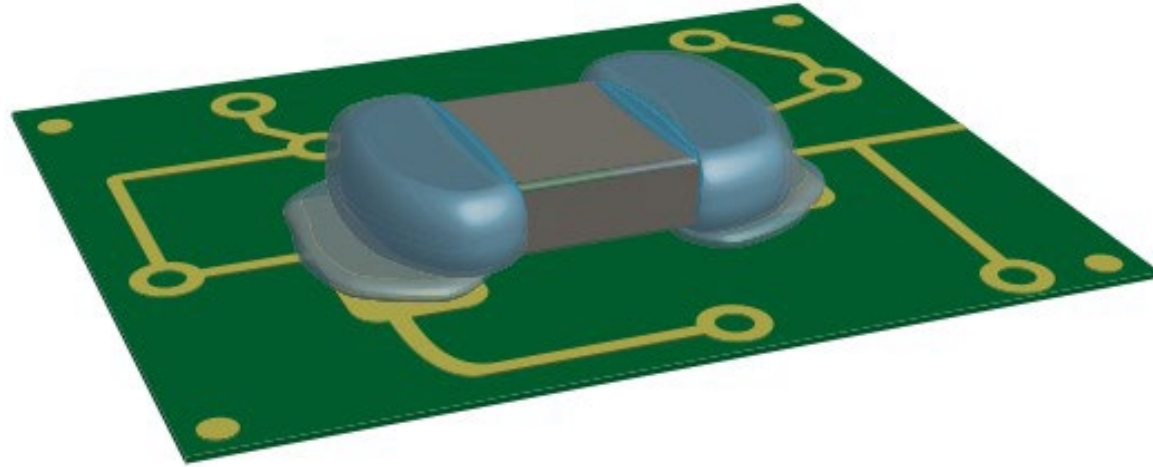
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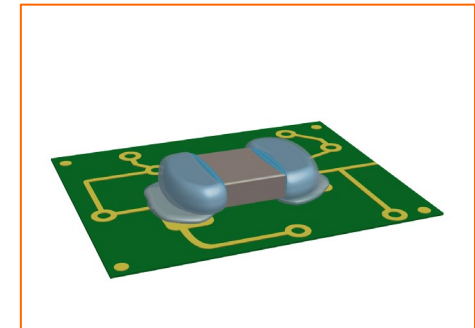


CAPACITORS & PASSIVE COMPONENTS TERMINATIONS MATERIALS

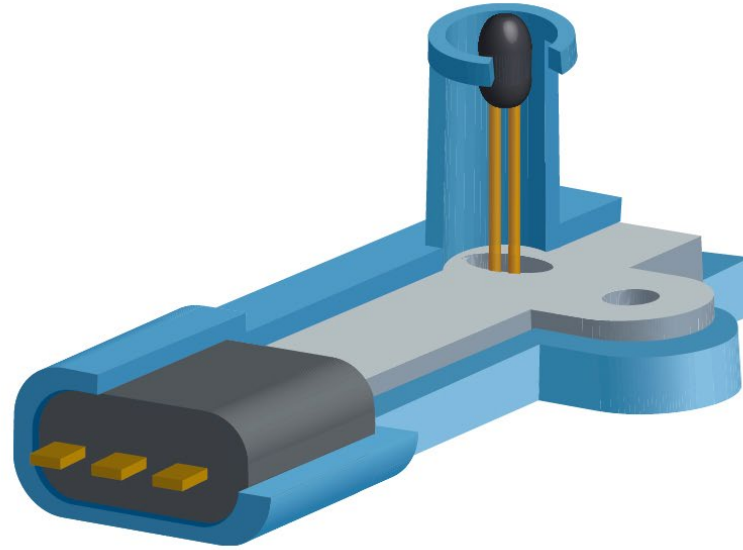
Adhesives and resins developed for faster and more environmentally friendly processes while increasing product reliability.

Product P/N	BCE 30370	BCE 30371	BCE 30374M	BCE 30375M	BCE 30375M HV	BCE 60462
Chemistry	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy
Density	2.9	2.9	3.1	2.7	2.7	1.6
Viscosity (mPa.s)	10,000	6,000	4,500	2,600	5,000	1,000
Tg (°C)	90	90	90	90	90	80
CTE (ppm/°C)	-	-	65	65	65	-
Elec. Res. (mΩ.cm)	0.2	0.2	0.05	0.2	0.2	0.2
Pot Life	16 hrs	16 hrs	16 hrs	-	-	-
Cure Schedule	Drying + 1h @ 150°C	Drying + 1h @ 150°C	Drying + 30 min @ 180°C	Drying + 1h @ 150°C	Drying + 1h @ 150°C	30 min @ 20°C + 1h at 125°C
Storage	6 mos @ -20°C	6 mos @ -20°C	6 mos @ 10°C	6 mos @ -20°C	6 mos @ -20°C	1 yr @ -20°C

**FLEXIBLE
TERMINATIONS**



Protaviv offers FLEXIBLE TERMINATIONS that are useful in reducing or eliminating failure of multi-layered components due to bending associated with PCB assembly and other stresses in harsh operating environments.

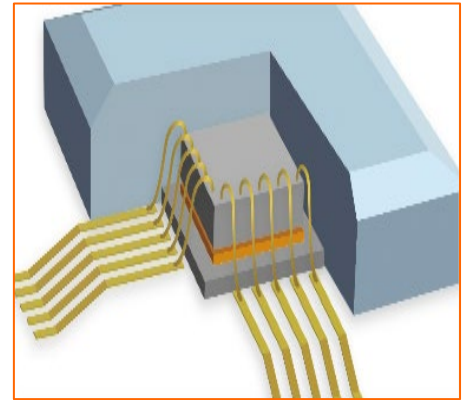


INTEGRATED CIRCUITS and PRINTED CIRCUITS ASSEMBLY MATERIALS

**Resins and adhesives developed to meet the requirements for electronic component assembly:
power modules, sensors, integrated circuits and MEMs.**

Product P/N	ACA 20510	ACC 20700	ACE 17021	ACE 34560	ACH 24053H	ACH 30200	Metaduct 1202
Chemistry	Acrylic	Cyanate Ester	Epoxy	Epoxy	Hybrid	Hybrid	Epoxy
Density	4.4	4.0	3.0	-	-	5.0	3.7
Viscosity (mPa.s)	9,000	10,000	1,100	11,700	9,600	10,000	5,000
Tg (°C)	55	210	95	130	30	60	-
CTE (ppm/°C)	-	-	45	44	135	20	55
TC (W/mK)	-	-	2.5	2.8	-	2.9	2.8
Elec. Res. (mΩcm)	< 0.1	2.0	< 0.3	0.35	0.2	0.01	0.001
Pot Life	8 hrs	24 hrs	24 hrs	7 days	24 hrs	7 days	1 hr
Cure Schedule	30 min @ 200°C	30 min 150°C + 15 min @ 300°C	5 min @ 150°C	30 min @ 190°	60 min @ 175°C	15 min 150°C + 15 min @ 200°C	15 min @ 150°C
Storage	6 mos @ -40°C	1 yr @ -40°C	6 mos @ -40°C	1 yr @ -40°C	1 yr @ -40°C	6 mos @ -20°C	6 mos @ 25

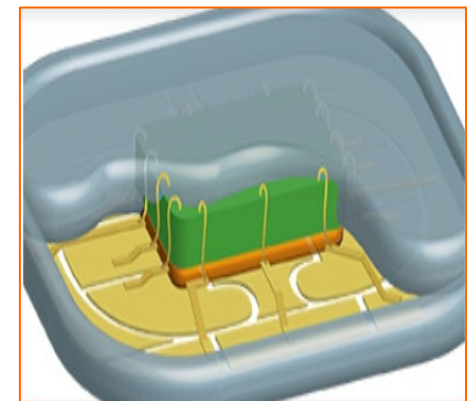
ELECTRICALLY CONDUCTIVE DIE ATTACH ADHESIVES



Protavic offers a wide range of ELECTRICALLY CONDUCTIVE ADHESIVE products and chemistries (epoxy, acrylic, polyimide, hybrid) designed to deliver value for multiple applications: low temp/fast cure; high thermal/high power; low stress/flexible; high speed dispensing/screen printing. Especially suited for semiconductor packaging and surface mount assemblies.

Product P/N	ANA 10710	ANE 10713	ANE 30100s	ANH 20142	ATE 10120	ATE 10130
Chemistry	Acrylic	Epoxy	Epoxy	Hybrid	Epoxy	Epoxy
Density	1.2	1.1	1.2	1.1	1.6	1.4
Viscosity (mPa.s)	8,000	11,000	7,000	8,500	25,000	7,500
Tg (°C)	150	110	110	-	75	75
CTE (ppm/°C)	90	95	55	-	65	-
TC (W/mK)	-	-	-	-	1.0	0.7
Hardness (Shore D)	-	86	90	-	-	-
Pot Life	24 hrs	5 days	7 days	24 hrs	7 days	5 days
Cure Schedule	10 sec @ 180°C	10 sec @ 170°C	60 min @ 120°C	30 min @ 175°C	10 min @ 150°C	5 min @ 125°C
Storage	6 mos @ -20°C	1 yr @ -20°C	6 mos @ -20°C	1 yr @ -20°C	1 yr @ -20°C	1 yr @ -40°C

**ELECTRICALLY
NON-
CONDUCTIVE
DIE ATTACH
ADHESIVES**



Protavic offers a wide range of ELECTRICALLY NON-CONDUCTIVE ADHESIVE products and chemistries (epoxy, acrylic, hybrid) designed to deliver value for multiple applications: low temp/fast cure; high thermal/high power; low stress/flexible; high speed dispensing/screen printing. Especially suited for smart card and semiconductor packaging applications.

Product P/N	PNE 30252	PNE 30270	PNE 90595	PNE 90295	PNE 30283	PNE 90310	PNS 40322
Application	Dam	Fill	Dam	Fill	Glob Top	Glob Top	Glob Top
Color	Black	Black	White	Off-White	Black	Off-White	Black
Chemistry	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy	Silicone
Density	1.76	1.7	1.4	1.4	1.8	1.5	1.4
Viscosity (mPa.s)	105,000	70,000	16,000	2,700	300,000	2,600	200
Tg (°C)	140	150	24	57	150	-	-
CTE (ppm/°C)	24	20	160	100	60	109	-
Hardness (Shore D)	90	85	50	80	90	48	50 (A)
Work Life	1 day	5 days	-	-	-	-	24 hrs
Cure Schedule	20 min @ 150°C	10 min @ 150°C	30 sec @ 120 mW/cm ²	30 sec @ 120 mW/cm ²	3 hrs @ 150 °C	30 sec @ 120 mW/cm ²	3 hrs @ 150 °C

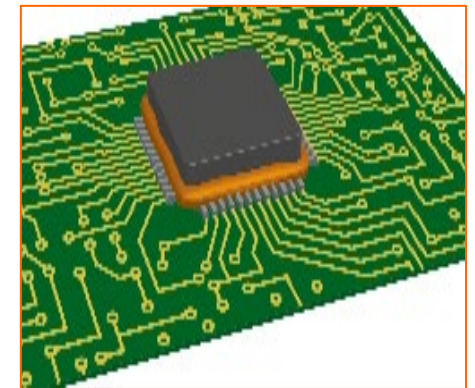
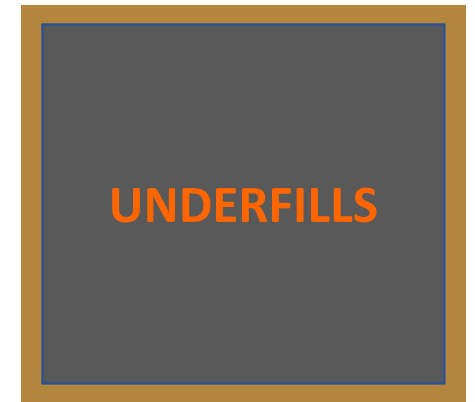
**DAM & FILL
AND
GLOB-TOP
ENCAPSULANTS**



Protavac offers DAM & FILL systems that protect sensitive components by providing resistance to thermal and environmental stress by offering materials with high Tg and low CTE properties.

GLOB-TOP materials are designed to coat and protect smaller components and provide the same resistance and environmental stress with one dispensed operation.

Product P/N	ANE 10932	ANE 10956-R	ANE 20904	ANE 20960	ANE 20970
Color	White	Cream	Black	Black	White
Chemistry	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy
Density	1,65	1.6	1.6	1.6	1.8
Viscosity (mPa.s)	25,000	10,000	20,000	6,000	7,000
Tg (°C)	150	125	50	165	150
CTE (ppm/°C)	25	25	40	17	25
Hardness (Shore D)	90	94	88	90	95
TC (W/mK)	-	-	0.7	1.0	-
Work Life	> 3 days	2 days	8 hrs	5 days	1 day
Cure Schedule	3 min @ 150°C	10 min @ 150°C	4 hrs @ 80°C	20 sec @ 150°C	30 min @ 150°C
Storage	6 months @ -40°C	6 months @ -20°C	3 months @ -20°C	3 months @ -20°C	3 months @ -20°C



Protavic offers UNDERFILLS designed to flow (capillarity) under flip chip dies and provide protection against shocks, drops, and vibrations. These insulating materials, with low thermal expansion, improves the reliability of the solder joints during thermal stress.

Product P/N	PNE 20274	PNE 26150	PNE 47207 (597)	PTE 47016	PTE 47850	Mereco 1650	Metacast 401
Color	Black	Black	Black	Black	Black	Translucent	Amber
Chemistry	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy
Density	1.8	1.7	1.8	1.7	2.0	1.1	1.1
Viscosity (mPa.s)	7,500	25,000	140,000	35,000	6,500	350 - 272,000	700
Tg (°C)	175	120	33	110	85	(-34)	-
CTE (ppm/°C)	20	25	65	29	42	225	60
Hardness (Shore D)	90	80	75	90	80	60 (A)	75
Work Life	24 hrs	24 hrs	90 min	4 hr	1 hr	3 hrs	45 min
Cure Schedule	30 min 125°C + 4 hrs @ 160°C	60 min @ 100°	90 min @ 65°C	30 min @ 125°C	30 min @ 65°C	10 min @ 150°C	1 hr @ 125°C

ENCAPSULANTS AND POTTING MATERIALS (EPOXY)



Protavic offers liquid insulating ENCAPSULANTS and POTTING MATERIALS designed to protect printed circuits and electronic components from harsh environments (moisture/humidity, dust, chemicals) and against shock/vibration. Various chemistries (epoxy, silicones, urethanes, hybrids, cyanate ester) are available. Silicone and Cyanate Ester resins provide additional thermal conductive protection.

Product P/N	PNA 90311	PNC 20014	PNS 56226-1	PTS 46303-5	PTS 46324	PTS 56227	Mereco XLN 589
Color	Colorless	Yellow	Clear	Black	Gray	White	Gray
Chemistry	Acrylic	Cyan. Ester	Silicone	Silicone	Silicone	Silicone	Silicone
Density	1.1	1.7	1.0	2.2	-	1.8	2.1
Viscosity (mPa.s)	250	120,000	600	13,000	12,000	2,500	10,000
Tg (°C)	-	265	(-64°C)	(-64°C)	(-64°C)	(-64°C)	-
CTE (ppm/°C)	160	22	55	250	55	18	39
Hardness (Shore D)	60	96	25 (A)	35 (A)	-	50 (A)	85 (A)
Work Life	3 mos	24 hrs	10 min	4 hrs	45 min	7 min	4 hrs
Cure Schedule	30 sec @ 120 mW/cm ²	30 min 150°C + 30 min 190°C	5 min @ 100°C	1 hr @ 85°C	30 min @ 100°C	15 min @ 25°C	4 hrs @ 65°C
Storage	3 mos @ 25°C	6 mos @ -20°C	1 yr @ 25°C	6 mos @ 25°C	6 mos @ 25°C	1 yr @ 25°C	1 yr @ 25°C

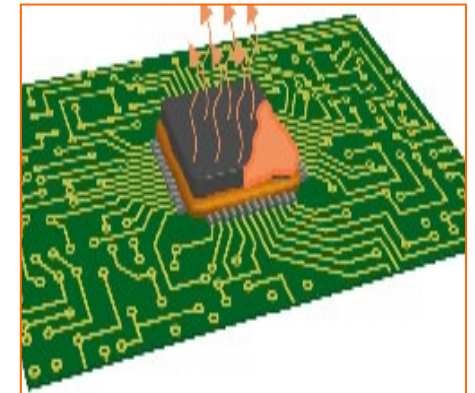
**ENCAPSULANTS
AND
POTTING
MATERIALS
(ACRYLIC, SILICONE
CYANATE ESTER)**



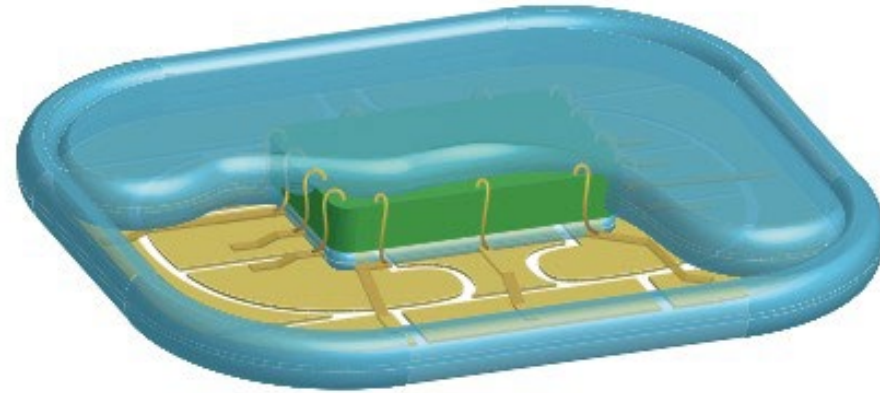
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Product P/N	ATE 10120	ATE 46439	PTE 30001	PTM 60331	PTS 46500 Series	PTS 80001	Mereco 809
Chemistry	Epoxy	Epoxy	Epoxy	Polyimide	Silicone (Gap Fill)	Silicone	Epoxy
Density (g/cm ³)	1.6	1.8	2.8	1.7	3	3.2	1.0
Viscosity (mPa.s)	10,000	8,000	70,000	10,000	50K - 500K	70,000	10,000
Tg (°C)	75	-	180	-	-	0	52
CTE (ppm/°C)	55	-	15	-	-	40	39
Hardness (Shore D)	-	85	94	80	55 (00)	85	90
TC (W/mK)	1.0	3.0	3.0	1.5	2.5 - 7.0	4.0	1.2
Work Life	1 mo	4 hrs	8 hrs	16 hrs	1 hr	24 hrs	90 mins
Cure Schedule	90 min @ 75°C	1 hr @ 100°C	1 hr @ 150°C	1 hr 150°C + 1 hr @ 275°C	24 hr @ 25°C	48 hrs @ 40°C	2 hrs @ 65°C
Storage	1 yr @ -20°C	6 mos @ 25°C	6 mos @ 25°C	6 mos @ 25°C	6 mos @ 25°C	6 mos @ -20°C	1 yr @ 25°C

THERMAL DISSIPATION MATERIALS



Protavac offers THERMALLY CONDUCTIVE ADHESIVES and POTTING RESINS to dissipate heat away from critical components and assemblies. These Thermal Interface Materials (TIM) allows heat to move away from power devices and helps to avoid creating hot spots leading to product failure. Multiple chemistries (Epoxy, Silicone, Polyimide) are available for a wide range of thermal applications.

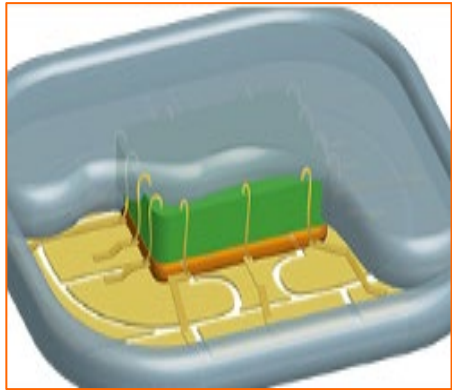


SMART CARDS and RFID MATERIALS

Groundbreaking technologies developed and used on millions of cards every day for banking, telecommunication, and identification.

Product P/N	ANE 10713	ANE 10714	ANE 10716	ANE 10717	ANE 30100	ATE 10130
Color	colorless	Blue	Opaque	Beige	Black	White
Chemistry	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy
Density	1.1	1.1	1.1	1.3	1.2	1.4
Viscosity (mPa.s)	9,000	11,000	11,000	11,000	7,000	12,000
Tg (°C)	110°C	110°C	92	-	110°C	75°C
CTE (ppm/°C)	95	95	67	-	55	55
Hardness (Shore D)	86	86	80	90	-	-
Work Life	1 month	1 month	-	-	1 week	5 days
Cure Schedule	1 min @ 150°C	40 sec @ 150°C	40 sec @ 150°C	40 sec @ 150°C	60 min @ 120°C	90 min @ 75°C
Storage	6 mos @ 5°C	6 mos @ 5°C	6 mos @ 5°C	6 mos @ 5°C	6 mos @ -20°C	1 year @ -20°C

**SMART CARD
DIE ATTACH
ADHESIVES**



Protavic offers a range of DIE ATTACH ADHESIVES to accommodate the high volume of smart card and RFID markets. These adhesives are compatible with the traditional wire-bonding micro-connector method and the newer reverse “flip-chip” assembly method.

Product P/N	PNE 90593	PNE 90293	PNE 90300	PNE 90301	PNE 30270	PNE 30273
Application	Dam	Fill	Dam	Fill	Glob Top	Glob Top
Color	White	White	White	White	Black	Black
Chemistry	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy	Epoxy
Density	1.4	1	1.4	1.5	1.7	1.8
Viscosity (mPa.s)	17,000	2,700	16,000	2,600	70,000	9,000
Tg (°C)	60	60	24	50	150	165
CTE (ppm/°C)	115	115	140	100	20	20
Hardness (Shore D)	82	82	55	80	85	88
Work Life	5 days	5 days	-	-	5 days	24 hrs
Cure Schedule	30 sec @ 120 mW/cm ²	30 sec @ 120 mW/cm ²	30 sec @ 120 mW/cm ² UV A	30 sec @ 120 mW/cm ² UV A	35 min @ 120°C + 1h @ 150°C	10 min @ 150°C
Storage	6 mos @ 25°C	6 mos @ 25°C	6 mos @ 5°C	6 mos @ 5°C	3 mos @ 20°C	1 yr @ -40°C

**SMART CARDS
DAM & FILL
and
GLOB TOPS**



Protavic offers DAM & FILL and GLOB-TOP options for protecting smart card micromodules. UV curing allows for faster processing in high volume manufacturing. Thermal curing allows lower coefficients of thermal expansion (CTE) and higher glass transition temperatures (Tg). Materials are designed to provide resistance to thermal and environmental stress

Product P/N	BCE 20250	BCE 37611	VCO 20200	PNU 90252
Color	Silver	Silver	Silver	-
Chemistry	Epoxy	Epoxy	-	Urethane
Density	2.0	2.3	2.1	-
Viscosity (mPa.s)	13,500	7,000	8,500	5,000
Electrical resistance (mΩ.cm)	0.5	0.3	0.1	N/A
Open time	1 mo	1 day	24 hrs	2 days
Cure Schedule	4 min @ 200°C	2 min @ 120°C	60 min @ 130°C	10 sec @ 120 mW/cm ²
Storage	1 yr @ -20°C	1 yr @ -20°C	1 year @ 25°C	6 mos @ 25°C

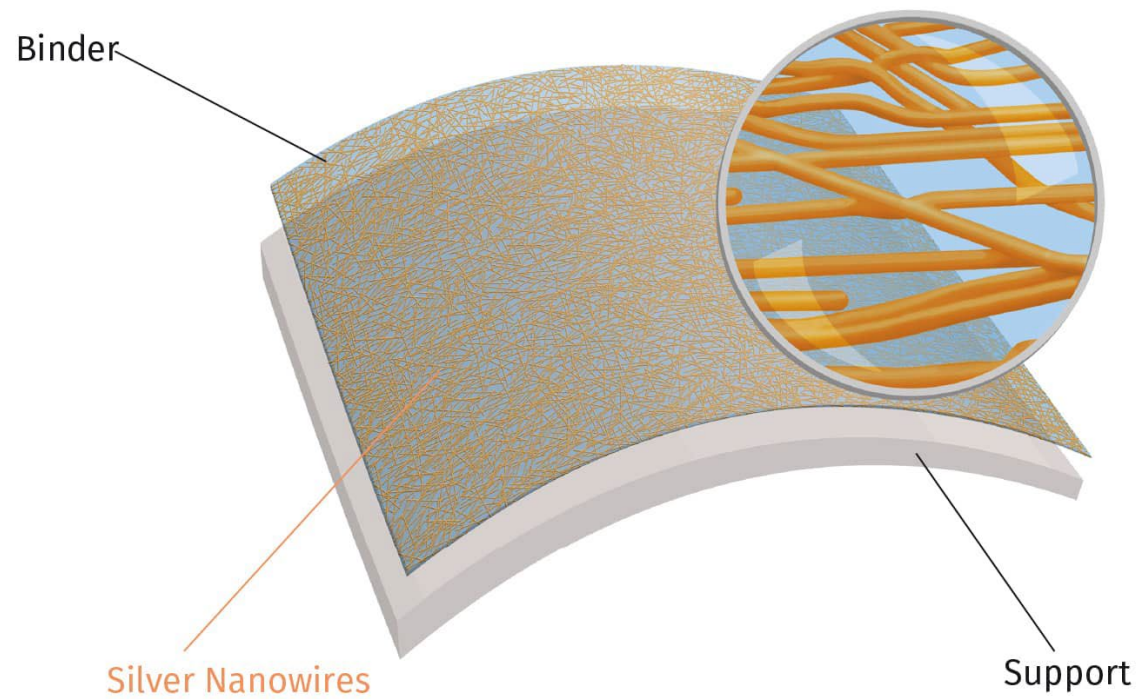
**SMART CARDS
CONDUCTIVE
&
DIELECTRIC
INKS**



Protaviv offers CONDUCTIVE INKS, applied by screen printing, spraying, or bar-coating, provide low temperature curing, flexibility, and electrical conductivity to be suitable for various substrates (paper, PET, PVC. Combined with printable DIELECTRIC INKS to provide cross-overs and multilayer RFID links, tracks or antennas.

Protaviv - Silver Nanowires

With binder

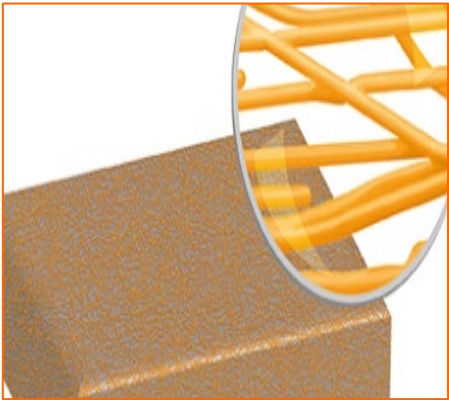


SILVER NANOWIRES MATERIALS

Creating the possibility of printing large surfaces that provide flexibility without compromising transparency or conductivity.

Product P/N	28202	28205	28206	28207	28208
Color	Silver	Silver	Silver	Silver	Silver
Chemistry	Dispersion	Dispersion	Dispersion	Dispersion	Dispersion
Viscosity (mPa.s)	2	2	1	5	2
Load (%)	3	3	5	12	12
Particle diameter (nm)	70	115	70	70	70
Particle length (µm)	10	4	10	10	10
Shape Ratio (l/d)	140	35	140	140	140
Solvent	IPA	IPA	Water	IPA	IPA and Water
Storage	1 yr @ 25°C	1 yr @ 25°C	1 yr @ 25°C	1 yr @ 25°C	3 mos @ 25°C

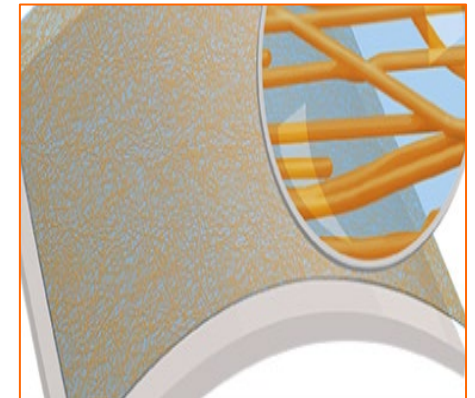
**SILVER
NANOWIRE
DISPERSION
FORMULATION**



Protavac offers Silver Nanowire in DISPERSION FORMULATIONS (aqueous, solvent based) concentrated suspensions. These materials support and meet the demands of new expanding markets including photovoltaic cells, flexible displays, electromagnetic shielding, and heating surfaces by replacing traditional transparent conductive materials.

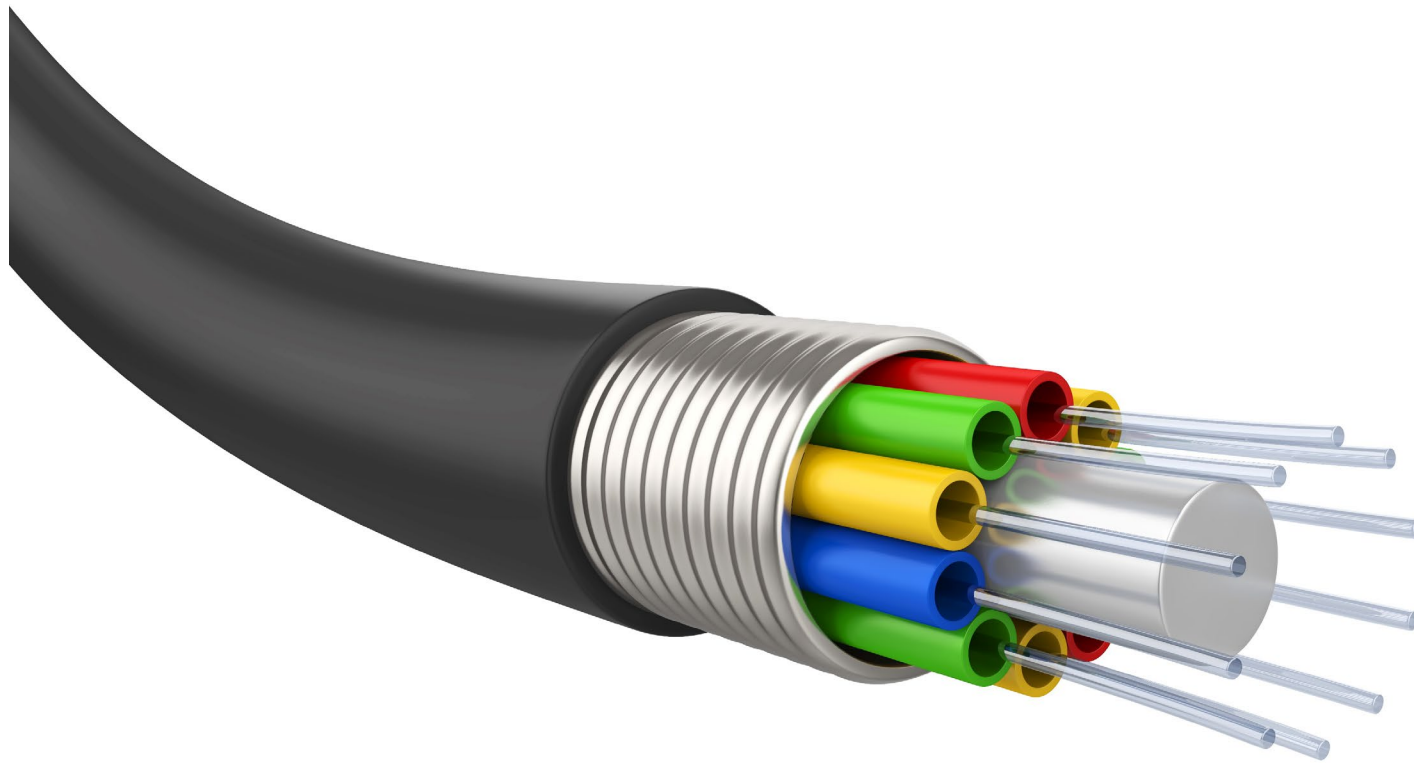
Product Name P/N	VCO 20260	VCO 20261	EXP 06335 MOD 10
Color	Silver	Silver	Silver
Viscosity (mPa.s)	100	100	300
Electrical resistance (mΩ.cm)	200	200	65
Load %	0.2	1.2	-
Particle diameter (nm)	70	70	-
Particle length (μm)	10	10	-
Shape ratio (l/d)	140	140	-
Cure Schedule	30 min @ 150°C	30 min @ 150°C	15 min @ 150°C
Storage	1 year @ 25°C	1 year @ 25°C	6 mos @ 25°C

**SILVER
NANOWIRE
COATING
and INK**



Protavic offers Silver Nanowire system for COATING and INK. Employing the knowledge of silver nanowire technology, materials are formulated with a binder to provide a clear conductive layer in a single application.

Another product for coating applications required for magnetic shielding is EXP-06335 MOD 10. Designed as a one component low viscosity; heat curing, silver-filled silicone coating specifically formulated for spray applications.

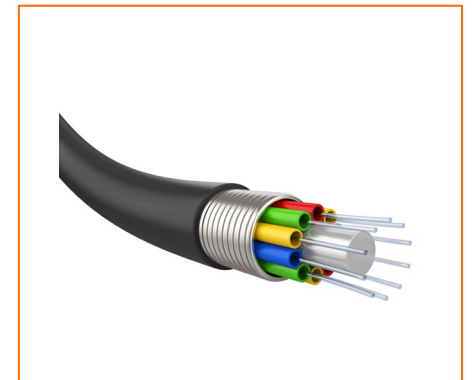


TELECOMMUNICATION MATERIALS

Encapsulation, adhesives, coatings and repair tools for traditional coax protection and repair in the Fiber Optic market.

Product P/N	URB7400	URB144C75	URB6200	URC7400
Color	Opaque Black	Opaque Black	Opaque Black	Light Yellow
Chemistry	Urethane	Urethane	Urethane	Urethane
Viscosity @ 25°C (77.0°F)	750 ± 100 cps	650 cps	450 ± 50cps	725 ± 50cps
Shore (A) (D) Hardness @ 10 sec dwell time	(A) 50 ± 5	(D) 82 ± 10	(D) 60 ± 5	(A) 50 ± 5
Gel Time @ 25°C (77.0°F)	45 sec (800 grams)	1 min 15 sec (30 grams)	2 min 35 sec (132 grams)	2 min 35 sec (195 grams)

**ELECTRONIC
POTTING
ENCAPSULATION**



Uraseal offers electronic potting and encapsulating kits especially designed for communications, electronic and fiber optic assembly kits.

Uraseal's URB kits exhibit low viscosity for easy flow and quick penetration of irregular shapes and deep potting applications.

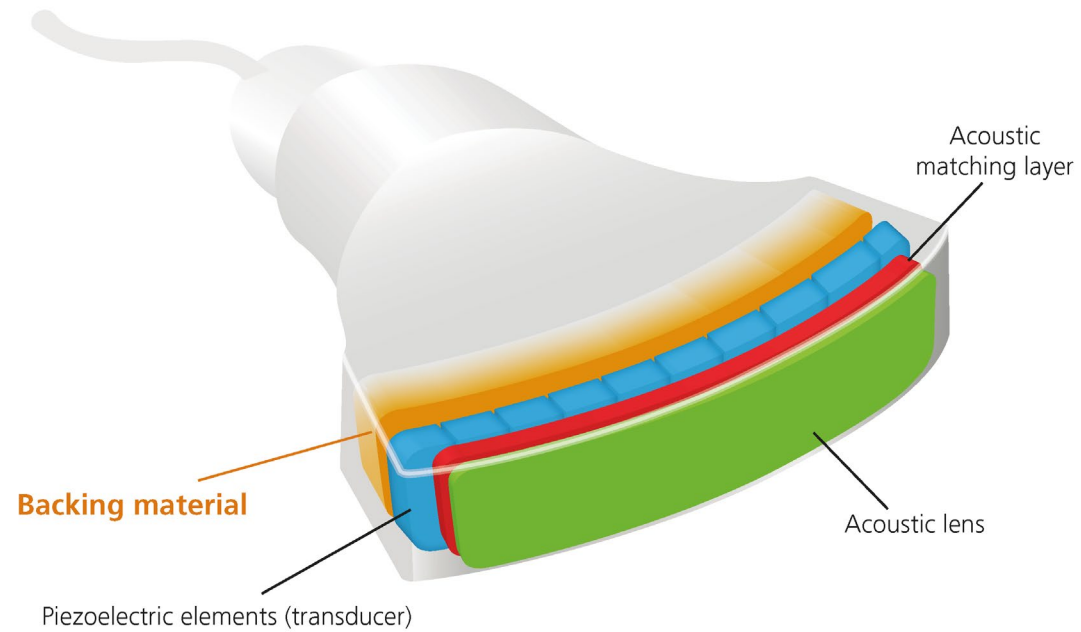
Product P/N	CK137 CK137B CK137BS	CK200 CK200B CK200BS	CK200BSV (Clamshell Closure)
Color	Amber	Amber	Amber
Chemistry	Urethane	Urethane	Urethane
Drop Wire Size (Pair)	2-3	2-6	2-6
Splice Type	Butt Splice	Butt Splice	Inline or Vertical
<p>“B kits include bonding bolt “BS” kits include bonding bolt and foam stopper for immediate burial “BSV” kits include hardware, two foam stoppers and clamshell like closure</p>			

**BURIED
SERVICE WIRE
REPAIR KITS**



Uraseal’s buried service wire splice kits are designed to quickly and permanently encapsulate buried drop wire cables. The encapsulant material is self-contained in a heavy-duty mixing tube. An exterior safety bag encloses the tube which eliminates any exposure to the field technician.

Uraseal’s buried service wire splice kits are waterproof, fully self-contained, fungus resistant and non re-enterable.



ACOUSTIC ASSEMBLY MATERIALS

For product information, call 603.623.8626

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

- Textiles
- Paints & Coatings
- **Electronics**
- Chemicals Specialties
- Paper
- Agriculture
- Food Processing
- Perfumes
- Fine Chemicals
- Water Treatment
- Biotechnologies
- Commodities





In 2001, **Protex International** had a desire to expand internationally and established **PROTAVIV AMERICA** in Londonderry, New Hampshire. With a dedicated research lab and production facility, it serves the American market, in addition to providing materials around the world. The portfolio includes epoxy, silicone, acrylic, polyurethane, polyimide, cyanate ester, bismaleimide, and hybrid chemistries. These chemistries are used to develop, formulate and produced Adhesives, Encapsulants, Coatings, and Sealants supplied to specialty electronic assembly applications.



MERECO TECHNOLOGIES, founded in 1960, is a globally recognized manufacturer of highly specialized adhesive materials for use in advanced technology applications. The portfolio includes epoxy, urethane, and silicone chemistries. This group was acquired in 2014, to extend Protaviv America's reach into new markets including acoustics materials used in ultrasound medical imaging, battery materials used in electric vehicles, and toughen materials used in the oil and gas industry.



URASEAL CORPORATION began operations over 30 years ago as a manufacturer that specializes in the development and production of materials and components to a variety of industries where superior connection protection is a value-added benefit. Today, Uraseal provides the highest quality and most cost-effective solutions for sealing small diameter cable connections. Some of the many markets Uraseal serves are: Telecommunications, Electrical, Mining, Electronic Assembly, as well as OEMs.