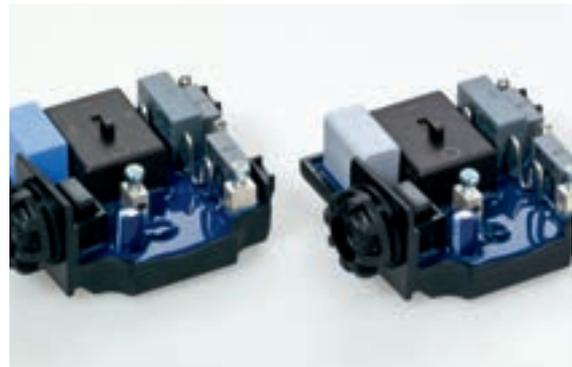
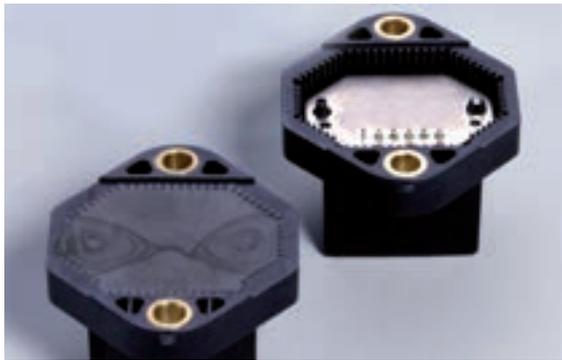


Encapsulation / Potting

For High Performance



Polyurethane and Polybutadiene 2 part systems: BECTRON® PU 45.. and BECTRON® PB 35.. family is comprised of 2 component Polyurethanes covering a clear, high transparency resin and several filled resins. A range of viscosity, hardness and thermal resistance characteristics are available with some qualified for UL94 -V0.

Polybutadiene containing resin of the BECTRON® PB 35.. range give additional flexibility which persists at very low temperatures to withstand severe thermal cycling.

Polyurethane 1 part systems: The one component formulation of BECTRON® PK.. is ready to use with no issues of mixing ratio or pot life and offers reliable performance with potentially good environmental properties.

The resin system offers a range of viscosities with rapid heat cure to form a solid with one of 4 different hardness levels.

Silicone 2 part systems: BECTRON® SK75.. Silicones with Cross Linkers SH79.. provide 2 component systems with either addition and condensation chemistry and the advantage of very high thermal resistance in a clear or filled material. They offer a choice of viscosities from transparent gels to filled elastic silicone rubber with high thermal conductivity and UL94 V0. These offer ideal protection for delicate electronic components.

Epoxy 2 part system: BECTRON® EP 55.. family with Hardeners EH59.. form 2-part epoxy systems which cure to form elastic epoxy plastic. BECTRON® EP55.. is a solvent-less resin with fillers and reacts with a modified aliphatic amine. The resin compound cures with low volume shrinkage and heat evolution to give a stress-free resin. The high elasticity ensures very favourable temperature cycling between -40 °C and +125 °C.

BECTRON® Encapsulation / Potting Resin

BECTRON® Encapsulation / Potting resins when cured display high elasticity and strength producing excellent temperature cycling behaviour within the range of -50 °C to +200 °C as well as resistance to vibrations. This ensures no crazing even in thick layered applications. Furthermore all have good adhesion to almost all materials used in electronics.

- Zero VOC / 100 % solids
- Resistant to temperature cycling from -50 to +200 °C / 20.000 h
- Low glass transition temperature
- Vibration damping, high elasticity
- No exotherm during curing
- Minimal shrinkage

BECTRON® PU-Series 2 Component Polyurethanes, filled

Product Code	Viscosity [mPas]	UL 94	Max Temp. [°C/20.000 h]	Hardness [Shore]	Pot Life [mins]	Cure [h] @ +25 °C	Cure [min] @ +90 °C	Thermal Conductivity [W/mK]
PU 4512	900	No	+110 °C	70 A	40	24	60	0.15
PU 4513	750	No	+115 °C	75 A	50	24	75	0.36
PU 4515	4,500	No	+150 °C	80 A	15	8	30	0.15
PU 4516	310	No	+125 °C	50 D	55	16	60	0.20
PU 4519	2,500	No	+125 °C	75 A	50	24	75	0.36
PU 4520	750	No	+125 °C	75 A	55	24	75	0.36
PU 4522	1,800	V0	+125 °C	85 A	20	8	30	0.48
PU 4526	1,900	V0	+130 °C	55 D	25	14	50	0.45
PU 4527	11,000	No	+125 °C	40 D	10	36	90	0.58
PU 4537	1,600	V0	+130 °C	64 D	30	24	120	0.74
PU 4539	4,000	V0	+130 °C	56 A	40	24	40	0.70

BECTRON® SK-Series 2 Component Silicones, filled

Product Code	Viscosity [mPas]	UL 94	Max Temp. [°C/20.000 h]	Hardness [Shore]	Pot Life [mins]	Cure [h] @ +25 °C	Cure [min] @ +90 °C	Thermal Conductivity [W/mK]
SK 7501/SH 7931	3,800	V0	+200 °C	68 A	20	24	–	0.37
SK 7502/SH 7931	2,650	HB	+180 °C	50 A	45	24	–	0.30
SK 7505/SH 7931 N	7,500	V0	+200 °C	75 A	20	6	–	0.42
SK 7563/SH 7962	3,500	V0	+180 °C	55 A	30	4	–	0.30
SK 7566/SH 7964/6	4,700	V0	+180 °C	25 A	60	4	–	0.55
SK 7567/SH 7965	1,100	V0	+180 °C	25 A	60	4	–	0.30
SK 7568/SH 7967	12,750	V0	+180 °C	< 2	60	48	60	1.08
SK 7569/SH 7968	4,250	V0	+200 °C	50 A	60	24	120	0.60
SK 7570/SH 7969	67,000	V0	+200 °C	40 A	85	24	30	0.15
SK 7571/SH 7970	2,000	V0	+200 °C	40 A	60	24	–	0.45
SK 7572/SH 7971	3,200	V0	+200 °C	40 A	60	24	–	0.52

ELANTAS Europe GmbH

Thin Film Coatings

For high performance



BECTRON® Thin Film Coatings are suitable for many process methods including select coat, spray, dip and selective flooding. Examples of applications include PCBs for the automotive and marine navigation industries, PCBs for industrial electronics, hybrid circuits, SMD assemblies and other discrete electronic components.

Air Drying Resistant Coating

BECTRON® PL4122 BLF is a lead-free coating range based on urethane-alkyd varnish for conformal coating of printed circuit boards (PCBs) and hybrid circuits. BECTRON® PL4122 BLF products are free of aromatic solvents and meet the latest performance characteristics for electronics, including low pin corrosion and fast curing at oven and room temperature. Conveyor oven systems permit very short cure times, below 10 minutes.

Rapid Process Acrylic Coatings

BECTRON® PL1102 and PL1104 air dried coating requires 15 minutes at +25 °C to give a good film for moisture and general protection for PCBs and related applications.

Waterborne Conformal Coating

BECTRON® PL6100 is a modified alkyd coating with rapid heat curing or overnight air dry curing provides the performance of solvent borne coatings but with no VOC.

Silicone

BECTRON® SC7575 is a VOC free silicone coating with high thermal performance, very fast curing at +90 °C possible.

BECTRON® SC7576 is a VOC free silicone conformal coating for thin layer applications, applied by cross-cut nozzle, airless spray system.

Thin Film Coatings

BECTRON® Thin Film Coatings provide optimal protection to electronic assemblies against moisture, chemicals, mechanical stress, dust, contaminants, corrosive gases and other impurities. Cured film properties include:

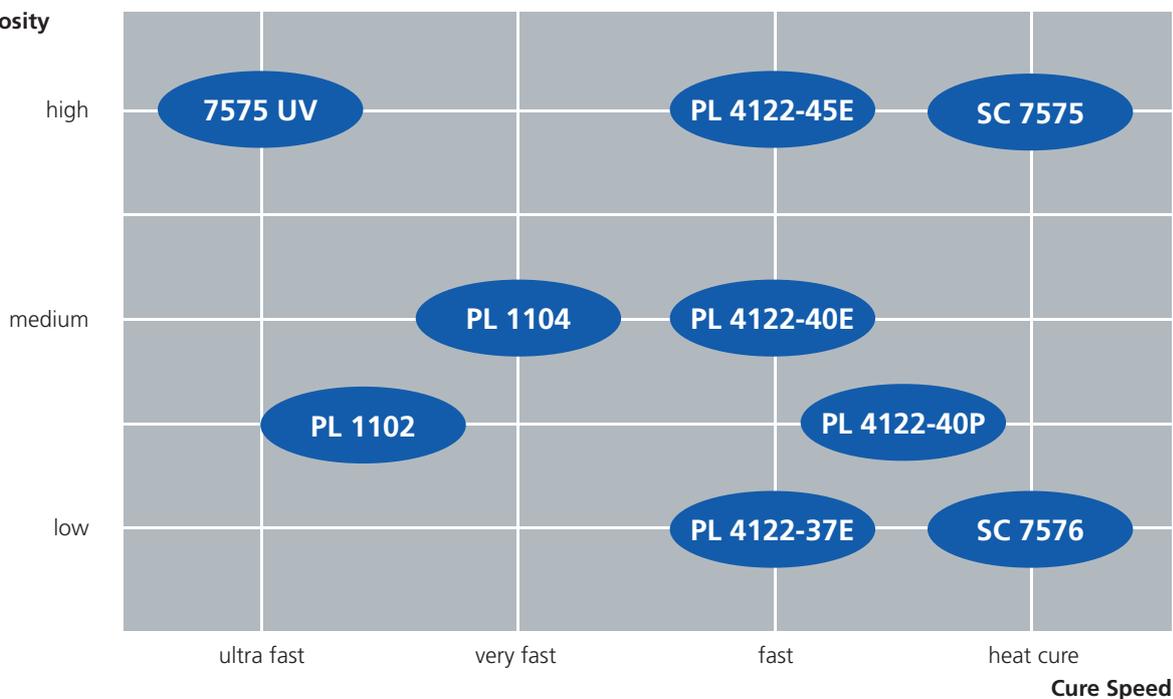
- High temperature index (up to +200 °C @ 20.000 h)
- Excellent thin film dielectrics
- Protection against several environmental influences
- Very good chemical resistance
- Excellent PCB adhesion withstanding several temperature cycles of -40 to +180 °C

BECTRON® PL 1104, PL 4122 Series, SC 7575

Product Code	Chemical Base	Colour	UL 94	Max Temp. [°C @ 20.000 h]	Cure Speed [h @ +25 °C]	Cure Speed [min @ +80 °C]
PL 1102	Acrylic	Transparent	V0	+120 °C	8	–
PL 1104	Acrylic	Transparent	V0	+120 °C	12	10
PL 4122-37 E	PUR	Transparent	V0	+134 °C	16	30
PL 4122-40 E	PUR	Transparent	V0	+134 °C	16	30
PL 4122-45 E	PUR	Transparent	V0	+134 °C	16	30
PL 4122-40 P	PUR	Transparent	V0	+134 °C	24	45
SC 7575/SC 7576	Silicone	Transparent	V0	+200 °C	–	30
SC 7575 UV	Silicone	Transparent	V0	+200 °C	10 s (UV)	30

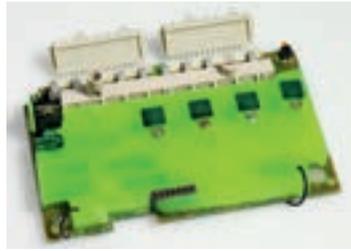
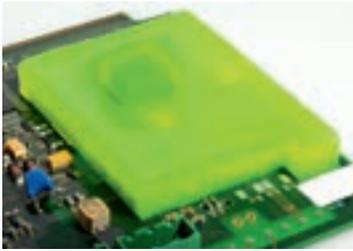
Thin Film Coatings BECTRON®

Viscosity



Melting Resins

For high performance



Optimal protection for extreme demands

BECTRON® MR 34.. series is a set of thick film coating melting resins developed for rapid and simple protection of electronics. The material is based on modified polyolefin and is solvent-free with zero VOC. These offer better moisture resistance and adhesion than standard hot melt materials based on polyamide chemistry.

BECTRON® MR 34.. series forms a soft and flexible group operating over the temperature range -40 °C to 125 °C.

The electrical insulation properties are excellent with very good adhesion to many substrates. Strong chemical resistance protects against acids, alkalis and polar solvents and also fungal growth, but not to aliphatic and aromatic and chlorinated hydrocarbons

Application of thermoplastic resins is particularly easy with a melting resin pistol, heated dispensing or monofilament system. With the monofilament system it is possible to reach thickness of approx. 200–400 µm. The removal of melting resin for repair or re-work is also very simple. Above 150 °C the melting resin is ready for use. On cooling to +105 °C it hardens to a solid. It is ideally suited to high volume production lines with very short process time.

Viscosities in the range 520 mPas to 9.250 mPas are available to suit more requirements.

BECTRON® MR34.. series has very good electrical properties particularly suitable for a wide range of electronic elements. It provides protection against moisture, corrosion, vibration and migration. Many uses are possible, from securing of individual components to the protection of hybrids and whole assemblies.

Melting Resins for high performance

BECTRON® MR 34 series is a one-component melting resin thick film coating developed for electronic application. It is based on polyolefin resin chemistry which is better suited to electronics than conventional polyamide based hot-melt thermoplastic:

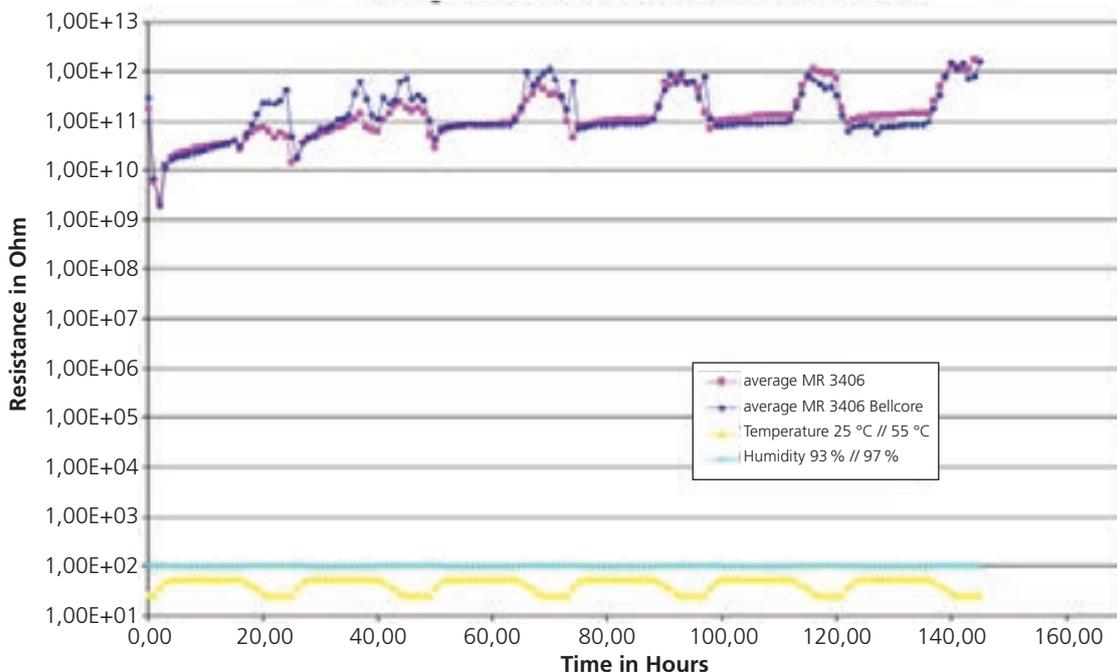
- One component / “Ready to use”
- Zero VOC / 100 % solids
- Environmentally friendly / non-hazardous classification
- Ideal dielectric properties for electronic applications as well as protection against humidity
- Very low water absorption
- Very good adhesion on PCB's
- Possible to reach thick film thicknesses of 200 µm to 400 µm as well as for potting applications

BECTRON® MR series (Polyolefine, Thick-Film, Melting Resin, Potting)

Product Code	Viscosity [mPas]	Colour	Max. operation temperature	Microshore A	Softening point
MR 3402	9,250 @ 190 °C	yellow	125°C	11	130 °C
MR 3404	1,100 @ 180 °C	yellow	105°C	15	107 °C
MR 3406	520 @ 180 °C	yellow	125°C	15	138 °C

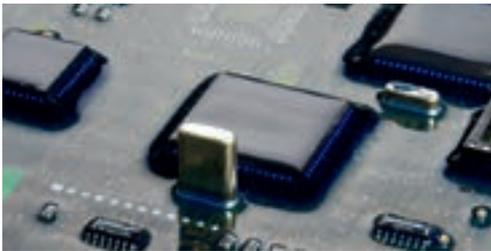
SIR testing of BECTRON®-MR 34

SIR Test according to IEC 60068-2-30 Db (25–55 °C/93–97 % rel. Humidity)
Average results BECTRON® MR 3406 on IPC B 25 A boards



Thick Film Coating – Moisture / UV cure

For high performance



Optimal Protection for extreme Demands

BECTRON® PT 46.. UV & moisture cure is a solvent-free, zero VOC, one-component polyurethane based thick film coating, cured by UV irradiation and/or by moisture. It provides an ideal VOC-free conformal coating with very short process time. For easy process control, the colour changes from blue to green/yellow to indicate the degree of UV-curing. BECTRON® PT 4600 is qualified according to UL 94 V-O (File-No. E211569).

UV cure is rapid, within seconds and moisture cure follows naturally for 2–3 days and can be accelerated by heat and humidity.

The cured product shows very good temperature cycling behaviour from -40 °C to +120 °C and good adhesion on most substrates. It is strong enough to form a support to secure large components, acting as an adhesive.

The viscosity is low, suitable for rapid automated robotic coating with a choice of application systems such as spraying, dispensing or jetting with reliable edge-covering of sensitive components.

BECTRON® PT 48.. series one-component moisture-cured polyurethane based thick film coatings are used for protecting and mechanically supporting connections and components of PCBs and hybrids. The whole range has low VOC contribution. The cured product is elastic over the range -50 °C to 120 °C with good adhesion to most substrates to resist vibration.

BECTRON® PT 48.. series is resistant to solvents and dilute acids and alkalis providing excellent protection against moisture migration and corrosion after severe wet storage conditions.

PT 48.. series offers the reliable dielectric properties expected from all BECTRON® products.

3 different viscosity levels, from 1,400 mPas to a viscous thixotropic grade, permit a wide range of applications and processes. BECTRON® PT 48.. cures at room temperature to a dry surface condition in 1–2 hours and further processing is possible a few hours later.

Thick Film UV cure Coatings

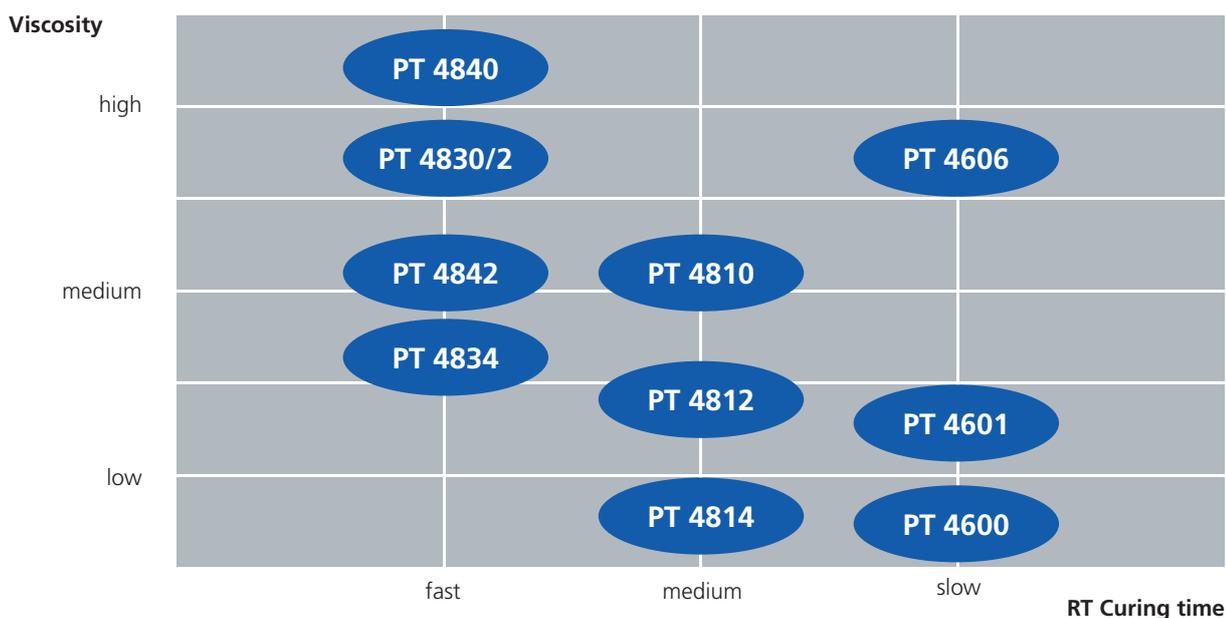
BECTRON® PT 4yxx is a urethane-acrylate UV and/or moisture cured coating. BECTRON® Thick Film Coatings provide optimal protection to electronic assemblies against moisture, chemicals, mechanical stress, dust, contaminants, corrosive gases and other impurities. Cured film properties include:

- Solvent Free, zero VOC
- Low temperatures to -50 °C
- Very good chemical resistance
- Excellent PCB adhesion withstanding several temperature cycles of -40 to +120 °C
- Protection against several environmental influences

BECTRON® PT urethane-acrylate UV & moisture cured coating

Product Code	Product Viscosity [mPas]	Chemical Base	Max Temp. [°C/20.000 h]	Hardness [Shore]	UV Cure	Touch dry [h @ +25 °C]
PT 4600	1,000	PUR	120 °C	65 A	Yes	0
PT 4601	1,700	PUR	120 °C	65 A	Yes	0
PT 4606	46,000	PUR	120 °C	75 A	Yes	0
PT 4810	3,500	PUR	100 °C	45 A	No	5
PT 4812	2,600	PUR	100 °C	40 A	No	5
PT 4814	1,400	PUR	100 °C	45 A	No	5
PT 4830	50,000	PUR	100 °C	45 A	No	4
PT 4832	50,000	PUR	100 °C	45 A	No	4
PT 4834	3,200	PUR	100 °C	45 A	No	4
PT 4840	125,000	PUR	120 °C	42 A	No	4
PT 4842	3,700	PUR	120 °C	45 A	No	4

BECTRON® PT-Series (Thick-Film, 1 component, RT curing)



Thick Film Coating – Thermal Cure

For high performance

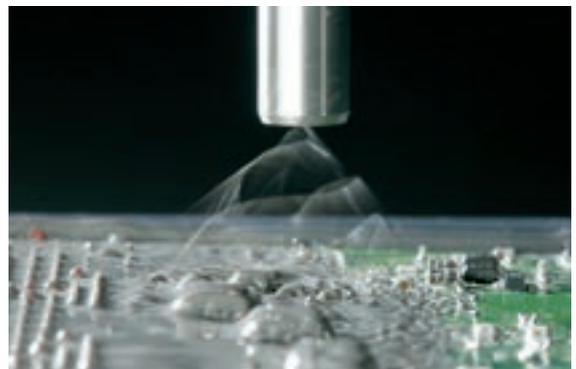


Optimal Protection for extreme demands

BECTRON® PK.. series is a one-component resin system which cures to form a thermoset plastic. The resin comprises special technology in a pre-mixed resin and hardener system which offers a range of viscosities which cure rapidly at +90 °C or Infra Red radiation to form solids with one of four different hardness levels.

As a 1 component product BECTRON® PK.. is ready to use avoiding issues of mixing ratios or pot life of 2 component systems but with no compromise on the excellent properties and, particularly, an environmentally friendly formulation.

Coatings of the PK resin series are used in the low viscosity version for select or swirl coating of PCBs or hybrids giving excellent edge covering under the coating layer. The high viscosity, thixotropic grades can be used for encapsulation of small components on the PCB. A combination of thixotropic and low viscosity grades allows Dam + Fill application “wet on wet” to achieve a thicker film needing only one curing cycle, which may be completed in only a few minutes under Infra Red irradiation.



Thick Film Coating – Thermal Cure

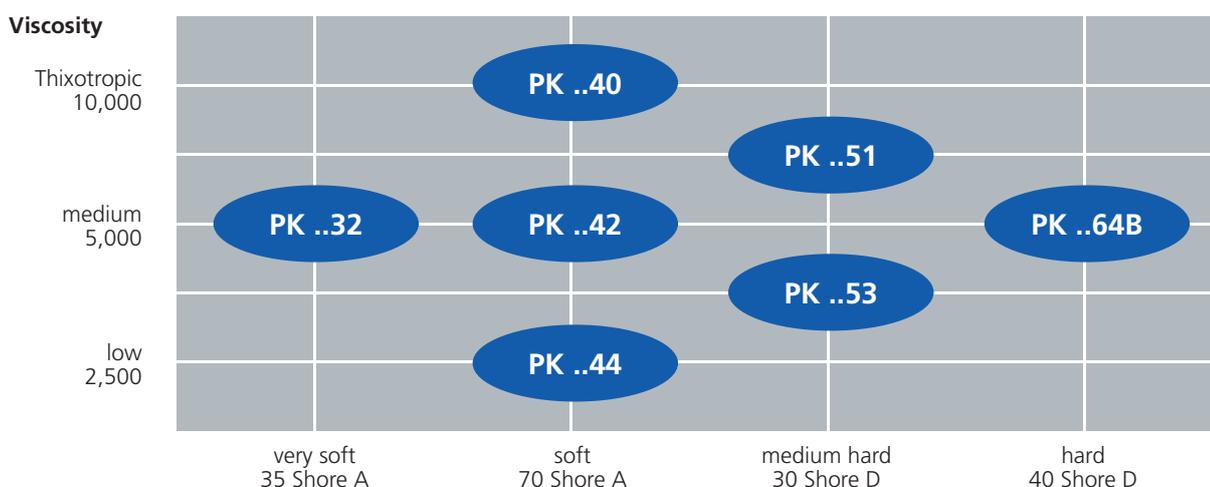
BECTRON® Thick Film Coatings of the PK series when cured display high elasticity and strength producing excellent temperature cycling behaviour within the range of -50 to +125 °C as well as resistance to vibration. This ensures no crazing even in thick film layered applications. The curing generates no heat (no exotherm) and minimal shrinkage poses no risk to sensitive components. Furthermore BECTRON® PK series has good adhesion to almost all materials used in electronics.

- One component / “Ready to use”
- Zero VOC / 100 % solids
- Environmentally friendly / non-hazardous classification
- Resistant to temperature cycling from -50 to +125 °C
- Glass transition temperature Tg < -60 °C
- Resistant to the usual car fluids

BECTRON® PK-Series (1 Component, heat-curing)

Product Code	Colour	Viscosity [mPas]	Max Temp. [°C/20.000 h]	Hardness [Shore]	Cure Speed [min] @ +90 °C	Thermal Conductivity [W/mK]
PK 4332	Black	5,250	+125 °C	35 A	60	0.2
PK 4340	Black	9,500	+125 °C	70 A	30	0.3
PK 4342	Black	5,000	+125 °C	70 A	30	0.3
PK 4344	Black	2,000	+125 °C	70 A	30	0.3
PK 4351	Black	6,250	+125 °C	30 D	30	0.3
PK 4353	Black	3,750	+125 °C	30 D	30	0.3
PK 4364B	Blue	5,000	+125 °C	40 D	30	0.3
PK 5532	Black	5,500	+130 °C	35 A	30	0.2
PK 5542	Black	5,000	+130 °C	70 A	30	0.4
PK 5553	Black	3,500	+130 °C	30 D	30	0.3

Thick Film Coatings BECTRON® PK ..xx-Matrix



BECTRON[®] for Automotive

For highest electronic performance

Thin Film Coating

- lead free, no aromatics
- fast curing
- good temperature cycling
- UL-listing 94 V0

Thick Film Coating

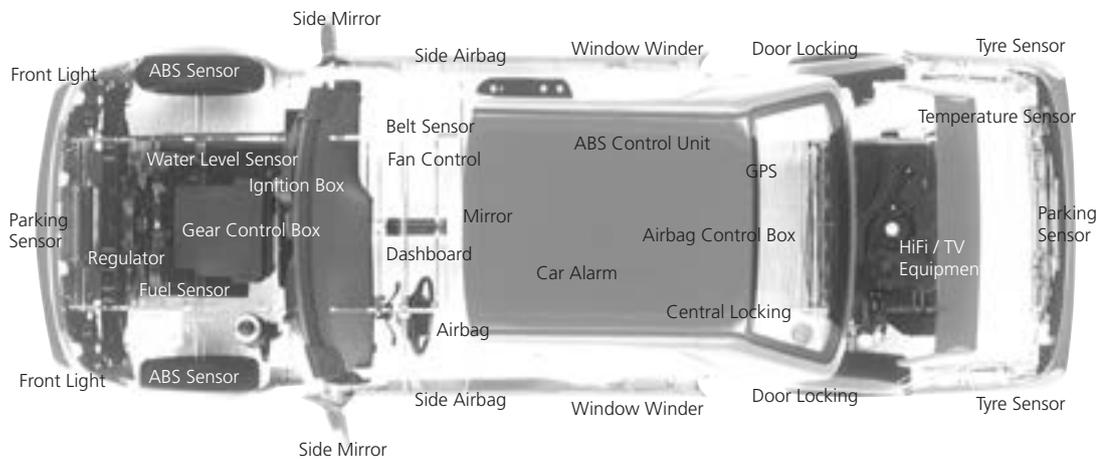
- zero VOC / 100 % solids
- easy processing
- good edge covering
- high operation temperature

Encapsulation / Potting

- from highly flexible to rigid
- transparent or filled
- one and two component
- very good adhesion

BECTRON[®] Coatings meet all requirements of modern automotive electronic industry

- Thermal Resistance
- Temperature Cycling
- Heat / High Humidity
- Mechanical Shock
- Corrosion Test
- Humidity Cycling
- Chemical Resistance
- Salt Spray
- Vibration



Conformal Coating Comparison Guide

Properties	ALKYD	EPOXY	POLY-URETHANE	ACRYLIC	SILICONE
Protection against moisture	1	1	1	2	2
Protection against solvents	1	1	1	4	2
Protection against aggressive media	1	1	1	4	2
Mechanical strength	1	1	2	3	2
Temperature resistance	2	2	3	4	1
Adhesion to unwashed PCB	2	2	1	4	2
Temperature cycle range (°C)	2	2	2	3	1
Volume resistivity	1	1	1	1	1
Environmentally friendly	Yes	Yes	Yes	No	No
UL 94 V-O	Yes	Yes (possible)	Yes	Yes	Yes

Rating: 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor

Standard testing @ ELANTAS Europe

Environmental conditions	Testconditions	Testmethod
Damp heat constant T: +85 °C humidity: 85 %	+85 °C ±2 °C at humidity = 85 % ±2 % duration time > 168 h	IPC-TM-650 2.6.3.3 (Flux) IPC-SM-840C; Class T
Damp heat, alternating temperature test cycles T: +25 to +55 °C humidity: 95 %	Environmental chamber +25 °C to +55 °C ±2 °C humidity 93 % ^{+2%} _{-3%} exposure time 9 h at +55 °C number of cycles (24 h) = 9 time of temperature changing 3 h	IEC 60068-2-30 GS 95003-4 VW 801 01 IPC-CC-830B
Alternating temperature test -40 °C to +120 °C	-40 °C to +120 °C at ±2 °C exposure time 30/45 min. no. of cycles = 100, (500 typ); (3000) time of temperature changing < 10 sec.	IEC 60068-2-14 GS 95003-4 VW 801 01 IPC-TM-650 2.6.7.1 IPC-CC-830B

Transparent Potting Resins and Gels



Soft Elastic Transparent Gels

Application of silicone gel is particularly easy with a standard 2K application equipment, dispensing or monofilament system. The removal of silicone gel for repair or re-work is also very simple. It is ideally suited to high volume production lines with very short process time. Viscosities in the range 200 mPas to 5.000 mPas are available to suit more requirements.

BECTRON® SG 75xx series are available as a “flexible and non-sticky” gel, as well as a “soft-elastic” or “soft elastic sticky” gel and as well as a “soft and sticky” or “soft and non-sticky” gel over the temperature range -50°C to 206°C. The electrical insulation properties are excellent with good adhesion to many substrates.

BECTRON® SG 75xx series has very good electrical properties particularly suitable for a wide range of electronic elements. It provides protection against moisture, corrosion, vibration and migration. Many uses are possible, from securing of individual components like cable joint boxes to the protection of IGBT's.

Transparent Resins UV Stable form Soft to Hard

BECTRON® PU 453x series in combination with hardener BECTRON® PH 4901 are 2 component systems which cures to form a resilient but flexible transparent polyurethane. All are solvent free systems with no bleeding characteristic even at high temperature exposure.

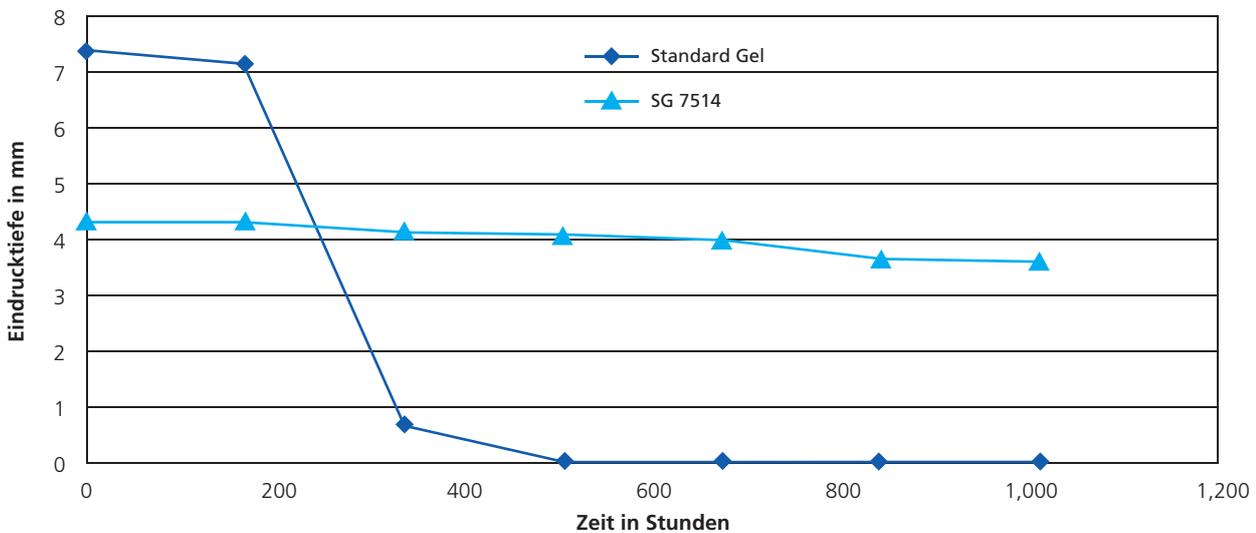
BECTRON® PU 453x series are designed for situations where visibility of the potted material is required, such as optoelectronics and sensor technology. All systems are non-yellowing in daylight They can also be used as a clear resin for automotive displays or LED modules where high UV stability is needed..



BECTRON® SG 75xx Silicone Gels

Product Code	Viscosity [mPas]	Max. operation temperature	Hardness [penetration]	Pot Life
SG 7510	2,100	+200 °C	flexible 4–8 mm	1–5 min@100 °C
SG 7511	350	+200 °C	flexible 4–8 mm	1–5 min@100 °C
SG 7512	700	+180 °C	flexible 4 mm	1–5 min@23 °C
SG 7514	1,000	+180 °C	6–9 mm	2–5 min@120 °C

Constant hardness of BECTRON® SG 75xx



BECTRON® Transparent Potting Materials

Product Code	Chemical Base	Viscosity [mPas]	Colour	Max. operation temperature	Hardness [Shore]	potlife@23 °C
SK 7504 SH 7963	Silicone	3,000	Transparent clear	+180 °C	< A20	120 min
PU 4532 PH 4901	PU	700	Transparent clear	+120 °C	D50	25 min
PU 4533 PH 4901	PU	800	Transparent clear	+120 °C	A35	35 min
PU 4535 PH 4901	PU	800	Transparent clear	+120 °C	A60	35 min
PU 4501 PH 4901	PU	800	Transparent clear	+90 °C	A35	35 min
PU 4528 PH 4915	PU	4,000	Transparent yellow	+120 °C	A20	25 min
PB 3201 PH 4918	PBD	7,000	Transparent yellow	+100 °C	A70	30 min