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ELECTRICALLY CONDUCTIVE COMPOUNDS

TDS 871214

ELECTRICALLY CONDUCTIVE COMPOUNDS

Basic conductive adhesives and coatings for industrial requirements.

SILVER FILLED:

Resin portion	8401-1A	8505-1A	8709-12A	8709-10
Hardener portion	8401-1B	8505-1B	50-12B	---
Vehicle type	epoxy	epoxy	epoxy	acrylic
Filler	silver	silver	silver	silver
Color	gray	gray	gray	gray
Solids, % by weight	81.5	100	87.5	44.9
Metal % of vehicle	95.7	75	80.6	82.4
Viscosity	low	paste	medium	medium
Ratios: A/B by weight	100/5	100/2.6	100/2.5	---
Pot life, minutes	3000	45	60	---
Cure or drying @ 22-30°C, hrs	>=24	>=24	>=24	>=12
Optional cure @ 50-100°C, hrs	0.5-3	0.5-3	0.5-3	---
Ohms/square	<=0.01	<=0.01	<=0.01	<=0.01
Max operating temp.	120°C	120°C	110°C	80°C

NICKEL FILLED:

Resin portion	8709-18A	8709-8A	8709-7
Hardener portion	50-12B	50-12B	---
Vehicle type	epoxy	epoxy	acrylic
Filler	nickel	nickel	nickel
Color	gray	gray	gray
Solids, % by weight	98.0	88.4	50.9
Metal % of vehicle	76.5	77.8	82.5
Viscosity	paste	high	low
Ratios: A/B by weight	100/2.6	100/2.4	---
Pot life, minutes	400	45	---
Cure or drying @ 22-30°C, hrs	>=24	>=24	>=12
Optional cure @ 50-100°C, hrs	0.5-3	0.5-3	---
Ohms/square	<=0.6	<=0.7	<=0.7
Max operating temp.	90°C	110°C	80°C

TDS 871214

CARBON FILLED:

Resin portion	8201-14A	8201-14A	8509-1A	8509-2A	8509-3A
Hardener portion	8201-14B	50-12B	8509-1B	8509-1B	8509-3B
Vehicle type	epoxy	epoxy	epoxy	epoxy	epoxy
Filler	carbon	carbon	carbon	carbon	carbon
Color	black	black	black	black	black
Solids, % by weight	100	100	100	100	100
Carbon % of vehicle	69	64	7.2	7.2	6.1
Viscosity	paste	paste	high	high	high
Ratios: A/B by weight	100/50	100/4.6	100/50	100/50	100/50
Pot life, minutes	200	40	120	120	120
Cure @ 22-30°C, hrs	>=24	>=24	>=24	>=24	>=24
Optional cure @ 50-100°C, hrs	0.5-3	0.5-3	0.5-3	0.5-3	0.5-3
Ohms/square (M=1000)	<=0.01	<=0.5	<=400M	<=200M	<=300M
Max operating temp.	60°C	90°C	50°C	50°C	50°C
Resin portion	8509-4A	8602-2A	8709-2A	8709-3A	8709-5A
Hardener portion	8509-4B	8602-2B	8709-2B	8709-3B	8709-5B
Vehicle type	epoxy	epoxy	epoxy	epoxy	epoxy
Filler	carbon	carbon	carbon	carbon	carbon
Color	black	black	black	black	black
Solids, % by weight	100	100	79	77	68
Carbon % of vehicle	6.8	4.4	15	20	25
Viscosity	high	paste	high	high	high
Ratios: A/B by weight	100/50	100/40	100/40	100/40	100/40
Pot life, minutes	120	400	800	800	800
Cure @ 22-30°C, hrs	>=24	>=24	>=24	>=24	>=24
Optional cure @ 50-100°C, hrs	0.5-3	0.5-3	0.5-3	0.5-3	0.5-3
Ohms/square (M=1000)	<=300M	<=6000M	<=200M	<=100M	<=10M
Max operating temp.	50°C	60°C	70°C	70°C	70°C

TDS 871214

ABOCOAT 8401-1 A/B: Conventional highly-filled coating to produce conductive paths with the highest silver content possible. Requires strict controls. Resistivity may rise to 0.1 ohm/sq under unfavorable mixing, application and atmospheric conditions.

ABOWELD 8505-1 A/B: Probably the best solventless silver-epoxy adhesive and resurfacer on the market. High rigidity, chemical and heat resistance. Superb adhesion to most rigid materials.

ABOCOAT 8709-12/ABOCURE 50-12: versatile silver-epoxy high-solids coating with superb conductive and adhesive properties. Most successful conductive compounds for most electronic uses.

ABOCOAT 8709-10: high-grade silver-acrylic 1-component coating that needs no A/B mixing. Excellent where the epoxy adhesion and thermochemical properties are not needed.

ABOWELD 8709-18/ABOCURE 50-12: Practically solventless nickel-epoxy adhesive and resurfacing system with good coating capabilities in the intermediate conductivity range. Very versatile.

ABOCOAT 8709-8/ABOCURE 50-12: Versatile nickel-epoxy conductive coating.

ABOCOAT 8709-7: Easy-to-use nickel-acrylic conductive coating.

ABOWELD 8201-14 with ABOCURE 8201-14 or 50-12: The most conductive carbon-epoxy pastes we know. The 8201-14 A/B system is easier to use and more conductive. ABOWELD 8201-14/ABOCURE 50-12 is preferred where higher heat and chemical resistance are more important.

As the size of the conductive particles is relatively coarse, these two products are used primarily as thick adhesives and conductive pastes rather than thin and smooth coatings.

8509-1 A/B, 8509-2A/8509-1B, 8509-3 A/B, 8509-4 A/B, 8602-2 A/B are solventless carbon-epoxy systems used as adhesives and silk-screening materials with anti-static and other lower-conductivity requirements.

ABOCOAT 8709-2 A/B, ABOCOAT 8709-3 A/B, ABOCOAT 8709-5 A/B: High-solids carbon-epoxy coatings with various conductivity ranges widely used in silk-screening.

CHARACTERISTICS

ELECTRICAL CONDUCTIVITY requires strict control of factors like: degree and type of dispersion by mixing, ambient moisture, initial temperature, curing or drying temperature, coating thickness, rate of evaporation of eventual volatiles, speed of curing or drying, surface preparation and other factors typical of the application in question.

VOLATILES: some products contain volatile organic solvents, as common with coatings. Such compounds must be applied in layers thin enough to allow solvent evaporation. Thicker layers would entrap the solvent under the surface and thus yield poor results.

MAXIMUM OPERATING TEMPERATURE in many cases is much higher than recorded above, depending on the configuration, operating conditions and other factors.

EPOXY COMPOUNDS harden by resin/hardener (A/B) reaction rather than "drying". Their use follows the procedures common to epoxy resins. They are described in our general epoxy instructions. Solventless epoxies can be employed in virtually any thickness and as adhesives without "open time" between non-porous surfaces.

ACRYLIC COMPOUNDS do not offer the superior adhesive, chemical and thermal resistance of epoxies, but they can be used straight from the can, since they need no A/B mixing.

TDS 871214

APPLICATION

EPOXY COMPOUNDS:

SURFACE PREPARATION: Clean surfaces by washing, sandblasting or other suitable means. Remove loose matter.

MIXING before removing from the container is critical, must be thorough and reproducible, for even different mixing speeds may cause different conductivities. Mixing the A/B components is also critical.

RATIOS: Precise weighing of the A/B components is essential. Ratios are critical and mixing must be thorough. Metric scales and calculations should be used.

POT LIFE is the time the A/B blend remains workable, before hardening, in the mixing container. As the hardening generates heat, which in turn accelerates the reaction, bulky masses harden much faster (as they retain the reaction heat) than small masses or thin layers from which the heat dissipates.

HARDENING, CURE. The epoxy hardening process is chemical, not "drying". Hardening may last from the pot life to over 10 times as long (the thinner the layer, the slower). Heating accelerates the process. At 180°F (82°C), for instance, hardening can occur within a few minutes, or even faster at higher temperatures.

CURE (completion of the reaction and full development of all properties) continues for several days at room temperature, or hours with heat. Heat-cure is unnecessary in normal circumstances, but it imparts optimum properties.

Cold retards hardening and curing. Under 50°F (10°C) the reaction is too slow and requires special accelerated formulations.

VISCOSITY is reduced by heat and increased by cold. Thus, a warmer resin and/or surface offers better adhesion because of better flow and wetting.

Clean all equipment immediately after use with a suitable solvent, like ABOSOLV.

ACRYLIC COMPOUNDS:

SURFACE PREPARATION, MIXING before removing from the container, general maintenance and safety rules are the same as with epoxies, except some details explained in the pertinent Material Safety Data Sheets.

As the acrylics are "dried", instead of "cured", all that is needed is the completion of the solvent evaporation upon application. This happens in the same manner as with most solvent-based coatings.

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ALTERNATIVES

As we are among the most experienced epoxy formulators in the USA, we offer many customized variations of the products described herein, for higher thermal, chemical and other requirements, as well as the widest range of epoxies for electrical, structural and marine purposes.

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SAFETY

All safety requirements described in the Safety Material Data Sheets are to be used in addition and accordance to federal, state and local rules. Although the above products don't present any great toxicity problems, all precautions should be observed dealing with hazardous materials, toxic vapors from organic materials, proper ventilation in enclosed areas, self-contained respirators where ventilation is not possible, protective/disposable clothing, gloves, goggles and protection against eventual dust.

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The above information is only a general guide resulting from laboratory and field tests that may not apply to the user's conditions. No guarantee is offered, as applications are beyond our control. The user is urged to test and adapt the above data in his own conditions and environment previous to product adoption. Specifications may be subject to state-of-the-art changes.