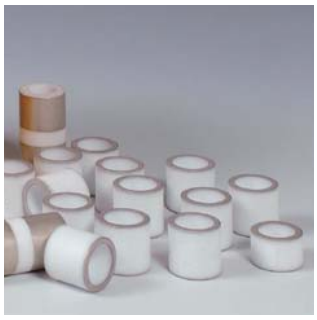
AREMCO

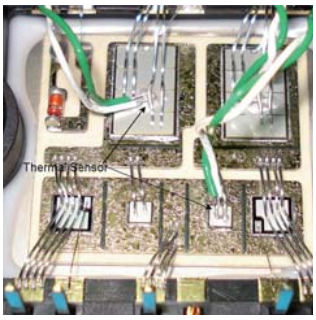
ELECTRICALLY & THERMALLY CONDUCTIVE MATERIALS

Technical Bulletin A8

Aremco offers a broad line of electrically and thermally conductive materials which provide solutions to a variety of electrical, electronic and thermal design problems throughout industry.



Pyro-Duct™ 597-C metallizes ceramic tubes.



Aremco-Bond™ 556-HT-SP used to bond thermal sensor.

PRODUCT HIGHLIGHTS

Conductive Adhesives & Coatings

525	Silver-Filled, One-Part Paste, 340 °F.
556	Silver-Filled, Two-Part Paste, 340 °F.
556-LV	Silver-Filled, Two-Part, Low Viscosity, 340 °F.
556-HT-SP	Silver-Filled, Screen Printable, Two-Part Paste, 570 °F.
556-HT-HC	Silver-Filled, Highly Conductive, Two-Part Paste, 480 °F.
597-A	Silver-Filled, One-Part Adhesive, 1700 °F.
597-C	Silver-Filled, One-Part Coating, 1700 °F.
598-A	Nickel-Filled, One-Part Adhesive, 1000 °F.
598-C	Nickel-Filled, One-Part Coating, 1000 °F.
614	Nickel-Filled, Two-Part Paste, 360 °F.
616	Silver-Filled, Two-Part Paste, 360 °F.

Resin Type	EPOXY							INORGANIC HIGH TEMP			
Product Number	**525**	**556**	**556-LV**	**556-HT-HC**	**556-HT-SP**	**614**	**616**	**597-A**	**597-C**	**598-A**	**598-C**
Filler	Silver Flake	Silver Flake	Silver Flake	Silver Flake	Silver Flake	Nickel Flake	Silver-Coated Glass	Silver Flake	Silver Flake	Nickel Flake	Nickel Flake
Particle Size, microns	< 28	< 20	< 20	< 20	< 44	< 20	< 130	< 20	< 20	< 20	< 20
No. Components	1	2	2	2	2	2	2	1	1	1	1
Mix Ratio, by Weight, resin:hardener	NA	1:1	100:4	100:2	1:1	1:1	1:1	NA	NA	NA	NA
Mixed Specific Gravity, g/cc @ 25 °C	1.85	3.2	2.9	3.1	3.1	1.8	1.53	2.3	2.0	2.8	1.5
Mixed Viscosity, cP @ 25 °C	Paste	35,000–40,000	4,000–6,000	40,000–45,000	35,000–45,000	100,000–110,000	50,000–60,000	Paste	400–800	20,000–25,000	400–600
Pot Life, 25 gms @ 25 °C	NA	1 Hr	1 Hr	48 Hrs	> 48 Hrs	¾ Hr	¾ Hr	NA	NA	NA	NA
Recommend Cure, hr/°F	2/300	2/200	2/200	2/200	1/350	2/100	2/100	2/RT + 2/200	1/RT + 0.5/480	2/RT + 2/200	2/RT + 2/200
Alternate Cure, hr/°F	6/250	24/RT	24/RT	1/250	2/300	1/200 or 8/RT	1/200 or 8/RT	—	—	—	—
Service Temperature, °F (°C)[1] **Continuous** **Intermittent**	 340 (170) 375 (190)	 340 (170) 375 (190)	 340 (170) 375 (190)	 390 (200) 480 (250)	 445 (230) 570 (300)	 360 (180) 400 (205)	 360 (180) 400 (205)	 1700 (927) —	 1700 (927) —	 1000 (538) —	 1000 (538) —
Volume Resistivity, ohm-cm	0.01	0.0009	0.0008	< 0.0001	< 0.0004	0.025	0.005	0.0002	0.0002	0.005	0.005
Tensile Shear Strength, psi[2]	2,500	1,700	1,100	1,700	1,400	2,500	1,000	—	—	—	—
Thermal Conductivity, W/m-K	1.9	2.2	2.2	2.2	3.5	0.5	0.4	9.1	9.1	2.6	2.6
Hardness, Shore D	76	72	84	90	88	78	78	—	—	—	—
Color	Silver	Silver	Silver	Silver	Silver	Dark Gray	Tan	Silver	Silver	Dark Gray	Dark Gray
Shelf Life, months	6	6	6	6	6	6	6	6	6	6	6

Reference Notes

[1] The low end of the service temperature range for all products is approximately −67 °F (−55°C).

[2] Tested according to ASTM D1002-94 at 25 °C, a method for determining the shear strength of a single lap-joint of metal substrates in tensile loading.

THERMALLY CONDUCTIVE EPOXIES

568 Aluminum Filled, Two-Part, High Strength, 400 °F.
805 Aluminum Filled, Two-Part, High Strength, 570 °F.
860 Aluminum Nitride Filled, Two-Part, 400 °F.

	Product Number	568[1]	805	860[1]
Handling & Curing	**Filler**	Aluminum	Aluminum	Aluminum Nitride
	Mix Ratio, by Weight, resin:hardener	1:1	100:12	1:1
	Mixed Specific Gravity, g/cc @ 25 °C	0.85	1.66	1.9
	Mixed Viscosity, cP @ 25 °C	Paste	11,000	40,000
	Pot Life, 100 gm mass @ 25 °C, hrs	4.00	≤ 1.0	4.00
	Recommend Cure, hr/°F	2/200	24/100 + 2/200	2/200
	Alternate Cure, hr/°F	24–48/RT	24/RT + 2/200	24–48/RT
Cured Properties	**Temperature Resistance,** °F	−85/+400	−103/+572	−85/+400
	Temperature Resistance, °C	−65/+204	−75/+300	−65/+204
	CTE, in/in/°F x 10^{-6} (°C)	33 (60)	25 (45)	19 (33)
	Thermal Conductivity, Btu-in/hr-ft^2-°F	9.0	12.5	8.5
	Tensile Shear Strength, psi^2	2,500	1,800	1,375
	Flexural Strength, psi	11,400	15,500	Not Measured
	Volume Resistivity, ohms-cm	1.0 x 10^5	1.0 x 10^5	1.0 x 10^{15}
	Dielectric Strength, volts/mil	80	50	250
	Chemical Resistance	Excellent	Good	Excellent
	Color	Gray	Gray	Gray
	Hardness, Shore D	75	87	75
	Cure Shrinkage, in/in	0.002	0.003	0.002

Aremco-Bond™ 568 bonds copper heat exchange tube to aluminum.

Aremco-Bond™ 568 bonds copper tube heater to reservoir.

Reference Notes
[1] Available as fast-set or low viscosity systems. Add "-LV" for low viscosity (eg. 568-LV) or "FS" for fast-set (eg. 568-FS).
[2] Tested according to ASTM D1002-94. This is a standard test method for determining the shear strength of single lap-joint metal coupons in tension loading.

Application Notes
Surface Preparation: All surfaces must be free of oil, grease, dirt, corrosives, oxides, paint or other foreign matter. Sand blast or abrade non-porous surfaces, or etch using Aremco's Corr-Prep™ CPR2000.

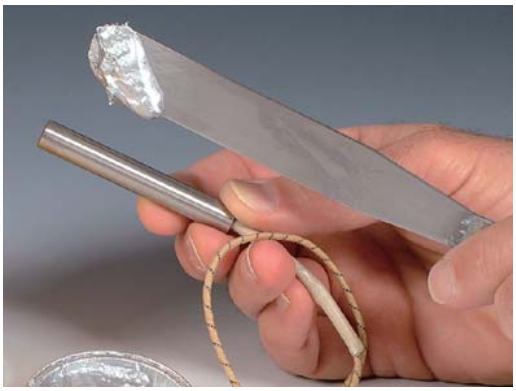
Mixing: Two component products should be mixed thoroughly prior to dispensing. For high viscosity systems each component can be preheated separately at 100–125 °F to facilitate mixing and dispensing. Aremco-Bond™ 568 is available in 50ml cartridges. Order 568-C 50ml Cartridge, 9910 6" Mixing Nozzle and 9850 Plunger or 9700 Mechanical Dispense Gun.

Application: Apply adhesive to both surfaces maintaining a glue line of less than 10 mils. Assemble parts and apply pressure to prevent warpage and reduce air entrapment. Refer to curing guidelines in above property chart.

THERMALLY CONDUCTIVE GREASES

Aremco's Heat-Away™ thermal greases are ceramic and metal-filled silicone systems which offer exceptional thermal and electrical properties to 550 °F. These materials are used in high-power electronic devices, heat pipes, and other heat exchange systems.

Product Number	637	638	639[1]	640[1]	641[1]	641-EV[2]
Filler	Alumina	Aluminum Nitride	Aluminum	Copper	Silver	Silver
Temperature Resistance, °F	−60 / +550	−60 / +550	−60 / +550	−60 / +550	−60 / +550	−60 / +550
Temperature Resistance, °C	−51 / +288	−51 / +288	−51 / +288	−51 / +288	−51 / +288	−51 / +288
Thermal Conductivity, W/m-K	0.475	2.23	3.04	4.68	5.58	5.58
Dielectric Strength, volts/mil	300	300	40	4	4	—
Volume Resistivity @RT, ohm-cm	10^{14}	10^{14}	10^4	10^3	NA	< 0.0008
Chemical Resistance	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Water Absorption	Nil	Nil	Nil	Nil	Nil	Nil
Solids, %	100	100	100	100	100	100
Specific Gravity, g/cc @ 25 °C	2.42	2.27	1.35	1.33	1.40	1.25
Color	White	Gray	Aluminum	Copper	Silver	Silver



Heat-Away™ 639 coats process heater to improve thermal contact.

Reference Notes
[1] Caution: Exposure to voltages in excess of rated maximum may cause a permanent electrical leak path.
[2] Heat-Away 641-EV is an electrically and thermally conductive grease that is rated for high vacuum systems. A vapor pressure table follows:

Temperature, °C (°F)	Vapor Pressure (Torr)
20 (68)	3×10^{-14}
50 (122)	2×10^{-12}
100 (212)	1×10^{-9}
200 (392)	2×10^{-6}

Refer to Price List for complete order information.